SERVICE MANUAL

INTERNATIONAL

384 and 238 TRACTORS

SM - 51A

INTERNATIONAL HARVESTER COMPANY
OF GREAT BRITAIN LIMITED

P O BOX 25 259 CITY ROAD LONDON EC1P 1AD

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Pedal settings		
Height from footplate	mm (in)	174.6 (6.875)
Free travel	mm (in)	19 (0.75)
Clearances		
Release bearing to release ring	mm (in)	2.5 (0.1)
Release lever plate height from flywheel	mm (in)	69.95 to 71.47 (2.754 to 2.814)
Setscrews and PTO pressure plate	mm (in)	..1.98 to 2.08 (0.078 to 0.082)
Special Torque Values		
Clutch pedal bolts	kgm (lbft)	4.9 to 5.5 (35 to 40)
Clutch fork pinch bolts	kgm (lbft)	2.6 to 2.9 (19 to 21)
Flywheel bolts	kgm (lbft)	9.0 to 9.7 (65 to 70)
Special Tools		
Available from:		V.L. Churchill & Co. Ltd., P.O. Box No. 3, London Road, DAVENTRY. Northants. NN11 4NF
Servicing fixture		99A
Dual clutch centralizer		IH 4039A
Dual clutch release lever setting gauge		IH 5132
Dismantling stand		270
Clutch pilot bearing remover		954C
used with slide hammer		MS 3072

8. TRANSMISSION

Bevel pinion shaft		
Bearing pre-load pull	kg (lb)	2.27 to 6.8 (5 to 15)
Cone centre distance		As etched on pinion face
Quill gear OD	mm (in)	34.91 to 34.92 (1.3754 to 1.3750)
Pilot bearing OD	mm (in)	25.30 to 25.40 (0.996 to 1.000)
Quill gear		
ID	mm (in)	41.26 to 41.27 (1.6254 to 1.6250)
Bearing OD	mm (in)	41.27 (1.6250)
Bearing ID	mm (in)	34.92 (1.3750)
Constant mesh gear		
ID	mm (in)	69.85 to 69.88 (2.7500 to 2.7512)
Bush OD	mm (in)	69.77 to 69.80 (2.7470 to 2.7480)
Reverse Idler Bushes (reaming size)		
Front	mm (in)	31.83 to 31.88 (1.253 to 1.255)
Rear	mm (in)	25.22 to 25.27 (0.993 to 0.995)
Special Torque Values		
Countershaft retaining nut	kgm (lbft)	4.2 to 4.8 (30 to 35)
Pinion shaft bearing		
First locknut	kgm (lbft)	20.73 (150)
Second locknut	kgm (lbft)	15.48 (112)
Housing retainer nuts	kgm (lbft)	11 to 12.4 (80 to 90)

9. REAR AXLE AND DIFFERENTIAL

Bevel gear backlash	mm (in)	0.18 to 0.28 (0.007 to 0.011)
Bevel gear pre-load	kgm (lbin)	0.2 to 0.3 (17 to 27)
Special Torque Values		
Bevel gear retaining bolts	kgm (lbft)	10.8 to 12 (78 to 88)

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(h) LUBRICATION FITTINGS

Check for damaged or missing fittings. Check that grease and oil galleries are clear.

(i) CASTINGS

Check castings for cracks and distortion.

(j) FUEL TANKS

Check for leaks and corrosion.

(k) FUEL, OIL & COOLANT PIPES AND HOSES

Check unions for leaks, stripped threads or other faults. Check pipes for cracks or chafing, hoses for chafing, twisting, perishing or other damage. Tighten pipe and hose unions to the following torque:

JIC 37° FLARED FITTINGS					
PIPE SIZE	THREAD SIZE	MIN. kgm	MIN. lbft	MAX. kgm	MAX. lbft
1/4	7/16 - 20	1.38	10	2.76	20
5/16	1/2 - 20	2.07	15	3.46	25
3/8	9/16 - 18	3.46	25	4.84	35
1/2	3/4 - 16	5.53	40	7.60	55
5/8	7/8 - 14	7.60	55	10.38	75
3/4	1-1/16 - 12	10.38	75	13.14	95
7/8	1-3/16 - 12	13.14	95	15.89	115
1	1-5/16 - 12	15.89	115	20.04	145
1-1/4	1-5/8 - 12	20.74	150	24.88	180
1-1/2	1-7/8 - 12	27.66	200	34.56	250
2	2-1/2 - 12	41.47	300	48.38	350

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(l) WELDS

Check all welded assemblies for cracks, twisting or misalignment. Information concerning the use of special welding rods or procedures is detailed, where relevent, in the appropriate GROUP. When welding operations are performed on items attached to the machine, it is advisable to disconnect the terminal block at the alternator to avoid any risk of damage to the alternator.

