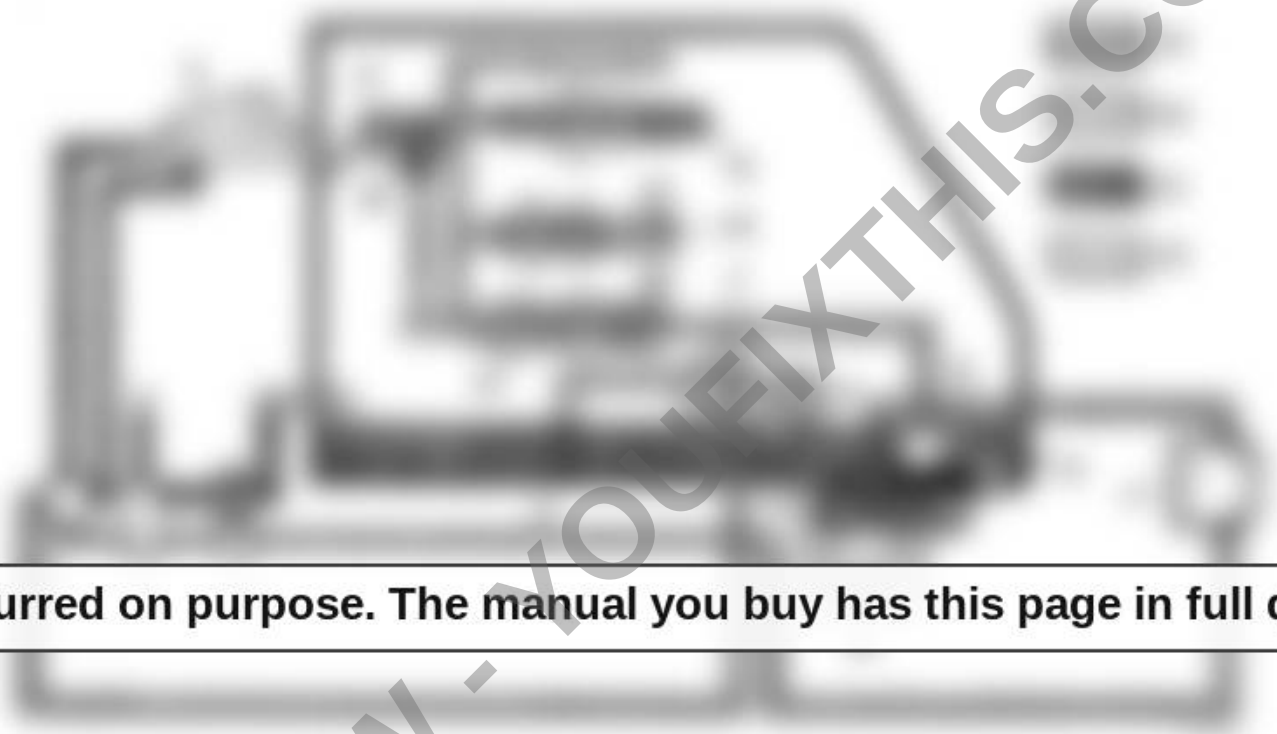
Group 5

GENERAL INFORMATION, DIAGNOSING MALFUNCTIONS, PRESSURE TESTS



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ASSEMBLY

When assembling, observe the following:

Coat the indicated faces and bores of the following parts with MOLYKOTE BR 2 grease:

The sides of the three lugs of front pressure plate 3 (fig. 4) and rear pressure plate 5, the sides of the three longitudinal flywheel grooves, the bores of base plate 7 for seating the three release pins 8 and the three operating bolts 16 as well as the bores of six bushings 9; the faces of diaphragm spring 4 contacting front and rear pressure plates; all faces of three release pins 8; the bearing surfaces of the three pivot pins 13.

The clutch assembly is balanced. Therefore, when reassembling observe the marks made during disassembly.

Install front driven disk 2 (fig. 4) in flywheel with long part of hub facing toward flywheel. Align with pilot bearing by means of centering tool No. 19.58-90.486.

To facilitate assembly, the heads of the three operating bolts should be flush against front pressure plate. For this purpose, place a suitable washer between each operating bolt and flywheel.

Place diaphragm spring 4 with cupped face on front pressure plate 3.

