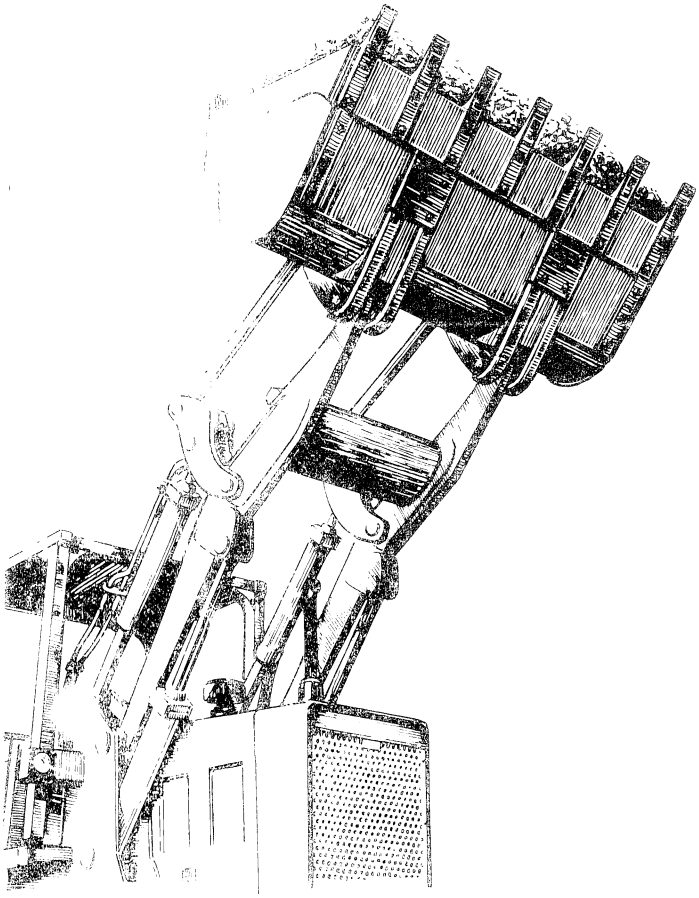
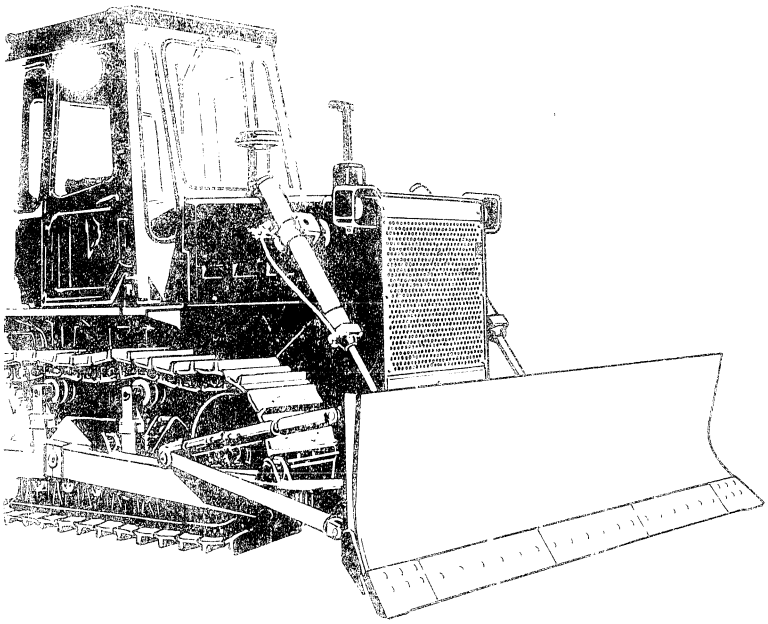
FIATALLIS





FL10 - FL10B

crawler loader

10 - 10B

dozer

Service manual

PRINT No. 604.06.077 - English

Reprinted

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

BENCH TEST DATA

TEST CONDITIONS

— Engine on bench with fan, air cleaner and exhaust silencer removed.

— Atmospheric pressure 740 ± 5 mm. Hg.

— Ambient temperature 20 ± 3 °C.

— Relative humidity 70% ± 5.

— Fuel density 830 ± 10 gram/litre.

— Timing 25 ± 30' B.T.D.C., cylinder No. 1 on compression stroke.

Throttle lever position	R.P.M.	Metric H.P. after running-in		Time required to burn 250 c.c. (15.2 cu.in.) of fuel (seconds)
		2 Hours	50 Hours	
Maximum (full load)	2000	107.6 or over	108 or over	38.6 to 39.6
Maximum (maximum torque approx.) .	1000	59.8 or over	60 or over	72.7 to 75.7
Maximum (no-load)	Up to 2170	—	—	—
Minimum (no-load)	500 to 550	—	—	—

COMPRESSION TEST

If engine performance is found to be unsatisfactory, check the injection system (by replacing nozzles and injection pump) and the compression in each cylinder.

To check engine compression use tester No. **291310** proceeding as follows:—

— Remove the injector from each of the six cylinders.

— Fit dummy injector Part No. **292634 (645 N)** in place of the injector of the cylinder under test.

— Hold the injection pump in engine stop condition and take the readings driving the engine through the starter.

In normal operating conditions, compression should be 26 to 28 kg/cm² (370 to 398 p.s.i.) as recorded at 40 °C sump oil temperature, 760 mm. Hg (sea level) atmospheric pressure with the engine running at 200 to 220 r.p.m.

The minimum compression which is acceptable for a used engine is 22 kg/cm² (313 p.s.i.).

In this connection it should be noted that every 100 metres (328 ft.) altitude increase from sea level results in a 1% (approx.) decrease in compression.

The maximum compression differential between cylinders is not to exceed 3 kg/cm² (42.7 p.s.i.).

Insufficient compression may be due to faulty valves and seats, pistons and associated rings, cylinder liners or cylinder head gaskets.

Note : The purpose of the compression test is to assess the consistency of compression in the cylinders and to obtain an indication of the degree of wear affecting the parts which help to seal the combustion chambers. Therefore, the test results should not be taken as an absolute indication of engine efficiency.

When checking the valve guides bear in mind that:—

— The bore surface should be perfectly smooth and free from score marks and evidence of pick-up or deposits of any kind.

— The guides should be tight in their seats, otherwise renew using oversize guides (see Data Table).

— When in position, the guides should protrude above the cylinder head as shown in Fig. 18.

— After refitting, each guide should be reamed using reamer Part No. **290944**.

Exhaust valve guides are 7 mm. (.28 in.) longer than inlet valve guides.

On completion of the refitting operation, ensure that:

— Valve depth below cylinder head is as prescribed in Fig. 13.

— Cup retaining cones (8, Fig. 23) are correctly seated. In case of any doubt the cones should be renewed.

TO ADJUST THE VALVE CLEARANCE

For valve clearance adjustment use a screwdriver and feeler gauge (see Fig. 24). The correct clearance is .25 mm. (.010 in.) for inlet valves and .30 mm. (.012 in.) for exhaust valves.

Cylinder matching for valve clearance adjustment is 1-6, 2-5, 3-4. Bring the valves of the first cylinder of each pair in a condition of balance to adjust the valves of the second cylinder of the same pair and viceversa.

TAPPETS AND ROCKERS

To remove the tappets take off the cylinder head and use tool Part No. **290947** (see Fig. 25).

For tappet inspection proceed as follows:—

— Check that the surface in contact with the cam is in good condition. Any score mark can be remedied using a very fine abrasive stone.

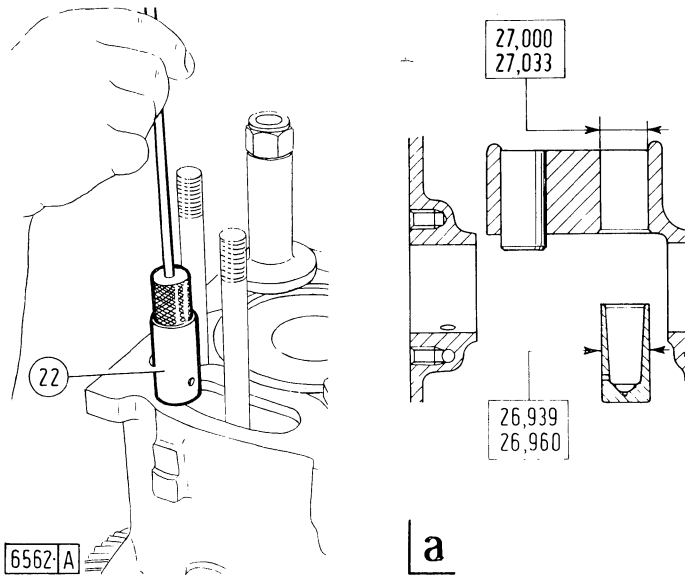


Fig. 25 - Removing (or Refitting) the Tappets Using Tool Part No. 290947

a. Detail of tappet and housing dimensions - 22. Tappet.

— Check the working clearance. If greater than .15 mm. (.006 in.) renew using oversize tappets and open out the associated housing bores in the engine block (see Data Table).

When refitting the tappets apply a liberal amount of engine oil.

Two separate rocker shafts are fitted.

To separate end rocker shaft brackets (23, Fig. 26) from the rocker shaft withdraw screw (V_1).

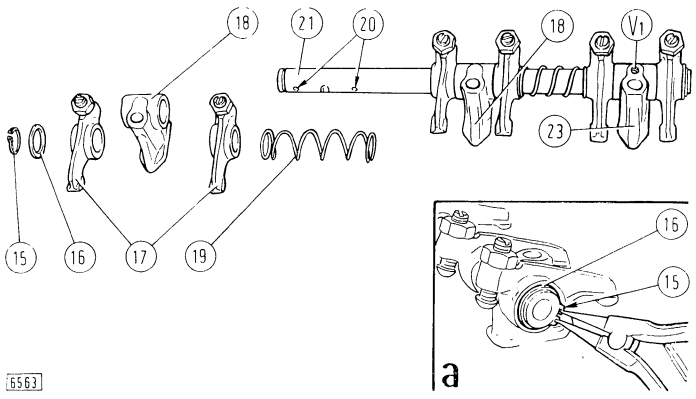


Fig. 26 - Rocker Assembly

a. Detail of circlip removal.

V_1. Bracket to-shaft retaining screw. - 15. Circlip. - 16. Thrust washer. - 17. Rockers. - 18. Intermediate bracket. - 19. Spacer spring. - 20. Lubrication holes. - 21. Rocker shaft. - 23. End bracket.

New connecting rods should be marked with the numbers corresponding to the cylinders to which they are fitted. The number is to be stamped on both body and cap in the position shown in Fig. 40.

Check lubrication hole (H, fig. 42), for cleanliness.

FLYWHEEL

The flywheel and associated starter ring gear can be separated without removing the engine from the machine; simply remove the torque converter or the master clutch as applicable.

Place the engine on the rotary stand with rotational axis vertical and remove the flywheel using a suitable lifting chain.

When fitting a new ring gear press onto the flywheel without heating ensuring that the chamfered side of the tooth form faces outwards.

Two of the retaining screw holes in the crankshaft are drilled at a greater centre distance than the others to ensure that the flywheel is correctly refitted on the crankshaft end.

ENGINE DATA

	mm.	in.
Engine Block		
Main bearing housing bore	80.626 to 80.646	3.1742 to 3.1750
Centre main bearing housing width	45.160 to 45.210	1.7779 to 1.7799
Cylinder Liners		
Fitted clearance (see Fig. 8)	.030 to .115	.0012 to .0045
Protrusion (see Fig. 9)	.150 to .180	.0059 to .0071
I.D. oversize	.60	.024
Length	236 to 236.5	9.29 to 9.31
Cylinder Heads		
Valve guide interference fit (see Figs. 18 and 22)	.010 to .039	.0004 to .0015
Valve guide oversize	.08	.0031
Camshaft		
Bearing interference fit	.073 to .136	.0029 to .0053
Journal running clearing	.080 to .140	.0031 to .0055
Wear allowance	.25	.0010
Thrust plate thickness (6, Fig. 21)	7.945 to 7.960	.3128 to .3134
Thrust plate recess width	8.000 to 8.036	.3150 to .3164
Camshaft end float	.040 to .091	.0016 to .0036
Inlet/exhaust cam lift	7.30	.2874

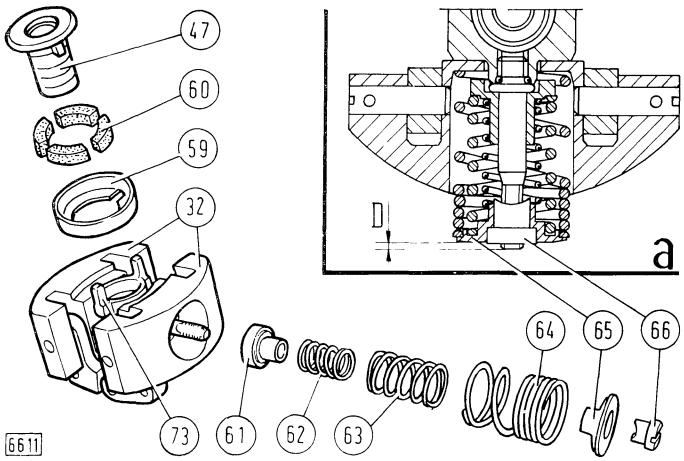


Fig. 59 - The Speed Governor Assembly

Note: On reassembly position the outer spring as shown.
a. Section through the flyweights. - D = 1.5 to 2 mm. (.060 to .080 in.) carrier stud protrusion. - 32. Flyweights. - 47. Damper coupling. - 59. Pad cup. - 60. Damper pads. - 61. Lower spring cup. - 62. Inner spring. - 63. Intermediate spring. - 64. Outer spring. - 65. Upper spring cup. - 66. Ring nut. - 73. Carrier.

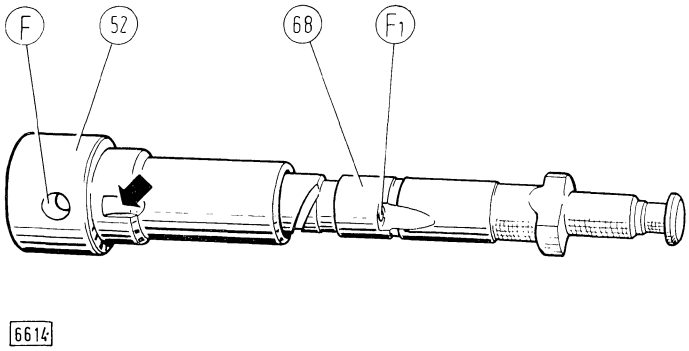


Fig. 61 - Pump Element Assembly

Note: The arrow indicates the guide pin groove.
F. Fuel inlet port. - F_1. Leak-off port (communicating with inlet chamber). - 52. Barrel. - 68. Plunger.

with toothed quadrants (72) so that with the control rod in mid-way position, the toothed quadrant lugs face in the same direction and are in alignment with the control sleeve holes and slots.

— Reassemble the plungers using tool **A. 65018 (291191)** (see Fig. 62) and turn leak-off ports (F_1) towards the tappet cover so that their position with respect to the associated barrels is as shown in Fig. 61.

Remember that this operation should be carried out with toothed quadrant lugs (72, Fig. 62) in centre position, acting on the control rod as necessary.

— Prior to reassembly, refit the flyweights and the damper coupling without cushion pads over the camshaft, ensuring that end float (M, Fig. 63) between retaining ringnut and flyweight carrier is .05 to .10 mm. (.002 to .004 in.); if necessary, change shim (R, Fig. 63).

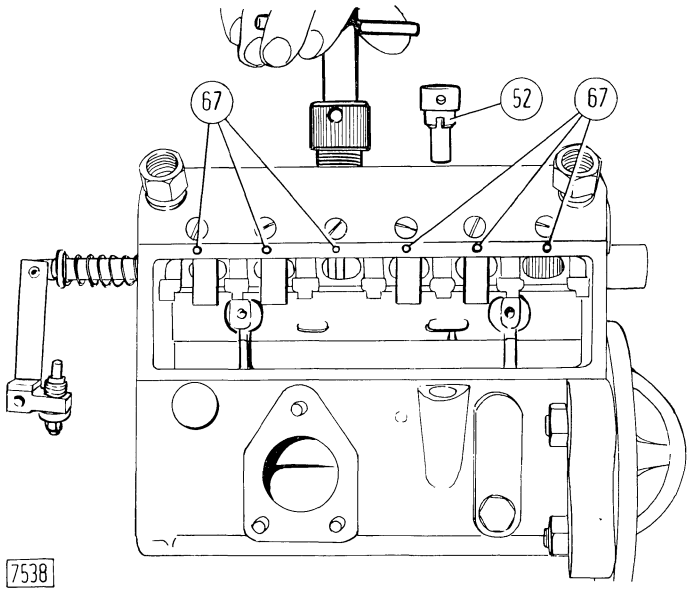


Fig. 60 - Redressing the Barrel Seats using cutter A. 94021 (290971)

52. Barrel. - 67. Barrel guide pins.

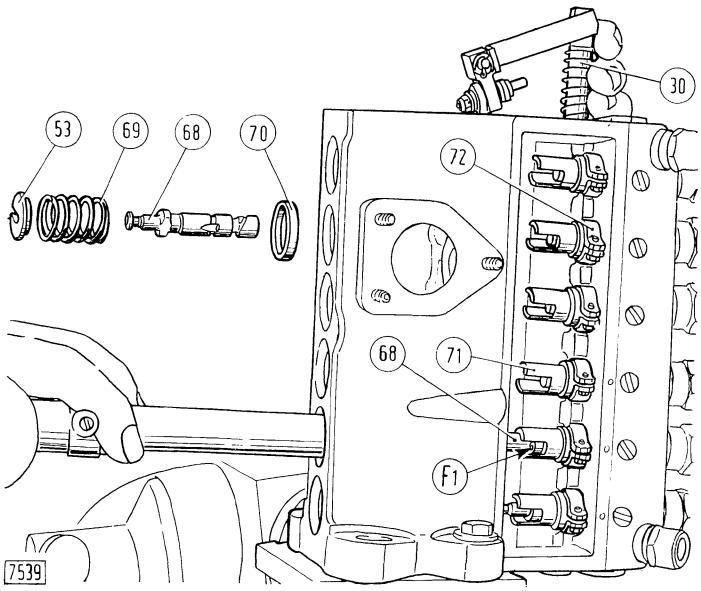


Fig. 62 - Refitting (or Removing) the Plungers using tool A. 65018 (291191)

F_1. Leak-off port. - 30. Control rod. - 53. Lower spring cup. - 68. Plunger. - 69. Spring. - 70. Upper spring cup. - 71. Control sleeve. - 72. Toothed quadrant.