1h. LUBRICATION

During assembly, running or wearing surfaces must be coated with the specified lubricant. Use sufficient lubricant to prevent seizing, scoring or excessive wear on initial operation. FAILURE TO PROVIDE STARTING LUBRICATION MAY RESULT IN SERIOUS DAMAGE.

1i. METRICATION

The metric units used in this manual are the ones most likely to be found on existing equipment such as torque wrenches, pressure gauges etc. which are often dual marked.

Other units may be encountered such as force in Newtons (N), torque in Newton metres (Nm), pressure in N/m^2, pascals (Pa) or bars. To assist the serviceman the following conversions are provided.

1N = 0.10197 kg = 0.2248 lb
1Nm = 0.10197 kgm = 0.7376 lbft
1bar = 1.01976 kg/cm^2 = 14.5038 lb/in^2
1bar = 10^5 Pa = 10^5 N/m^2

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2. BOLT IDENTIFICATION

IH TYPE	BSS	TENSILE STRENGTH T/in^2	MANUFACTURERS MARKINGS					
5	S	50 - 55	BEES 50 S 55	NEWALL HITENSILE "S"	SPNS	NEWTON S	SPARTS S	TWLS
	T	55 - 65	BEES 55 T 65	NEWALLOY T or NEWALL HITENSILE T	SPNT	NEWTON T	SPARTS T	TWLT
8	V	65 - 75	BEES 65 V 75	NEWALLOY "V"	SPNV	NEWTON V	SPARTS V	TWLV

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3. STANDARD TORQUE DATA FOR NUTS AND BOLTS

Where no special torque is quoted the following torque figures should be applied. ~~Threads should be applied.~~ Threads should be lubricated with engine oil or chassis grease. Apply the minimum figure to bolts that have previously been used.

BOLT SIZE (in)	TYPE 5				TYPE 8			
	MIN.		MAX.		MIN.		MAX.	
	kgm	lbft	kgm	lbft	kgm	lbft	kgm	lbft
1/4	1.24	9	1.26	10	1.66	12	1.93	14
5/16	2.62	19	2.90	21	3.73	27	4.14	30
3/8	4.56	33	5.11	37	6.22	45	6.91	50
7/16	7.32	53	8.30	60	10.37	75	11.75	85
1/2	11.06	80	12.44	90	15.90	115	17.97	130
9/16	15.90	115	17.97	130	22.81	165	25.58	185
5/8	22.12	160	24.89	180	30.42	220	34.56	250
3/4	40.09	290	44.24	320	55.30	400	62.21	450
7/8	58.07	420	64.98	470	89.87	650	100.93	730
1	87.10	630	98.16	710	134.11	970	150.70	1090
1-1/8	117.52	850	131.34	950	190.79	1380	214.30	1550
1-1/4	165.91	1200	186.64	1350	268.21	1940	301.40	2180

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4. SPECIFICATIONS

1. The following specifications are listed in GROUP order. During overhaul personal initiative must be exercised to determine whether or not a component is suitable for re-use. It is obviously uneconomical to return worn parts to service with a short life expectancy which will involve labour costs at an early date.