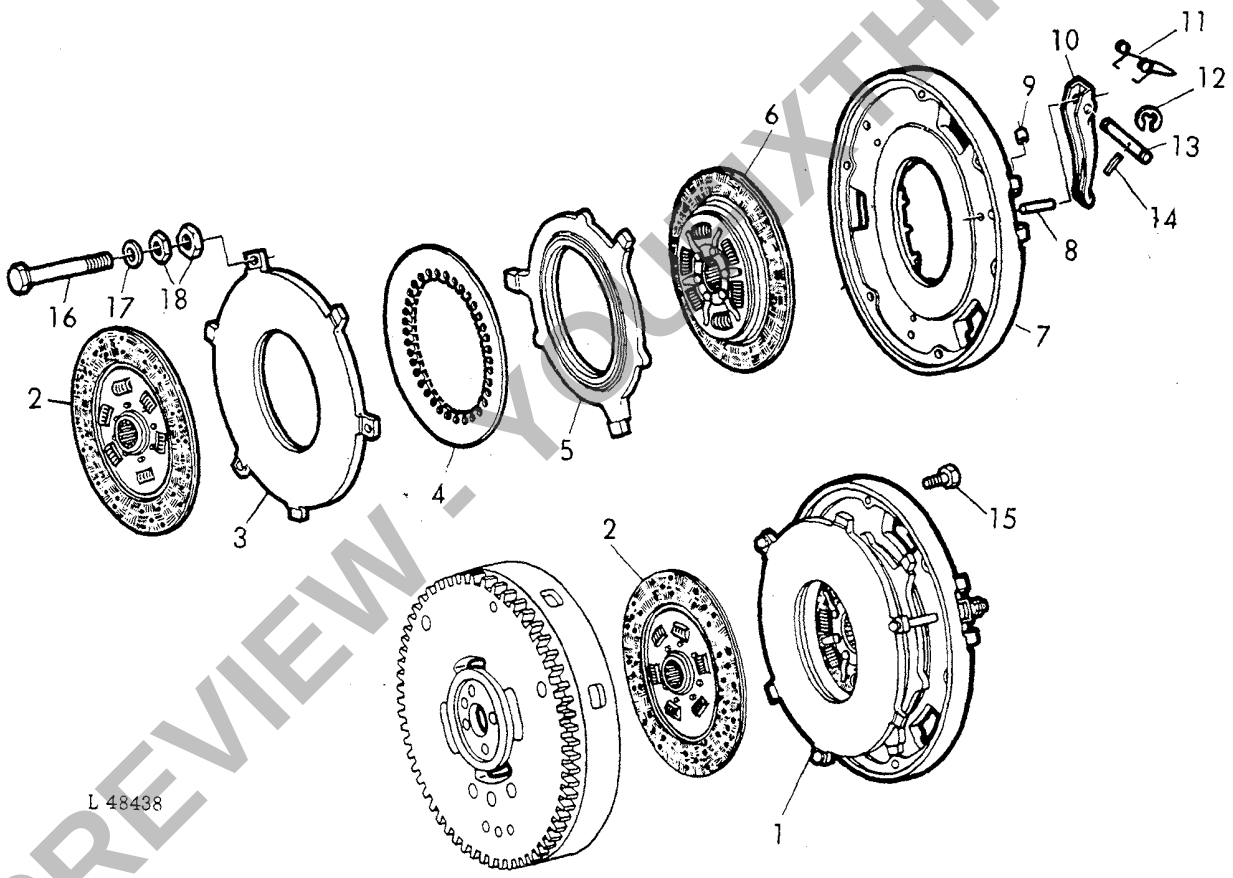


Fig. 4 — Exploded View of Engine Dual-Stage Clutch

1 Clutch assembly
2 Front driven disk (engine clutch)
3 Front pressure plate
4 Diaphragm spring
5 Rear pressure plate
6 Rear driven disk (PTO clutch)
7 Base plate
8 Release pin (3 used)
9 Bushing (6 used)
10 Release lever (3 used)
11 Loop spring (3 used)
12 Snap ring (6 used)
13 Pivot pin (3 used)
14 Spring pin (3 used)
15 Cap screw (6 used)
16 Operating bolt (3 used)
17 Spacer (3 used)
18 Hex. nut (6 used)

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Group 25
SEPARATION

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SEPARATING BETWEEN ENGINE AND TRACTOR FRONT END

REMOVAL

For safety disconnect battery cable.

Remove front end weights (if equipped).

Remove radiator and fuel tank caps. Remove radiator side grilles and hood. Install radiator and fuel tank caps. Remove side frames.

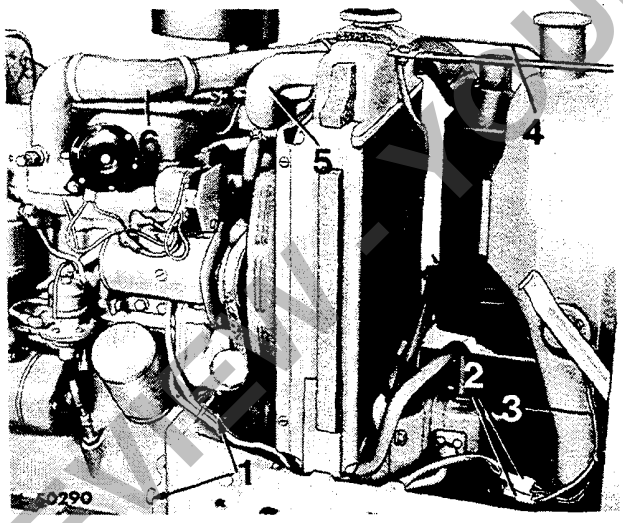


Fig. 1 — Separating between Tractor Front End and Engine

1 Cap screws
2 Distributor
3 Cable of fuel gauge sending unit
4 Fuel return line
5 Upper water hose
6 Air intake pipe

Disconnect air intake pipe 6 at intake manifold of engine.

Drain coolant and disconnect upper and lower water hose at radiator.

Close fuel shut-off valve at bottom of fuel tank.

Disconnect fuel inlet line at fuel tank and transfer pump. Remove transfer pump and fuel inlet line.

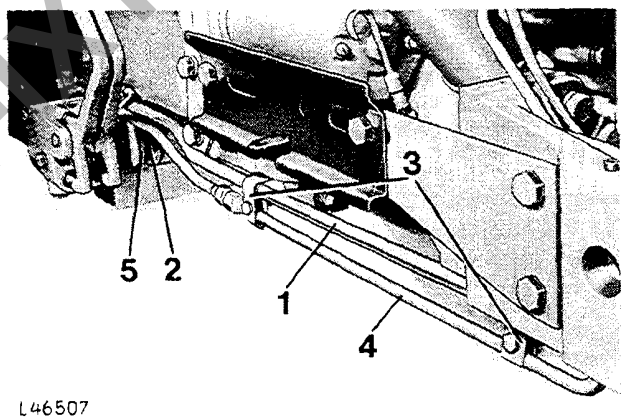


Fig. 2 — Disconnecting Hydraulic Lines on Tractors with Collar-shift Transmission

1 Suction line of hydraulik pump
2 Retainer
3 Pipe clamps
4 Pressure line of hydraulic pump
5 Cap screw

Remove pipe clamps 3 (fig. 2). Remove cap screw 5 and retainer 2 for attaching suction line 1 to front of clutch housing. Disconnect pressure line 4 at connector.

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Model 820 Tractor

(from tractor serial no. 37000)

Technical Manual

TM-4212 (June-72)

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INTRODUCTION

This technical manual for the 820 tractor is a concisely written publication for the service personnel. It contains procedures and specifications which an individual cannot be expected to remember.

The table of contents on the first page of this manual lists the individual sections and their groups. A table of contents on the first page of each section lists the groups in the section and the page number of the major subjects found in each group. Coloured tabs make it easy to locate the individual sections.

Coverage for each components includes:

General information, diagnosing malfunctions checks, removal, disassembly, repair, assembly, installation, adjustments, specifications and special tools. Specifications and special tools are always listed at the end of each group.

The section "GENERAL INFORMATION" includes instructions for "Pre-delivery, delivery and after-sales inspections" as well as "Engine and tractor tune-up" to restore full performance.

Tractor service and lubrication as well as lubricants required are described in the Operator's Manual.