FUEL INJECTION SYSTEM DATA

Lift Pump	Piston, injection pump camshaft driven
Type	FP/KS 22 A : L 4/4
Feed pressure	1.6 to 1.8 Kg/cm² (23 to 26 p.s.i.)
Speed Governor	Mechanical, centrifugal flyweight, all-speed
Type	RPVA 250 - 1000 F 144
Flyweight carrier-to-ring nut shim thickness	1.40 - 1.45 - 1.50 - 1.55 - 1.60 - 1.65 - 1.70 - 1.75 - 1.80 - 1.85 - 1.90 - 1.95 and 2 mm. (.056 - .058 - .060 - .062 - .064 - .066 - .068 - .070 - .072 - .074 - .076 - .078 and .080 in.)
Injection Pump (OM, BOSCH Licence)	In-line plunger type pump elements
Type	PE 6 A 90 B 410 : L 4/114
Direction of rotation (as seen from drive end)	Clockwise
Firing order	1 - 5 - 3 - 6 - 2 - 4
Camshaft end float	.02 to .06 mm. (.0008 to .0024 in.)
Camshaft shim thickness range	.10 - .12 - .14 - .16 - .18 mm. (.0040 - .0048 - .0056 - .0064 and .0072 in.)
Stroke to close inlet port	2.15 to 2.25 mm. (.085 to .088)
Timing (spill cut-off in cylinder No. 1)	25° ± 30′ B.T.D.C. on compression stroke
Injectors	Four-orifice nozzles
Injector bodies	KB 82 S 1 F 11
Spray nozzles	DLL 145 S 54 F
Spray orifice dia	.28 mm. (.011 in.)
Spindle spring	
— Free length	27 to 27.5 mm. (1.06 to 1.08 in.)
— Spring deflection (under a load of 16.1 to 41.8 ± 1.9 Kg.)	.8 mm. (.032 in.)
Release pressure	195 to 205 Kg/cm² (2773 to 2916 p.s.i.)

HYDRAULIC TORQUE CONVERTER

Overhauling of converter unit is covered in this section; the associated hydraulic circuit is dealt with in the section starting from page 78 together with the gearbox hydraulic system.

TO REMOVE

It is advisable to place the tractor over a pit.

1. Raise the bucket. Remove converter/gearbox side covers, transmission lower rear and centre covers, centre floor-board, driver's seat complete with scuttle and batteries.

2. Drain converter/gearbox oil and slacken filter equipment oil tank filter vent plugs.

3. To remove cross member (4, Fig. 85) complete with pedals and gearbox clutch oil pressure check valve:—

— Take off side/front floor-boards and dashboard centre guard.

— Remove steering clutch/brake valve block linkage (3), the associated pedal return springs, equipment pump outlet hose (2) and oil filler pipe (28).

— Separate the cross member from actuator rods (12 and 13), lines and fasteners.

4. Remove from the bottom of converter/gearbox unit:—

— Oil return hose (42, Fig. 86) from heat exchanger.

— Filter (Fa) on converter/gearbox pump inlet line.

— Converter/gearbox feed and scavenge pump (Pa).

— Steering clutch/brake pump (Pf). Be careful to raise inlet pipe (37) to prevent the loss of oil.

5. Remove from the top of converter/gearbox unit:—

— Equipment pump (P, Fig. 87).

— Drive shaft (29), after removing front universal joint.

— Lines connecting converter unit to the gearbox and heat exchanger.

6. To remove the converter unit complete with bell housing:—

— Clamp bracket Part No. **291516** (B, Fig. 98) onto converter shaft hub, hook up with Part No. **291359** (C) and take up the weight by means of the tackle.

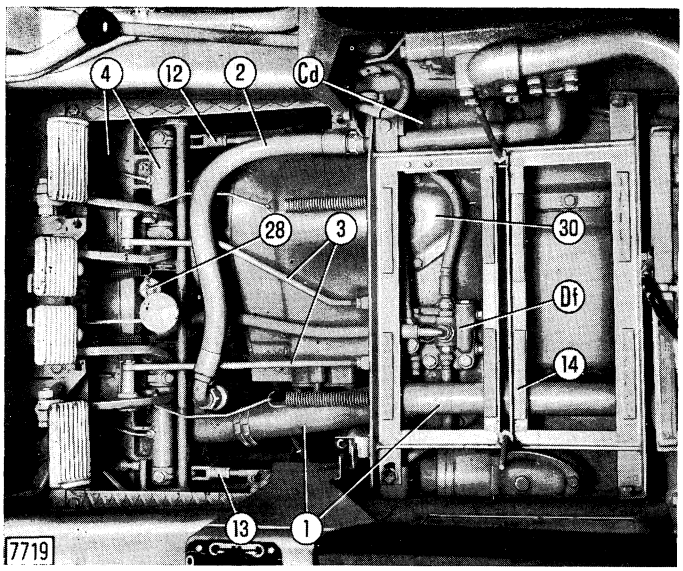


Fig. 85 - Top View of Converter/Gearbox Unit

Cd. R. H. brake power cylinder. - Df. Steering clutch/brake valve block. - 1 and 2. Equipment pump inlet/outlet hoses. - 3. Steering clutch/brake valve block linkage. - 4. Pedal supporting cross member. - 12 and 13. Brake actuator rods. - 14. Battery tray. - 28. Oil filler pipe. - 30. Axle case front cap.

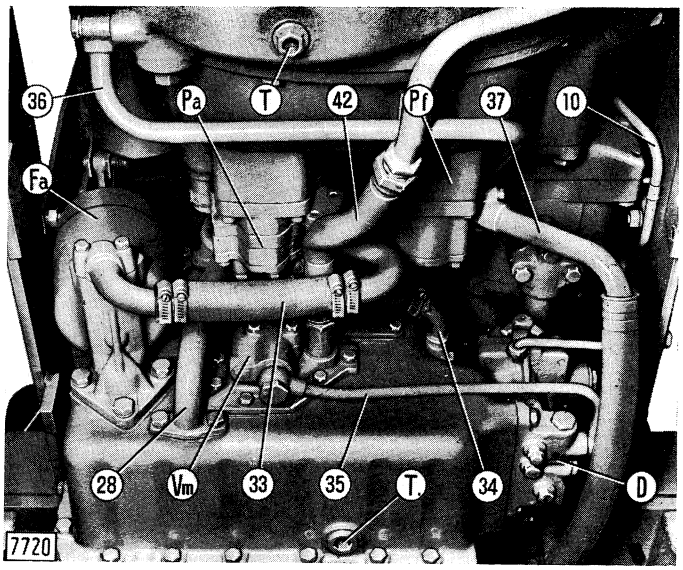


Fig. 86 - Bottom View of Converter/Gearbox Unit

D. Gearbox valve block. - Fa. Converter/gearbox filter pump. - Pa. Converter/gearbox pump. - Pf. Steering clutch/brake pump. - T. Drain plugs. - Vm. Retarder valve. - 10. Line to gearbox valve block. - 28. Oil filler pipe. - 33. Converter/gearbox pump inlet line. - 34. Scavenge pump outlet line. - 35. Line to retarder valve. - 36. Scavenge pump inlet line. - 37. Steering clutch/brake pump inlet line. - 42. Heat exchanger outlet line (gearbox lubrication).

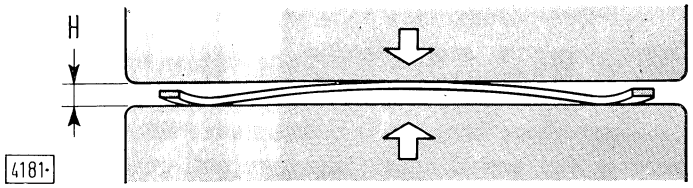


Fig. 108 - Checking Spacer Spring Deflection
H = 3 mm. (.118 in.) Deflection to be obtained without inducing permanent set.

— Maximum thickness difference between sintered metal surfaces which should not exceed .05 mm. (.002 in.).

— Excessive wear of said surfaces because of clutches running dry or because of dirty oil, or pitting areas.

Ring spacer springs (23, Fig. 107) rarely lose their elasticity; however, we suggest compressing them to the dimension of 3 mm. (.118 in.) (H, Fig. 108); at this condition springs should not show any permanent set.

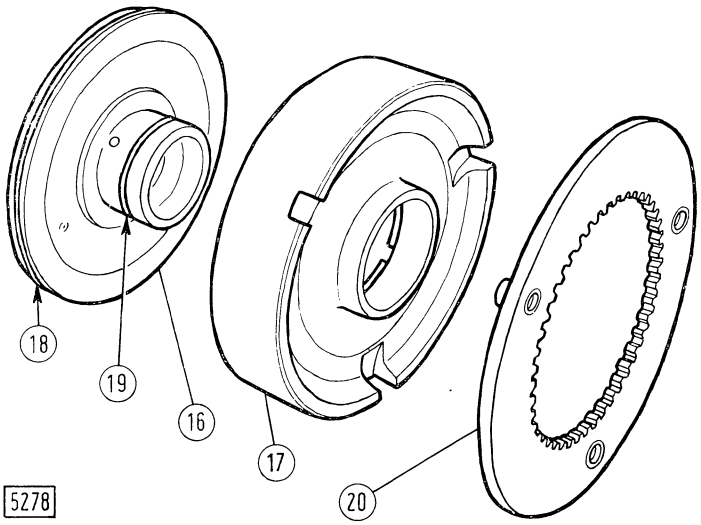


Fig. 109 - Exploded View of Low/Intermediate/Reverse/Forward-speed Clutch Hydraulic Power Cylinder
16. Reaction plate. - 17. Piston. - 18 and 19. O-rings. - 20. Outer steel plate.

SHIFT CLUTCH CONSTRUCTION

ITEMS	NUMBER OFF		
	Intermediate Low-Reverse	Forward	High
Outer steel plate (20, Fig. 107) (°)	1	1	1
A.M. inner steel plate (29) (°)	1	1	—
Sintered facing friction plates (*)	7	7	4
Intermediate steel plates (22) (°)	6	6	3
Spacer springs (23)	7	7	4
Thrust springs (25 and 32)	9	9	9
A.M. spacer ring (98)	—	1	—

Note: (*) Drive plates in **intermediate/high/forward** gear clutches.
(°) Drive plates in **low/reverse** gear clutches.

TO REASSEMBLE

Install gearbox on rotary stand Part No. **290090** by means of brackets shown in Fig. 100 and follow this operation sequence:—

1. To reassemble reverse-gear clutch (I, Fig. 106), associated shaft (68) and driven gear (70):

— Rebuild shaft (68, Fig. 111) with bearing (69), gear (70) thrust ring (43) and complete drum (73, Fig. 110).

— Tighten assembly on bench vise, then fit backing plate (27 or 28), hub (26) and clutch pack as shown in Fig. 107.

— Mate reaction plate (16, Fig. 110) and piston (17) with shaft (68, Fig. 110), mount spring compressor Part No. **291518** (A), fully tighten the pack (see a) acting on nut (C_{14}), fit hold-down brackets Part No. **291520/1** (B) tightening the screws against drum (b) and, finally, withdraw complete clutch unit (I, Fig. 111) from the shaft.

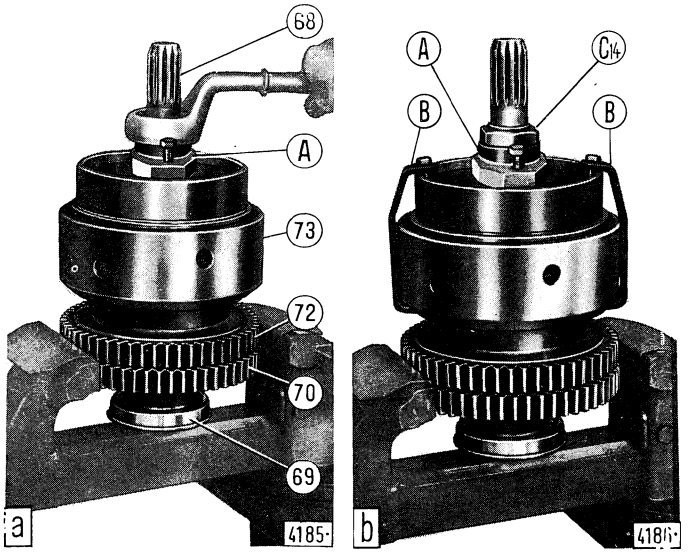


Fig. 110 - Rebuilding Reverse-speed Clutch
a. Tightening retaining nut (C_{14}). - b. Fitting hold-down brackets (B). - A. Spring compressor Part No. 291518. - B. Hold-down brackets Part Nos. 291520/1. - C_{14}. Retaining nut. - 68. Clutch shaft. - 69. Front bearing. - 70. Driven gear. - 72. Drive gear. - 73. Drum.

The gearshift lever remains in the manually selected position as the oil pressure acting on plunger (16, Fig. 122) overcomes the opposing force of spring (15) and cuts off the safety device which would otherwise bring back the gearshift lever to neutral and set control valves (11 and 12) for discharge.

Interlock valve (14) prevents the oil under pressure from flowing from the selected forward (or reverse)-speed clutch circuit to the circuit of the other clutch, which, not being operated, is connected to exhaust. Moreover, the oil under pressure reaches retarder valve (Vm) through the same interlock valve.

Retarder valve (Vm) determines a smooth clutch engagement, regulating the pressure increase in the circuit regardless of operator's manoeuvring skill (see para. 5).

Clutch engagement can be felt at the hand lever as the oil pressure acts on the bottom of the valve (11 or 12) while, through springs (10), the **inching control** permits very small machine movements.

During high-speed clutch engagement, exhaust valve balls (23) are in the closed position under oil pressure.

When downshifting, the associated control cylinder is connected to exhaust and, owing to the pressure drop, the centrifugal force prevails over the oil pressure and shifts balls (23) outwards, allowing oil outflow from the cylinder with consequent rapid clutch disengagement.

Oil pressure gauge (P), on the dashboard, indicates gearbox clutch oil pressure.

5. Retarder Valve

When the gearshift lever is operated, the oil pressure in the selected speed clutches does not reach the shifting value immediately.

In fact the oil reaching retarder valve (Vm, Fig. 122), opens spool (19) and flows to the lubrication circuit where the pressure is lower.

Spool opening is only temporary, as oil reaching also plunger (28), larger in diameter than the spool, forces the latter to close with a consequent pressure increase.

However, spool closing is made gradual by orifice (20) which delays oil outflow, and by springs (30) which, when compressed, increase plunger stroke.

Spring delay action stops when plunger (28) moves spool (19) through push rod (29) and thus the pressure increases rapidly to the setting value of valve (4).

Valve (31) allows a rapid outflow of the oil from the chamber of plunger (28) when the operating circuit is connected to the exhaust line.

HYDRAULIC PUMP

Gear type feed pump (Pa, Fig. 122) and scavenge pump (Pr) are driven by a pair of gears deriving motion from the flywheel.

To dismantle the pumps, remove the complete drive coupling (2, Fig. 120) using a universal extractor and unscrew tie bolts (C_1).

Lubricate the parts to be assemblied to avoid the risk of seizing during initial running.

In case of replacement, fit new bushes (19 and 20) to a depth of .5 mm. (.020 in.) (H) from the faces shown in the illustration and ream bores (A, Fig. 121) using jig Part No. **291370** and reamer Part No. **291372** (see Fig. 123).

Before refitting the pump to the converter case, make sure that the drive shaft runs free.

The pump should never be run dry; therefore, after refitting, check oil level in gearbox case, and prime the pump through repeated short engine starts.

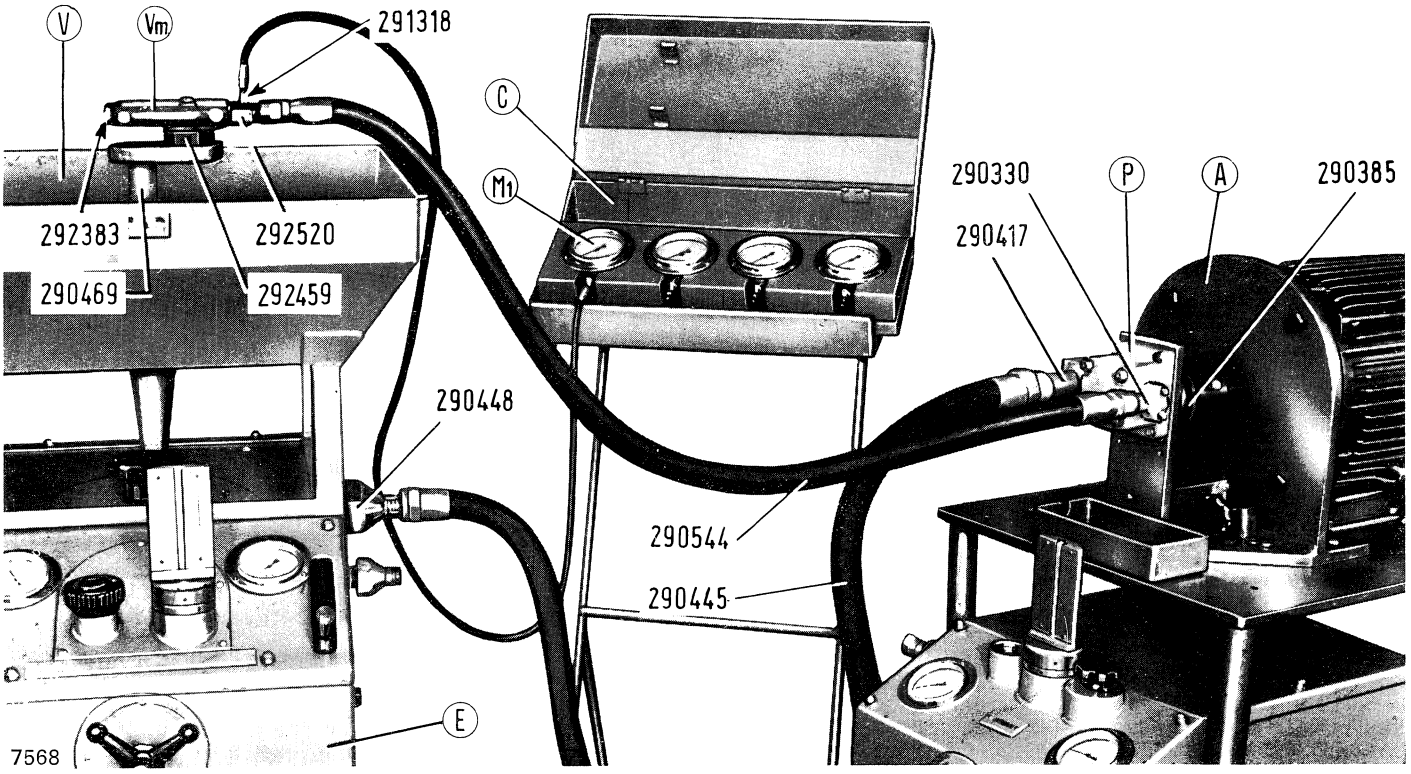


Fig. 135 - Adjusting Retarder Valve

A. Electric motor with trolley Part No. 291235. - C. Pressure gauge kit Part No. 291314. - E. Output test apparatus Part No. 291231. - M_1. Pressure gauge (0 to 8 Kg/cm² - 0 to 114 p.s.i.) - P. A 18 X Plessey pump Part No. 292588. - V. Oil tank Part No. 291237. - Vm. Retarder valve.