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Hydraulics (Continued)
Independent Auxiliary Control Valve (Continued)

Relief valve spring		
Free length	mm (in)	72.3 (2.845)
Test length	mm (in)	65.2 (2.568)
Test load	kg (lb)	41 (90)
Special Tools		
Available from		V.L. Churchill & Co. Ltd., P.O. Box No. 3, London Road, DAVENTRY, Northants. NN11 4NF
Vary-touch control valve servicing kit		IH 5130A

13. POWER TAKE-OFF AND BELT PULLEY

POWER TAKE-OFF		
Driven gear bush I.D.	mm (in)	50.85 to 50.9 (2.002 to 2.004)
Driven gear bush O.D.	mm (in)	57.22 to 57.27 (2.253 to 2.255)
Shaft bush I.D.	mm (in)	35.12 to 35.17 (1.383 to 1.385)
Shaft bush O.D.	mm (in)	39.07 to 39.09 (1.538 to 1.539)
Rear shaft bush I.D. (ream after assembly)	mm (in)	19.18 to 19.26 (0.7555 to 0.7585)
Front shaft O.D.	mm (in)	35.00 to 35.05 (1.378 to 1.380)
Front shaft spigot O.D.	mm (in)	18.99 to 19.05 (0.748 to 0.750)
Rear shaft rear bearing retaining collar distance of furthest collar from end of shaft	mm (in)	146.05 to 146.30 (5.750 to 5.760)
BELT PULLEY		
Pulley I.D.	mm (in)	38.07 to 38.12 (1.499 to 1.501)
Shaft O.D.	mm (in)	38.07 to 38.1 (1.499 to 1.500)
Bevel gear to bearing mounting distance		
550 rev/min	mm (in)	90.27 to 90.52 (3.554 to 3.564)
700 rev/min	mm (in)	86.33 to 86.58 (3.399 to 3.409)
Minimum gap between oil seal retainer and housing	mm (in)	0.050 (0.002)
Bevel gear backlash	mm (in)	0.127 to 0.177 (0.005 to 0.007)
Belt pulley retaining nut torque	kgm (lbft)	12.44 to 14.51 (90 to 105)

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2. CAB

Mounting location		
(distance from centre line of tractor)	mm (in)	510 (20.4)
Special Torque Values		
Mounting retaining bolts	kgm (lbft)	6 (45)
Mounting centre bolt	kgm (lbft)	15 (100)
Rear mounting support retaining bolts	kgm (lbft)	10 (70)
Front mounting support retaining bolts	kgm (lbft)	33 to 38 (240 to 280)
Rear window latch handle	kgm (lbft)	4.5 to 5.4 (10 to 12)
Lower window retaining bolt	gm (lbin)	345 to 460 (30 to 40)
Rubber damper	gm (lbin)	115 to 172 (10 to 15)
Special Tools		
Available From:		Pressac, Masons Road, Stratford-upon-Avon.
Weatherstrip and fillerstrip installation tool kit:		B5406 ref 1.

3. COOLING SYSTEM

Radiator		
Type		Fin and flat tube
Cap pressure	kg/cm^2 (lb/in^2)	0.49 (7)
Fan		
Type		Suction
Number of blades		4
Diameter	mm (in)	400 (15.75)
Thermostat		
Open at	°C (°F)	77 (170)
Full open at	°C (°F)	93 (199)
Capacity	litre (UK pint)	10.25 (22)

4. ELECTRICAL

Battery		
Voltage		12
Capacity at 20 hr rate	amp h	95
Cold start performance (to BS3911/IEC)	amp	385
Alternator		
Make		Lucas
Model		15ACR
Output	amp	28
Starting Motor		
Make		Lucas
Model		M45G
Glowplugs		
Make		Bosch
Model		KE/GA1/8
Safety start switch		
Plunger depressed	mm (in)	1.27 (0.050)

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12. INSTRUMENTS

Access to instruments and warning lamps is by removing the side covers on the instrument panel.

12a. REMOVAL

(a) Remove the screws (1-11) then ease the cover (2-11) away from the housing and support it so that the leads to the keyswitch, horn button or cigar lighter are not stretched or disconnected.

(b) To remove the speedometer (1-12) disconnect the drive cable (4-12) and lamp (5-12) then remove the knurled nuts (3-12) and clamping strips (2-12). Lift the speedometer through the top of the instrument panel.

(c) To remove a gauge, disconnect the leads (6-12) then remove the knurled nuts (7-12) and clamping strips (8-12) and lift the gauge through the top of the instrument panel.