Little explanation is given about theory of operation in this manual unless the theory is peculiar only to the component in this machine. Basic theory of operation and general information about the systems or components of the tractor will be found in the "JOHN DEERE Fundamentals of Service" manuals.

Keep this "Technical Manual" in the shop where it is readily accessible and refer to it whenever in doubt about correct procedures of servicing the 820 tractor. Using it as a guide for any and all service problems will reduce error and costly delay.

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Group 10

CYLINDER HEAD AND CAMSHAFT

GENERAL

The intake and exhaust valves are set in the cylinder head. The valve guides are integral with the head. The valve seats are ground directly into the cylinder head. Between each valve stem and the rocker arm is a hardened stem cap.

The camshaft is driven at half engine speed by the upper idler gear of the timing drives. It is supported by three pressure lubricated bores, integral with the cylinder block.

The camshaft has an eccentric lobe to actuate the fuel transfer pump and an axial, pressed-in lug to drive the tractormeter.

DIAGNOSING MALFUNCTIONS

For diagnosing malfunctions see group 5.
NOTE: For comprehensive and detailed repair data see "Fundamentals of Service, Engines" manual.

CYLINDER HEAD

REMOVAL

NOTE: It is not necessary to remove the engine in order to work on the cylinder head, valves and associated parts.

Immediately cover or plug holes of all removed or exposed fuel pipes with plastic caps or plugs.

Remove injection nozzles (nozzle points are protruding from cylinder head sealing face and might be damaged).

Disconnect both battery ground straps.

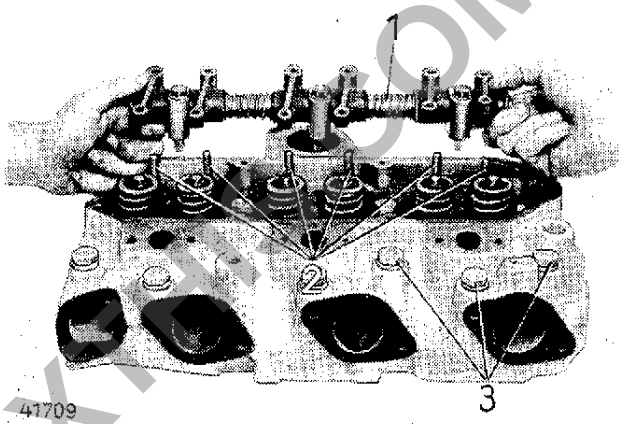


Fig. 1 - Removal of Rocker Arm Shaft Assembly

1 Rocker arm shaft
2 Push rods
3 Cylinder head cap screws

When removing, identify parts to facilitate reinstallation.

Do not turn crankshaft after removal of cylinder head, before all liners are secured with screws and washers.

REPAIR

DISASSEMBLY

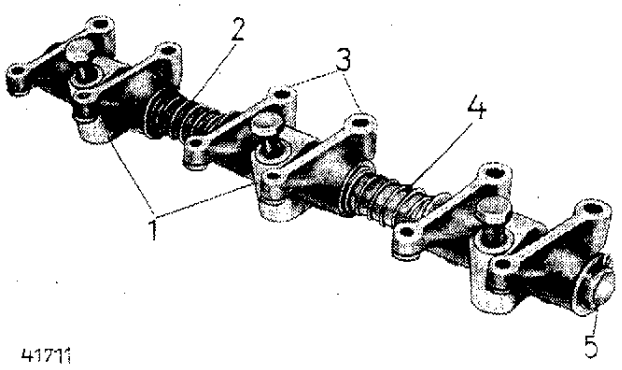


Fig. 2 - Rocker Arm Shaft Assembly

1 Rocker arm support
2 Springs
3 Rocker arms
4 Rocker arm shaft
5 Plug

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Group 30

OIL PUMP, OIL PRESSURE REGULATING VALVE AND OIL FILTER

GENERAL

LUBRICATION SYSTEM

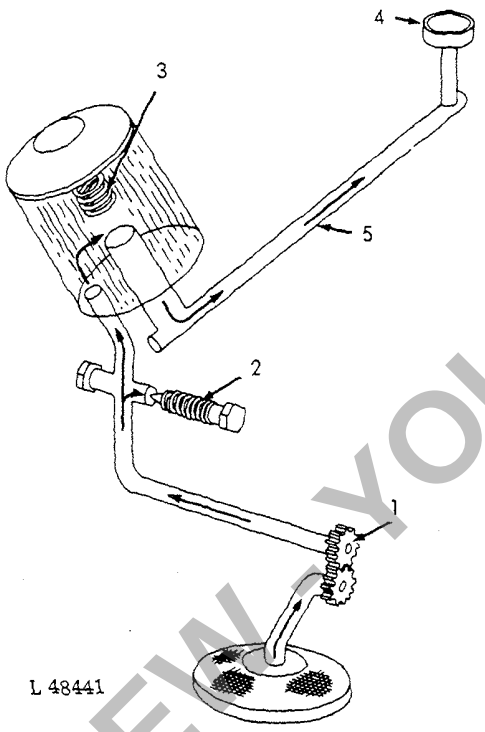


Fig. 1 — Engine Lubrication System

1 Oil pump
2 Oil pressure regulating valve
3 By-pass valve
4 Oil pressure sending unit
5 Main oil gallery

The engine has a pressure lubrication system. In the main it consists of the gear pump, filter strainer in the suction pipe, full flow oil filter, adjustable oil pressure regulating valve and the electrical oil pressure warning switch in the flywheel housing.

OIL PUMP AND OIL PRESSURE REGULATING VALVE

The pump draws the lubricating oil from the oil pan through a strainer and a suction line and pumps it through a pressure line to the oil filter and to the main oil gallery of the cylinder block. The pressure regulating valve is located at the front of the cylinder block. It is situated at the end of the gallery branching off the cylinder bore leading to the oil filter. It controls oil pressure before the oil enters the filter and it provides constant pressure in the main gallery and in the entire lubrication system.

The cone of the pressure regulating valve is pressed by a spring onto the replaceable valve seat in the cylinder block. This pressure spring is retained by means of a plug turned into the timing gear cover. The oil pressure can be adjusted by changing the number of shims between spring and plug. If oil pressure exceeds spring pressure, the cone is lifted from its seat and part of the oil may return to the oil pan via the timing case, in order to maintain constant pressure.