When refitting the valve, make sure that o-rings (6, Fig. 133) have been installed.

TO ADJUST

Install retarder valve and test equipment (see Fig. 153) and adjust as follows:—

— Connect the valve with attached o-rings (6, Fig. 133) to support Part No. **290469** using plate Part No. **292459**.

— Place the complete support in tank Part No. **291237**, coupled with output tester Part No. **291231**.

— Connect electric motor on trolley Part No. **291235** to A 18 X Plessey pump Part No. **292588** using coupling Part No. **290385**.

— Connect pump inlet line to tester Part No. **291231** using hose Part No. **290445**.

— Connect pump outlet line to the accumulator valve using hose Part No. **290544**.

— Replace plug (1, Fig. 133) with plug Part No. **292383** (without retarder orifice).

— Connect pressure gauge (0 to 8 Kg/cm² - 0 to 114 p.s.i.) of kit Part No. **291314** to fitting Part No. **292520** using fitting Part No. **291318**.

— Check valve setting proceeding as directed under paragraph **4** of pag. 91 during gearbox hydraulic test with retarder valve in position.

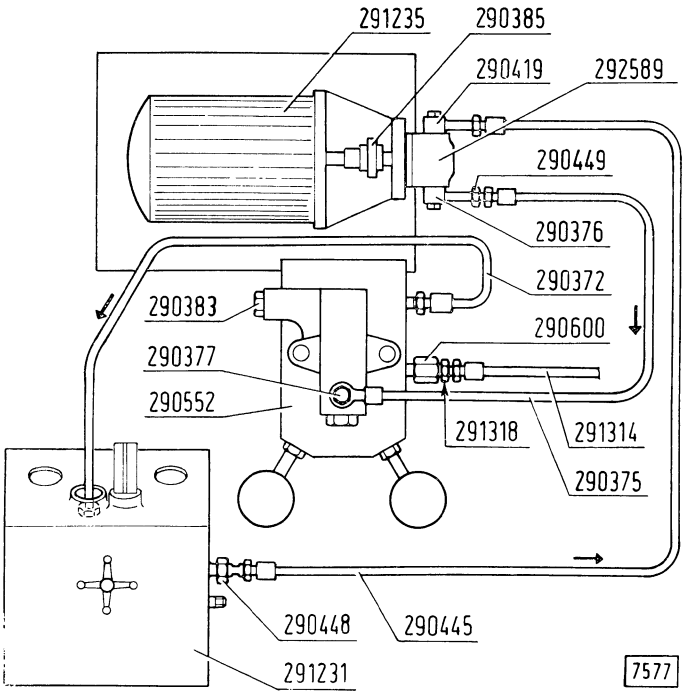


Fig. 136 - Gearbox Clutch Oil Pressure Regulating Valve Test Equipment

Hydraulic System Data - Continued.

Converter Pressure Regulating Valve		
Pressure setting	.9 to 1.1 Kg/cm²	13 to 15 p.s.i.
Spring (9, Fig. 139)		
— Free length	77.5 mm.	3.051 in.
— Length under a 3.8 to 4.2 Kg. (8.4 to 9.2 lb.) load	39 mm.	1.535 in.
Lubrication Oil Pressure Warning Transmitter		
Contact opening/closing pressure setting	.20 to .60 Kg/cm²	2.8 to 8.5 p.s.i.

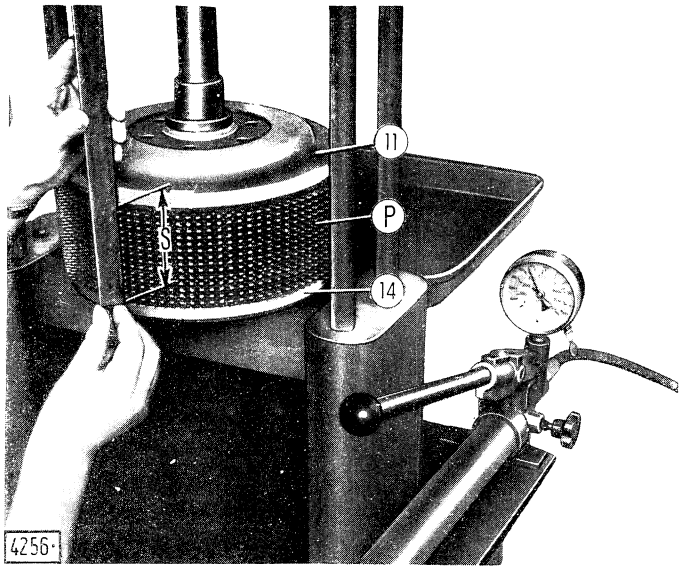


Fig. 164 - Checking Total Clutch Pack Thickness

Note : The hydraulic press should produce a load of 300 to 400 Kg. (660 to 880 lb.).

P. Clutch pack. - S = 83 to 86 mm. (3.27 to 3.38 in.) Total pack thickness (P). - 11. Pressure plate. - 14. Clutch hub.

— Excessive wear, due to foreign matter in the oil or clutches working dry, or pitted areas.

After plate inspection, rebuild each clutch pack (P, Fig. 164) (12 driven plates and 12 drive plates) and pressure plate (11) on drum (14) and check with a hydraulic press that actual pack thickness (S) is 83 to 86 mm. (3.27 to 3.38 in.) under 300 to 400 Kg. (660 to 880 lb.). If less, add one or more drive plates (12) on the side indicated by the arrow in Fig. 162.

STEERING CLUTCH CONSTRUCTION

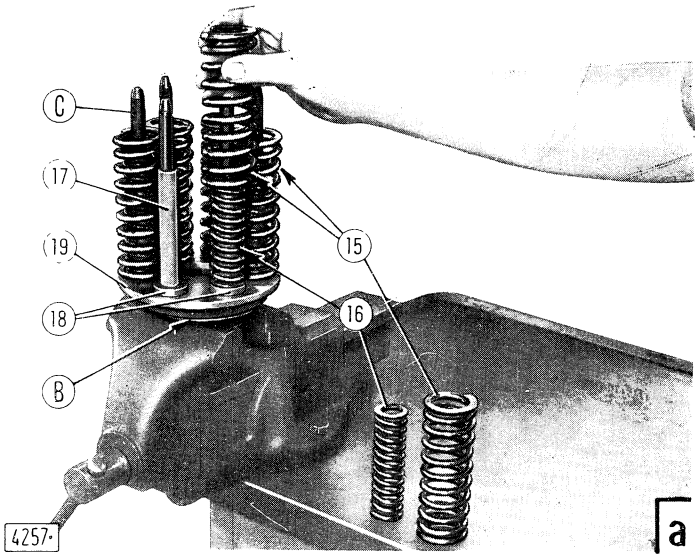
ITEMS	No. off
Steel drive plates (12, Fig. 162) .	12 (*)
Sintered facing driven plates (13)	12
Outer springs (15, Fig. 165) . .	6
Inner springs (16)	6

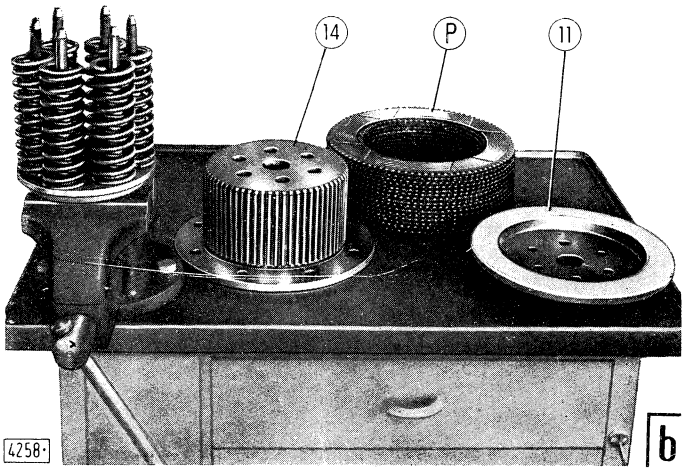
(*) The number of plates is only nominal and may be increased to obtain the specified dimension (S, Fig. 162).

TO REASSEMBLE

Proceed as follows:—

— Tighten the plate of compressor Part No. **291535** (a, Fig. 165), place stud carrier (19) in position and reinsert studs (C) in the tool seats.





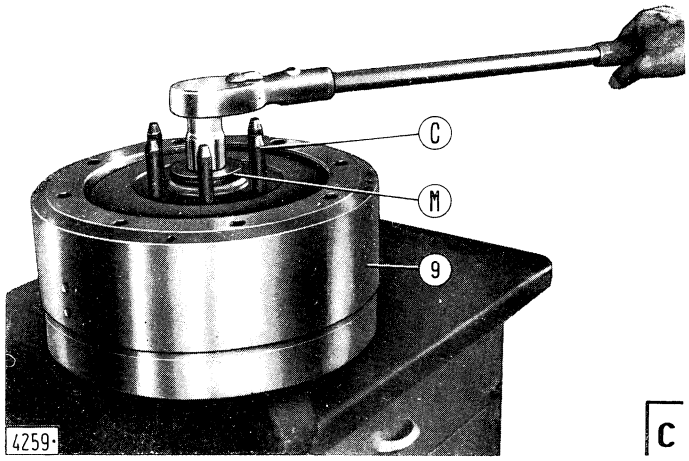


Fig. 165 - Rebuilding a Steering Clutch Pack

a. Refitting springs. - b. Rebuilding clutch pack. - c. Compressing springs for stud refitting. - B, C and M. Plate, studs and sleeve of compressor Part No. 291535. - P. Clutch pack. - 9. Drum. - 11. Pressure plate. - 14. Clutch hub. - 15. Outer springs. - 16. Inner springs. - 17. Stud spacer. - 18. Inner spring thrust washers. - 19. Stud carrier.

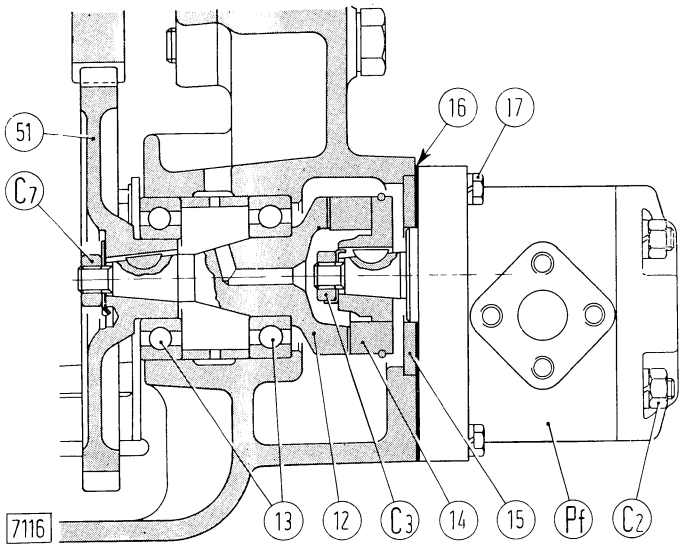


Fig. 174 - Hydraulic Pump Control Cross Section

C_2. Pump element retaining nuts. - C_3. Drive coupling retaining nut. - C_7. Driven gear retaining nut. - Pf. Hydraulic pump. - 12. Shaft. - 13. Ball bearings. - 14. Drive coupling. - 15. Centering ring. - 16. Seal. - 17. Pump retaining screws. - 51. Driven gear.

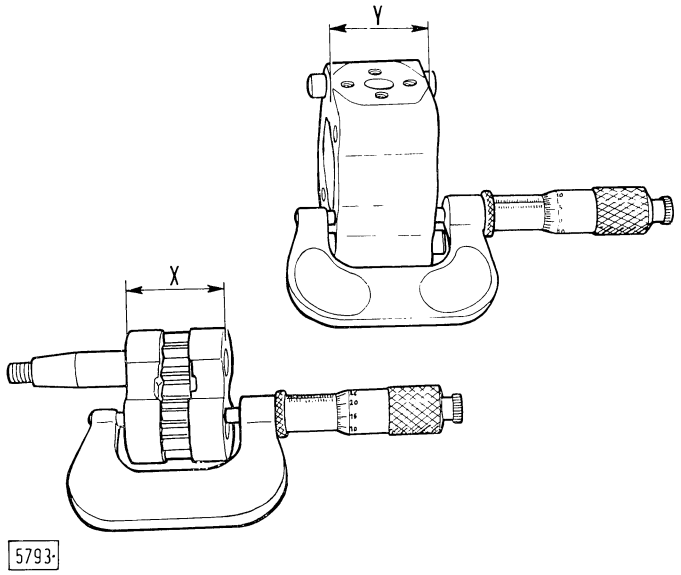


Fig. 175 - Checking Gear/Bearing End Clearance in Valve Body

Note : Dimension X should be less than Y by .1 to .2 mm. (.004 to .008 in.).

To take off drive shaft (12, Fig. 174) and associated ball bearings (13) remove the complete converter unit from the machine and subsequently the converter from the case.

To dismantle the pump remove drive coupling (14, Fig. 174) using a universal puller, then dismantle the pump (see Fig. 172) by removing element retaining screw nuts (C_2), and mark the parts in order to restore them to their original position on reassembly.

Refit the gears to their supports and check side face flatness and squareness, smearing the faces in question with carbon black. Any small correction can be effected using extra-fine emery cloth lubricated with paraffin wax.

Check gear/bearing end clearance in pump body (see Fig. 175). The correct clearance should be .1 to .2 mm. (.040 to.080 in.).

Any pump body face dressing, with a view to restoring the prescribed end clearance, should be carried out using extra-fine emery cloth lubricated with paraffin wax, removing as little material as possible.

Lubricate the parts to be refitted to prevent seizing during initial running.

Rebuild the pump bearing in mind the following points:

— Position the o-rings on covers and insert plastic seal retainer (11, Fig. 176) on the inside of the centre seal.

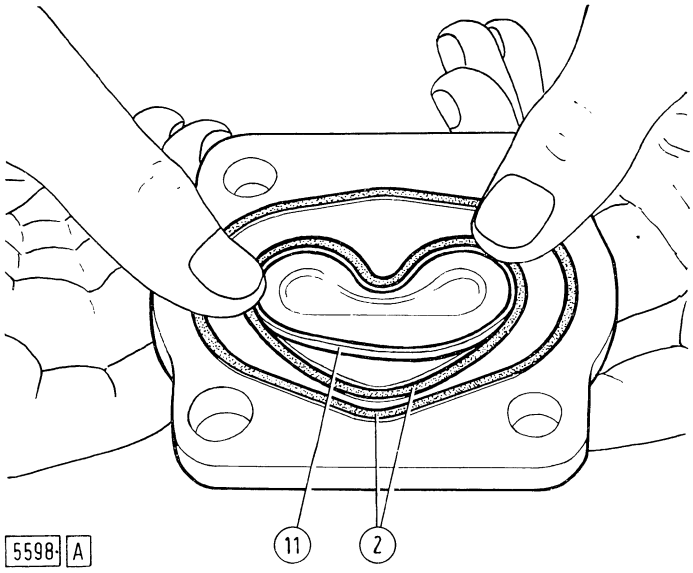
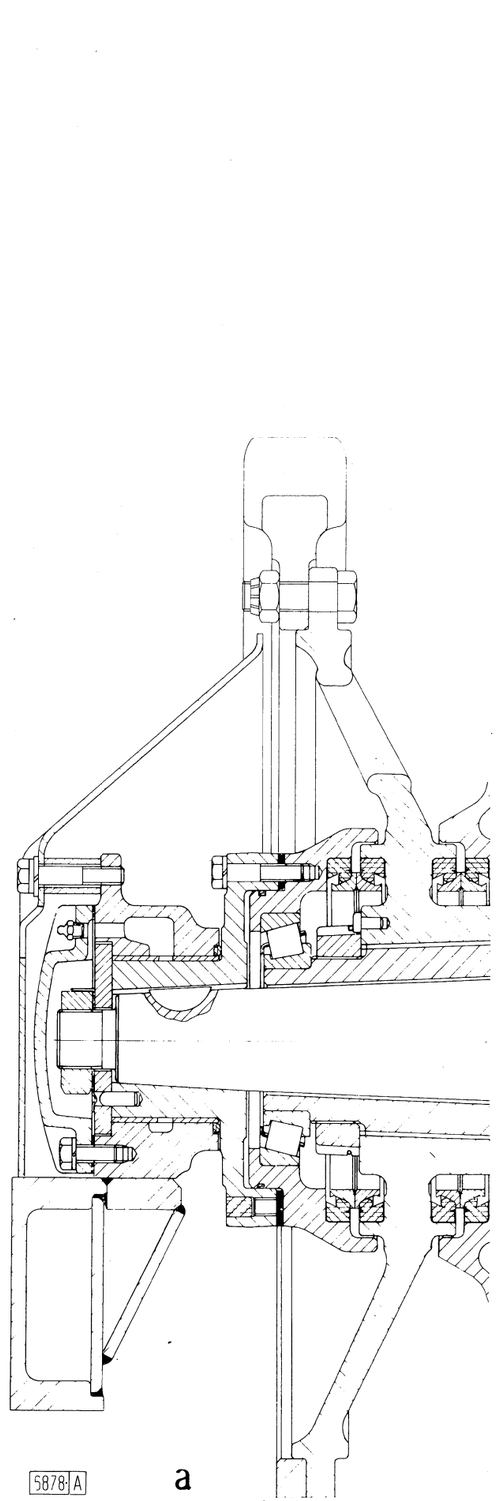


Fig. 176 - Positioning Ring Retainer in Pump Cover

Note : Retainer to be positioned inside the centre o-ring. 2. O-rings. - 11. Ring retainer.