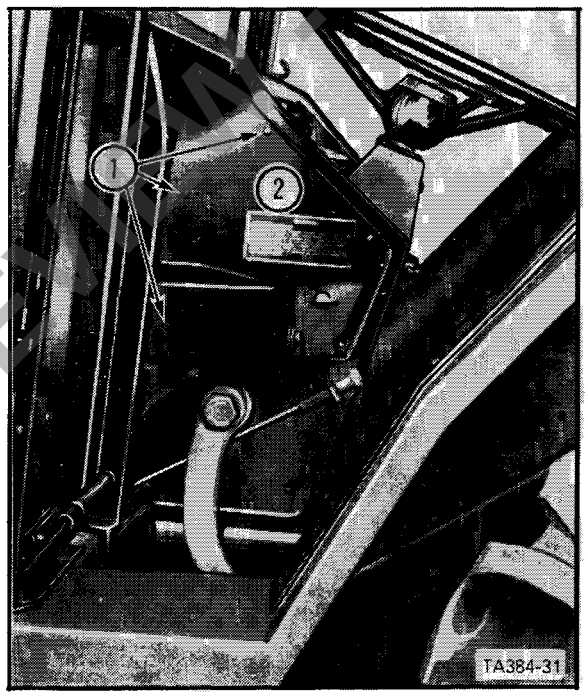


Fig. 11

12b. INSTALLATION

(a) Locate the speedometer in the instrument panel and secure with the clamping strips (2-12) and knurled nuts (3-12). Connect the drive cable and install the lamp (5-12).

(b) Position the gauge in the instrument panel and secure with the clamping strip (8-12) and knurled nuts (7-12). Connect the leads (6-12).

(c) Install the side cover and secure with the screws (1-11).

13. LIGHT SWITCH

13a. REMOVAL

(a) Remove the left side cover.

(b) Disconnect the battery. Turn the switch knob so that a drilling in the knob is accessible.

(c) Insert a small screwdriver into the drilling and push down, at the same time pull off the knob.

(d) Remove the nut which secures the switch (9-12) to the instrument panel, then withdraw the switch.

(e) If a new switch is to be fitted, disconnect the cables individually, then connect them to the corresponding terminal on the new switch.

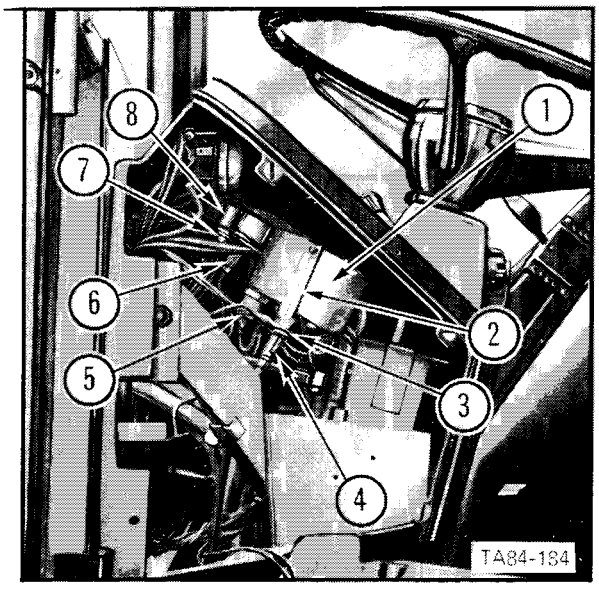


Fig. 12

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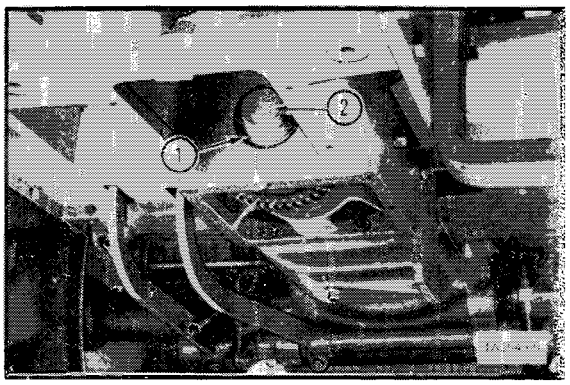


Fig. 23

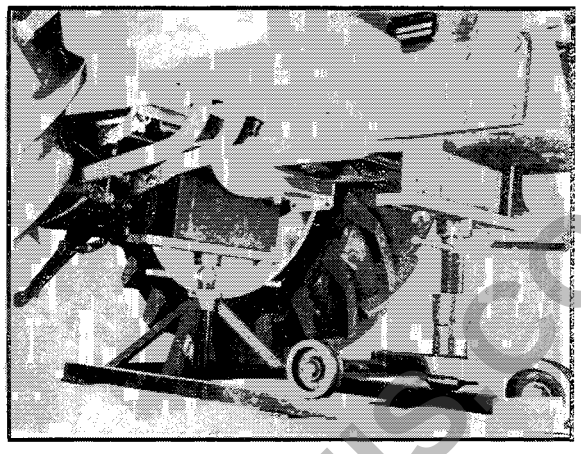


Fig. 25

3b. ASSEMBLING THE TRACTOR

(a) Using a new gasket between the clutch housing and transmission case, carefully ease the clutch housing rearward ensuring that the transmission driving shaft is kept centralized in the PTO driving shaft to avoid damage to the shaft bearing and oil seal (32-14). Turn the shaft(s) as necessary to engage the mating splines.

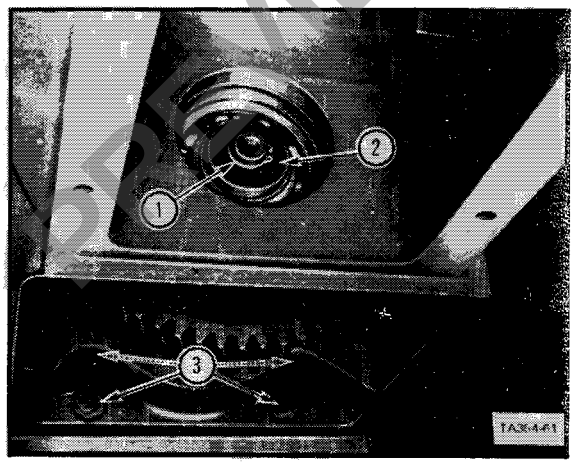


Fig. 24

(b) Install the bolts (6-20, 5-21 and 3-24) or if a standard build, install the six bolts inside the clutch housing and the two outside.

(c) Remove the dismantling stand.

(d) On F/R and constant running PTO versions install the retaining washer (2-24), circlip (1-24), front bearing cap (2-23) and circlip (1-23).

(e) Install the PTO cover plate (3-22) and clutch housing cover (2-22).

(f) On F/R builds push in the connecting shaft (9-39) and secure the retainer plate (2-40). Position the lever (2-39) on the high-low shifter shaft (13-39) and secure with the circlip (1-39). Connect the clevis (7-39).

(g) Connect the safety start switch (3-21) and the connection (2-21).

(h) Connect the foot accelerator control rod (4-20).

(i) Connect the high pressure pipe (3-20) at the valve and the low pressure pipe at the suction strainer connection (2-20).

(j) Install the battery. Fill the transmission to the correct level with the specified oil.

(k) Remove the wood blocks between the front axle and axle support.

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GROUP 11

FRONT AXLE & STEERING

CONTENTS	Page Numbers				
	REMOVAL	DISMANTLING	ASSEMBLY	INSTALLATION	ADJUSTMENTS
FRONT HUBS	3	3	3	3	-
TIE ROD	4	4	4	4	4
DRAG LINK	5	5	5	5	-
STEERING KNUCKLES	5	5	5	5	-
AXLE STAY ROD (ATTACHMENT)	7	-	-	7	7
FRONT AXLE	7	8	8	8	8
FRONT AXLE SUPPORT	9	-	-	9	-
STEERING BOX	9	9	12	12	12
STEERING CYLINDER	13	15	18	21	-
STEERING RELIEF VALVE	21	21	22	22	-