OIL FILTER

The lubricating oil filter is located on the right-hand side of the cylinder block. As it is of the full-flow type, oil for lubricating the points connected with the main gallery flows through the filter. The element is integral with the filter housing and for this reason the entire filter must always be replaced. When the oil filter element no longer permits sufficient oil flow, the pressure relief valve opens, allowing oil to flow through (unfiltered). Thus excessive pressure build-up is avoided and lubrication of the engine is maintained.

DIAGNOSING MALFUNCTIONS

For diagnosing malfunctions, see group 5.

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Automatic Control and Adjustment of Injection Timing

In order to facilitate the start-up of the engine and to obtain the best possible combustion and engine performance over the entire speed range, the injection pump is equipped with an automatic and hydraulically operated device for controlling the injection timing (or the start of fuel supply). The "speed advance" 16, which is preset in the factory, controls the injection timing in relation to engine speed and load. This is effected by the fuel pressure acting on the piston of the speed advance, the value of this pressure being determined by the engine speed.

When the engine is started, roll ring 28 is set for retarded injection time by the speed advance spring. With increasing speed the roll ring will be turned in the direction marked "advance". The max. value of this position ist at a certain engine speed according to the setting. The force required to turn the roll ring is exerted by the piston of the speed advance which is joined to the roll ring through joint and eccentric bolts. When the fuel pressure acting on the piston is reduced, the pre-stressed coil spring of the speed advance moves against the hydraulically caused movement. When the engine is stopped, the spring presses the roll ring back to its initial position.

Automatic Control of Fuel Required for Starting the Engine

The hydraulic control of the injection pump ensures that at the crankshaft speed produced by the starter, a larger quantity of fuel is automatically injected into each cylinder than during operation at full load.

Due to the hydraulic control over the entire load range, the max. fuel quantity which can be obtained by modulating the full cam-height of face cam 27 is not fully used when the engine is running. The slide valve cuts off the fuel supply to the injection nozzles before the maximum is reached.

At the crankshaft speed produced by the starter the control circuit pump produces a comparatively low pressure. The control spring of the slide valve is therefore subject to a smaller counterpressure than during any speed when the engine is running. The slide valve is, therefore, in a special position which it takes up automatically while the engine is being started. As a result, on the one hand, the fuel supplied into the control circuit by the control circuit pump is returned to the fuel pump pressure chamber without exerting any pressure on the slide valve. On the other hand, the slide valve closes the channel which also leads to the fuel pump pressure chamber and through which the fuel flows when it is not required for injection. Therefore, the whole stroke volume of the pump piston (high pressure circuit) corresponding to the full cam height, is used for fuel injection.

When the ignition has started and the engine is running at a speed considerably higher than starting speed, the fuel pump, as well as the control circuit pump are able to build up sufficient fuel pressure in the control circuit to compress the control spring of the slide valve and simultaneously force the slide valve into its control position. The injected fuel quantity is then reduced and regulated.

REMOVAL

NOTES

Before removing the injection pump, carefully clean all lines, the injection pump and its vicinity.

All fuel lines must be fitted to the injection pump and injection nozzles without stress. Take care not to bend the lines when removing them as this would affect their durability. Remove all fuel pressure lines before disassembling the injection pump.

When a BOSCH distributor pump is not installed in the tractor, the return spring keeps the pump piston in the bottom dead center position (BDC). When an injection pump is removed with the crankshaft in any position, the pump piston moves into its lowest position and the drive shaft into the corresponding position. As the pump can only be installed in the bottom dead center position, rotate the crankshaft, before removing the injection pump, until piston No. 1 is at the TDC of its compression stroke. Then turn it in the opposite direction till the timing mark on the cam disk of the injection pump is at a distance "s" from the timing mark on the roll ring indicator (as shown in fig. 5. The pump piston is then in the bottom dead center position.

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POWER TRAIN

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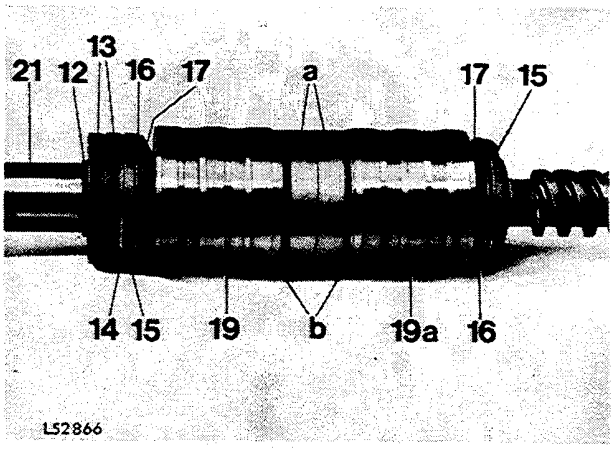


Fig. 12 — Determining Thickness of Shim Pack between Thrust Washer and Special Washer

a Spacers
b Shims
12 Snap ring
13 Special washers
14 Shims
15 Thrust washers
16 Thrust bearings
17 Thrust washers
19 Upper valve body assy.
19a Lower valve body assy.
21 Steering wheel shaft

5. Position some shims 14 (figs. 8 to 12) on thrust washer 15. Then place one of the two special washers 13 on the shims with the recess facing downward. Adjust total thickness of shims so that snap ring 12 just fits into groove of steering wheel shaft 21. At this moment it is not necessary that the snap ring is fully seated in its groove. However, at any rate make sure that the snap ring really fits in the groove.

Add as many shims 14 as are required to obtain the specified pre-load (see Specifications).

Insert lower snap ring 12 in its groove. Install second special washer 13 on steering wheel shaft with the recess facing downward and fit upper snap ring 12.

If required, insert one O-ring (see 30, fig. 9) and one back-up ring 29 each in bore of piston rod guide 38 and in bore of steering valve housing 22. Install O-ring 36 and back-up ring 37 in groove of guide 38.

Slide guide 38 over piston rod 34 and insert piston rod with piston, guide and connecting rod in steering valve housing.

Carefully install pre-assembled steering wheel shaft in steering valve housing and screw shaft into piston rod. Insert spacer 11 in steering valve housing.