HYDRAULIC SYSTEM DATA

Hydraulic Pump (Plessey license)	Gear type	
FIAT type	A 42 X	
Direction of rotation (drive shaft end)	Anticlockwise	
Engine-to-pump ratio	1.326 to 1	
Maximum rotation speed (engine at 2.000 r.p.m.)	2653 rev./min.	
Maximum output rating	50.5 litres/min. (12.1 gall./min.)	
	mm.	in.
Drive/driven gear shaft (8 and 9, Fig. 172) diameter	17.400 to 17.424	.6850 to .6860
Shaft bearing housing diameter	17.450 to 17.470	.6870 to .6880
Gear shaft running clearance	.026 to .070	.0010 to .0027
— Max. wear allowance	.220	.0086
Bearing and gear housing diameter	37.270 to 37.294	1.4672 to 1.4682
Max. pump body wear allowance (inlet side)	.1	.039
Drive/driven gear tooth width	30.791 to 30.816	1.2122 to 1.2132
Gear/bearing end clearance (see Fig. 175)	.1 to .2	.039 to .078
Oil Filters		
— On pump inlet line	Full-flow type, replaceable element of steel wool	
— On axle case inlet line	Branched off, replaceable paper cartridge and by-pass valve	
Spring (20, Fig. 179) for bypass valve:—	mm.	in.
— Free length	81	3.189
— Length under 9.2 to 11.2 Kg. (20.2 to 24.6 lb.)	24	.945
Valve Block		
Steering clutch control valve spring pressure (see M, Fig. 173)	19.5 to 20.5 Kg/cm² (277 to 291 p.s.i.)	
Steering clutch control valve return spring (18, Fig. 183)	mm.	in.
— Free length	52	1.968
— Length under 3.9 to 4.3 Kg. (8.5 to 9.4 lb.)	38	1.496



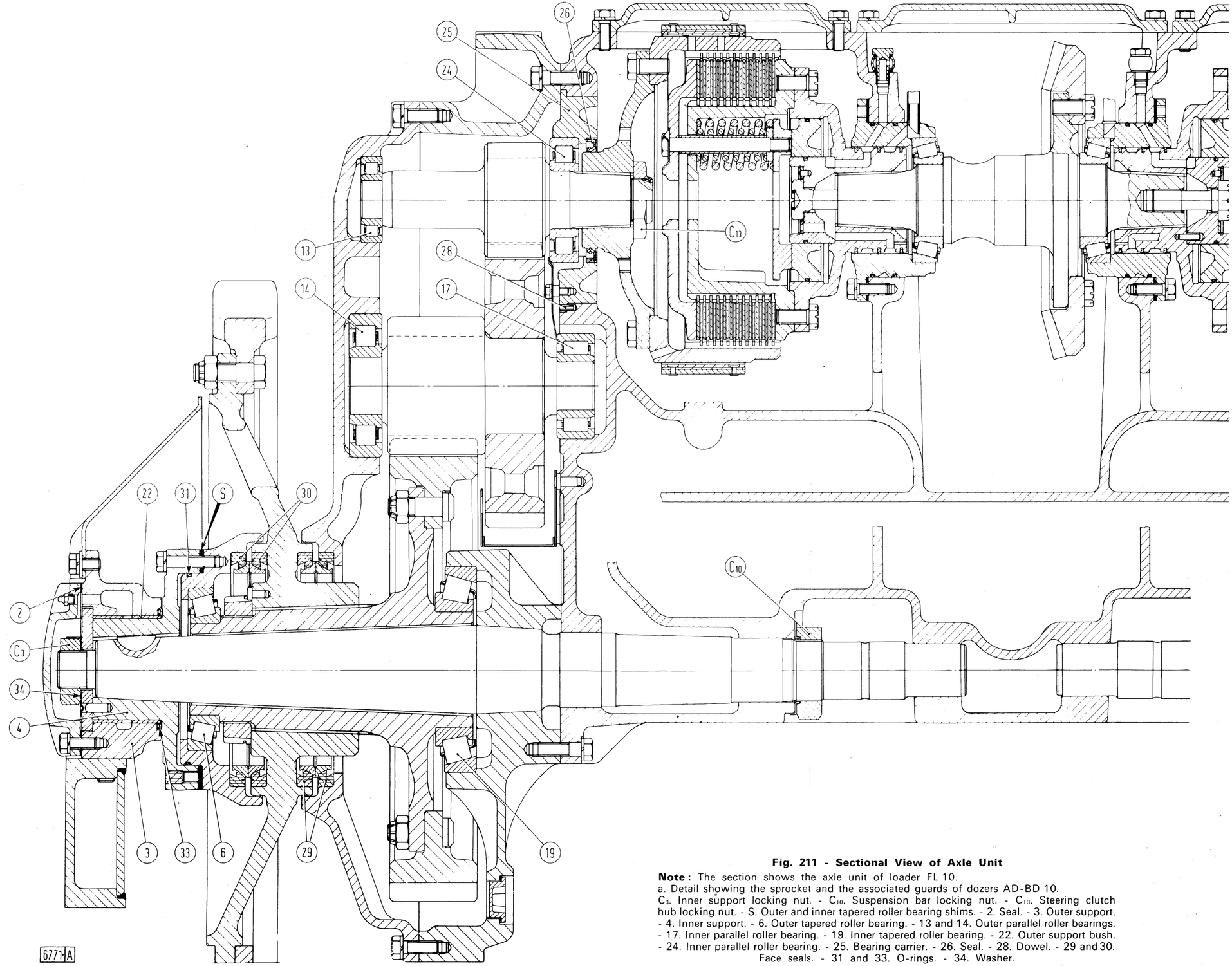


Fig. 211 - Sectional View of Axle Unit

Note : The section shows the axle unit of loader FL 10.
a. Detail showing the sprocket and the associated guards of dozers AD-BD 10.
C_3. Inner support locking nut. - C_{10}. Suspension bar locking nut. - C_{13}. Steering clutch hub locking nut. - S. Outer and inner tapered roller bearing shims. - 2. Seal. - 3. Outer support. - 4. Inner support. - 6. Outer tapered roller bearing. - 13 and 14. Outer parallel roller bearings. - 17. Inner parallel roller bearing. - 19. Inner tapered roller bearing. - 22. Outer support bush. - 24. Inner parallel roller bearing. - 25. Bearing carrier. - 26. Seal. - 28. Dowel. - 29 and 30. Face seals. - 31 and 33. O-rings. - 34. Washer.

TO ADJUST HYDRAULIC CYLINDER OVERLOAD VALVE

Dismantle the valve and clean thoroughly.

To reassemble the valve proceed as follows:—

— Clamp tester Part No. **291573** (A, Fig. 223) in a vise, install valve (Vs) onto the tester with interposed o-ring.

— Fill well (P) with petrol or spirit.

— Operate torque spanner (B) bearing in mind that the valve should remain closed — and therefore, the level of the liquid in the well should not change — for a torque reading of 6.5 to 7 kgm. (47 to 51 lb. ft.). On the contrary, the valve should open — and the well should become empty — at a torque reading of 7 to 7.5 kgm. (51 to 54 lb. ft.), which is equivalent to a valve setting of 800 to 850 Kg/cm² (11, 378 to 12.089 p.s.i.).

— Alter shim thickness (see S_1) to obtain the prescribed setting.

— Pack the valve with grassofiat G9 or other approved grease and refit.

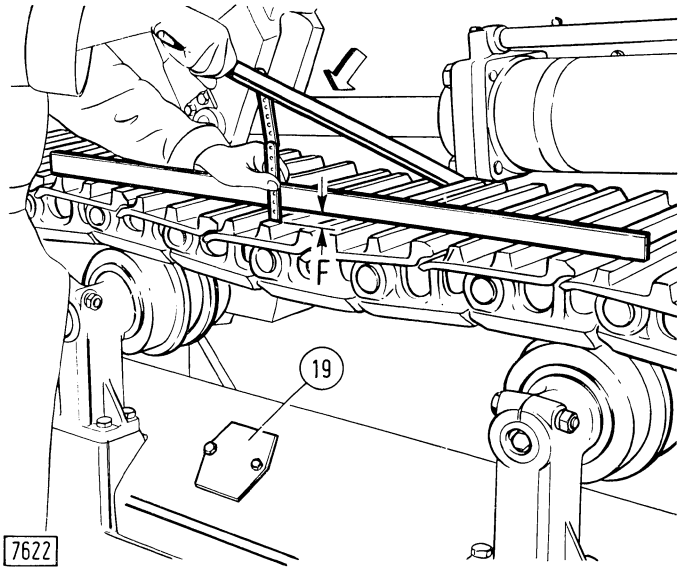


Fig. 224 - Checking Track Chain Tension

F = 30 to 40 mm. ($1^1/_8$ to $1^1/_2$ in.) camber under normal tension - 19. Regulating valve access cover.

TO CHECK AND ADJUST TRACK CHAIN TENSION

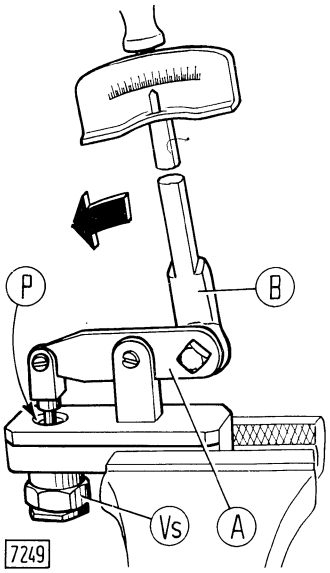
Track chain tension should be adjusted according to the nature of the ground on which the machine is operated; the normal track chain tension is adeguate for dry, stony or rocky ground, whereas it is advisable to increase track chain camber when working on muddy ground, wet clay or wherever sand, gravel, snow or ice is present.

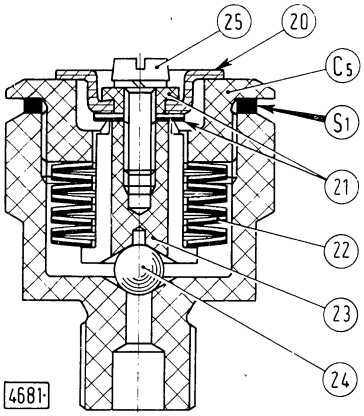
Proceed as follows:—

— Prise the track chain between the two top idler wheels (see Fig. 224) applying a sufficient load to take up both the slack and the play on either side.

— Using a suitable straightedge, measure the resulting camber (F) which for normal tension should be 30 to 40 mm. ($1^1/_8$ to $1^1/_2$ in.).

— To increase track chain tension, pump grassofiat G9 or other approved grease in the track tension cylinder through regulating valve (Vr, Fig. 225).





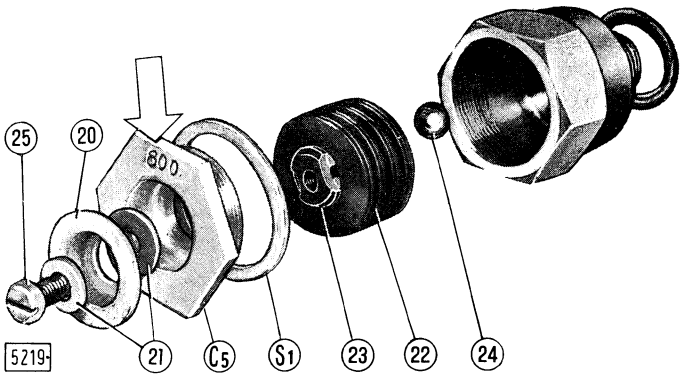


Fig. 223 - Checking Track Tension Cylinder Overload Valve Setting - Sectional View and Exploded View of Overload Valve

Note: The arrow points to the pressure setting stamped on valve cover (800 to 850 Kg/cm² - 11,378 to 12,089 p.s.i.).

A Tester Part No. 291573. - B. Torque spanner. - C_5. Valve cover. - P. Petrol or spirit well. - S_1. Shim. - Vs. Overload valve - 20. Rubber shield. - 21. Steel washers. - 22. Bauer springs. - 23. Valve plunger. - 24. Ball. - 25. Rubber shield retaining nut.

Undercarriage Data - Continued.

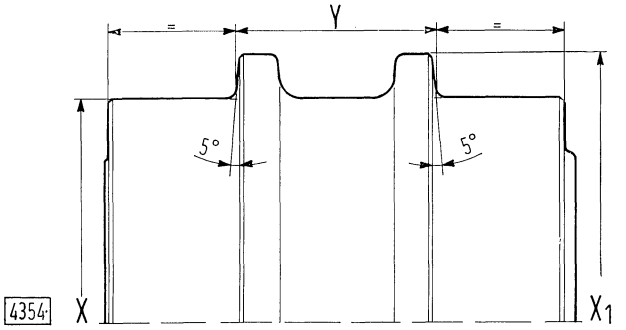


Fig. 248 - Top Idler Wheel Details
Diameter X = 165 mm. (6.496 in.). - Diameter X_1 = 198.5 to 201.5 mm. (7.815 to 7.933 in.). - Y = 75 to 76 mm. (2.953 to 2.992 in.).

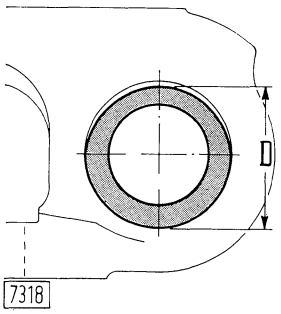


Fig. 249 - Assessing Link Bush Wear on Outside Diameter (D)

Track Chains	Recessed track links with stiffening cross rib	
Construction		
— Number of shoes	40	
— Number of right-hand links (marked D)	39	
— Number of left-hand links (marked S)	39	
— Number of coupling links	2	
	mm.	in.
Track shoe width	380	15
Shoe lug height (H, Fig. 245)	22 to 24	.866 to .945
— Wear limit	10	.394
Shoe thickness (S)	12 to 13	.47 to .51
Track chain ground contact area	17366 cm² (2,692 sq. in.)	
Specific ground pressure	.67 Kg/cm² (9.5 p.s.i.)	
	mm.	in.
Link pitch	175.92 to 176.08	6.9260 to 6.9322
— Wear limit	179.5	7.0669
Link height	102.90 to 103.10	4.0512 to 4.0590
— Wear limit (1)	99	3.8976
Link thickness	38.5 to 39	1.516 to 1.535
Bush O.D.	57.950 to 58.080	2.2815 to 2.2866
— Wear limit (1) (D, Fig. 268)	55	2.1653
Bush housing diameter in link	57.760 to 57.820	2.2740 to 2.2764
Bush interference fit	.130 to .320	.0051 to .0126
Link pin diameter (2)	36.990 to 37.060	1.4562 to 1.4591
Link pin bore in links	36.760 to 36.820	1.4472 to 1.4496
Pin-to-link interference fit	.170 to .300	.0067 to .0118

(1) Down to bottom of hard case.
(2) Up to machine frame No. 101179 pin diameter is 36.950 to 37.000 mm. (1.4547 to 1.4567 in.).

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

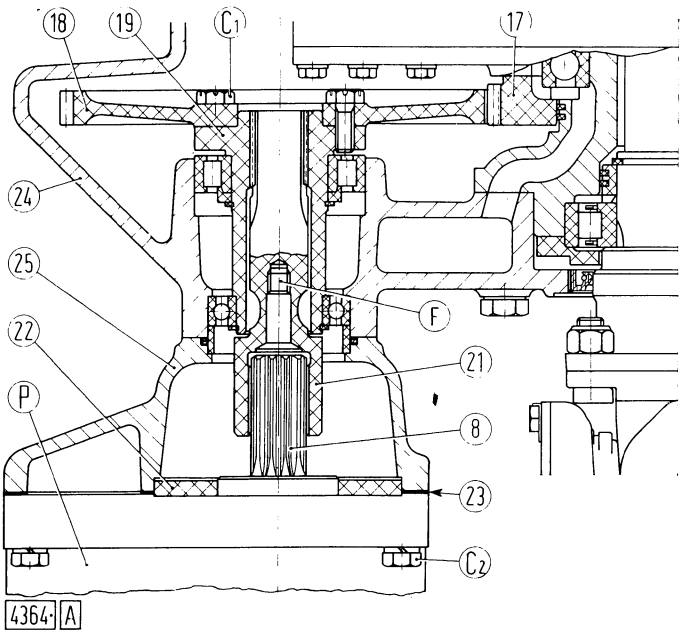


Fig. 255 - Section Through Equipment Hydraulic Pump Drive

C_1. Gear retaining screws. - C_2. Pump fixing screws. - F. Extraction hole (M 12 × 1.25). - P. Pump drive. - 8. Pump drive shaft. - 17. Pump drive gear attached to engine flywheel. - 18. Driven gear. - 19. Sleeve. - 21. Splined pump drive shaft. - 22. Pump centraliser ring. - 23. Gasket. - 24. Converter housing cover. - 25. Pump carrier.

In case of replacement, reassemble bushes (12, Fig. 256) onto the supports noting the following points:—

— Position lubrication slots (S) as shown in Fig. 256.

— Bush fitted depth (H) with respect to surface (T) should be 2 mm. (.08 in.). Make sure that when fitted, the bushes do not protrude from the opposite end and that lubricating holes (14 and 15) are not obstructed.

— The bushes do not necessitate reaming after fitting.

— Ensure that lubricant ways (13, 14 and 15) are absolutely clear.

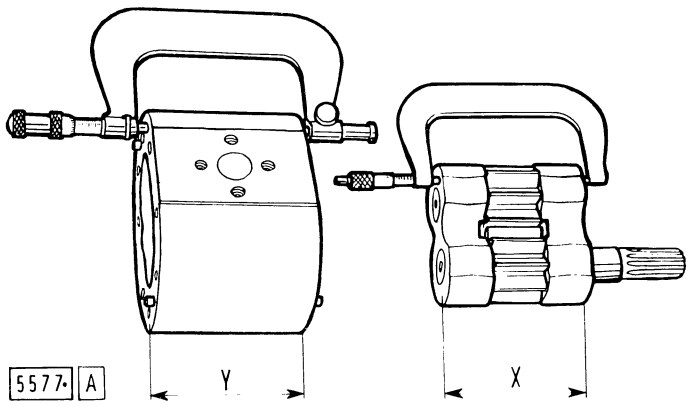


Fig. 257 - Checking Gear End Clearance in Pump Body

Note : Dimension X to be smaller than Y by .20 to .25 mm. (.008 to .010 in.).

Liberally lubricate all pump parts using hydraulic oil, then reassemble referring to Fig. 254 and noting the following points:—

— Plastic seal retainer (11, Fig. 258) is to be inserted on the inside of centre seal (3).