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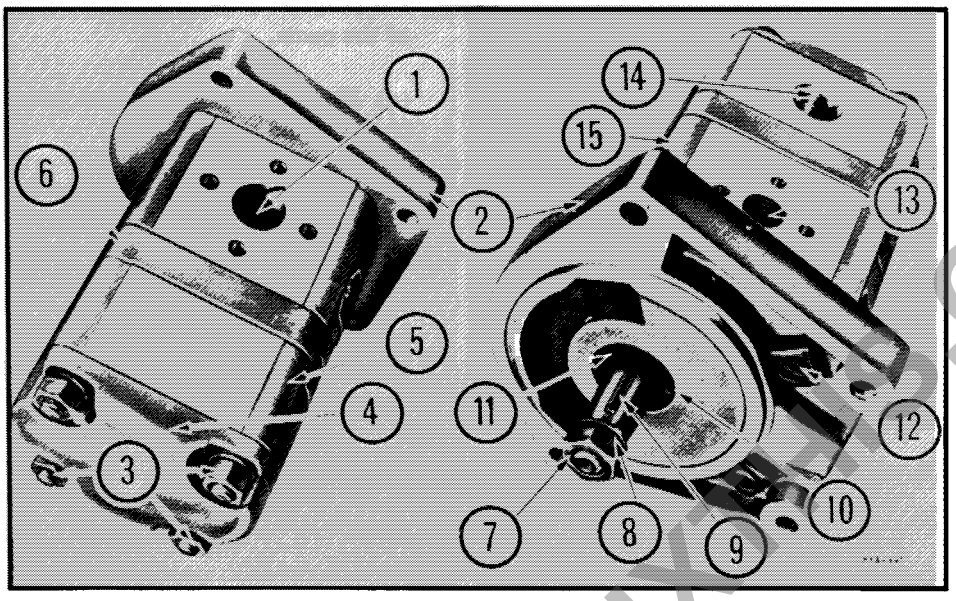


Fig. 23

3b. DISMANTLING

1. THE STEERING CYLINDER SECTION

(a) Mark all the sections of the pump with scribe marks to ensure correct re-assembly.

(b) Remove the four nuts (3-23) from the through bolts (12-23).

(c) Gently tap the steering cylinder pump (3-24) off the two locating dowels (7-24).

All the pump sections are dowelled together and a gentle tap with a soft faced hammer is sufficient to separate the faces. DO NOT drive any tool between the mating faces.

(d) Remove the 'O' rings (5 & 6-24) from the adaptor and the splined coupling (4-24) from the gear.

(e) Withdraw the upper bearing block (2-24) carefully noting the position.

(f) Scribe a mark on the mating teeth of the drive and driven gears (3 & 4-25) then withdraw the gears noting their position.

(g) Remove the lower bearing block (1-25) noting the position.

(h) Remove the end cover (4-23) and discard the inner and outer 'O' rings.

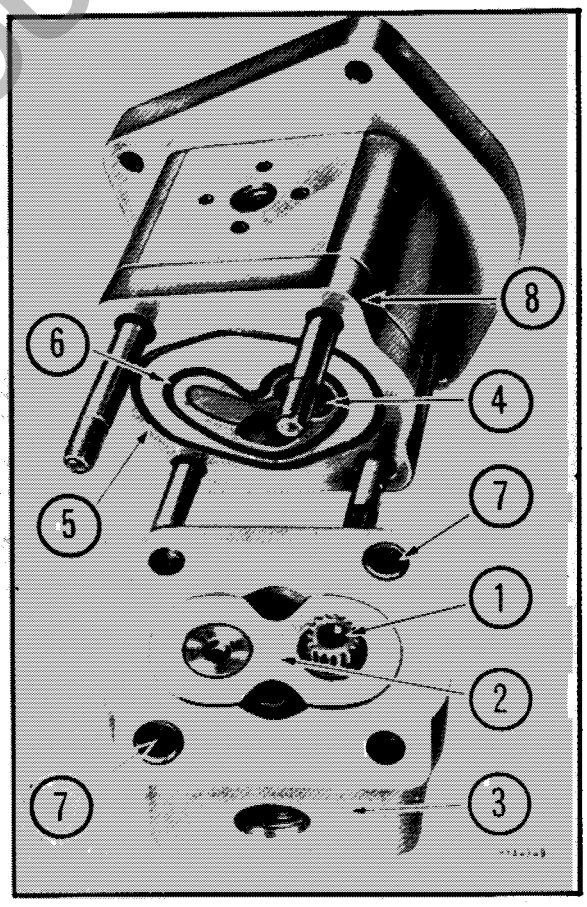


Fig. 24

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