Insert O-ring 2 in groove of adjuster 9 pre-assembled with oil seal 7 and bushing 10. Coat lip of oil seal ring 7 with grease. When sliding adjuster 9 on steering wheel shaft, protect sealing against damage by means of a suitable sleeve etc.

Screw adjuster into steering valve housing 8 by means of a pronged wrench and tighten to the specified torque (see "Torques for Hardware"). Turn jam nut 6 on adjuster 9 and tighten to the specified torque, holding the adjuster with the pronged wrench.

INSTALLATION AND ADJUSTMENT

For installation, reverse sequence of removal.

Install new gasket between steering valve housing and clutch housing.

Tighten screws of steering valve housing assembly to the specified torque (see "Torques for Hardware").

Tighten cap screw of steering shaft lock plate (see 10, fig. 7) to the specified torque (see "Torques for Hardware").

Install steering shaft bearing cover before tightening cap screw of steering arm. Use a new gasket between bearing cover and clutch housing.

NOTE: Install cap screw provided with seal ring 41 (fig. 9) in bottom bore of bearing cover.

Tighten steering arm cap screw to specified torque (see "Torques for Hardware"). Tap the steering arm with a hammer and re-tighten screw to the specified torque.

Install all tractor parts which had to be detached for removal of the steering unit and connect all connections which had been separated (see "Removal").

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Attach oil manifold with pressure control valve and selective control valve (if equipped) to final drive housing.

Connect all oil lines and install pipe clamp.

Connect brake lines and bleed brakes, as explained in section 60, group 15.

Install rear fenders. Connect lines of wiring harnesses to connectors.

Connect cable to brake warning switch.

Install rear wheels and tighten to the specified torque.

CAUTION: Tighten ground cable to negative (-) poles of batteries.

REMOVAL AND INSTALLATION OF ROCKSHAFT

REMOVAL

IMPORTANT: Work on the hydraulic system requires extreme care and cleanliness. Minute dirt or foreign particles, scratches, nicks or burrs may put the hydraulic system out of function. Before removing the rockshaft, check hydraulic system for leaks.

For safety, disconnect ground cable from batteries.

Remove transmission shield. Disconnect line 1 (fig. 8) of starter safety switch.

Remove operator's seat. Disconnect both lift links at lift arms.

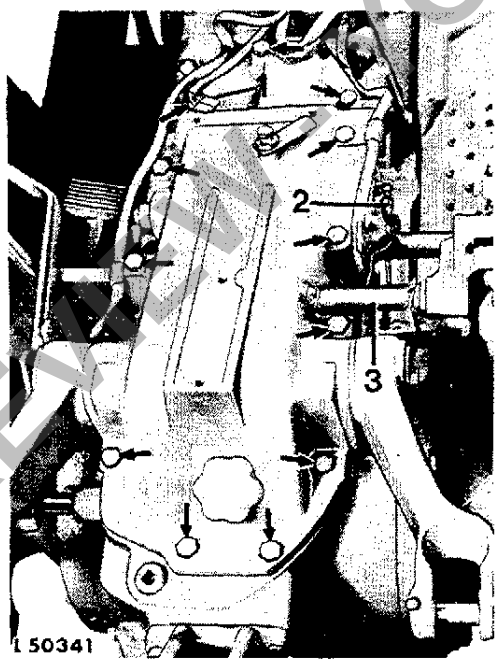


Fig. 8 — Rockshaft, Installed

1 Line of starter safety switch
2 Pilot line
3 Oil return line

Loosen clamp of oil return hose 3 (fig. 8) facing rockshaft and move aside.

Disconnect lines of rear quick couplers (if equipped) at selective control valves.

Disconnect pilot line 2 (fig. 8) at elbow on rockshaft.

Free both rear wiring harnesses.

Move selector lever in position "L" so that the control linkage roller slides along the cam of the control arm when removing the rockshaft.

Attach engine lifting eye No. JD 244-2 to top of rockshaft housing.

Remove rockshaft attaching screws (see arrows in fig. 8). Lift rockshaft assembly off transmission case by means of a hoist. Withdraw oil return line 3 from rockshaft adapter.

Take care not to damage two rear harnesses.

NOTE: After removing rockshaft, cover transmission case to prevent foreign particles from falling into the transmission.

INSTALLATION

Use a new gasket between transmission case and rockshaft. Make sure dowels in transmission case and seal ring of oil inlet passage are installed.

Move selector lever in position "L" so that the control linkage with roller can be slided over the cam.

Lift rockshaft on transmission case, using a suitable hoist.

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Group 20
CRANKSHAFT, MAIN BEARINGS AND FLYWHEEL

GENERAL INFORMATION

The crankshaft is a steel forging supported by four, replaceable aluminium, steel-backed, tinplated, main bearings.

The rear main bearing has a flange on each side to support the crankshaft thrust and to limit end play.

The crankshaft is drilled for pressure lubrication to all bearings.

The flywheel ring gear engaged by the starter is shrunk-fit to the front of the flywheel. The flywheel has a bore for setting top dead center if the engine timing is to be adjusted.

DIAGNOSING MALFUNCTIONS

See group 5 for diagnosing malfunctions.

REMOVAL

For removal of engine, see section 10, group 25.

NOTE: It is recommended to check crankshaft end play be means of a dial indicator prior to removal. If end play is excessive, reduce play by installing a new pilot bearing.

REPAIR

NOTE: Overall and detailed information on Repair see "Fundamentals of Service, Engine" manual.

DISASSEMBLY

Remove starting motor.

Remove engine clutch, flywheel and flywheel housing. Place engine on assembly stand.

Remove cylinder head (see group 10).

Remove oil pan and oil pump (see group 30).

Remove pistons and connecting rods (see group 15).

NOTE: As a rule, pistons and connecting rods will have to be removed. However, removal is not required if only the crankshaft is to be lifted out of the cylinder block.

Remove timing gear cover and gears as well as cylinder block front plate (see group 25).

Remove oil slinger from front of crankshaft.

Remove crankshaft.

CHECKING FLYWHEEL AND HOUSING

Inspect flywheel ring gear for serviceability and tight fit on flywheel. Check if flywheel seat, dowel bore and ball bearing are in proper condition. Inspect flywheel friction face contacting driven disk for heat cracks and rough spots.