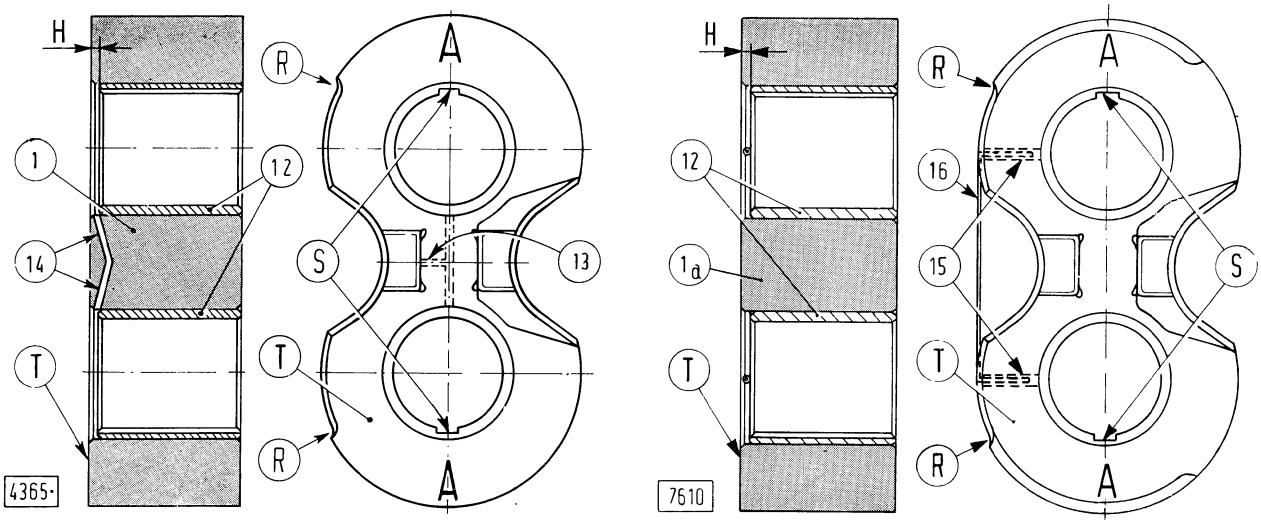


Fig. 256 - Pressing the Bushes into A.M. and P.M. Pump Supports

Note : Maximum angular allowance between support centreline A-A and centreline of lubricating slot (S) not to exceed 2°. H = 2 mm. (.08 in.) bush depth below surface (T). - R. Oil groove fillets. - S. Bush lubricating grooves. - T. Gear thrust shoulder. - 1. A.M. pump support. - 1a. P.M. pump support. - 12. Bushes. - 13 and 14. Bush lubricant ways in A.M. support. - 15. Bush lubricant ways in P.M. support. - 16. Bush lubricating oil catcher.

HYDRAULIC CYLINDERS, SIDE ARMS AND BUCKET

To remove, withdraw the pivot pins as follows:—

— Pins a, d, e, f, g and h, Fig. 280 — Remove the retaining plates or pins and strike using a suitable drift.

— Pins b and c — Use an impulse extractor (see Fig. 281) in conjunction with two of the retaining screws.

Note: If necessary, both the side arms and the bucket can be held overhead using dog (19, Fig. 283).

On reassembly note the following points:—

— Insert spacer (18, Fig. 280) between the pair of bushes fitted to side arms (b).

— Centralise the side arms with respect to the engine bonnet by fitting the correct thickness of shims (S_2) on either side and check that side arms lateral clearance is as prescribed (1 to 2 mm. - .04 to .08 in.).

— Also fit the correct thickness of shims over pins (a, d, g and h) on either side so that the inner member is centralised as far as possible, maximum lateral clearance allowance being 1 to 2 mm. (.04 to .08 in.).

— On completion of reassembly, lubricate all articulations using grassofiat G9 or other approved grease.

BUCKET CYLINDERS

Bucket raise/lower and roll cylinders (11 and 12, Fig. 280) are of the double-acting type.

To dismantle the cylinder, remove the end plate

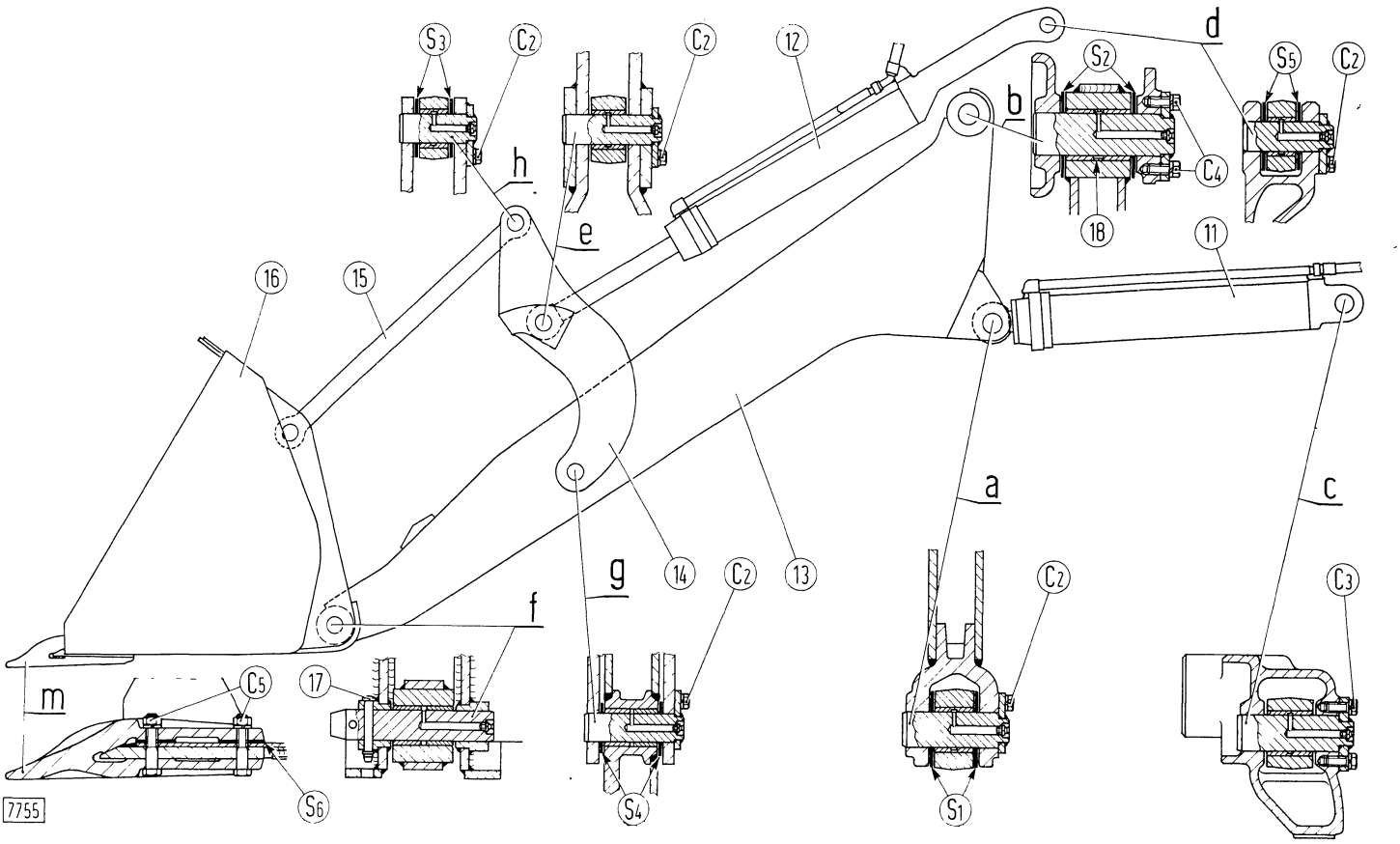


Fig. 280 - Equipment Articulations

a, b, c, d, e, f, g and h. Pivot pins. - m. Bucket tooth. - C_2. Retaining plate fixing screws. - C_3 and C_4. Pin retaining screws. - C_5. Tooth retaining nuts. - S_1, S_2, S_3, S_4 and S_5. End play shims. - S_6. Tooth play take-up shim. - 11. Bucket raise/lower cylinders. - 12. Bucket roll cylinders. - 13. Side arms. - 14. Relay lever. - 15. Connecting rod. - 16. Bucket. - 17. Pin retainer. - 18. Spacer.

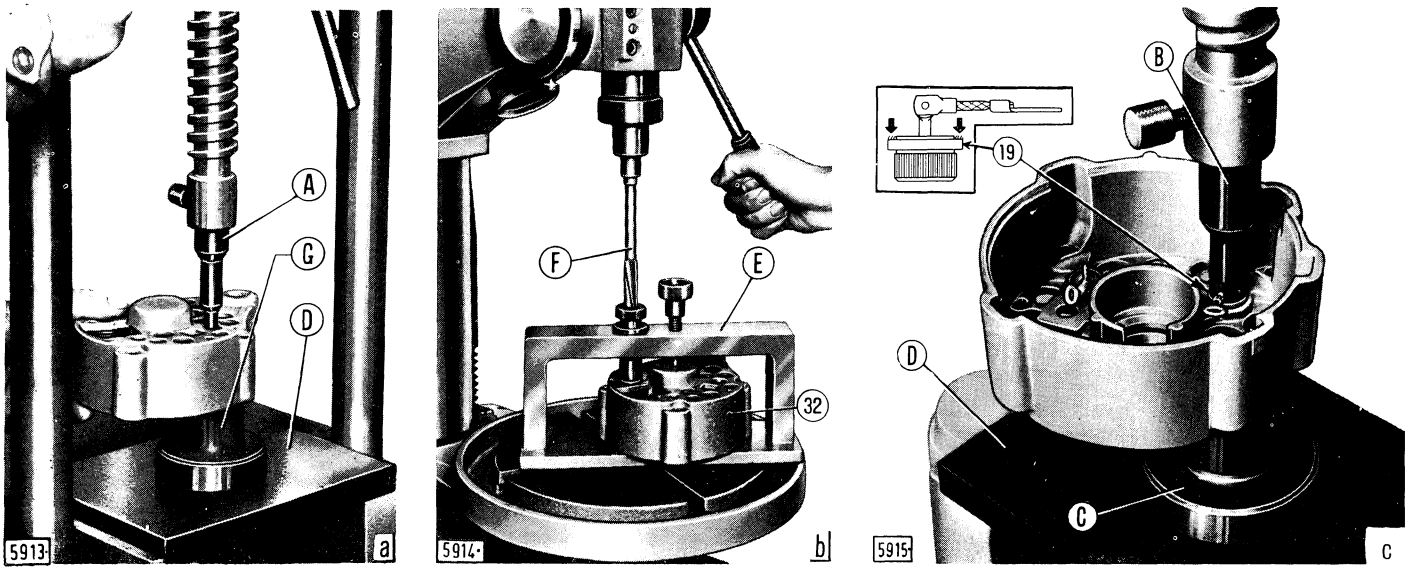


Fig. 288 - Removing Negative Diodes, Reaming Diode Seats and Reinstalling the Diodes by means of Hand Press Part No. 290021 and Fixed Drilling Machine (Speed = 1,000 r.p.m. approx.)

(a) Negative diode dismantling. - (b) Diode seat reaming. - (c) Diode reassembling.
The arrows in detail (c) point to the areas where the drift is to be applied in the course of diode press fitting. - A. Diode remover drift A. 76027 (290679). - B. Diode replacer drift A. 76028 (290680). - C. Support A. 76031 (290682). - D. Base A. 76032 (292195). - E. Diode fixture A. 76035 (290683). - F. Diode seat reamer A. 90340 (290686). - G. Support A. 76029 (290681). - 19. Rectifier diode. - 32. Alternator body.

Disconnect the stator winding terminals from the associated clamps, and the alternator warning terminal, and withdraw the stator assembly from the alternator body.

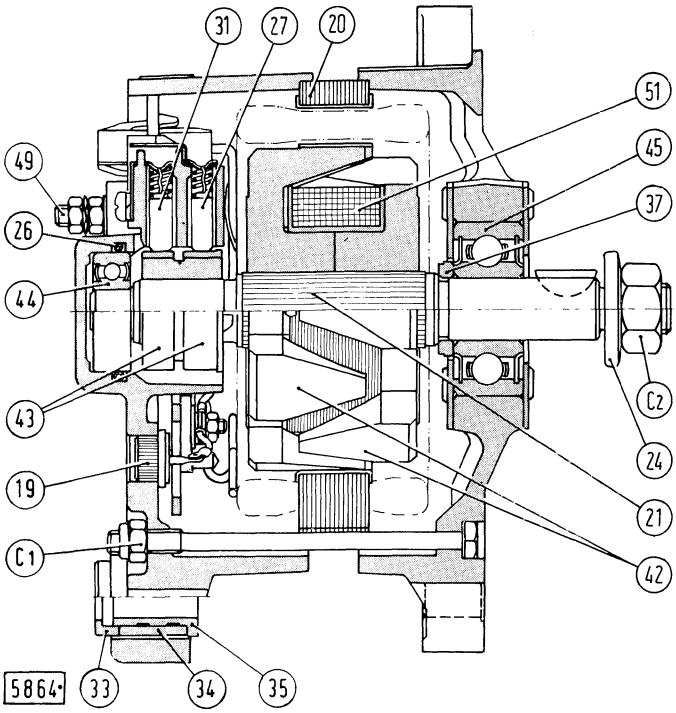


Fig. 289 - Section through Alternator Assembly.

C_1. Tie rod nut. - C_2. Pulley retaining nut. - 19. Negative diode. - 20. Stator. - 21. Rotor. - 24. Spring washer. - 26. Bearing outer race retaining ring. - 27. Positive brush (connected to terminal 67). - 31. Negative brush. - 33, 34 and 35. Bonded bush. - 37. Spacer. - 42. Polar wheels (pole shoes). - 43. Slip rings. - 44. Diode end ball bearing. - 45. Drive end ball bearing. - 49. Positive terminal post 30. - 51. Field winding.

Check for diode inefficiency bearing in mind that if one or more positive diodes are found to be faulty, the bridge assembly (6, Fig. 287) will have to be renewed as a whole, whereas defective negative diodes can be removed individually from the alternator body and renewed with others of the same polarity. When renewing a negative diode, note the following:—

a. The replacement diode must be of the type specially designed for the purpose. In addition to their identification marks, spare diodes bear the letter R stamped on them. Moreover, diode diameter over the knurled area is approximately .5 mm. (.02 in.) oversize (13.24 to 13.31 mm. instead of 12.73 to 12.80 mm. - .521 to .524 in. instead of .501 in. to .504 in.).

b. The mounting hole from which each failed diode is removed should be opened out to 13.12 to 13.16 mm. (.5165 to .5181 in.) before fitting the replacement diode.

To prevent damaging the parts involved during diode removal, reaming and assembly, it is advisable to use the equipment illustrated in Fig. 288.

Check for brush wear and, if necessary, renew the complete brush holder assembly.

In the course of reassembly, refer to Fig. 289 paying particular attention to the following points:—

— The alternator pivot holes should be correctly aligned.

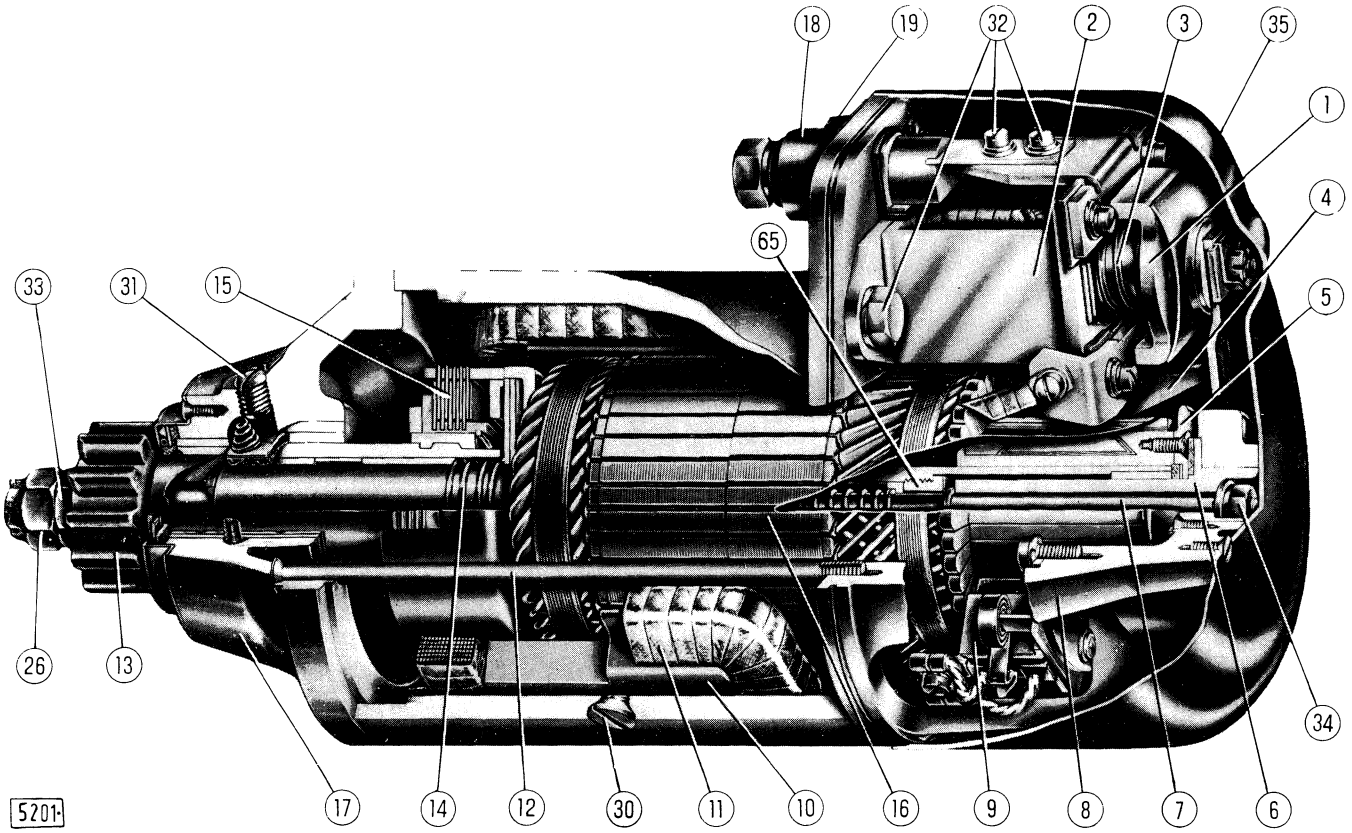


Fig. 298 - Cut-away View of Sliding Armature Starter

1. Moving contact bridge. - 2. Starter switch. - 3. Bridge return spring. - 4. Stop lever. - 5. Trip plate. - 6. Armature guide bush. - 7. Armature guide shaft with return spring. - 8. Rear brush holder. - 9. Brush. - 10. Pole shoe. - 11. Field winding. - 12. Tie rod. - 13. Pinion. - 14. Thrust spring. - 15. Clutch assembly. - 16. Armature. - 17. Drive end bracket. - 18. Positive terminal. - 19. Solenoid terminal. - 26. Locknut (with shear pin). - 30. Pole shoe retaining screw. - 31. Lubrication fitting. - 32. Solenoid retaining screws. - 33. Pinion retaining nut (with thrust and wear control washers). - 34. Armature retaining nut. - 35. Cover. - 65. Armature guide shaft ring nut.

Subsequently, upon energising the main field winding, the armature imparts maximum torque to the pinion.

— A friction type clutch (see Fig. 303), consisting of splined nut (23) screwed onto the pinion extension, which tends to unscrew when pinion rotation is opposed (cranking and starting phase), thereby causing the clutch friction plates to be compressed and establish a positive connection between armature and pinion.

On the contrary, when the pinion is driven by the ring gear (after starting), the splined nut tends to screw itself in, thereby eliminating clutch plate load to free the pinion and protect the armature from overspeeding.