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INSTALLATION AND TIMING

INSTALLATION OF THE INJECTION PUMP

The outlets of the injection pump (see fig. 3) for the connection of the fuel pressure lines are marked with letters on the distributor body 21a: "A", "B" and "C" refer to cylinders No. 1, 2 and 3 in firing order.

To facilitate the setting of the TDC, an indicator with a timing mark is cast onto the timing gear cover. On the outer rim of the V-belt pulley on the crankshaft is a mark "O"* indicating top dead center (see fig. 6).

1. Make sure that the pump drive gear is still in the same position as when the injection pump was removed (see "Removal").

2. Rotate the pump shaft of the injection pump until the distance "s" between the timing mark "i" (figure 5) on the face cam and the timing mark "h" on the roll ring indicator is approx. 0.4 in. (10 mm). The pump piston is then at bottom dead center (BDC).

NOTE: The bottom dead center can easily be felt at the pump shaft.

3. Make sure that the woodruff key is in place on the pump shaft. Install a new gasket on the pump housing. Insert the shaft into the gear, and the pump housing into the bore in the cylinder block front plate and secure with the two hex. nuts. Put the lock washer over the thread portion of the pump shaft. Screw on the nut and tighten to the specified torque.

4. Time the injection pump (see "Timing the Injection Pump").

5. Replace the cover on the timing hole of the injection pump and tighten cap screws. Only if required: replace the cover on the mounting hole in the timing gear cover (see fig. 7) and tighten the screws to the specified torque.

6. Install and connect all fuel lines, the speed control rods and the stop cable; then bleed the fuel system.

* On earlier tractors the crankshaft pulley has three marks indicating the respective TDC: 1, 2 and 3, spaced 120° from each other (in firing order).

TIMING THE INJECTION PUMP

As the pump piston was set at bottom dead centre before installation of injection pump, the injection timing must be accurately set when the installation has been completed.

This is done with the aid of the timing marks on the roll ring and the face cam.

1. Bring piston No. 1 to TDC of its compression stroke and insert timing screw through the flywheel housing and into the bore in the flywheel (see fig. 8).

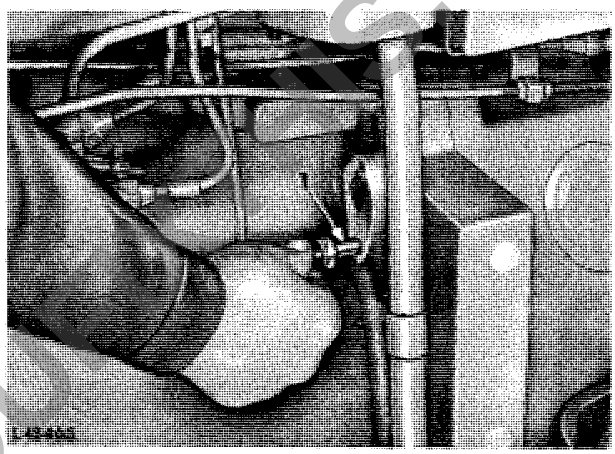


Fig. 8 — Using Timing Screw to Adjust TDC
1 Timing screw

2. Loosen the injection pump mounting nuts and pivot the pump housing first away from the cylinder block as much as the slots permit and then back toward the cylinder block, but only till the timing mark "i" (fig. 4) on face cam 27 aligns with mark "h" on the indicator "g". Tighten the injection pump mounting nuts to the specified torque.

3. To check the injection timing, remove timing screw and rotate the crankshaft clockwise, as seen from the radiator, by two full turns until piston No. 1 (radiator end) is at TDC of its compression stroke. Re-insert the timing screw in the flywheel bore and check the position of the face cam in relation to the roll ring (see item 2, above).

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ALTERNATOR (GENERATOR) INDICATOR LIGHT

The alternator (generator) indicator light is located in the dashboard (see 4, fig. 1). When switching on the main switch, this light goes on. It fades out as soon as the engine is running.

If all components of the electrical system, including the indicator light, are functioning properly and the indicator light fades out, the batteries are being charged by the alternator (generator). However, if the indicator light stays or goes on when the engine is running, this indicates a fault which should be remedied immediately (see group 5).

CONTROLS AND INSTRUMENTS

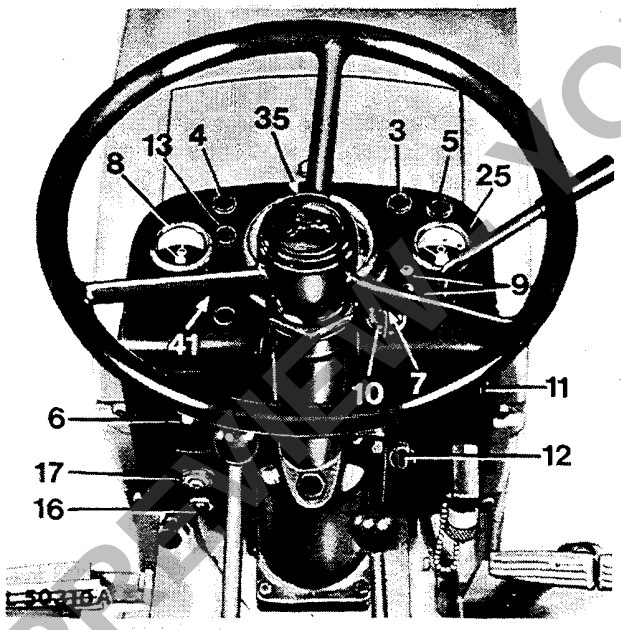


Fig. 1 — Dashboard, Controls and Instruments

3 Engine oil pressure indicator light
4 Alternator (generator) indicator light
5 High-beam indicator light
6 Fuse box
7 Tractor turn signal indicator light
8 Coolant temperature gauge
9 Trailer turn signal indicator lights
10 Turn signal light switch
11 Horn button
12 Socket for handlamp
13 Air cleaner indicator light
16 Starter button
17 Main switch
25 Fuel gauge
35 Speed-hour meter
41 Hazard warning light switch*

* On tractors equipped with hazard warning lights.

Most of the controls and instruments are located in the dashboard (see fig. 1).

Other controls are located as follows: Engine oil pressure warning switch in the flywheel housing, fuel gauge sending unit in the fuel tank, warning switch for air cleaner indicator light in air cleaner outlet manifold, start safety switch in the rock-shaft housing and the stop light switch in the left-hand brake line.

CABLES AND WIRES

The components of the electrical system are connected by cables and wires which are partly arranged in harnesses, as shown in the wiring diagrams:

Wiring Harness	Connects the following Components of the Electrical System
"A"	Dashboard — Engine
"B"	Dashboard — Stop light switch, start safety switch, connectors, right and left-hand
"C"	Connector, right-hand — Turn and clearance light, right-hand, 7-terminal socket
"D"	Main switch — Fuse box
"E"	Connector, left-hand — Turn and clearance light, left-hand, stop and turn light, and tail light, left-hand
"F"	Alternator (generator) — Regulator
"G"	Flasher — Turn light switch and turn light indicator lights
"H"	Wire distributor — Head light, right-hand
"J"	Wire distributor — Head light, left-hand
"K"	7-terminal socket — Stop and turn light, and tail light, right-hand
"L"*	Hazard warning light switch — Turn light switch and fuse box

GROUND STRAP AND GROUND CABLE

A ground cable connects the negative pole of the right-hand battery to the negative pole of the left-hand battery. A ground strap connects the negative pole of the left-hand battery to the cowl.

* On tractors equipped with hazard warning lights.

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INSTALLATION

For installation of clutch linkage reverse removal procedure.

When installing, observe the following details:

Coat sliding face of sleeve, bore and both faces of bearing carrier which contact clutch fork, using MOLYKOTE BR 2 grease. Fill grease compartment of bearing carrier with multipurpose grease.

Install two spring pins 13 (fig. 2) flush with clutch fork and secure with wire end.

When installing drive shafts, take care not to damage oil seals.

ADJUSTMENT

Normal adjustment of clutch pedal

With this adjustment both (engine and PTO) clutches are operated one after the other. Adjust as follows: Loosen cap screw 5 (fig. 3) and move clutch pedal rearward until cap screw 5 contacts front of slot in pedal arm 6. Then tighten screw.

Adjusting clutch pedal for operating engine clutch only

Loosen cap screw 5 (fig. 3) and move clutch pedal forward until screw contacts rear of slot in pedal arm 6. Then tighten screw.

Adjusting clutch pedal free travel

CAUTION: If clutch pedal free travel is less than specified minimum (see Specifications), do not start engine until correct free travel has been set.

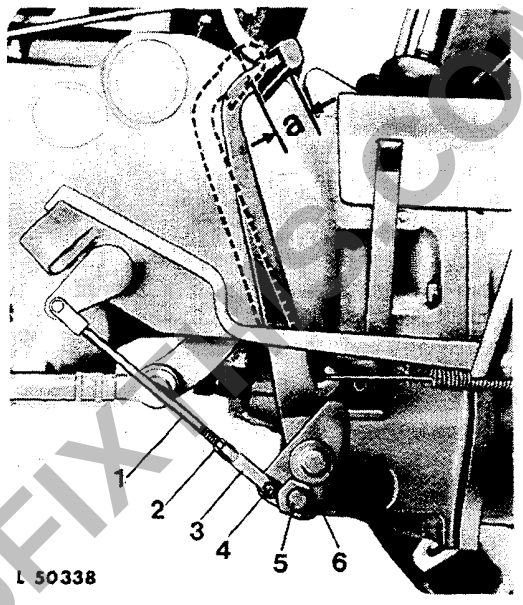


Fig. 2 — Adjusting Clutch Pedal Free Travel

1 Free travel
2 Clutch rod
3 Hex. nut
3 Yoke
4 Headed pin
5 Cap screw
6 Pedal arm

Remove pin 4 (fig. 3) from yoke 3 and pedal arm 6. Loosen hex. nut 2 and thread yoke 3 on clutch rod 1 until clutch pedal shows specified free travel (see "a", fig. 3) (see Specifications).

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Group 20
FINAL DRIVES

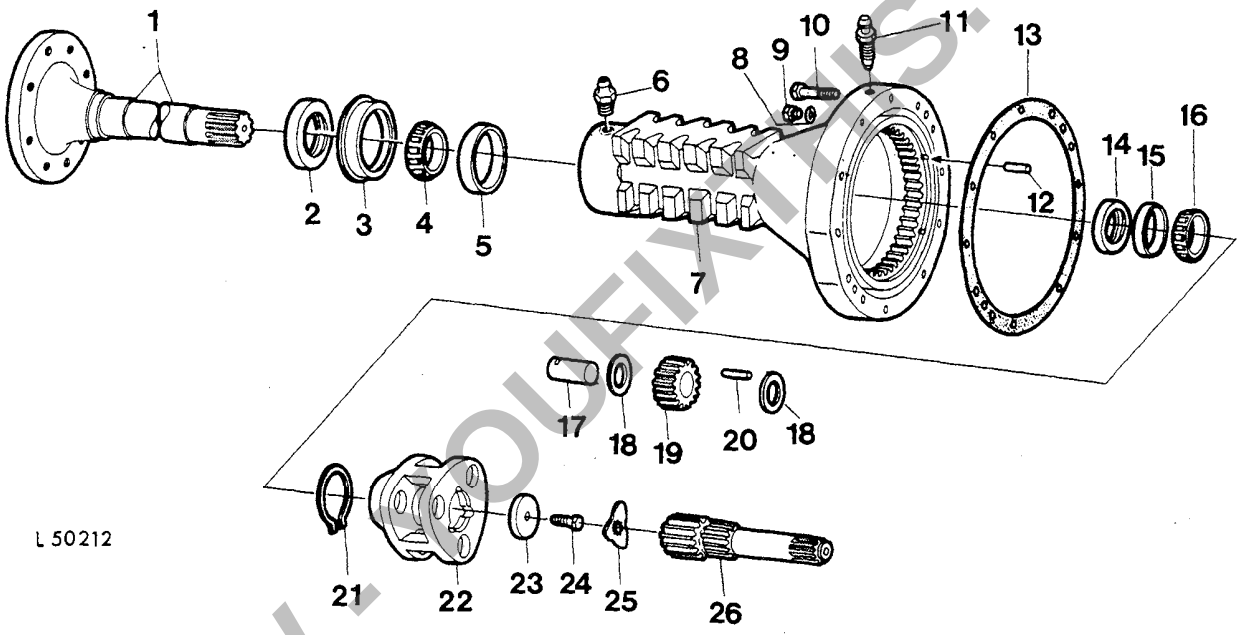


Fig. 1 — Parts of a Final Drive Assembly

1 Flanged axle
2 Oil seal
3 Oil seal cup
4 Taper roller bearing cone
5 Taper roller bearing cup
6 Pipe plug
7 Final drive housing
8 O-ring
9 Plug
10 Cap screw (12 used)
11 Bleed plug
12 Dowel pin (3 used)
13 Gasket
14 Oil seal
15 Taper roller bearing cup
16 Taper roller bearing cone
17 Planet pinion shaft (3 used)
18 Thrust washers (6 used)
19 Planet pinion (3 used)
20 Bearing rollers (69 used)
21 Snap ring
22 Planet pinion carrier
23 Washer
24 Special cap screw
25 Lock plate
26 Final drive shaft

GENERAL

Each final drive unit contains a rear axle mounted on two taper roller bearings with oil seals and a planetary gear system which provides the final speed reduction.

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Inspect bearing cover 33 for damage and replace, if necessary. Check bushing 34 of bearing cover and opposite steering shaft bushing in clutch housing and replace, if necessary. Drive in new bushing so that its face is flush with chamfer of bearing bore, using driving tool No. JD 252.

Check remaining steering linkage for serviceability.

ASSEMBLY

When attaching yoke 4 (fig. 4) to ball nut, make sure that closed side of yoke faces ball tracks of ball nut (see fig. 4).

Tighten screws 1 attaching flange to ball nut and to yoke, to the specified torque.

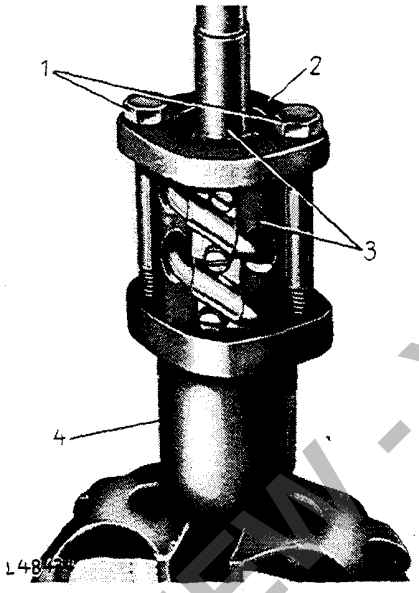


Fig. 4 — Ball Nut and Yoke Assembled

1 Cap screw 3 Steering wheel shaft and ball nut
2 Flange 4 Yoke

Turn steering wheel shaft counterclockwise out of ball nut, as far as possible.

Install steering wheel shaft assembly (take care of steering housing oil seal) so that tracks of ball nut face front side of steering housing. Pack one of the two barrel bearings with grease and install on steering wheel shaft with bearing cone facing upward. Insert both thrust washer halves and secure by means of retainer.

Push steering wheel shaft into housing until barrel bearing is seated on ridge in housing. Pack bearings and thrust washers liberally with grease. Then slide second barrel bearing on steering wheel shaft so that cone bottoms on thrust washers (position opposite that of first barrel bearing).

Make sure that all parts are well greased und screw adjuster sleeve in steering gear housing.

ADJUSTMENT

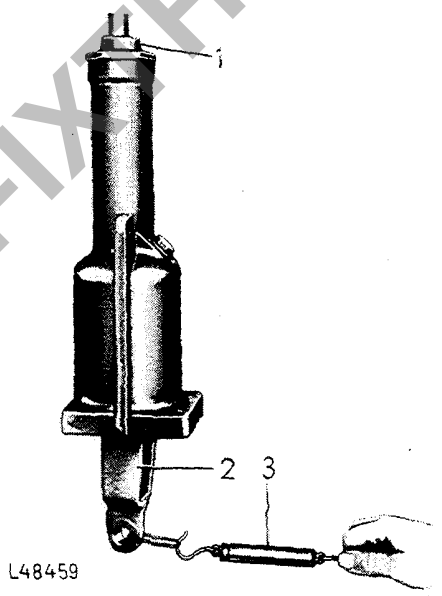


Fig. 5 — Adjusting Preload of Barrel Bearings

1 Adjuster 2 Yoke 3 Spring scale

Turn ball nut so that it is at the bottom of the steering wheel shaft worm. Hook spring scale into bore of yoke as shown in fig. 5 and tighten adjuster 1 (fig. 5) until a specified force is required to move the yoke (see Specifications).

Tighten adjusting nut to specified torque. Hold adjuster while tightening.

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Check valve bodies 2 and 7 for wear or damage, especially on seats and bearing surfaces.

Inspect valve springs 3 and 5 for damage. Check tension of springs (see Specifications).

Check ball 8 of main valve for wear or damage.

Examine connectors 16 and 12, elbows 10 and 11 as well as plugs for serviceability. Replace all O-rings.

ASSEMBLY AND INSTALLATION OF DUMP VALVE

When assembling and installing dump valve, reverse sequence of steps observed for removal and disassembly as shown in figs. 4 and 5.

ROCKSHAFT

REMOVAL

Remove rockshaft assembly as explained in section 10, group 25.

NOTE: Observe the utmost cleanliness whenever working on the rockshaft. Dirt, dust metal filings etc. can impair the reliability and performance of the unit. Also take care not to damage any of the parts when disassembling. Scratches, nicks or burrs may adversely affect the operation of the rockshaft.

DISASSEMBLY AND REPAIR

Remove selector lever from its shaft.

Remove control lever from shaft and lever.

Remove cap screws attaching quadrant to rockshaft housing.

Turn rockshaft assembly upside down.

Drive out spring pin securing pivot pin on lever shaft. Remove remote cylinder adapter from left side of rockshaft housing. Unhook valve actuating lever return spring from the special pin fitted in the rockshaft housing.

Loosen adjusting screw of shut-off rod.

Remove cap screw at outside front of transmission case holding rockshaft cylinder and valve housing and also internal cap screws. Lift rockshaft cylinder and valve housing off rockshaft housing (the piston rod remains attached to the crank arm and pulls away from the piston); at the same time work load selector arm free of slotted load selector link.

CAUTION: Take care not to lose throttle valve ball as it will fall free.

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