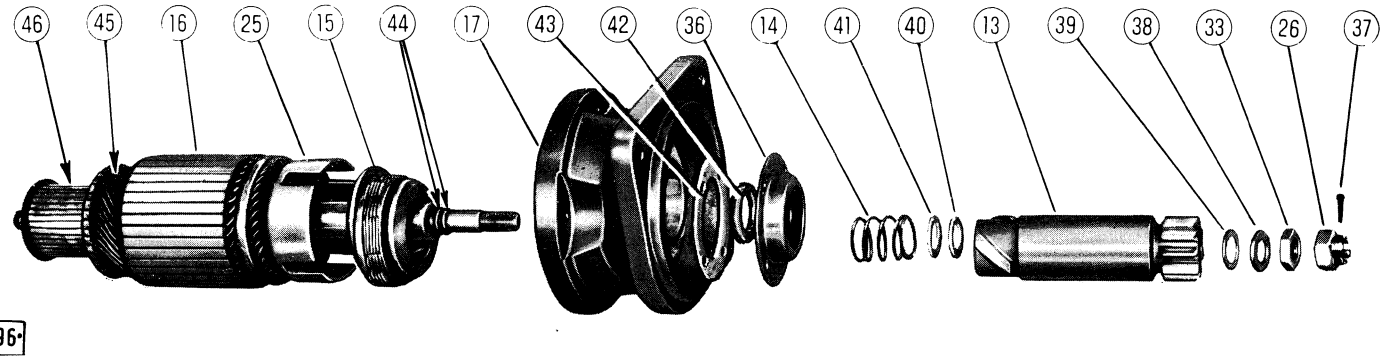


Fig. 299 - Exploded View of Armature and Starter Drive Assembly

13. Pinion. - 14. Thrust spring. - 15. Clutch assembly. - 16. Armature. - 17. Drive end bracket. - 25. Clutch yoke (attached to armature). - 26. Locknut. - 33. Pinion retaining nut. - 36. Seal retainer. - 37. Shear pin. - 38. Thrust washer. - 39. Wear control washer. - 40. Insulating washer. - 41. Plain washer. - 42. Pinion outer seal. - 43. End bracket seal. - 44. Pinion inner seals. - 45. Armature winding. - 46. Commutator.

Tightening Torque Figures - Continued.

DESCRIPTION	Thread Size	Torque (1)	
		kgm	lb. ft.
TORQUE CONVERTER			
Impeller retaining screws (C_1, Fig. 94)	5/16" - 18 UNC	2.8	20
Hydraulic pump drive gear retaining screws (C_2, Figs. 94 and 96)	5/16" - 18 UNC	2.8	20
Stator retaining screws (C_8, Fig. 97)	5/16" - 18 UNC	2.8	20
Hub retaining screws (C_3, Fig. 88)	3/8" - 16 UNC	5.3	38
Front bearing plate retaining screws (C_9, Fig. 94)	3/8" - 24 UNF	5.3	38
Converter hub plate retaining screws (C_5, Fig. 89)	3/8" - 24 UNF	5.3	38
Bell housing retaining screws (C_6, Fig. 94)	M 10 × 1.25	6	43
Oil baffle retaining screws (C_4, Fig. 93)	M 10 × 1.25	6	43
Converter/gearbox and steering clutch/brake pump driven gear retaining nuts (C_7, Figs. 88 and 93)	M 10 × 1.25	4.7	34
Equipment pump driven gear retaining screws (C_{10}, Fig. 88)	M 10 × 1.25	6.5	47
Rear bearing carrier retaining screws (C_{11}, Fig. 89)	1/2" - 13 UNC	8.4	61
Drive shaft retaining nuts (C_{16}, Fig. 87)	M 14 × 1.5	21	152
GEARBOX			
Rear cover retaining nuts (C_1, Fig. 100)	M 10 × 1.25	6	43
Front cover retaining screw (C_2)	M 10 × 1.25	6	43
Low-speed clutch cover bolts and nuts (C_3)	M 10 × 1.25	6	43
L.H. side cover retaining screws (C_4)	M 10 × 1.25	6	43
Reverse-speed clutch front cap retaining screws (C_5, Fig. 112)	M 10 × 1.25	6	43
Reverse-speed drive gear self-locking screw (C_6, Fig. 118)	M 10 × 1.25	6.5	47
Drive gear front bearing thrust plate retaining screws (C_7, Fig. 112)	M 10 × 1.25	6	43
Reverse-speed shaft flange retaining screws (C_8, Fig. 103)	M 10 × 1.25	6	43
Clutch control valve spool cap retaining screws (C_9, Figs. 100 and 105)	M 10 × 1.25	6	43
Front bearing tab self-locking screws (C_{10}, Fig. 118)	M 10 × 1.25	6.2	45
Drive gear bracket retaining screws (C_{11}, Fig. 112)	M 12 × 1.25	10	72

(1) Wet (engine oil).

Service Tools - Continued.

Part No.	DESCRIPTION
290445 (1-2-3-4)	— Hose
290447 (1-3)	— Hose
290448 (1-2-3-4)	— Adaptor
290449 (2-4)	— Fitting with restrictor
290469 (3)	— Valve support
290525 (3)	— Support Part No. 290469 pad
290526 (3)	— Hose
290540 (1)	— Adaptor
290541 (1-3)	— Adaptor
290542 (4)	— Filler
290544 (3)	— Hose
290552 (2-4)	— Plate complete with temperature gauge, pressure gauge and valve
290555 (4)	— Screws (two off) for fitting 290331
290581 (4)	— Fitting
290600/1 (4)	— Plug
291231 (1-2-3-4)	— Output tester
291235 (1-2-3-4)	— Electric motor on trolley
291237 (2-3)	— Oil tank
291314 (2-3-4)	— Pressure gauge kit
291318 (3-4)	— Fitting
292520 (3)	— Fitting
292256 (2) } 292257 (2) }	— Plate Part No. 292262 brackets
292262 (2)	— Valve block plate
292382 (2)	— Fitting
292383 (3-4)	— Plug
292459 (3)	— Support Part No. 290469 pad
292520 (3)	— Fitting
292574 (1)	— Output tester
292588 (3)	— A 18 X Plessey pump
292589 (2-4)	— A 42 X Plessey pump
292850 (4)	— Washer for valve incorporated in plate Part No. 290552

Part No.	DESCRIPTION
	BEVEL DRIVE
291221	Crown wheel remover/replacer support (see Fig. 150)
291285	Torque spanner (up to 275 kgm - 1998 lb. ft.) (see Fig. 148)
291530/1	Pinion position adjustment gauge
291533	Crown wheel lifting hook (see Figs. 149 and 152)
291580	Pinion stop for clearance check and bevel drive rotation (see Fig. 158)
291581	Pinion remover/replacer support (see Fig. 148)
291585	Pair of bearing housing puller screws (see Fig. 147)
291586 (°)	Pair of pinion carrier remover guide pins
292224	Pinion bearing locknut spanner (see Fig. 148)
	STEERING CLUTCHES
290166	24 mm. clutch pack retaining screw spanner, long type (see Fig. 167)
291517 (*)	Universal lifting chain (see Fig. 159)
291535	Clutch pack remover/replacer tool (see Figs. 163 and 165)
291536	Clutch pack retaining screw clamp (see Fig. 167)
291538	Drive plate drum sealing ring replacer compressor
291578	Drive/driven plate hub extractor (see Figs. 161 and 197)
291579	Drive plate hub clamp (see Figs. 161 and 197)

(1) Hydraulic pump test. - (2) Valve block test. - (3) Valve test. - (4) Gearbox assembly test and setting of valve incorporated in plate Part No. 290552.
(°) Also used for gearbox (see page 207).
(*) Also used for torque converter and gearbox (see pages 206 and 207).

STEERING CLUTCH/BRAKE HYDRAULIC SYSTEM

See FL 10, page 8.

HUB-REDUCTION FINAL DRIVE

See FL 10, page 8.

SPROCKETS

See FL 10, page 8.

UNDERCARRIAGE

See FL 10, page 8.

UNDERCARRIAGE

Floating box frame track carriage assemblies hinged at the rear and guided at the front.

- No. of shoes (each chain) 38
- Standard shoe width . . 450 mm. (17.7 in.)
- Link pitch . . . . . 176 mm. (6.93 in.)
- Ground contact area (standard shoes) . . . 18,990 sq.cm. (2,943 sq.in.)
- Specific ground pressure (standard shoes)
  - AD 10 . . . . . .62 Kg/cm² (8.8 p.s.i.)
  - BD 10 . . . . . .63 Kg/cm² (8.9 p.s.i.)
- Optional shoe width 500-550 mm. (19.7-21.6 in.)
- Number of track rollers (each chain) 5
- Number of top idler wheels (each chain) 1

Hydraulically-actuated double spring track tension assembly

- Overload valve pressure setting . . . . . 800 to 850 Kg/cm² (11,378 to 12,089 p.s.i.)

Sealed-for-life track rollers, top idlers and front idler wheels, fitted with long-life floating ring seals.

FRONT SUSPENSION

Swinging crossmember hinged at the centre and cushion-mounted onto the track carriage assemblies.

REAR SUSPENSION

Two bars attached to the axle case and resting on the track carriage assemblies to which they are fastened by means of double hinges.

EQUIPMENT

Gear-type hydraulic pump driven off the flywheel through a pair of gears.

- Pump drive ratio . . . . . .956 to 1
- Rated output . . . . . 218 litres/min. (48 gall./min.)
- Rated pressure . . . . . 122 Kg/cm² (1,735 p.s.i.)

Steel wool cartridge oil filter on pump inlet and paper cartridge filter branched off the oil exhaust to tank.
Hydraulic control valve assembly incorporating three shuttle valve spools, pressure relief valve, safety valves, reverse flow control valves and non-return valves for each circuit.

- Relief valve pressure setting . . 118 to 122 Kg/cm² (1,678 to 1,735 p.s.i.)
- Safety valve pressure setting . . 128 to 132 Kg/cm² (1820 to 1877 p.s.i.)

Two double-acting blade control cylinders equipped with stroke control valves and rapid lower valves

- Bore and stroke . . . . . 100 × 840 mm. (4 × 33 in.)

Blade tilt double-acting cylinder (on left-hand side of blade, model BD 10) incorporating flow control valves.

- Bore and stroke . . . . . 180 × 140 mm. (7 × 5 1/2 in.)

Scarifier double-acting cylinder (optional)

- Bore and stroke . . . . . 140 × 385 mm. (5 1/2 × 15 1/8 in.)

Two ripper double-acting cylinders (optional)

- Bore and stroke . . . . . 100 × 400 mm. (4 × 15 3/4 in.)

ELECTRICAL SYSTEM

See FL 10, page 9.

WEIGHTS

- Dry engine (without lubricant, coolant and air cleaner) 670 Kg. (1,477 lbs.)
- Standard machine (fully operational, including driver)
  - AD 10 . . . . . 11700 Kg. (25,798 lbs.)
  - BD 10 . . . . . 11850 Kg. (26,129 lbs.)

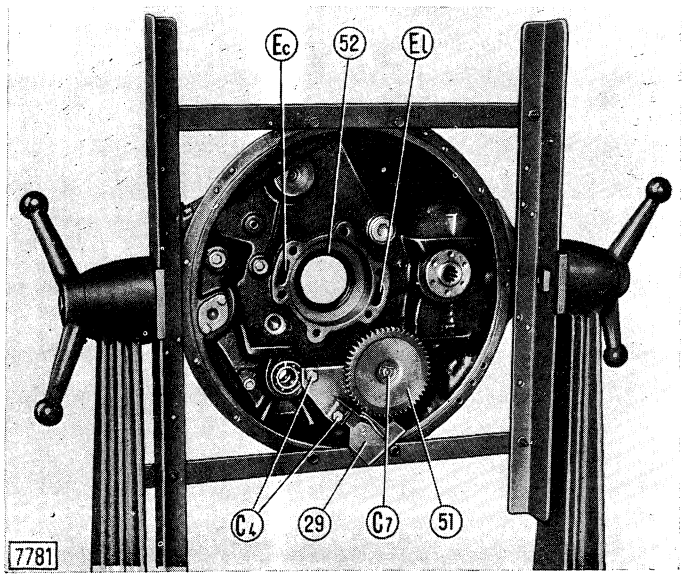


Fig. 324 - Master Clutch Bell Housing

C_1. Oil baffle retaining screws. - C_7. Steering clutch/brake pump driven gear retaining nut. - Ec. Engagement oil port. - El. Lube. oil port. - 29. Oil baffle. - 51. Steering clutch/brake pump driven gear. - 52. Seal.

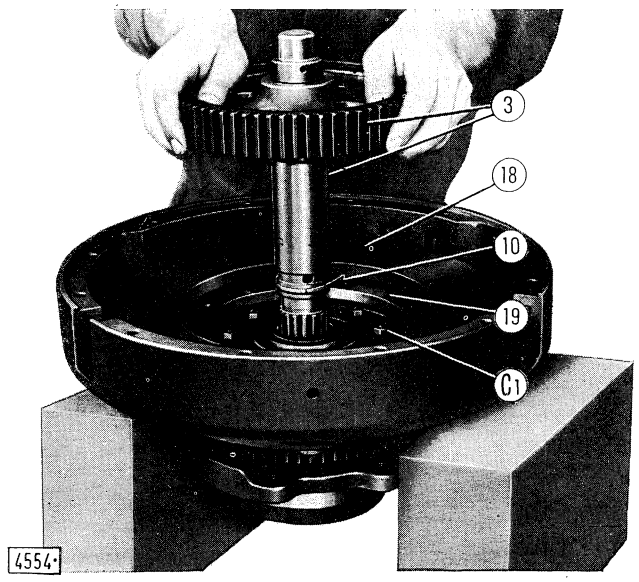


Fig. 326 - Refitting the Complete Clutch Shaft

C_1. Drive gear self locking screws. - 10. Split sealing rings. - 18. Rear thrust ring. - 19. Thrust plate.

TO REASSEMBLE

Proceed as follows:—

— Refit oil baffle (29, Fig. 324) and hydraulic pump driven gears (51).

— Reposition spacer (9, Fig. 323) into the bearing carrier as shown, and reinstall rear ball bearing (26).

— Refit sealing ring (31), reinstall drive gear (24, Fig. 325) as shown, lock intermediate ball bearing (23) with circlip (25) and reposition sealing rings (22).

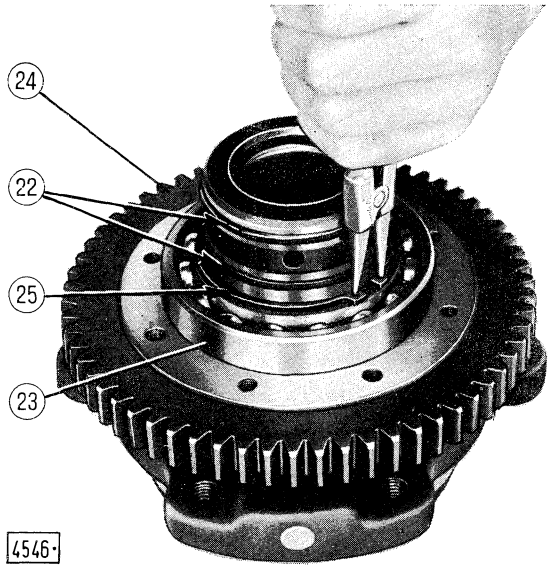


Fig. 325 - Removing (or Refitting) Intermediate Ball Bearing Circlip

22. Sealing rings. - 23. Intermediate ball bearing. - 24. Hydraulic pump drive gear. - 25. Circlip.

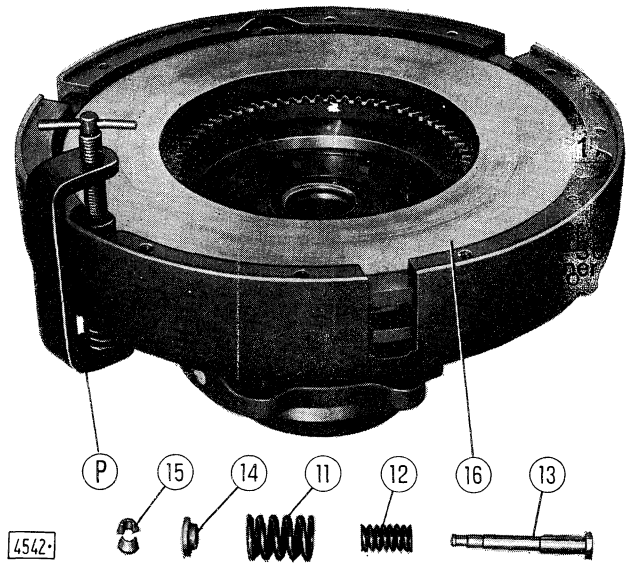


Fig. 327 - Removing (or Refitting) Thrust Plate Outer and Inner Return Springs

P. Compressor Part No. 291519. - 11. Outer springs. - 12. Inner springs. - 13. Pin. - 14. Cup. - 15. Retaining split cones. - 16. Intermediate pressure plate.

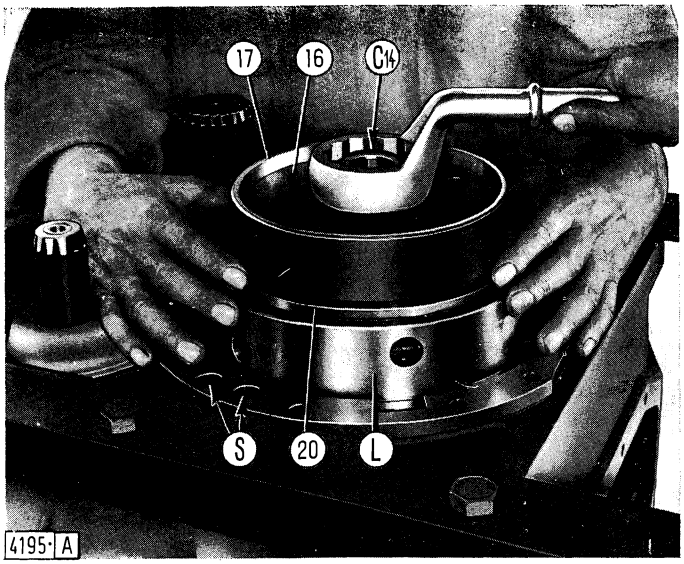


Fig. 339 - Refitting the Low-speed Clutch Retaining Nut
C_{14}. Nut. - L. Low-speed clutch. - S. Lube. and hydraulic oil ports - 16. Reaction plate. - 17. Piston. - 20. Outer steel plate.

9. To reassemble gearbox outer covers:—

— Reinstall complete rear cover (29, Fig. 330) and cover (28) for low-speed clutch case, being careful to refit the seals.

— Refit plug (T, Fig. 335) and smear cover gasket with grease.

— Reconnect tubes (9 and 10, Fig. 331) and place lifting hook Part No. **291526** (A, Fig. 116) on front cover, screw dowels Part No. **291525** (B) on case and use a drive punch to fit the low-speed clutch tubes into the associated cover bores.

— Reinstall left/right-hand side covers (6, Fig. 330), inspection cover (2) and lube. oil manifold cover (1) after refitting seals and making sure that cover (1) is complete with o-rings.

— Slide in control valve spools (8, Figs. 113 and 117) of low/high/forward-speed clutches following the instructions listed under **5**.

— Refit gasket (G, Fig. 117) smeared with grease and reinstall caps (3, 4 and 5, Fig. 330).

TO REFIT

Refit the complete gearbox unit noting the following:—

— Perfectly clean with trichloroethylene the gearbox/axle case mating surfaces and apply one of the following jointing compounds:— LOCTITE PLASTIC GASKET - VIT C type - OMNI FIT 150 H - RHODORSIL CAF 1.

— Use dowels Part No. **291586** and lifting rope Part No. **290650** to refit gearbox to the axle case.

— When refitting main drive shaft, make sure that the rear universal joint is complete with cork gasket (49, Fig. 340) and the splined end is smeared with NEVER-SEEZ lubricant (supplied by ANGST-PFISTER).

GEARBOX DATA

Type	Power-shift Mechanical speed reduction unit
Speeds	Two forward and two reverse in work and travel gear range
Gear type	Spur, constant mesh

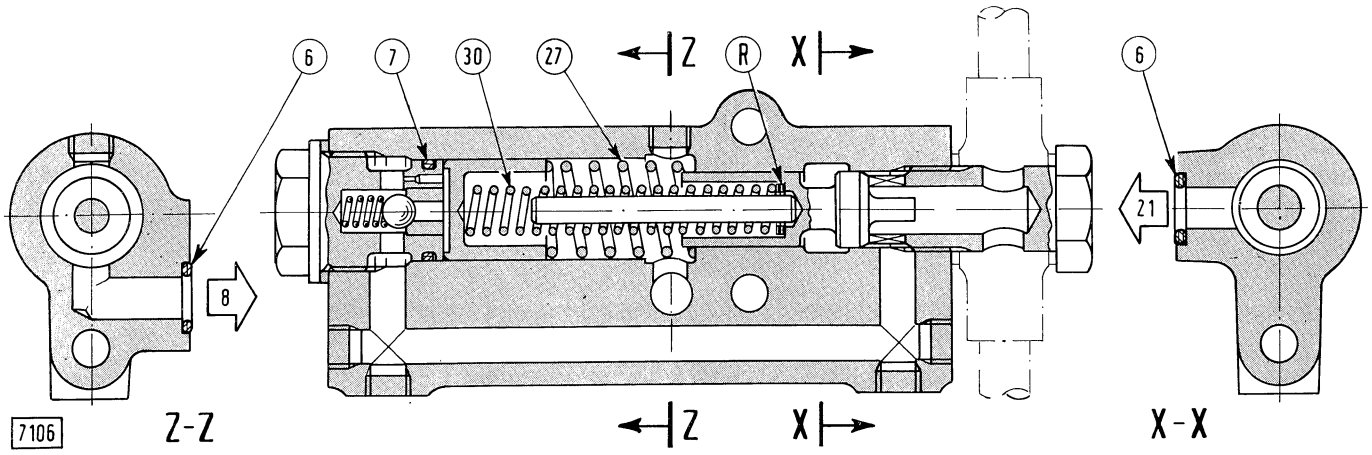


Fig. 345 - Sectional Views of Retarder Valve

R. Inner spring shims (8 off maximum). - 6 and 7. O-rings. - 8. Exhaust duct. - 21. Duct to lubrication manifold. - 27. Outer spring. - 30. Inner spring.

In case of replacement, make sure that plug reference number **6** is positioned as shown (see Fig. 346).

When refitting the valve, be careful to install o-rings correctly in their grooves (6, Fig. 345).

Fix hose (35, Fig. 317) to the valve body without tightening fitting (2, Fig. 347).

Refit the valve with attached hose and fully tighten fitting (2).

TO ADJUST

Install retarder valve and tester on bench as directed on page 87 for the FL 10 loader retarder valve.

Check the valve setting following the procedure described on page 249 under **4** for gearbox hydraulic test with retarder valve in position.

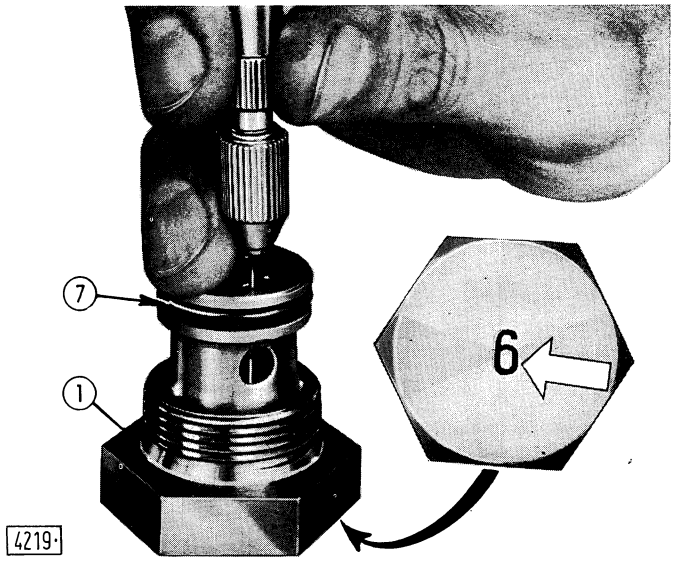


Fig. 346 - Cleaning Retarder Orifice

Note: Number 6, indicated by the arrow, is the reference mark for the plugs to be used on Models AD 10 and BD 10 fitted with master clutch.

1. Plug assembly. - 7. O-ring.

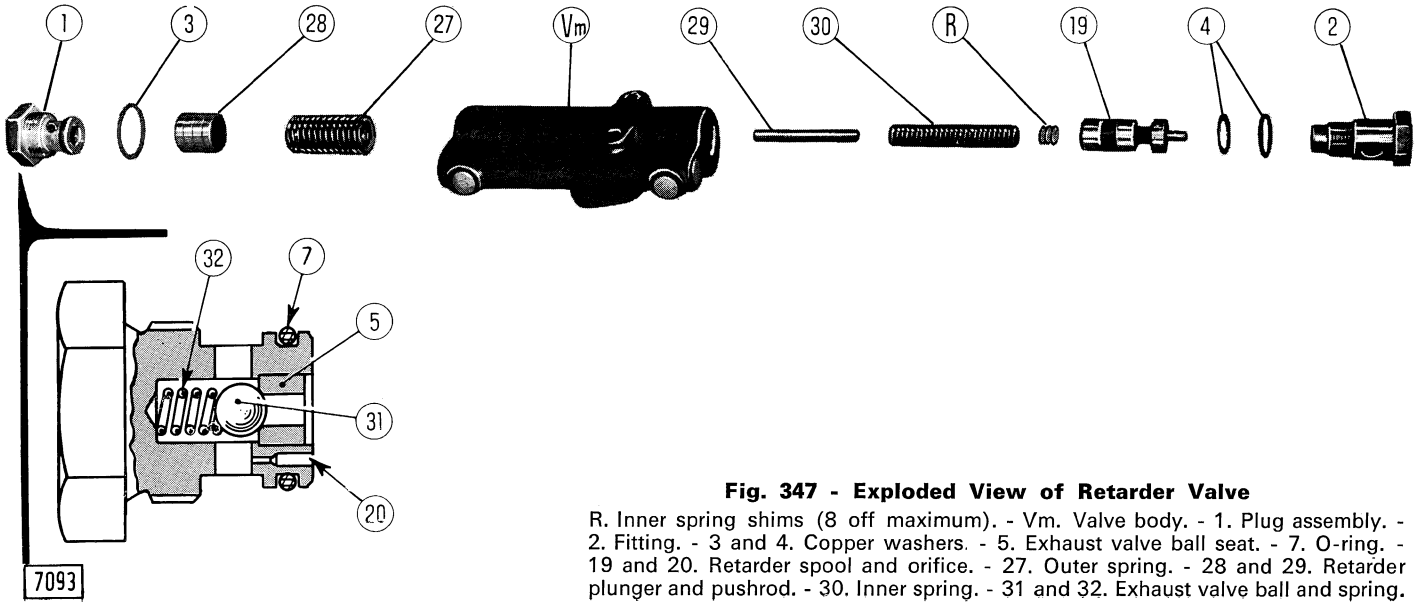


Fig. 347 - Exploded View of Retarder Valve

R. Inner spring shims (8 off maximum). - Vm. Valve body. - 1. Plug assembly. - 2. Fitting. - 3 and 4. Copper washers. - 5. Exhaust valve ball seat. - 7. O-ring. - 19 and 20. Retarder spool and orifice. - 27. Outer spring. - 28 and 29. Retarder plunger and pushrod. - 30. Inner spring. - 31 and 32. Exhaust valve ball and spring.

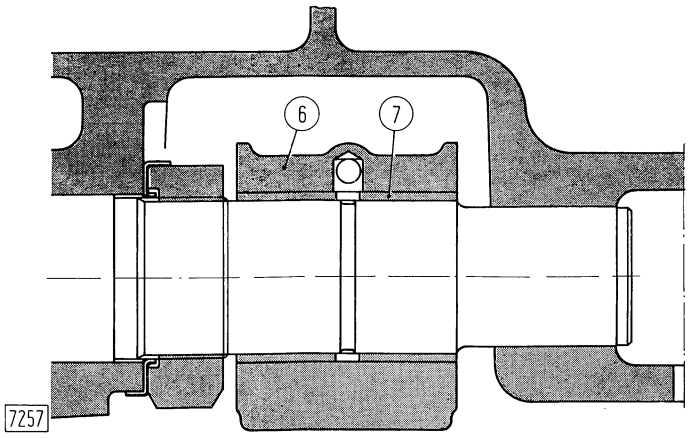
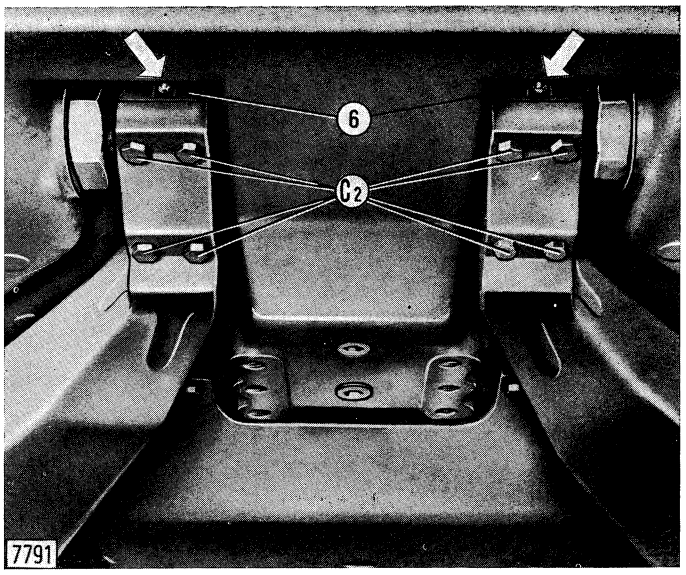


Fig. 359 - Rear Track Carriage Inner Carrier Arms
Note: The arrows point to the position of the bush lubricators. C_2. Cap retaining screws. - 6. Carrier arm caps. - 7. Split bushes.



Front Idler Wheel Slipper Guide Mounting Surfaces

Maximum flatness error of both rail surfaces (B) is 1 mm. (.04 in.). The same allowance applies to the parallelism error with respect to surfaces (A).

Top Idler Mounting Surfaces

The allowance on parallelism between surfaces (C) and (A) is 1 mm. (.04 in.).

Suspension Bar Outer Support Mounting Surfaces

Outer rail surface (D) on each track carriage frame should be flat to within .3 mm. (.012 in.) and parallel with respect to surfaces (A) to within 1 mm. (.04 in.).

Track Carriage Inner Support Bush Housing

Bore diameter (E) should be 67.200 to 67.250 mm. (2.6457 to 2.6476 in.) with caps in position.

TO REFIT

When refitting the track carriage assemblies note the following points:—

— Upon connecting the rear end of each track carriage to the machine, insert dowels (1, Fig. 356) in their holes which, in production, have been drilled with the track carriage frames connected to outer supports (3) after checking track carriage parallelism.

— Adjust the clearance between guide plates (8, Fig. 358) and connecting plate (10) to .5 mm. (.02 in.) on each side (H_1 and H_2), by altering shim thickness (S_1 and S_2) as necessary.

— Lubricate the inner carrier arm split bushes using grassofiat G9 or other approved lubricant.

TO CHECK AND ADJUST TRACK CARRIAGE ALIGNMENT

The track carriage assemblies should be square to machined face (Z, Fig. 360) on the axle case, and parallel to one another to within ± 4 mm. (.160 in.).

To check track carriage parallelism use service tool Part No. **291572** together with support fixture Part No. **291575** (see Fig. 243), proceeding as directed below.

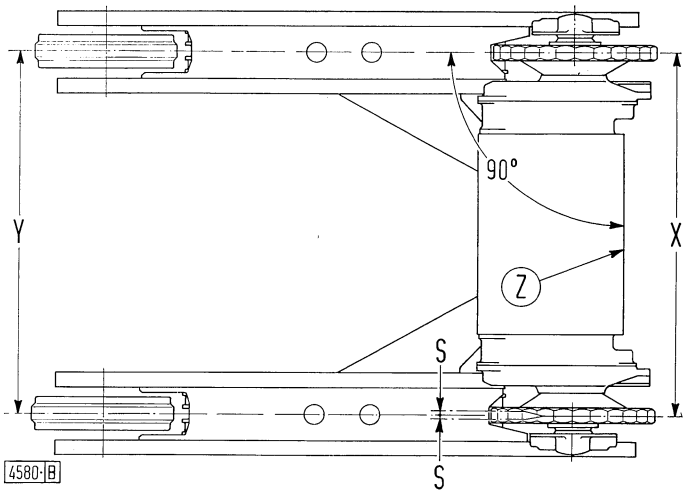


Fig. 360 - Checking Track Carriage Parallelism
Note: Maximum variation of dimension Y from dimension X is ± 4 mm. (.16 in.).
S = 2 mm. (.08 in.) centreline misalignment. - Z. Machined face on axle case.

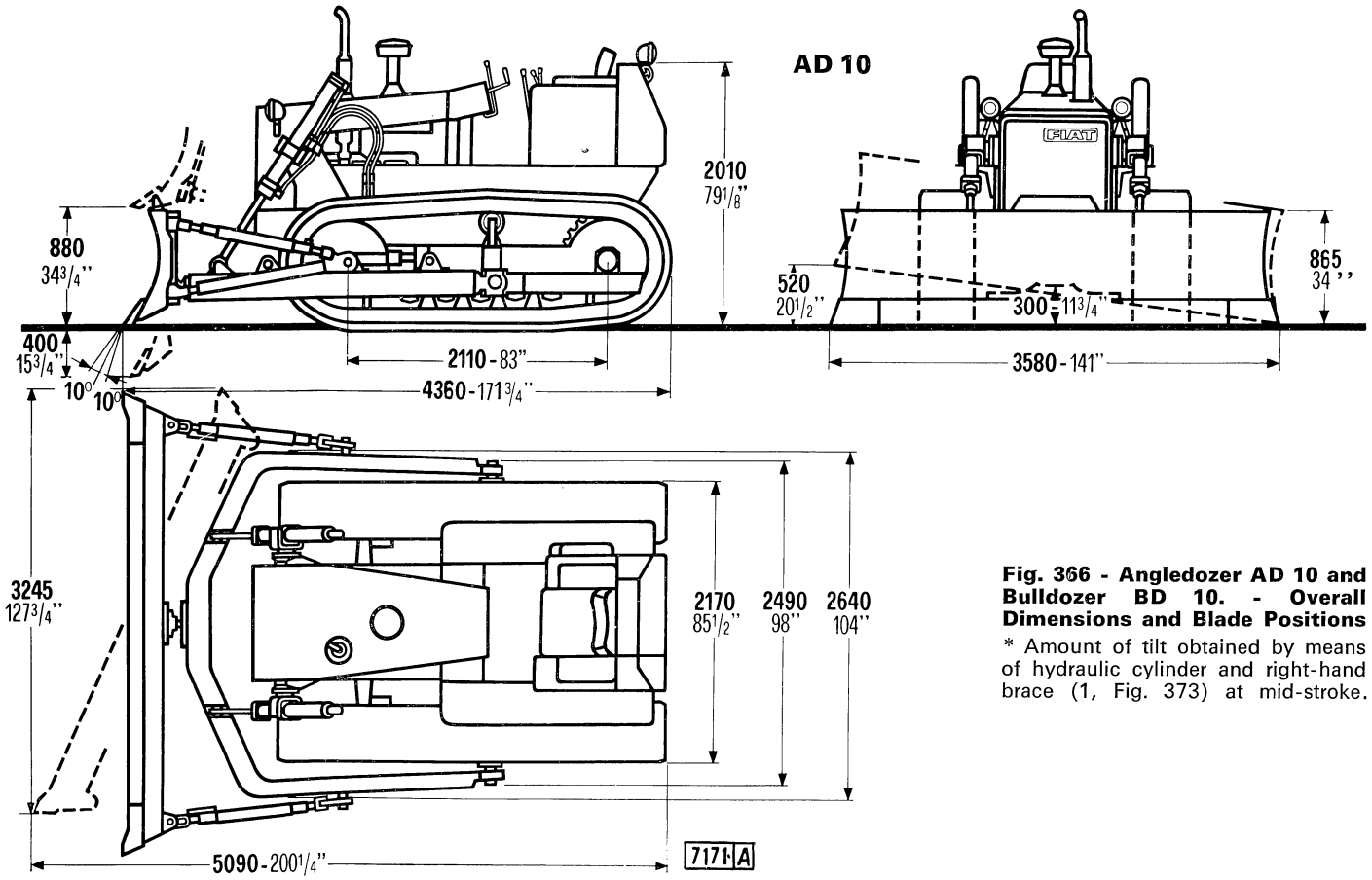
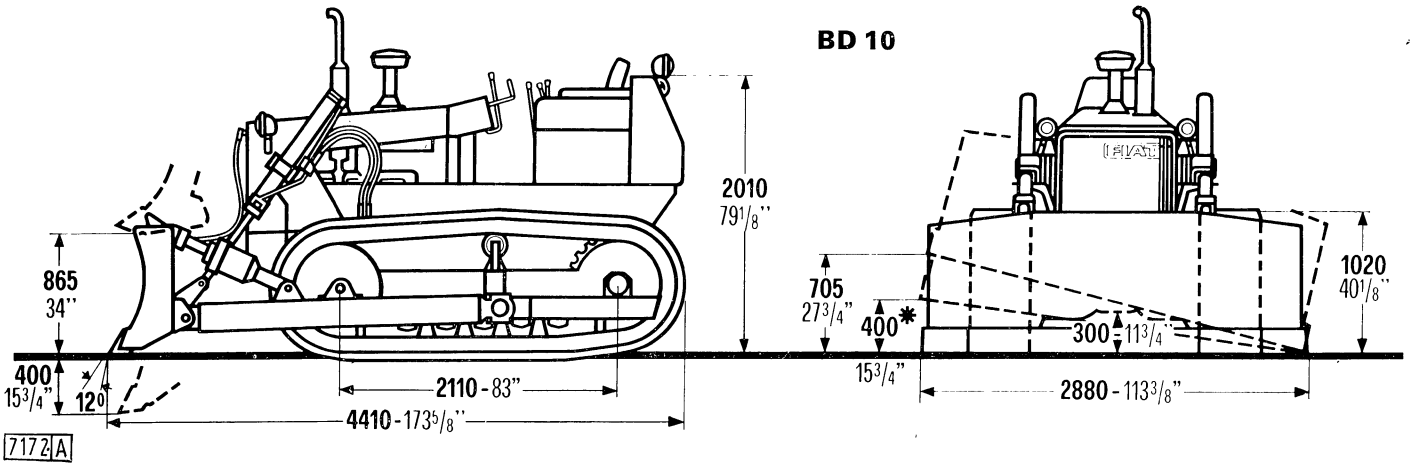


Fig. 366 - Angledozer AD 10 and Bulldozer BD 10. - Overall Dimensions and Blade Positions

* Amount of tilt obtained by means of hydraulic cylinder and right-hand brace (1, Fig. 373) at mid-stroke.



VALVE BLOCK ASSEMBLY

The equipment valve block assembly is situated on the inside of the panel to the right of the driver's seat (see Fig. 367).

Detent balls (33, Fig. 368) acting on blade raise control valve spool, enable the associated control lever (B, Fig. 367) to be held in float position.

When dismantling the valve block assembly, note the following points:—

— Withdraw front cover (18, Fig. 368) from control valve spools with due care, to prevent damaging seals (22 and 23) and to ensure that pilot valve (4) does not fall off its seat.

— Remove blade valve spool detent ball end plugs (29) and, possibly, the rear end cover, prior to removing the rear cover assembly.

— Mark the assembled position of both side control valve spools (a and c) to ensure that they are correctly refitted on reassembly.

— Withdraw the valve spool assemblies from the rear end of the valve block body and take off the associated return springs using tool Part No. **292969** (see Fig. 265).

EQUIPMENT FAULT FINDING CHART

FAULT	CAUSE	REMEDY
1. Pump noise (hissing) after 15 to 30 minutes of operation (according to temperature).	a. Low tank oil level.	Top up (see page 261) and remedy any leakage.
	b. Clogged inlet filter (Fa, Figs. 364 and 365).	Inspect and wash filter.
	c. Pump inlet line leakage.	Check and tighten clips.
	d. Excessive oil density.	Renew using fluid oil.
	e. Leaking pump drive seals (6, Fig. 254).	Renew seals.
2. Blade or scarifier fails to raise.	a. Pump drive shaft failure (see 21, Fig. 255).	Renew as necessary.
	b. Pump inefficiency.	Overhaul or renew as necessary.
	c. Valve block body failure.	Renew valve block body.
	d. Stuck relief valve (4, Figs. 364 and 365).	Clean valve and inspect filters.
	e. Plunger (13, Fig. 364) stuck open.	Clean valve and inspect filters.
3. Blade or scarifier fails to remain in selected position.	a. Excessive valve spool leak-through.	Renew worn parts.
	b. Safety valves (6 and 9, Figs. 364 and 365) stuck open or set too low.	Clean valves and inspect filters, check pressure setting.
	c. Hydraulic cylinder piston leak-through.	Renew piston glands.
	d. Excessive leak-through on flow control valve plunger (13, Fig. 364).	Renew worn parts.
4. Slow and weak blade and scarifier movement.	a. Clogged pump inlet filter (Fa, Figs. 364 and 365).	Inspect and wash filter.
	b. Low relief valve pressure setting (see 4).	Restore correct pressure setting (see page 264).
	c. Poor pump performance.	Overhaul or renew as necessary.
	d. Cracked valve block body interior.	Renew valve block body.
	e. Flow control valve plunger (13, Fig. 364) stuck open.	Clean valve and inspect filters.
5. Erratic blade and scarifier raise.	a. Low tank oil level.	Top up (see page 261) and remedy any leakage.
	b. Clogged pump inlet filter (Fa, Figs. 364 and 365).	Inspect and wash filter.
	c. Pump inlet line leakage.	Check and tighten clips.
	d. Leaking pump drive shaft seals (6, Fig. 254).	Renew seals.
6. Engine labouring and relief valve cut-in upon valve block control lever operation.	Non-return valve stuck closed (see 8, Figs. 364 and 365).	Clean valve and inspect filters.

Tightening Torque Figures - Continued.

DESCRIPTION	Thread size	Torque (1)	
		Kgm	lb. ft.
Blade tilt tie rod and cylinder ball joint socket retaining screws (C_3, Fig. 374)	M 16 × 1.5	23	166
Arm rear end ball plate retaining screws (C_7, Fig. 372)	M 18 × 1.5	34.5	249
Blade tooth retaining nuts	M 20 × 1.5	51	369
Arm rear end ball socket retaining nuts (C_9, Fig. 372)	M 20 × 1.5	48	347
Blade Hydraulic Cylinders			
Cylinder yoke thrust plate retaining screws (C_1, Fig. 375)	M 14 × 1.5	15	108
Yoke cap retaining screws (C_2)	M 14 × 1.5	15	108
Piston rod seal retainer screws (C_3, Fig. 376)	M 14 × 1.5	15	108
Cylinder carrier retaining screws (C_4, Fig. 375)	M 16 × 1.5	23	166
Cylinder front end plate retaining screws (C_5, Fig. 376)	M 16 × 1.5	22	159
Piston retaining nut (C_6)	M 30 × 2	50	362
Rapid Lower Control Valves			
Pipe flange retaining screws (C_1, Fig. 377)	M 12 × 1.25	11	80
Blade Tilt Hydraulic Cylinder - Bulldozer BD 10			
Piston rod seal retainer fixing screws (C_1, Fig. 378)			
— A.M.	M 14 × 1.5	12	87
— P.M.	M 12 × 1.25	10.5	76
Cylinder front end plate retaining screws (C_2)	M 24 × 2	76.5	553
Split piston retaining nut (C_3)			
— Slotted nut (A.M.)	M 48 × 1.5	130	940
— Nylon-insert self-locking nut (P.M.)	M 48 × 3	210	1519
Flow Control Valves - Bulldozer BD 10			
Tilt cylinder pipe retaining nuts (C_7, Fig. 367)	M 10 × 1.25	4.3	31
Scarifier SC 10			
See FL 10, page 204			
Ripper RP 10			
Piston rod seal retainer screws (see C_1, Fig. 382)	M 14 × 1.5	13	94
Cylinder rear end plate retaining screws (C_2)	M 16 × 1.5	22	159
Ripper carrier retaining screws	M 24 × 2	81	586
Piston retaining nut (C_3)	M 30 × 2	50	362
ELECTRICAL SYSTEM			
See FL 10, page 204			

(1) Wet (engine oil).

TORQUE CONVERTER DATA

Note: For all other information, see page 66.

Type	13 in. single stage, single phase
Make	TWIN DISC
Model	6-F-1301 MS 400
Torque multiplication ratio	2.3 to 1

IMPORTANT

Figures, specifications and repair instructions contained in this Supplement cover the modifications introduced on units of class 10, version B (from frame No. 102.604), as well as a number of modifications previously introduced on the units of the preceeding version and retained on class 10 B. For all other information consult the Main Section. To facilitate retrieval of the relevant information, the Contents of the Appendix carry bold type page numbers for the text to be found in the Main Section, and standard type numbers for the text of this appendix.

P. M. TORQUE CONVERTER/GEARBOX HYDRAULIC SYSTEM

OPERATION

1. Feeding and Scavening

Feed pump (Pa, Fig. 5) draws oil from gearbox case, through filter (Fa) and feeds the system where the oil is cleaned again through filter (Fm).
By pass valve (5) protects filter (Fm) from any sudden rise in pressure due to cartridge clogging or abnormal oil density. It operates when an abnormal pressure drop occurs inside the filtering element, and its function is to ensure oil flow through the system all the time, partially or totally by-passing the cartridge.
Scavenge pump (Pr), integral with feed pump (Pa), draws oil from the converter case through gauze filter (Fr) and feeds it back into the gearbox case.

2. Converter/Gearbox Pressure Regulating Valve

After flowing through filter (Fm) the oil from feed pump (Pa, Fig. 5) enters pressure regulating valve (4), the functions of which are as follows:

— To maintain gearbox clutch oil pressure setting (red sector).

— To convey to the torque converter (C) the greater quantity of the oil, for converter cooling, oil cooling, lubrication and clutch cooling.

Valve (6), on outlet line, regulates converter pressure (red sector).
Safety valve (3) protects the converter unit and heats exchanger from accidental pressure overloads, normally due to cold or too thick oil, draining surplus into the scavenge pump outlet line (Pr).

3. Oil Cooling, Lubrication and Clutch Cooling

The oil from the converter enter the heat exchanger past valve (6, Fig. 5) and through manifold (21) flows to the lubrication lines of gearbox clutches. Maximum lubrication pressure is controlled by relief valve (22). A temperature gauge (T), on the dashboard, indicates the temperature of the oil entering the heat exchanger. An oil pressure warning light (S) flashes or lights up with the engine running when the lubrication pressure is insufficient; in this case the engine unit be stopped immediately and the fault checked following the instructions given on page 92 of the Main Section.

4. Gearbox Clutch Control

Valve (4, Fig. 5) controls gearbox clutch oil pressure (red sector) which reaches valve block (D)
When the gearshift lever is operated, control valves (11, 12 and 13) distribute oil to selected gear clutch shift cylinders.
According to valve position, the gears will beengaged, as tabulated below.

VALVE	VALVE POSITION	SELECTED SPEEDS
11 12 13	Up Down Up	Low - Forward
11 12 13	Down Up Up	Low - Reverse
11 12 13	Up Down Center	Intermediate - Forward
11 12 13	Down Up Center	Intermediate - Reverse
11 12 13	Up Down Down	High - Forward
11 12 13	Down Up Down	High - Reverse
11 12 13	Up Up Any	Neutral (*)

(*) With gearshift lever in neutral one of the three clutches, low, intermediate or high speed, is always engaged.

Undercarriage Data - Continued.

	mm.	in.
Track roller axle journal dia. (8, Fig. 11)	59.970 to 60.000	2.361 to 2.362
Bush fitted I.D. (6)		
— Standard yellow bronze	60.270 to 60.345 (2)	2.372 to 2.375
— white bronze (3)	60.390 to 60.465 (2)	2.377 to 2.380
Bush running clearance		
— yellow bronze bushes	.270 to .375	.010 to .014
— white bronze bushes (3)	.390 to .495	.015 to .019
Bush wear allowance	1.5	.059
Bush O.D. (6, Fig. 10 and 11)	69.075 to 69.105	2.719 to 2.720
Bush housing bore dia. (in idler and roller)	69.000 to 69.030	2.716 to 2.717
Bush interference fit	.045 to .105	.0018 to .0041
Bush flange thickness (6)	4.950 to 5.000	.1949 to .1970

(2) No reaming.
(3) Silvery colour.

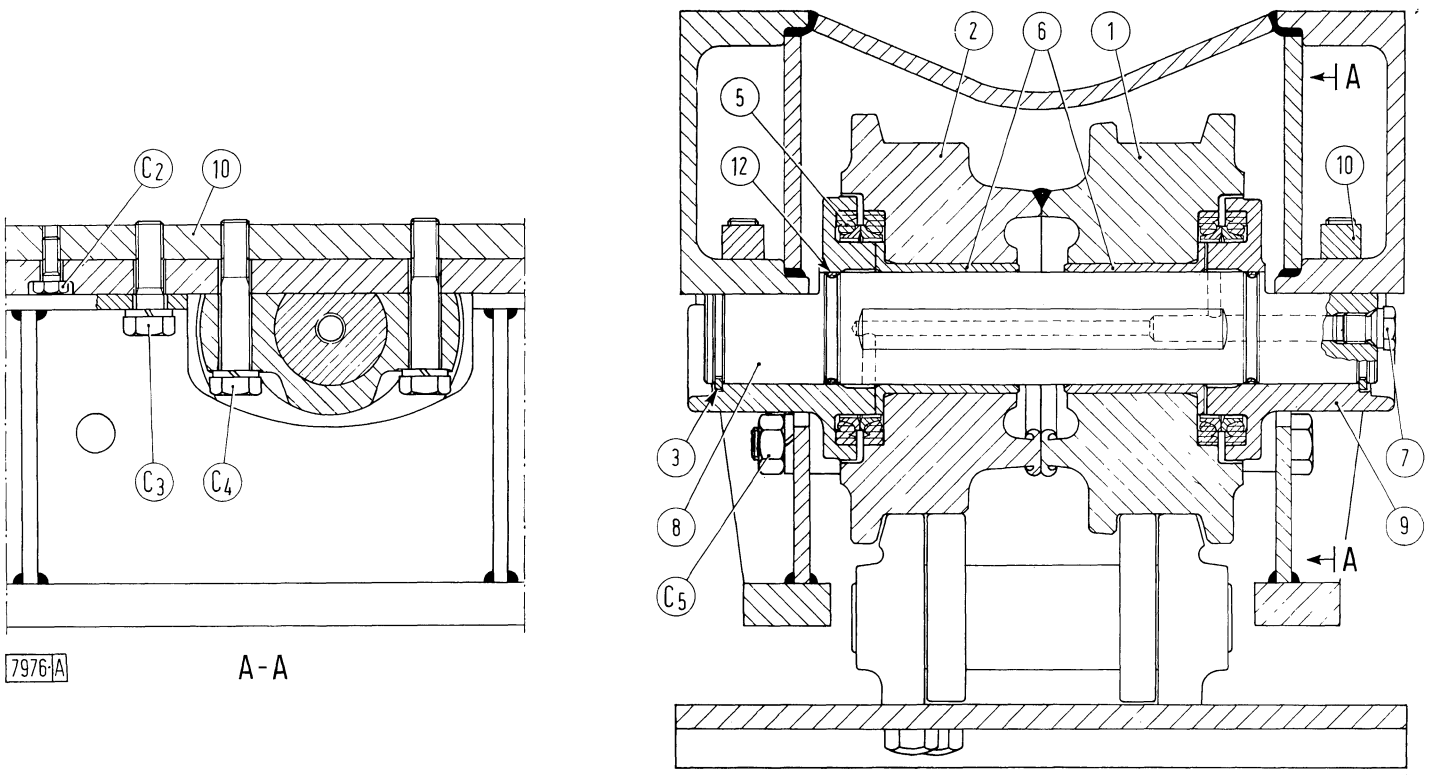


Fig. 11 - Section Throug Track Roller.

C_2. Retaining screws (10). - C_3. Lower carriage guard screws. - C_4. Roller carrier screws. - C_5. Carriage guard retaining nuts. - 1. Roller (double flanged). - 2. Roller (Single flanged). - 3. Split axle retaining ring. - 5. Floating ring seal. - 6. Bushes. - 7. Lubrication fitting. 8. Axle. - 9. Roller carrier. - 10. Lower guard and roller rail. - 12. O-Ring.

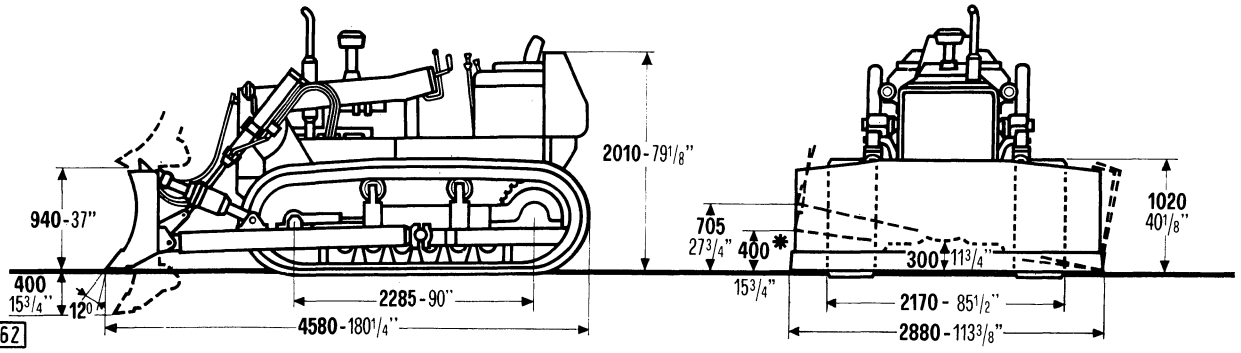


Fig. 18 - Bulldozer BD 10 B Overall Dimensions and Reach Data with extreme position of Blade.

Note: Dimension given apply to 450 mm. standard track shoes. Dimension marked thus (*) applies to tilt as obtained by activating hydraulic cylinder and with R.H. tie rod in mid-position.

TRANSMISSION RATIOS - TRAVEL SPEEDS - TRACTIVE EFFORT FIGURES

WORK	Gearbox reverser ratios 1:	Engine to sprocket ratios 1:	Max travel speed (engine at 2100 R.P.M.) K.P.H.	M.P.H.	Tractive effort Kg.	lb.
Work:—						
— Low						
— Forward . . .	3.484	129.176	2.4	1.49	11,160	25,930
— Reverse . . .	3.258	120.779	2.6	1.61	10,555	23,273
— High						
— Forward . . .	2.314	85.807	3.6	2.23	7,810	17,221
— Reverse . . .	2.164	80.229	3.9	2.42	7,010	15,457
Transfer:—						
— Low						
— Forward . . .	1.531	56.763	5.5	3.41	5,165	11,389
— Reverse . . .	1.431	53.073	5.9	3.66	4,640	10,231
— High						
— Forward . . .	1.017	37.705	8.2	5.09	3,430	7,563
— Reverse . . .	.951	35.254	8.8	5.46	3,080	6,791

MASTER CLUTCH/GEARBOX HYDRAULIC SYSTEM

GEARBOX VALVE BLOCK

P.M. Gearbox valve block incorporates springs of different rating. For all other information consult the Main Section, pages 242 and 243.

HYDRAULIC SYSTEM DATA

Hydraulic Pump	See FL 10 B page 17	
Gearbox Valve Block		
Forward/reverse clutch control valve spring length (See 10, Fig. 342 of class 10 Service Manual:—	mm.	in.
— Free	33.5	1.319
— Under 14.7 to 16.3 Kg (32.5 to 35.8 lb.)	25.0	.984
Tappet spring length (22, Fig. 342 of class 10 Service Manual):—		
— Free	43.0	1.693
— Under 11.6 to 12.8 Kg (25.5 to 28.3 lb.)	25.0	.984

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL