

# **WINGET**

## **OPERATING INSTRUCTIONS & SPARE PARTS LIST**

### **FOUR/50E DIESEL DUMPER (CAPACITY 50 CWT)**

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## INTRODUCTION

This Parts & Operators Manual is a re-print of the manual last published in 1978 and contains some amended part numbers.

**Note: this publication is applicable to machines with serial numbers from and including 4/50E-7421**

Health & Safety legislation and working practices applicable to Site Dumpers, both 2 and 4 wheel Drive, Rigid Chassis and Articulated Chassis have changed considerably in the years since this manual was last published and immediately following this Introduction are notes on the Safe Use of Site Dumpers. These notes supersede and replace all previous 'Dumper Safety' notes issued with Winget FOUR/50E Four Wheel Drive Dumpers.

Reference is made on a number of pages to 'bolt c/w nut and washer', this no longer the case, fixings such as nuts, bolts, screws and washers should be ordered as individual items. A number of Whitworth and B.S.F fixings are now no longer available, in these cases the nearest metric equivalent size will be supplied.

The contents of this manual although correct at the time of publication, may be subject to alteration by the manufacturers without notice and Winget Limited can accept no responsibility for any errors or omissions contained within the following pages. Nor can we accept any liability whatsoever arising from the use of this manual howsoever caused.

Winget Limited operate a policy of continuous product development. Therefore, some illustrations or text within this publication may differ from your machine.

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# DUMPER SAFETY

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**Safety is the responsibility of all persons working with this machine. Think "safety" at all times. Read and remember the contents of this handbook.**

## MACHINE MODIFICATIONS

**WARNING** Any modifications to the machine will affect its working parameters and safety factors. Refer to the Manufacturers before fitting any non-standard equipment or parts.



The Manufacturers accept no responsibility for any modifications made after the machine has left the factory, unless previously agreed by the Manufacturers in writing; the Manufacturers will accept no liability for damage to property, personnel or the machine if failure is brought about due to such modifications, or fitment of spurious parts.

## TRAINING

**WARNING** Only trained operators should use this machine.



Operators should hold an appropriate full motor vehicle driving licence and undergo both a safety awareness course and a driver training course for Site dumpers run by the C.ITB or equivalent body leading to the award of a CTA.

It is strongly recommended that operators read the H.S.E. publication "Safe Working with Small Dumpers" which is available from government bookshops (HMSO) or from other bookshops quoting the following number ISBN 011 8836935. Another useful publication is British Standard number BS 6264, "Procedure for Operator Training For Earth Moving Machinery" available from the British Standard Institution.

## OPERATION

**WARNING** *NEVER* use the machine for purposes other than those for which it was designed. This machine was designed to carry loads such as soil, clay, sand, wet concrete, stone or other similar materials. It was not designed to carry loads which may move around in the skip uncontrollably, nor to carry any loads or materials which overhang the skip in any way. If in any doubt as to the suitability of this machine for a particular task, contact your nearest Distributor or the Manufacturer for advice.



*ALWAYS* be aware of local and national regulations governing the use of the machine.

*NEVER* commence work with the machine until the "Daily (or every ten hours)" service checks have been made. (See *Service Section for details*)

*ALWAYS* check wheel nut tightness daily.

*NEVER* carry passengers.

Where seat belt restraints are fitted as part of Rops/Fops Protection they must be worn. Ensure that the seat and seat belt are securely fixed to the machine. Check that the seat belt is in good condition, free from cuts and frayed edges.

*ALWAYS* remain in the driving seat whenever the engine is running. Never attempt to operate any controls unless seated.

*ALWAYS* apply the parking brake before leaving the driver's seat.

## DUMPER SAFETY

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*NEVER* dismount with the engine running, and never leave the machine unattended with the key in the starter switch.

When Battery Isolators are fitted they must be activated only when the engine is turned off except in cases of emergency.

Activating a Battery Isolator when the engine is running can result in damage to the electrical components and circuits.

*NEVER* fill the fuel or hydraulic tanks with the engine running.

*ALWAYS* drive only on surfaces that are known to be stable.

*ALWAYS* keep the floor plates and walkways clean.

*NEVER* drive the machine close to the edge of any excavation. Always use effective wheel stops to prevent the machine running close to the edge. Make sure that the stops are in proportion to the size of the wheels and are set sufficiently far enough back from the edge of any excavation to prevent the weight of the load causing a collapse.

*NEVER* adjust the tyre pressures in an attempt to improve traction on soft ground or obtain a softer ride on hard ground. Incorrectly adjusted tyres can affect the steering and handling characteristics.

*NEVER* attempt to free a machine which is 'bogged down' by pushing with the bucket of a backhoe loader, tracked excavator or other similar machine.

*NEVER* make unnecessary "crash stops" when travelling at speed, especially in forward direction.

*NEVER* work under an unpropped skip. *If the dumper was supplied with a special Skip Support always ensure that it is used.*

*Some articulating dumpers are manufactured with an articulation lock. If your machine has this feature proceed as follows:*

*ALWAYS* fit the articulation lock when working within the articulation point crush zone.

*NEVER* attempt to lift the machine unless the articulation lock is engaged.

## SKIPS AND LOADING

**WARNING** *NEVER* exceed the rated payload. The weights of all loads above skip water level must be checked.



*NEVER* remain on the machine when loading the skip with excavators or loaders. Stop the engine, apply the parking brake, dismount, and stand well clear.

*ALWAYS* ensure that the load is evenly distributed in the skip.

*NEVER* carry loads or heap materials in such a manner as to affect the forward vision.

*ALWAYS* take extra care when tipping non free running loads.

*NEVER* use the skip in a tipped position to bulldoze heaped materials level or to backfill material into excavations.

# DUMPER SAFETY

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## TOWING

**WARNING** NEVER attempt to start the engine of a dumper by towing or pushing.



Dumpers are not designed as towing vehicles, but loads (including weight of trailer) not exceeding the rated payload of the dumper may be towed on dry level ground in first gear, providing the dumper skip is loaded with half the rated payload to ensure tyre adhesion when braking.

ALWAYS use a purpose made towing pin.

NEVER tow loads up, down or across gradients.

## GRADIENTS

**WARNING** NEVER operate *Four Wheel Drive articulated steer dumpers* on any gradients which exceed 25% (1 in 4), or across gradients which exceed 16% (1 in 6).



NEVER operate *Two Wheel Drive rigid chassis dumpers* on any gradients which exceed 10% (1 in 10), or across gradients which exceed 10% (1 in 10).

ALWAYS remember that slippery or loose surface conditions can adversely affect safe machine operation, including braking, particularly on gradients.

ALWAYS choose routes that avoid steep, slippery or loose gradients.

NEVER coast down gradients. Always negotiate gradients in first gear.

ALWAYS drive forwards up gradients when loaded.

ALWAYS reverse down gradients when loaded.

ALWAYS keep the load facing uphill.

NEVER park on a gradient. If this is unavoidable, ALWAYS chock the wheels.

NEVER attempt to turn on a gradient.

NEVER tow up, down or across a gradient.

NEVER operate high discharge or rotating skips on gradients.

## HYDRAULICS

**WARNING** ALWAYS "Dump" residual pressure from the system before leaving the machine or before carrying out any maintenance or adjustments.



If maintenance work requires the skip to be in the raised position, then it must be raised and supported before dumping the pressure.

Dump pressure by switching off the engine, then moving the hydraulic control lever several times in each direction.

NEVER leave the machine unattended with pressure in the system.

ALWAYS purge hydraulic rams before commencing work. With the engine running operate the hydraulic control to fully extend and retract the rams.

ALWAYS practise the greatest cleanliness in maintaining hydraulic components.

# DUMPER SAFETY

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## SERVICING

**WARNING** ALWAYS report any defect at once, before an accident or consequential damage can occur.



ALWAYS conform to service schedules except where:

- 1 Warning lights or warning indicators call for immediate attention.
- 2 Adverse conditions necessitate more frequent servicing.

ALWAYS wear correctly fitting protective clothing. Loose or baggy clothing can be extremely dangerous when working on running engines or machinery.

ALWAYS, where possible, work on or close to engines or machinery only when they are stopped. If this is not practical, remember to keep tools, test equipment and all parts of your body well away from the moving parts.

ALWAYS dump pressure from the hydraulic system before carrying out any kind of maintenance or adjustment. (*see Hydraulics Warnings*).

ALWAYS avoid contact with exhaust pipes, exhaust manifolds and silencers when the engine is running; these can be very hot.

ALWAYS work out of doors, or in a well-ventilated area.

NEVER run an engine in an enclosed space. Exhaust fumes in enclosed areas can kill.

ALWAYS disconnect battery cables and remove battery before using an external charger, carrying out welding repairs or to prevent unauthorised usage when unattended or during a repair.

NEVER allow unqualified personnel to attempt to repair, remove or replace any part of the machine, or anyone to remove large or heavy components without adequate lifting tackle.

NEVER attempt to modify or repair Rops Frames or Fops Canopies by welding, drilling or any other means. Attempts to do so will invalidate Rops/Fops Certification.

ALWAYS obtain advice before mixing oils; some are incompatible. If in doubt drain and refill.

NEVER allow oils and fuels to come into regular contact with skin. This can lead to serious skin diseases including, medical evidence suggests, skin cancer. ALWAYS wear protective gloves when handling oils and fuels whether topping up, draining or refilling. ALWAYS wash hands if oils or fuels come into contact with the skin.

Many liquids used in this machine are harmful if taken internally or splashed into the eyes. In the event of accidentally swallowing oils, fuels, anti-freeze, battery acid etc, DO NOT encourage vomiting, seek qualified medical assistance immediately.

ALWAYS dispose of waste oils and fuels into waste oil storage tanks. If storage tanks are not available consult your distributor or local authority for addresses of local designated disposal points. It is illegal to dispose of waste oil into drains or water courses or to bury it.

## DUMPER SAFETY

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Equipment which includes friction materials will sometimes contain asbestos. When removing friction material dust from components, such as when servicing brakes or clutches, do not blow out with an airline; it could be harmful to inhale the dust. Remove the dust with a vacuum cleaner or wipe clean with a damp rag. Waste should be placed in a sealed container, marked, and disposed of in accordance with local or national regulations.

The accumulated dust found in clutch housings may contain lead/antimony. No food should be eaten at a work place contaminated by this dust. Hands must be washed before eating. Do not blow out dust with an airline.

*ALWAYS* ensure that the starting handle is clean and in good condition. Keep the engine starting dog, and the part of the starting handle that mates with it, lightly lubricated (*Refer to the Engine Handbook*).

*NEVER* work under an unpropped skip. ***If the dumper was supplied with a special Skip Support always ensure that it is used.***

***Some articulating dumpers are manufactured with an articulation lock. If your machine has this feature, ALWAYS fit the articulation lock when servicing or working on the machine.***

## PREPARATION FOR USE

Before the Dumper is put into service, always check the following points:

### Engine

Check the oil level on the dipstick, topping up if necessary to the full mark.

### Gearbox

Check the oil level on the dipstick, topping up if necessary to the full mark.

### Drive Axles and Transfer Case.

Remove filler/lever plugs from drive axles and filler/level plug from transfer case and check that oil is up to bottom of holes. Top up if necessary, through filler/level plugs.

### Fuel Tank

Fill tank with diesel oil until approximately 1" from the top.

NOTE: Never allow fuel level to fall below 2" deep in the bottom of the tank.

### Hydraulic Tank

Fill the hydraulic tank. Before removing the cap, clean the surrounding area to prevent the possible entry of foreign matter.

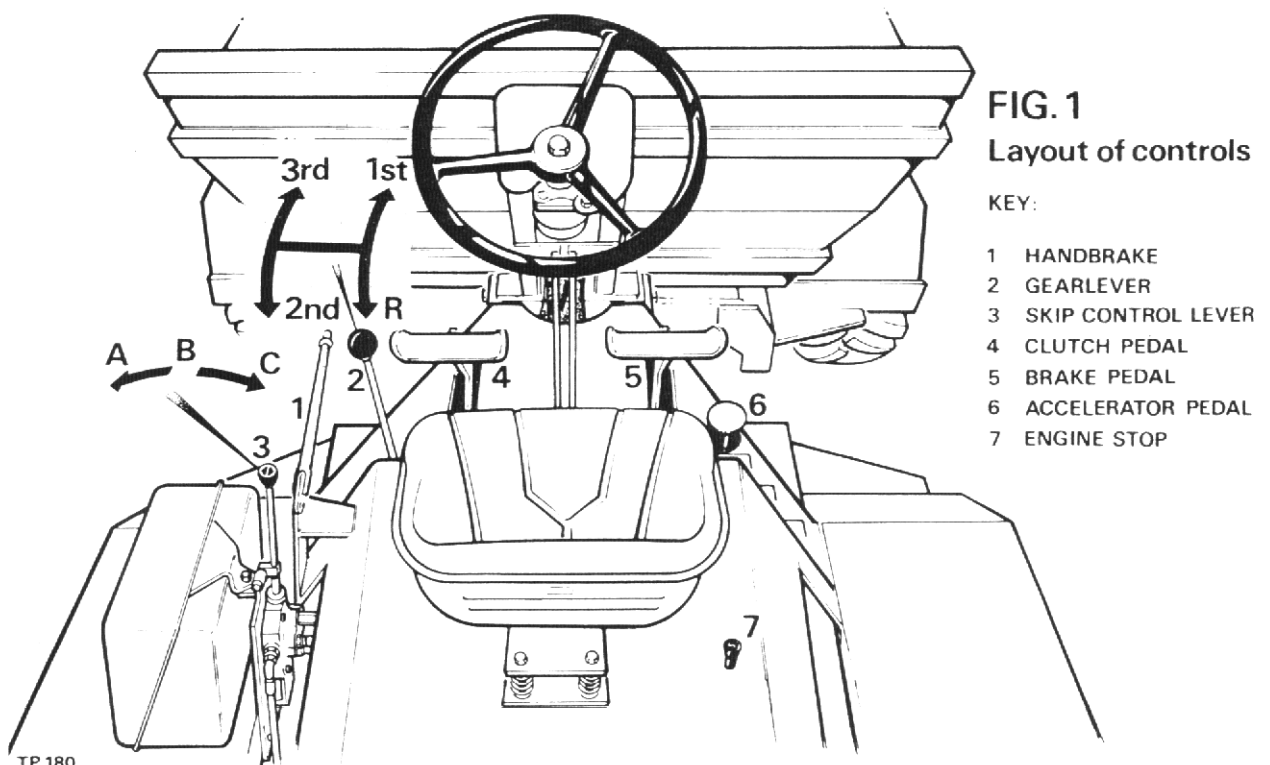
### Brake System

Ensure that both brake cylinder reservoirs are full of fluid. Top up if necessary to within  $\frac{1}{4}$ " of the top of the reservoirs. Use only brake fluid that conforms to B.S. – SAE.J.1703.

### Miscellaneous

Check all wheel nuts for tightness

Check all nuts and bolts for tightness, loose nuts and bolts may lead to damage not covered by Warranty.





## SPECIFICATION FOR MACHINES WITH FORWARD TIP SKIP

A	Overall height	6'-7"	(200 cm)
B	Skip loading height	4'-3"	(129 cm)
C	Wheelbase	5'-7 5/8"	(172 cm)
D	Overall length	12'-3 5/8"	(375 cm)
E	Ground clearance	11 1/2"	(29 cm)
F	Overall width	5'-9"	(175 cm)
G	Skip ground clearance when tipped	1'-4"	(40 cm)
H	Overall height tipped	7'-6 3/4"	(230 cm)
J	Discharge forward to tyre	1'-10"	(55 cm)
K	Overhang	3'-6 1/2"	(108 cm)
L	Wheeltrack	5'-0"	(152 cm)
M	Prow width	4'-8 1/2"	(144 cm)

<b>Skip</b>			<b>Turning Circle</b>	23'-8"	721 cm
Water level	32 cu. ft.	906 Litres	<b>Unladen Weight</b>	4312 lbs.	1957 kgms
Struck level	38 cu. ft.	1076 Litres	<b>Hydraulic relief valve</b>	1750 p.s.i.	123 kgs/cm <sup>2</sup>
Heaped	48 cu. ft.	1359 Litres	<b>Rear axle articulation</b>	1'-2"	35 cm
Maximum payload	2 ton 5 cwt	2286 Kgm	<b>Road Speeds</b>	<b>m.p.h.</b>	<b>km.p.h.</b>
			1st	2.48	3.99
<b>Tank Capacity</b>			2nd	5.76	9.26
Hydraulic	6 gals	27 1/4 Litres	3rd	10.66	17.15
			Rev.	2.7	4.3

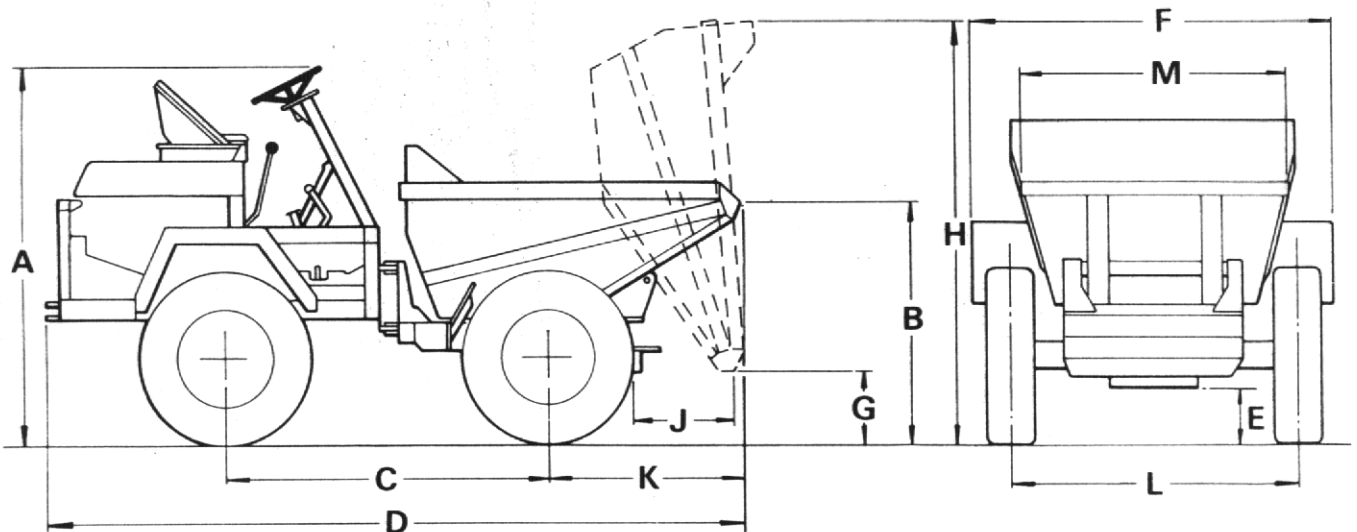


FIG. 2

## SPECIFICATION FOR MACHINES WITH HIGH DISCHARGE SKIP

A	Overall height	6'-9"	(206 cm)
B	Skip loading height	6'-2"	(188 cm)
C	Wheelbase	5'-7 5/8"	(172 cm)
D	Overall length	11'-8 5/8"	(357 cm)
E	Ground clearance	11 1/2"	(29 cm)
F	Overall width	5'-9"	(175 cm)
G	Skip ground clearance when tipped	5'-9"	(175 cm)
H	Overall height tipped	11' - 0"	(335 cm)
J	Discharge forward of tyre	1'-8 1/2"	(52 cm)
K	Overhang	3'-1/2"	(93 cm)
L	Wheeltrack	5'-0"	(152 cm)
M	Prow width	2'-2 1/2"	(67 cm)

<b>Skip</b>			<b>Rear axle articulation</b>	1'-2"	35 cm
Water level	34 cu.ft.	963 Litres	<b>Road Speeds at 2000 r.p.m.</b>	<b>m.p.h.</b>	<b>km.p.h.</b>
Struck level			1st	2.48	3.99
Heaped capacity			2nd	5.76	9.26
Maximum payload	2 tons	2032 kgms	3rd	0.66	17.15
<b>Hydraulic relief valve set at</b>			Rev	2.7	4.3
	1750 p.s.i.	123 kgm/cm <sup>2</sup>			
<b>Hydraulic tank capacity</b>			<b>Unladen weight</b>		
	6 gals.	27 1/4 Litres		2 tons 0 cwt. 3 qtrs	
<b>Ground clearance</b>	11 1/2"	29 cm		2069 kgms	
<b>Turning circle</b>	23'-8"	721 cm			

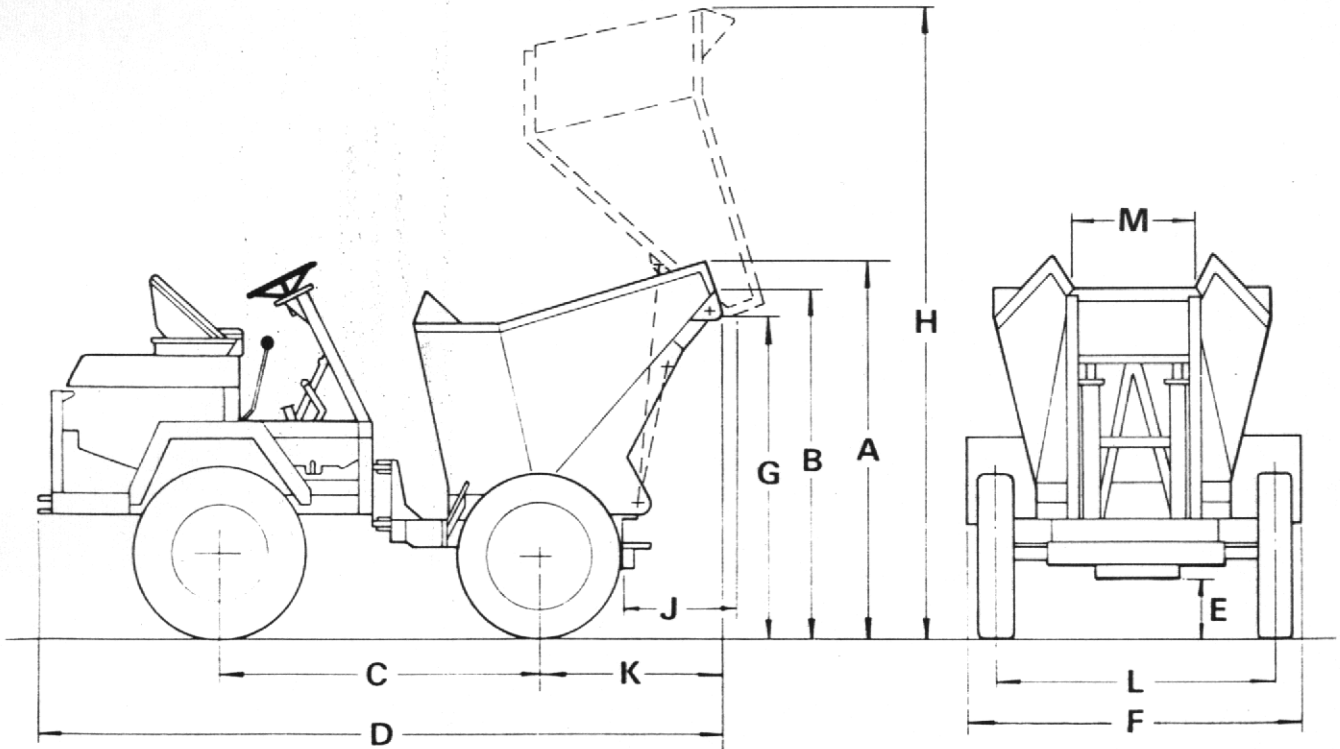


FIG. 3

## SPECIFICATION FOR MACHINES WITH TURNTABLE NARROW MOUTH SKIP

A	Overall height	6'-7"	(200 cm)
B	Skip loading height	4'-8"	(142 cm)
C	Wheelbase	5'-7 5/8"	(172 cm)
D	Overall length	12'-1"	(368 cm)
E	Ground clearance	11 1/2"	(29 cm)
F	Overall width	5'-9"	(175 cm)
G	Skip ground clearance when tipped	2'-6"	(76 cm)
H	Overall height tipped	9'-0"	(274 cm)
J	Discharge forward of tyre	2'-0"	(61 cm)
K	Overhang	3'-6 1/2"	(108 cm)
L	Wheeltrack	5'-0"	(152 cm)
M	Prow width	1'-8"	(51 cm)
N	Side discharge distance	10"	(25 cm)

<b>Skip</b>		
Water level	30 cu.ft.	849 Litres
Struck level	34 cu.ft.	963 Litres
Heaped level	43 cu.ft.	1217 Litres
Maximum payload	2 tons 5 cwt	2286 kgms
<b>Hydraulic relief valve set at</b>		
	1750 p.s.i.	123 kg/cm <sup>2</sup>
<b>Hydraulic tank capacity</b>		
	6 galls.	27 1/4 Litres
<b>Ground clearance</b>	11 1/2"	29 cm
<b>Turning circle</b>	23"-8"	721 cm

<b>Rear axle articulation</b>	1'-2"	35 cm
<b>Road Speeds at 2000 r.p.m.</b>		
	<b>m.p.h.</b>	<b>km.p.h.</b>
1st	2.48	3.99
2nd	5.76	9.26
3rd	10.66	17.15
Rev.	2.7	4.3

**Unladen Weight**  
1 ton 18 cwt 3 qtrs  
1968 kgms

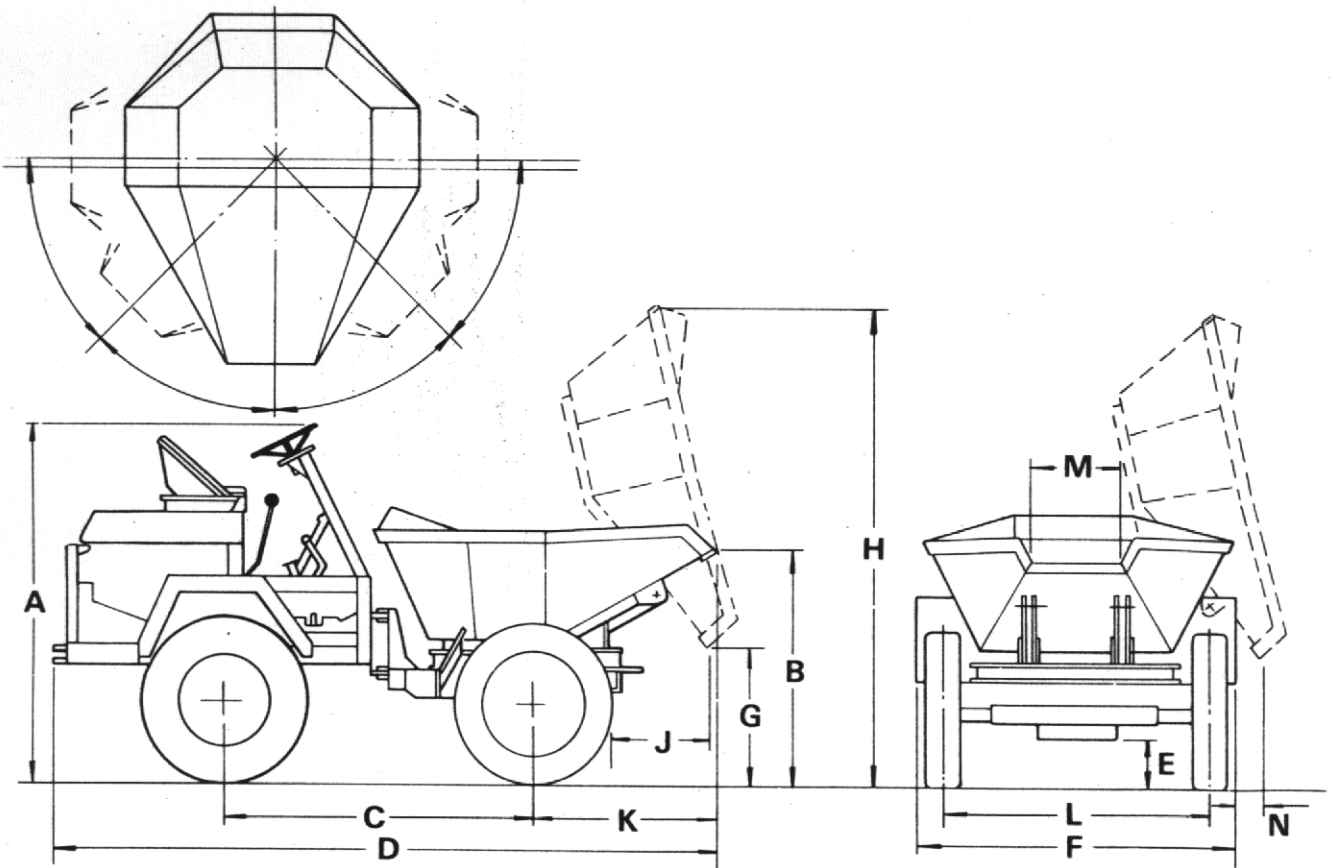


FIG. 4

## SPECIFICATION FOR MACHINES WITH TURNTABLE WIDE MOUTH SKIP

A	Overall height	6'-7"	(200 cm)
B	Skip loading height	4'-9"	(145 cm)
C	Wheelbase	5'-7 5/8"	(172 cm)
D	Overall length	12'-5 1/4"	(379 cm)
E	Ground clearance	11 1/2"	(29 cm)
F	Overall width	5'-9"	(175 cm)
G	Skip ground clearance when tipped	2'-6"	(76 cm)
H	Overall height tipped	8'-10 1/2"	(271 cm)
J	Discharge forward of tyre	2'-1"	(63 cm)
K	Overhang	3'-8 1/4"	(112 cm)
L	Wheeltrack	5'-0"	(152 cm)
M	Prow width	3'-6"	(107 cm)
N	Side discharge distance	10 1/2"	(27 cm)

<b>Skip</b>				<b>Rear Axle Articulation</b>		1'-2"	35 cm
Water level	30 cu. ft.	849 Litres		<b>Road Speeds at 2000 r.p.m.</b>		<b>m.p.h.</b>	<b>km.p.h.</b>
Struck level	34 cu. ft.	963 Litres		1st	2.48	3.99	
Heaped level	43 cu. ft.	1217 Litres		2nd	5.76	9.26	
Maximum payload	2 tons 5 cwt	2286 kgms		3rd	10.66	17.15	
<b>Hydraulic relief valve set at</b>	1750 p.s.i.	123 kgm/cm <sup>2</sup>		Rev	2.7	4.3	
<b>Hydraulic tank capacity</b>	6 gals.	27 1/4 Litres		<b>Unladen Weight</b>			
<b>Ground clearance</b>	11 1/2"	29 cm		1 ton 18 cwt. 3 qtrs.			
<b>Turning circle</b>	23'8"	721 cm		1968 kgms.			

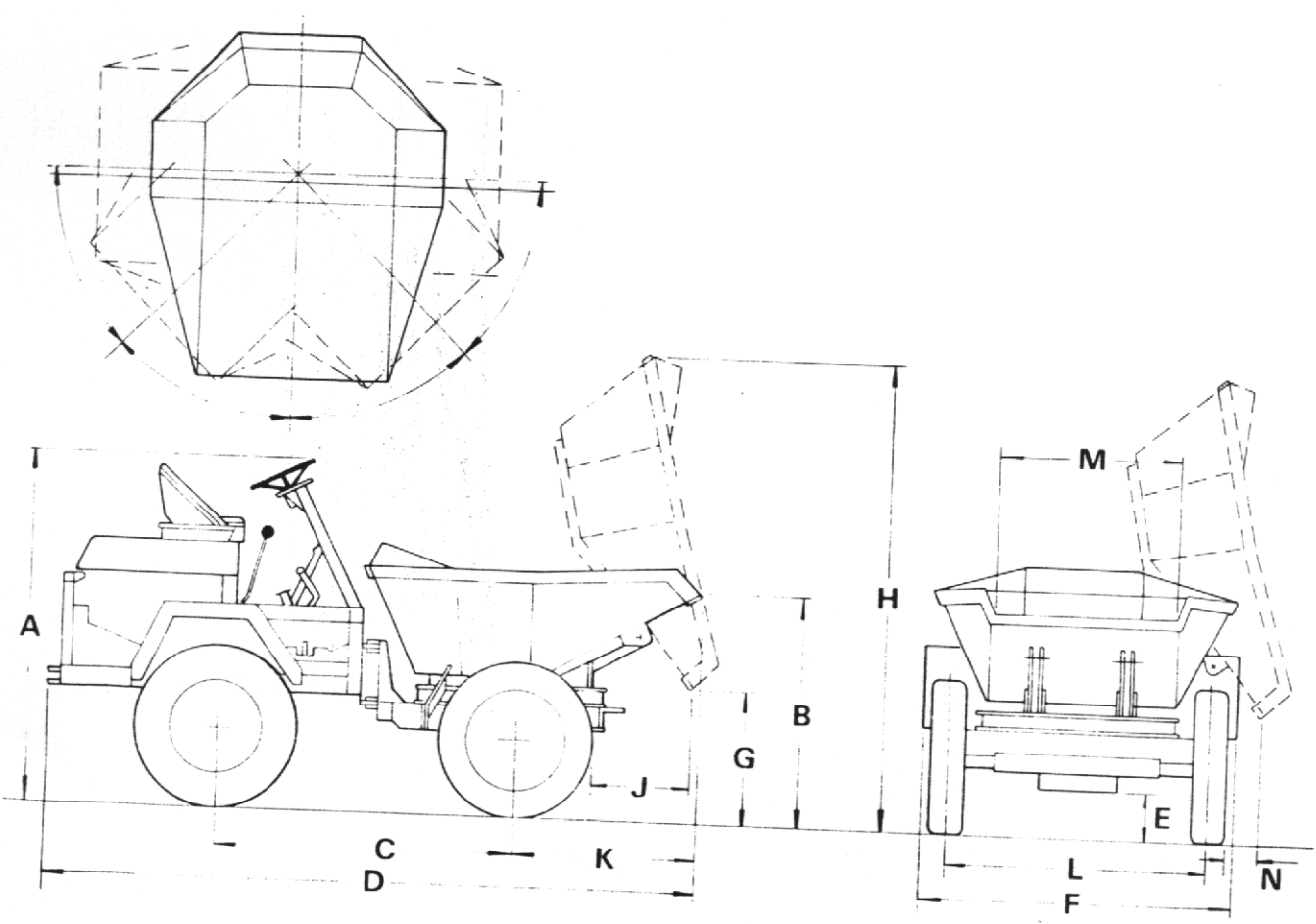


FIG. 5

## RECOMMENDED LUBRICATING OILS

COMPANY	ENGINE	DRIVE AXLE	TRANSFER BOX	GEARBOX	WHEEL BEARINGS & OTHER GREASE POINTS	HYDRAULIC SYSTEM
(U.K.) ESSO (Overseas)	ESSOLUBE HDX 20W  ESSOLUBE HDX 30 ESSOLUBE HDX 20W ESSOLUBE HDX 10W	TORQUE FLUID 62	GEAR OIL GP 90/140  GEAR OIL GP 140 GEAR OIL GX 85W-140 GEAR OIL GP 80W	ESSOLUBE HDX 30  ESSOLUBE HDX 30	BEACON 2  BEACON 2	NUTO H32  NUTO H68 NUTO H32 NUTO H22
(U.K.) CASTROL (Overseas)	DEUSOL CRB 20  DEUSOL CRB 30 DEUSOL CRB 20 DEUSOL CRB 10	AGRICASTROL AS  AGRICASTROL AS SPECIAL	DEUSOL EP 90  DEUSOL GEAR EP 140 DEUSOL GEAR EP 90 DEUSOL GEAR EP 80	DEUSOL CRB 30  DEUSOL CRB 30	CASTROL SPHEEROL APT 2  CASTROL SPHEEROL APT 2	CASTROL HYPIN AWS 32
(U.K.) SHELL (Overseas)	ROTELLA SX OIL 20/20W  ROTELLA SX OIL 30 ROTELLA SX OIL 20/20W ROTELLA SX OIL 10W		SPIRAX 90 EP  SPIRAX 140 EP SPIRAX 90 EP SPIRAX 80 EP	ROTELLA SX OIL 30  ROTELLA SX OIL 30	RETINAX A  RETINAX A	TELLUS OIL 27
(U.K.) BP (Overseas)	VANELLUS M20W  VANELLUS M30 VANELLUS M20W VANELLUS M10W		GEAR OIL SAE 90 EP  GEAR OIL SAE 140 EP GEAR OIL SAE 90 EP GEAR OIL SAE 80 EP	VANELLUS M30  VANELLUS M30	ENERGREASE L2  ENERGREASE L2	ENERGOL HLP 65
(U.K.) MOBIL (Overseas)	DELVAC 1220  DELVAC 1230 DELVAC 1220 DELVAC 1210 DELVAC SPECIAL 10W-30	MOBILFLUID 422	MOBILUBE HD 90 MOBILUBE GX 90  MOBILUBE HD 140 MOBILUBE GX 140 MOBILUBE HD 90 MOBILUBE GX 90 MOBILUBE HD 80 MOBILUBE GX 80	DELVAC 1230  DELVAC 1230	MOBILGREASE MP  MOBILGREASE SUPER	DTE 24
(U.K.) WALKERS CENTURY (Overseas)	CENTLUBE HD 20  CENTLUBE HD 30 CENTLUBE HD 20 CENTLUBE HD 10		CENTURY EP 90  CENTURY EP 140 CENTURY EP 90 CENTURY EP 80	CENTLUBE HD 30  CENTLUBE HD 30	REGULUS A2  REGULUS A2	CENTURY PWL A HYD. OIL  CENTURY PWL A HYD. OIL

IN THE UNLIKELY EVENT OF THE ABOVE OILS NOT BEING AVAILABLE  
EQUIVALENT OILS SUPPLIED BY A REPUTABLE MANUFACTURER MAY BE USED.

## OPERATION

### Starting

(See Fig.2)

1. Lift red-painted overload stop (A) situated on the fuel pump rack above and to the rear of the priming levers (B) and move fuel pump rack (C) into fully-open position.
2. Operate priming levers (B) six times.

NOTE:— This is unnecessary if engine is already warm.

3. Lift decompression lever (D), positioned on top of engine and turn engine as fast as possible using starting handle. When engine is turning at a good speed, knock down decompression lever and engine should fire.
4. If engine does not fire, lift decompression lever and slowly crank engine a few times before attempting to start again. Where ambient temperature is 5° F (–15° C) or below, a cold start aid should be fitted.

### Stopping

(See Fig.1)

Pull up stop control knob and hold in its fully raised position until engine stops. Release stop control knob when engine has ceased to turn.

### IMPORTANT:

1. DO NOT stop engine by means of decompression levers, this will lead to damaged valve seats and cylinder head joints.
2. DO NOT stop engine by closing fuel tap or by allowing fuel tank to run dry, this will allow air into fuel lines and necessitate bleeding and priming system.

### Gear Shift Lever

(See Fig.1)

Four/50E Dumper is fitted with three forward and one reverse gear. When changing gear, the clutch pedal is used in the normal manner.

### Skip Control Lever

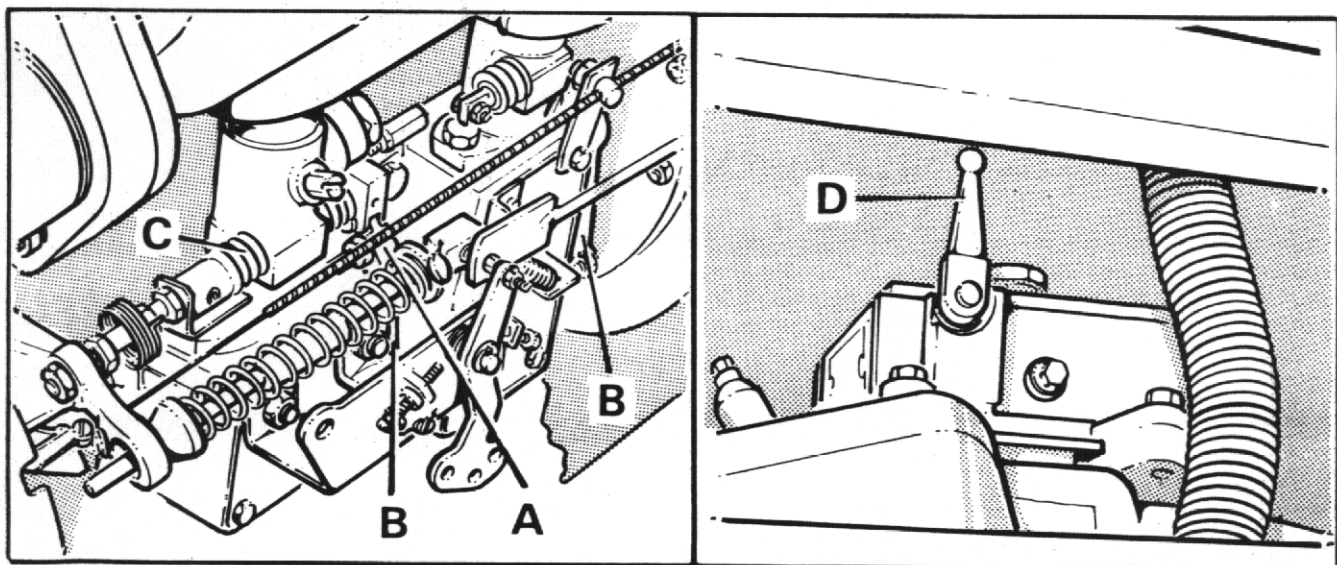
(See Fig.1)

1. Control lever has three positions DUMP (A), HOLD (B), and RETURN (C).
2. Push lever forward to DUMP (A) to deposit load.
3. Pull lever back to RETURN (C) to return skip carrying position.

NOTE:— If lever is released when in DUMP or RETURN position, it will automatically return to HOLD (B) position and motion of skip will cease. In this way, speed at which load is deposited can be finely controlled.

### Turntable (if fitted)

Pull cranked release lever on turntable catch fully back to release turntable. Revolve skip to required position. To lock in position lift release lock lever and ensure that locking lug locates in turntable locking plate. Cranked release lever will return to its former position.



## GENERAL MAINTENANCE

### Periodic Maintenance

1. DAILY check engine oil level and fill to full mark on dipstick, if necessary.
2. DAILY fill fuel tank, or as often as proves necessary to approximately 1" of top. Never allow there to be a depth of less than 2" of fuel in tank.
3. WEEKLY check oil level in gearbox and fill to full mark on dipstick, if necessary.
4. WEEKLY remove filler/level plugs from drive axles and transfer case. Oil level should be to bottom of holes. Top up, if necessary through filler/level plugs.
5. WEEKLY check oil level in hydraulic tank. Always clean the surrounding area before removing cap to prevent possible entry of foreign matter. Fill tank, if necessary, to within 1" of top.
6. WEEKLY check brake fluid level in master cylinder reservoirs and top up if necessary, to within ¼" of top.
7. WEEKLY apply grease to all grease nipples.
8. WEEKLY check all wheel nuts and tighten, if necessary.
9. WEEKLY check tyre pressures 35 lb/sq.in. (2.46 kgs/cm<sup>2</sup>)
10. WEEKLY check all nuts and bolts, and tighten if necessary.

### Lubrication (See Fig.3)

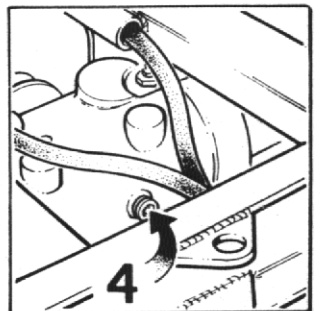
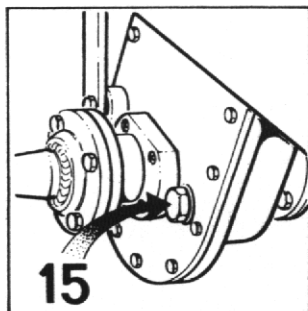
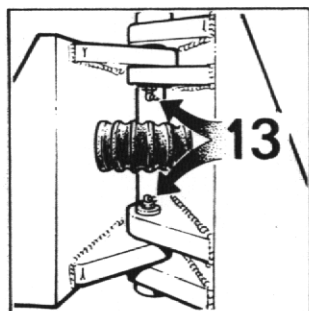
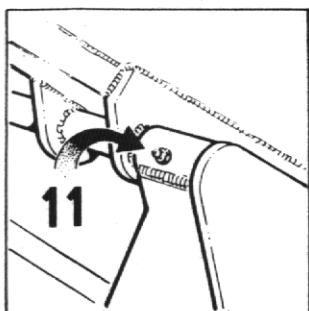
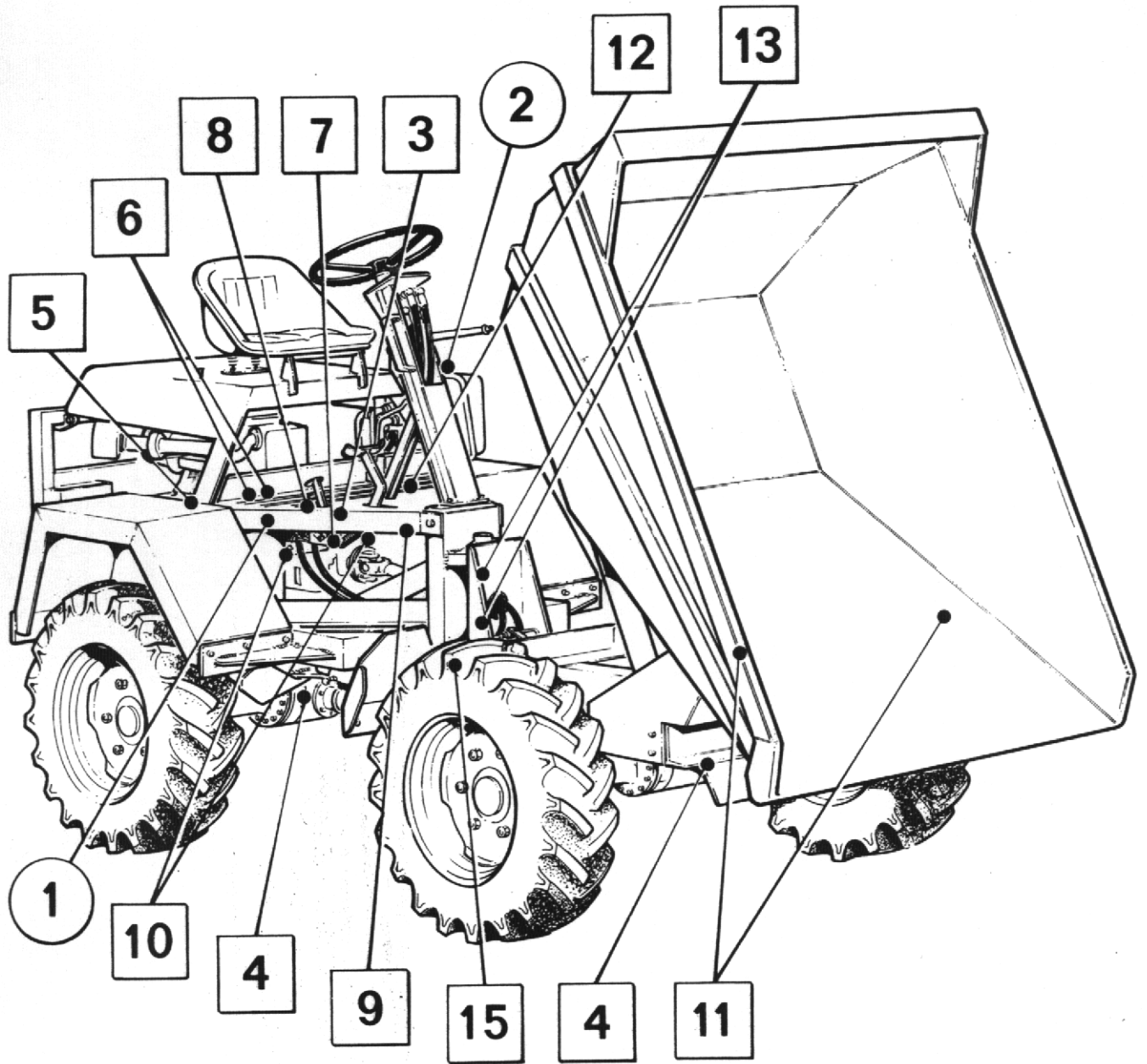
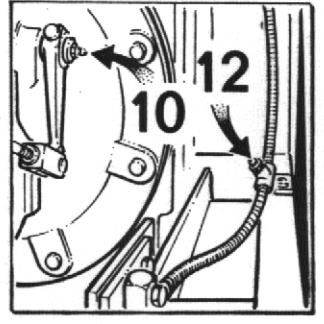
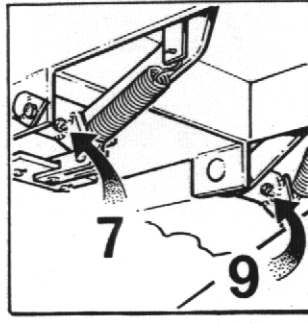
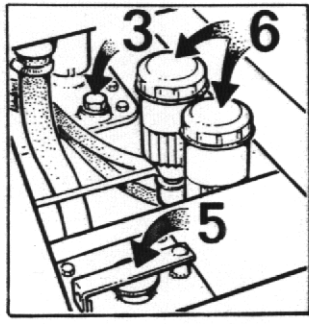
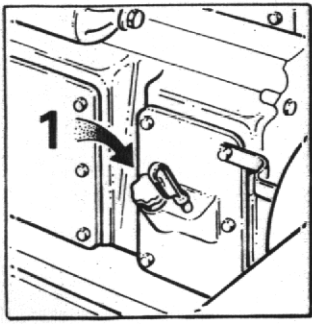
Period	Key	Description	Lubrication	No. of Points
Daily	1	Engine	Engine Oil	1
	2	Fuel Tank	Diesel Fuel	1
Weekly	3	Gearbox	Gearbox Oil	1
	4	Drive Axles	Axle Oil	2
	5	Hydraulic Tank	Hydraulic Fluid	1
	6	Brake Master Cylinder Reservoirs	Brake Fluid	2
	7	Footbrake Pedal	Grease Gun	1
	8	Accelerator Pedal	Grease Gun	1
	9	Clutch Pedal	Grease Gun	1
	10	Clutch Cross Shaft	Grease Gun	2
	11	Skip Pivot	Grease Gun	2
	12	Handbrake Cable	Grease Gun	1
	13	Chassis Centre Pivot	Grease Gun	2
	14	Prop Shafts & Universal Joints	Grease Gun	10
	15	Transfer Case	Axle Oil	1

N.B. FOR RECOMMENDED LUBRICATING OILS SEE CHART

### Oil Capacities

Transfer Box .....	1pt. (.57 litres)	Drive Axle .....	8 pts. (4.6 litres)
Gear Box .....	1½ pts. (.85 litres)	Engine .....	12 pts (6.82 litres)

- NOTES: 1. Rear Axle articulation points consist of bearings that require no lubrication.  
 2. For full details of the lubrication and maintenance of the engine refer to Manufacturers Manual.





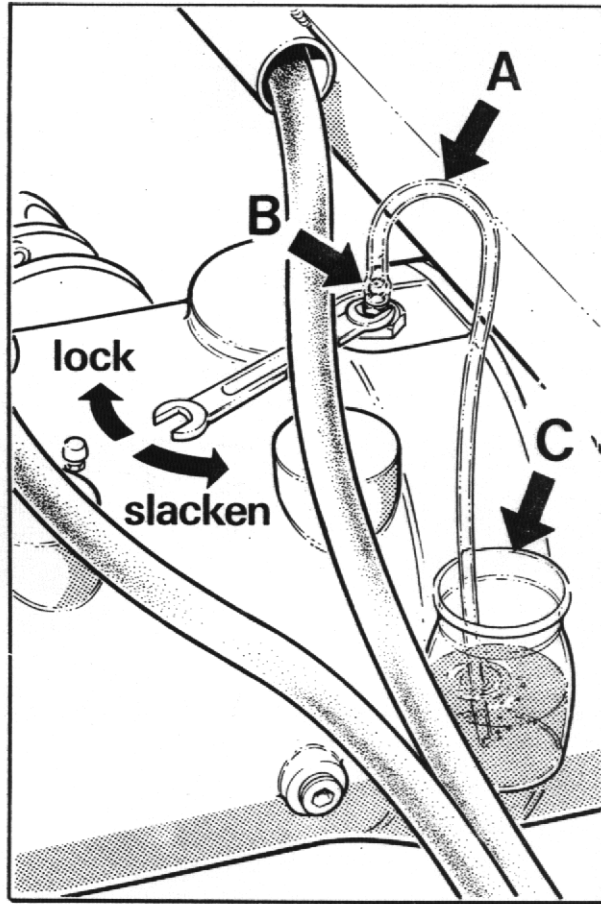
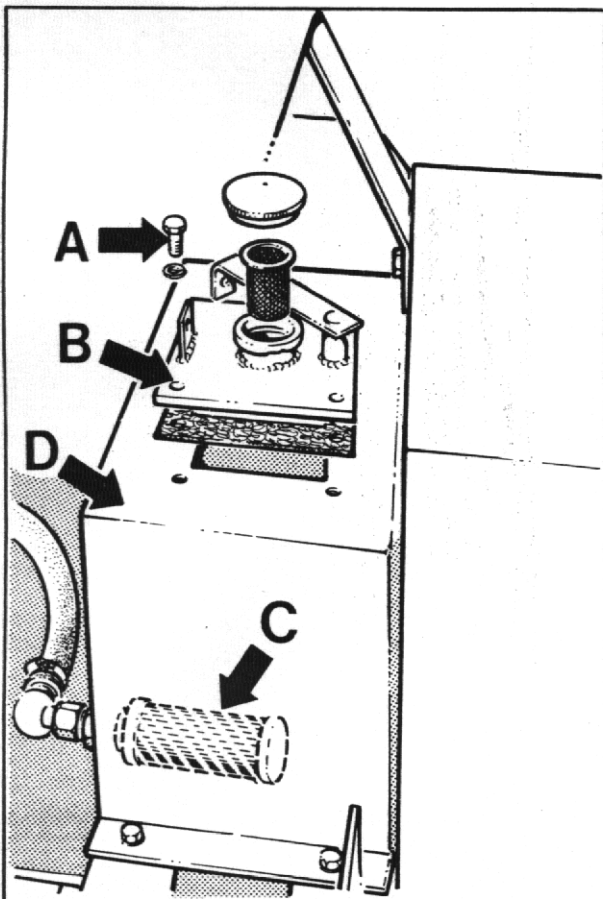


FIG. 8



TP 280

FIG. 9

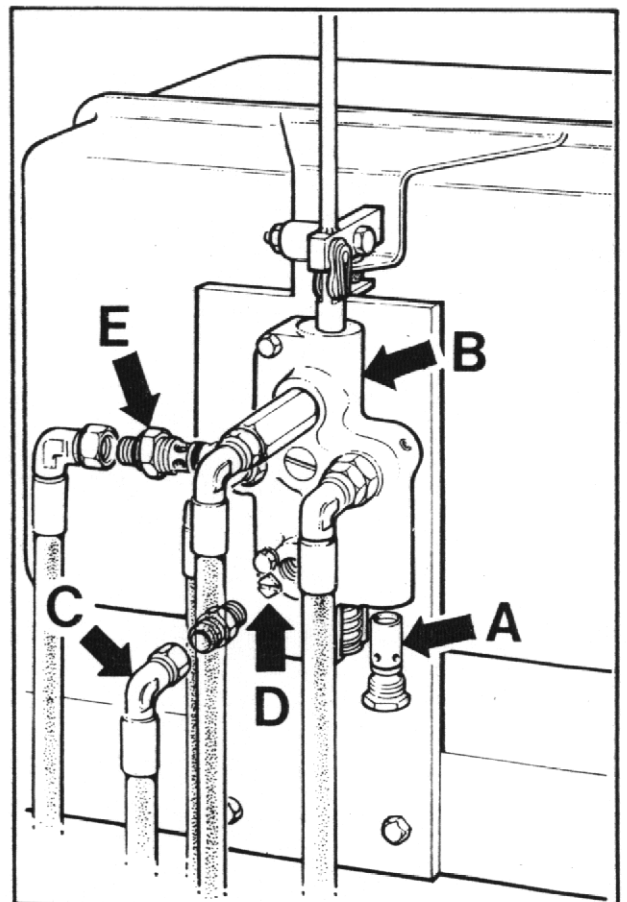


FIG. 10

## Brake System

The brake system is designed to require the minimum of maintenance, and, providing the hydraulic fluid in the reservoirs is not allowed to fall below the recommended level, no defects should normally occur. Fluid loss must be supplemented by topping up the reservoirs with brake fluid that conforms to SAE J 1703. No other fluid may be used. If air is present in the system it will be indicated by sluggish response of the brakes and by spongy action of the brake pedal. This may be due to air being introduced at a loose joint or by the reservoir fluid levels being allowed to fall very low. These defects must be remedied immediately and the complete system bled.

To bleed the system, proceed as follows:—

1. Check that all connections are tight and all bleed screws are closed.
2. Fill reservoirs with brake fluid.
3. Attach bleeder tube (A) (See fig. 8) to one of the bleed screws (B) on front axle and immerse other end in a small quantity of brake fluid contained in a glass jar (C). Slacken bleed screw and operate brake pedal up and down to its full stroke, until fluid pumped into the jar contains no air bubbles. Hold down pedal and close bleed screw. Remove bleeder tube and release pedal.
4. Repeat on the other bleed screw on the front axle.
5. Carry out the procedure on the one bleedscrew on the rear axle and continue until all air has been bled from the system.
6. Lock all the bleed screws and top up the reservoirs to the correct level.
7. Apply normal working load on brake pedal for two or three minutes and examine the entire system for leaks.

NOTES: DURING THE OPERATION IT IS ESSENTIAL THAT THE RESERVOIR LEVELS ARE KEPT TOPPED UP TO PREVENT FURTHER AIR BEING DRAWN INTO THE SYSTEM. ONLY USE NEW FLUID FOR TOPPING UP.

ALWAYS ENSURE THAT FREE PLAY EXISTS BETWEEN BRAKE PEDAL AND MASTER CYLINDERS. UNLESS THE PISTONS IN BOTH MASTER CYLINDERS ARE ALLOWED TO FULLY RETURN, BRAKE PRESSURE WILL BUILD UP AND THE BRAKES WILL REMAIN ON.

## Hydraulic System

The single hydraulic pump provides power for both the skip operation and steering. The pump output is split into two circuits with priority flow to steering circuit which incorporates a flow control valve. If the hydraulic system fails to operate completely or does so extremely slowly carry out the following procedure.

1. Check that hydraulic tank is full of oil.
2. Check that hydraulic filter is not blocked. (See fig. 9)
  - a) Remove the four setscrews (A) that secure the filler cap assembly (B) and remove assembly.
  - b) Unscrew suction filter (C) from inside tank (D) and wash in white spirit. Dry with moisture-free compressed air.
  - c) Replace suction filter and filler cap assembly.

NOTE:— If suction filter cannot be thoroughly cleaned, fit a new one.

3. Check that the hydraulic pressures are correct.

Tip circuit.

  - a) Fit a 2000 lb/sq.in. gauge into the hydraulic system at the base of the skip ram.
  - b) Operate control lever to dump skip and check that pressure reading on gauge is 1750 lb/sq.in. when ram is fully extended and relief valve is "blowing".

Steering circuit

- a) Fit a 2000 lb/sq.in. gauge into the hydraulic system at the base of the steering ram.
- b) Turn steering wheel with machine on "full lock" and check that the reading on the gauge is 1750 lb/sq.in.

NOTE:— If correct pressure is not attained—

Tip circuit

4. Remove relief valve cartridge (A) (hexagon head) from the bottom of the control valve (B) (See fig. 10) and replace with a new one.
5. Remove hose adaptor (C) from control valve (See Fig. 6), remove hexagonal orifice plate (D) and wash in white spirit. Dry using moisture-free compressed air. DO NOT poke wire etc. into the orifice. Re-fit plate and hose adaptor with slot of orifice plate facing outwards.

Steering circuit

6. Remove relief valve cartridge (A) (hexagon head) from the bottom of the control valve (B) (See fig. 10) and replace with a new one.
7. Replace flow control valve (E) (See fig. 10)

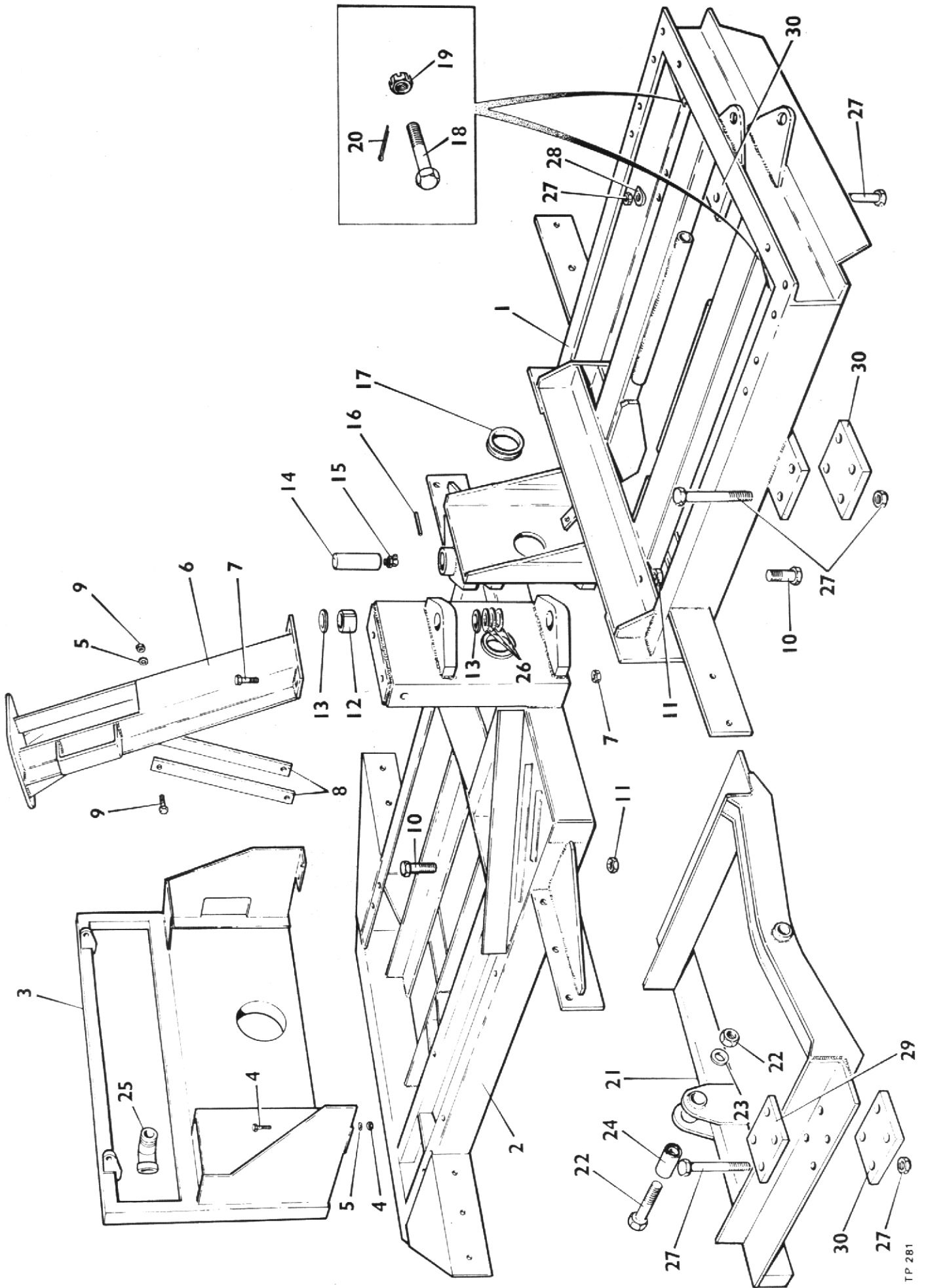
If none of these procedures correct the fault contact your Winget agent. Periodically check the hose between the pump and the tank to ensure it is not deformed. Any deformation in the hose may result in a restricted flow of fluid and damage to the pump.

IMPORTANT:— ON NO ACCOUNT SHOULD THE STEERING VALVE BE DISMANTLED, SHOULD IT REQUIRE ATTENTION REMOVE IT COMPLETE AND RETURN IT TO THE FACTORY

# spare parts section

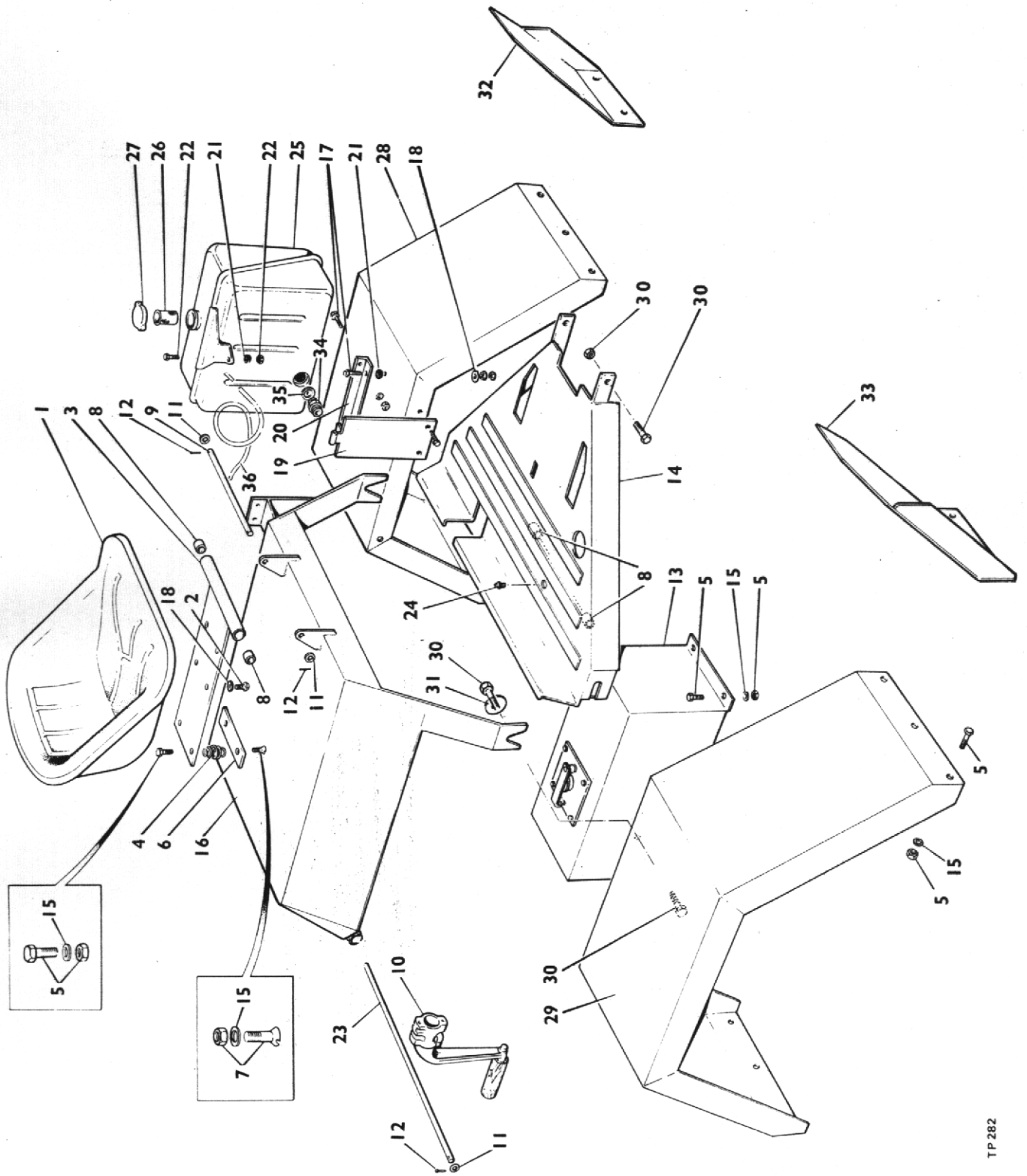
## LIST OF CONTENTS

Title	Page No.
CHASSIS . . . . .	18, 19
MUDWINGS & COVERS. . . . .	20, 21
HIGH DISCHARGE SKIP & FRAME . . . . .	22, 23
TURNTABLE SKIP, FRAME & CATCH. . . . .	24, 25
FORWARD TIP SKIP . . . . .	26
FLYWHEEL & CLUTCH ASSEMBLY . . . . .	27
GEARBOX . . . . .	28-31
TRANSFER BOX & PROP SHAFTS . . . . .	32, 33
DRIVE AXLE (250 SERIES) . . . . .	34-37
HANDBRAKE UNIT . . . . .	38
BRAKE MASTER CYLINDER ASSEMBLY . . . . .	39
BRAKE PIPES & FITTINGS . . . . .	40, 41
HANDBRAKE, VALVE CONTROL LEVER & ENGINE STOP CONTROL . . . . .	42, 43
PEDALS & CONTROLS . . . . .	44, 45
HYDRAULIC PIPES & FITTINGS . . . . .	46, 47
HYDRAULIC PUMP & DRIVE . . . . .	48
HYDRAULIC RAM (FWD TIP & TURNTABLE) . . . . .	49
HYDRAULIC RAM (HIGH DISCHARGE) . . . . .	50
STEERING RAM . . . . .	51
HYDRAULIC CONTROL VALVE . . . . .	52, 53
DRIVE WHEELS & TYRES . . . . .	54
AIR CLEANER . . . . .	55



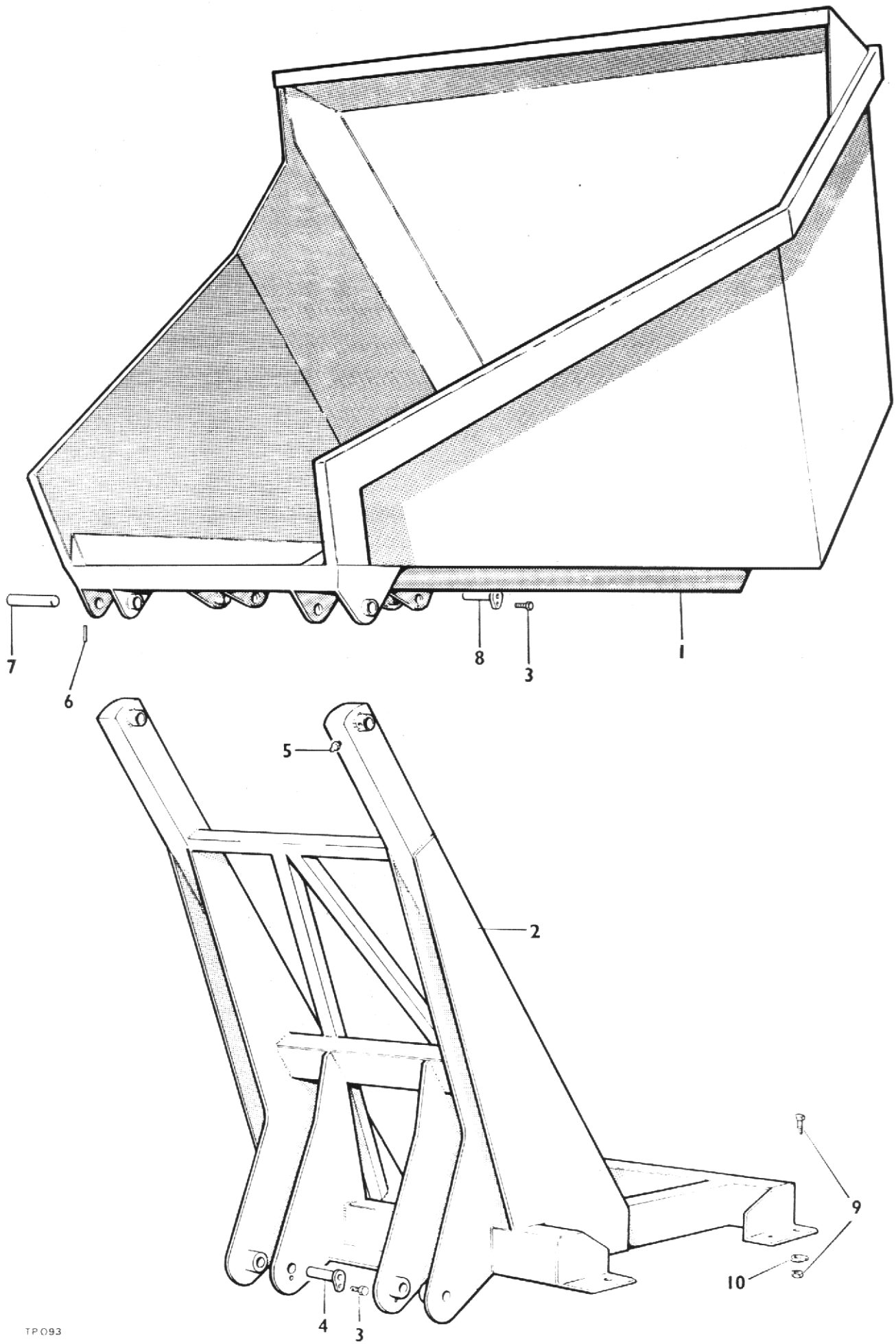
## CHASSIS

Item No.	Part No.	Description	Qty.
1	CSE 195	Front Chassis .....	1
2	CSE 129	Rear Chassis.....	1
3	CSE 160	Rear Frame .....	1
4		Bolt M10 x 30mm long & locknut .....	8
5		Shakeproof Washer 10mm dia. ....	10
6	CSE 107	Steering Column .....	1
7		Bolt M12 x 45mm long & locknut .....	2
8	4-35-333	Steering Column Brace .....	2
9		Bolt M10 x 40mm long & locknut .....	2
10	4-35-110A	Steering Ram Bolt .....	2
11	4-35-110B	Steering Ram Nut .....	2
12	4-35-29B	Centre Pivot Pin Bush .....	2
13	4-35-29C	Centre Pivot Thrust Washer - Bronze .....	4
14	4-35-29	Centre Pivot Pin .....	2
15	T.90	Grease Nipple - 90° .....	2
16	4-35-29A	Tension Pin 5/16" dia. x 2¼" long .....	2
17	F4-45-182	Grommet .....	2
18	4-60-104	Skip Ram Bolt (FWD Hydraulic Tip only) .....	2
19	4-60-172	Skip Ram Nut (FWD Hydraulic Tip only) .....	2
20		Split Pin 3/16" dia. x 2¼" long (FWD Hydraulic Tip only) ..	2
21	CSE 194	Articulating Frame .....	1
22		Bolt M24 x 127mm long & locknut .....	2
23		Washer 24mm dia. ....	2
24	MH5236	Articulating Frame Pivot Bush.....	2
25	CSE 141	Exhaust Elbow 1½" BSP .....	1
26	ASE 180	Centre Pivot Thrust Washer - M.S. 2½" O.D. x 1½" I.D. x 10 S.W.G. ....	A/R
	ASE 178	Centre Pivot Thrust Washer - M.S. 2½" O.D. x 1½" I.D. x 14 S.W.G. ....	A/R
	ASE 179	Centre Pivot Thrust Washer - M.S. 2½" O.D. x 1½" I.D. x 20 S.W.G. ....	A/R
27		Bolt M16 x 200 mm long & nut .....	16
28		Taper Washer 5/8" dia. ....	4
29	CSE 192	Articulating Frame Stop Plate .....	2
30	CSE 193	Axle Clamp Plate .....	2
31		Bolt M12 x 55mm long & locknut (engine mtg.) .....	4



## MUDWINGS AND COVERS

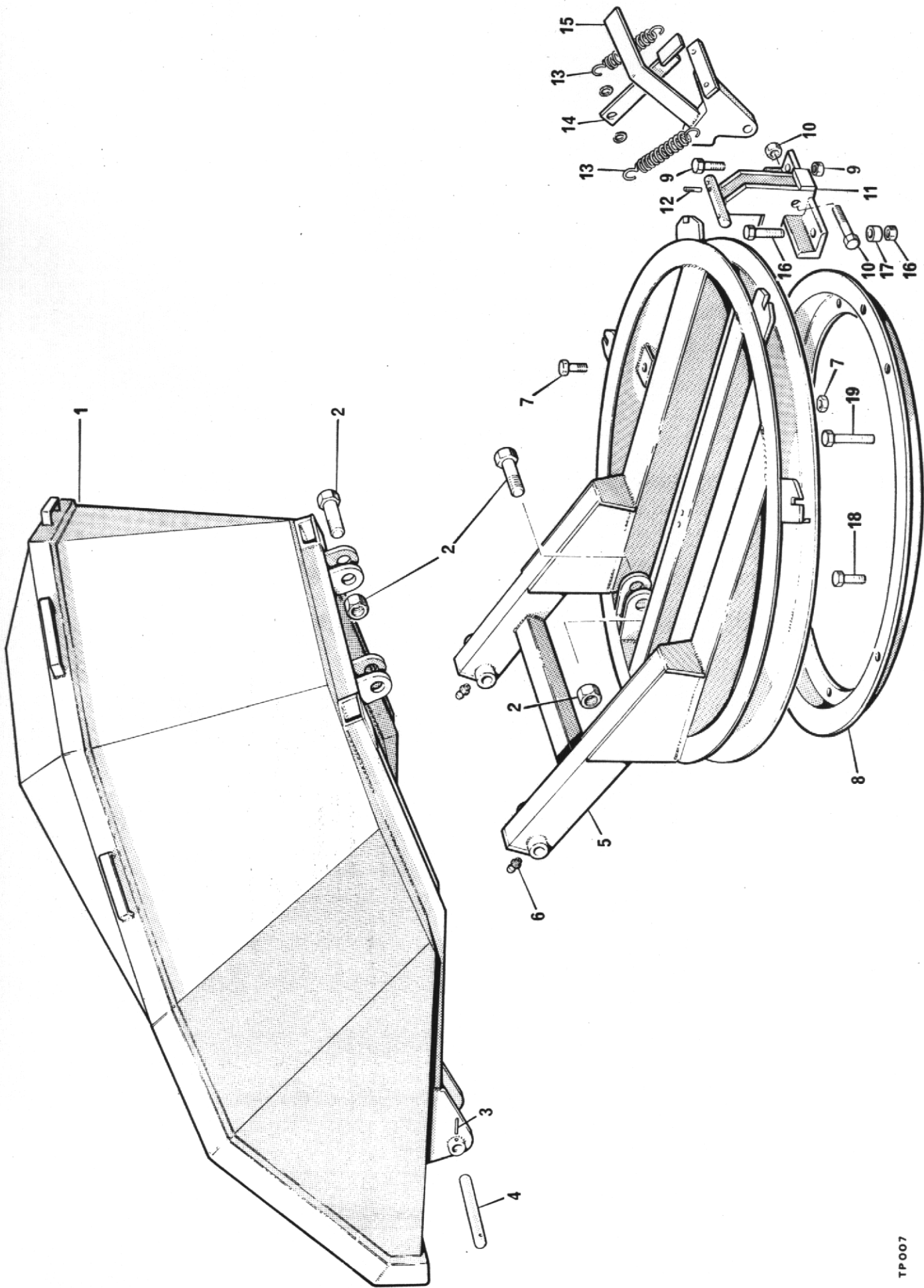
Item No.	Part No.	Description	Qty.
1	4-35-301	Seat .....	1
2		Seat Bolts 8mm x 20mm long Mushroom Head .....	4
3	CSE 116	Seat Frame .....	1
4	5ST 99	Seat Spring .....	2
5		Bolt M10 x 25mm long & locknut .....	22
6	4-35-331	Seat Spring Plate .....	1
7		Bolt csk. M10 x 25mm long & locknut .....	2
8	WB0808	Bush.....	4
9	4-35-307	Seat Pivot Rod.....	1
10	C188	Starting Handle .....	1
11		Flat Washer 12mm dia. ....	4
12		Split Pin 3/32" dia x 1" long .....	4
13	CSE 123	Hydraulic Tank (See Page 47) .....	1
14	CSE 191	Footplate.....	1
15		Flat Washer 10mm dia. ....	24
16	CSE 161	Engine Cover .....	1
17		Bolt M8 x 25mm long & locknut .....	4
18		Flat Washer 8mm dia .....	6
19	F4-45-173	Hydraulic valve mounting Bracket (See Page 43) .....	1
20	CSE 170	Angle .....	1
21	CSE 158	Rubber bush .....	3
22		Bolt M6 x 30mm long and locknut .....	1
23	CSE 168	Pivot Pin .....	1
24	T-ST	Grease Nipple .....	1
25	BAE 7E	Fuel Tank .....	1
26	JE 13	Strainer .....	1
27	CE 12	Cap .....	1
28	F4-45-181	Left Hand Mudwing Assembly.....	1
29	CSE 187	Right Hand Mudwing .....	1
30		Bolt M12 x 40mm long & locknut .....	6
31	CSE 167	Blanking Plate .....	2
32	4-35-390	Left Hand Mudflap .....	1
33	4-35-389	Right Hand Mudflap .....	1
34	4-60-189	Adaptor 3/8 in. BSP x 1/4 in. BSP .....	1
35	4-35-364	Fibre Washer .....	1
36	258721	Leak back tube 18 in. ....	1





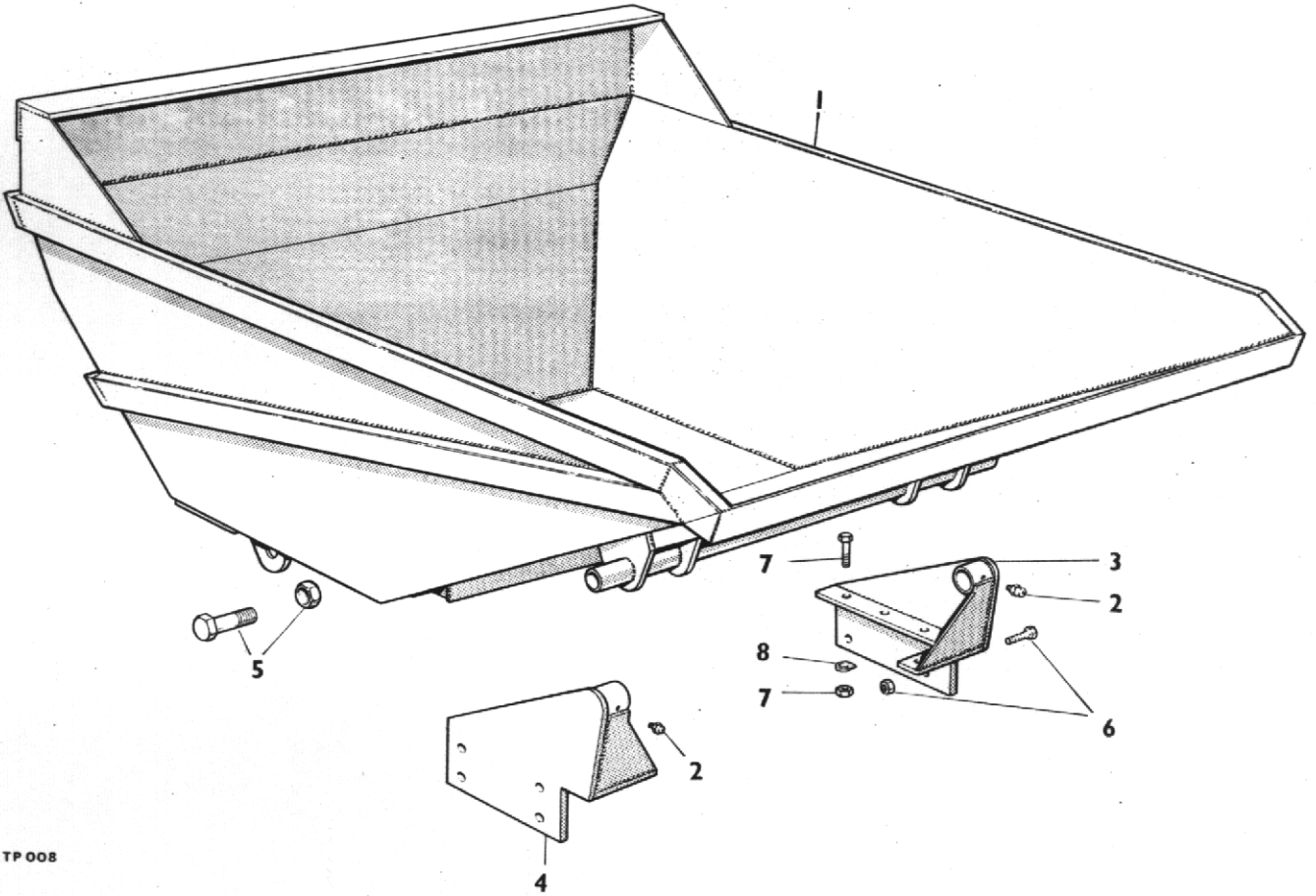
## HIGH DISCHARGE SKIP AND FRAME

Item No.	Part No.	Description	Qty.
1	4-35-210	Skip .....	1
2	4-35-323	Frame .....	1
3		Bolt M8 x 20mm long & locknut .....	4
4	4-35-226	Lower Ram Pin .....	2
5	5ST 100	Grease Nipple .....	2
6	4-35-29A	Tension Pin 5/16" dia. x 2 1/4" long .....	2
7	5ST 84	Skip Pivot Pin .....	2
8	4-35-178	Ram Pin .....	2



## TURNTABLE SKIP, FRAME AND CATCH

Item No.	Part No.	Description	Qty.
1	5ST 79	Narrow Mouth Skip .....	1
	5ST 97	Wide Mouth Skip .....	1
2	4-35-110	Ram Bolt & Nut .....	4
3	4-35-29A	Tension Pin 5/16" x 2 1/4" long .....	2
4	5ST 84	Skip Pivot Pin .....	2
5	5ST 78	Turntable .....	1
6	5ST 100	Grease Nipple .....	2
7		Bolt M12 x 35mm long & locknut .....	4
8	5ST 69	Turntable ring .....	1
9		Bolt M12 x 40mm long & locknut .....	1
10		Bolt M16 x 55mm long & locknut .....	1
11	4-35-319-12	Turntable Catch Body .....	1
12	C129A	Tension Pin 3/16" dia. x 1 1/4" long .....	1
13	4-35-320	Spring .....	2
14	4-35-319-4	Locking Bar .....	1
15	4-35-319-13	Catch Plate .....	1
16		Bolt M12 x 55mm long & locknut .....	1
17	4-35-327	Packing Piece 7/8" dia. 1/2" Bore x 5/8" long .....	1
18		Bolt M12 x 45mm long & locknut .....	4
19		Bolt M12 x 105mm long & locknut .....	4
20	4-35-319	Turntable Catch Assembly (Complete) .....	
		(Not Illustd.) .....	1

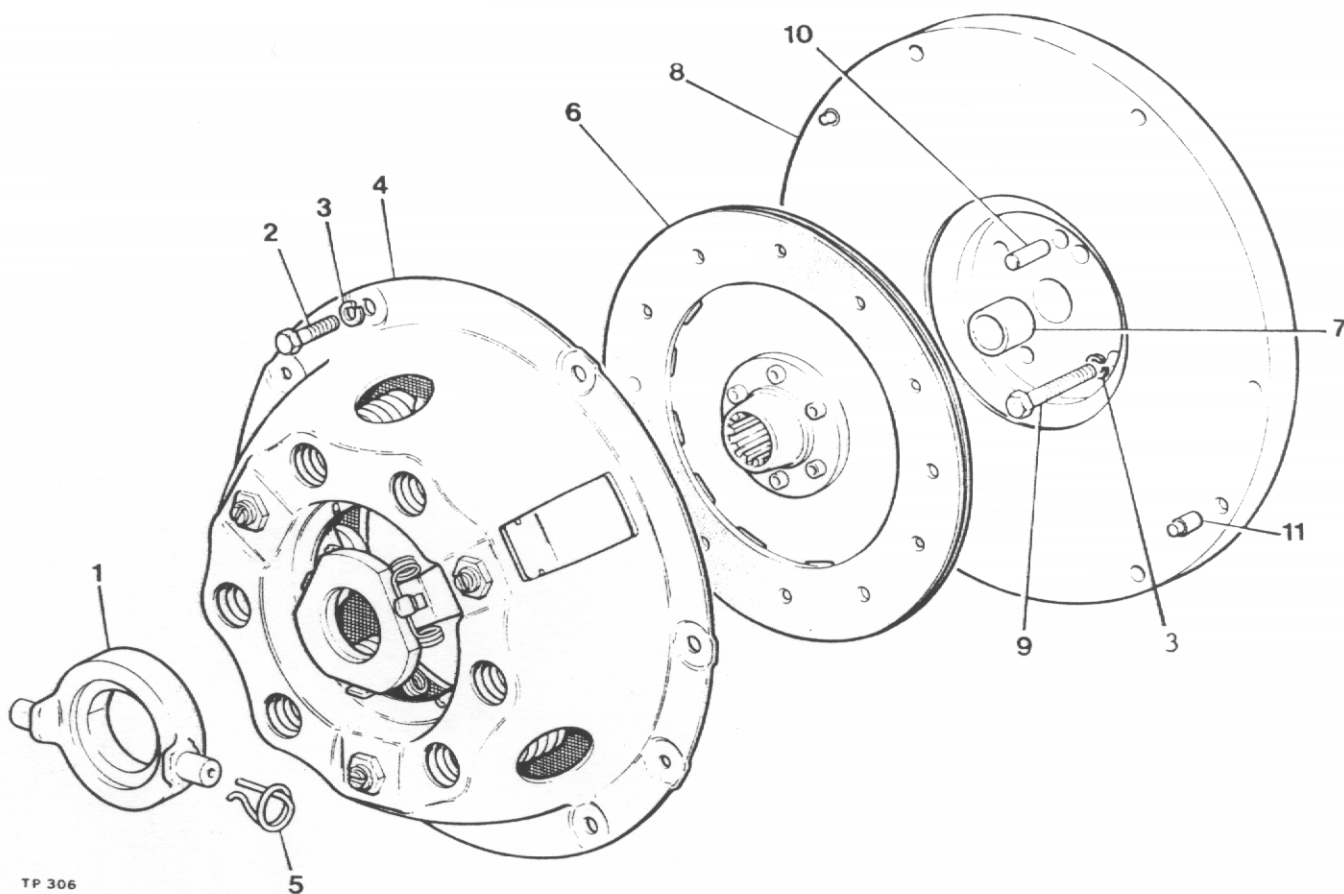


TP 008

### FORWARD TIP SKIP

Item No.	Part No.	Description	Qty.
1	4-35-302	Skip .....	1
2	5ST 100	Grease Nipple .....	2
3	4-35-309	Skip Mtg. Brkt. L.H. ....	1
4	4-35-308	Skip Mtg. Brkt. R.H. ....	1
5	4-35-110	Ram Bolt & Nut .....	2
6		Bolt M12 x 40mm long & locknut .....	8
7		Bolt M12 x 45mm long & locknut .....	10
8		Taper Washer 1/2" dia. ....	10

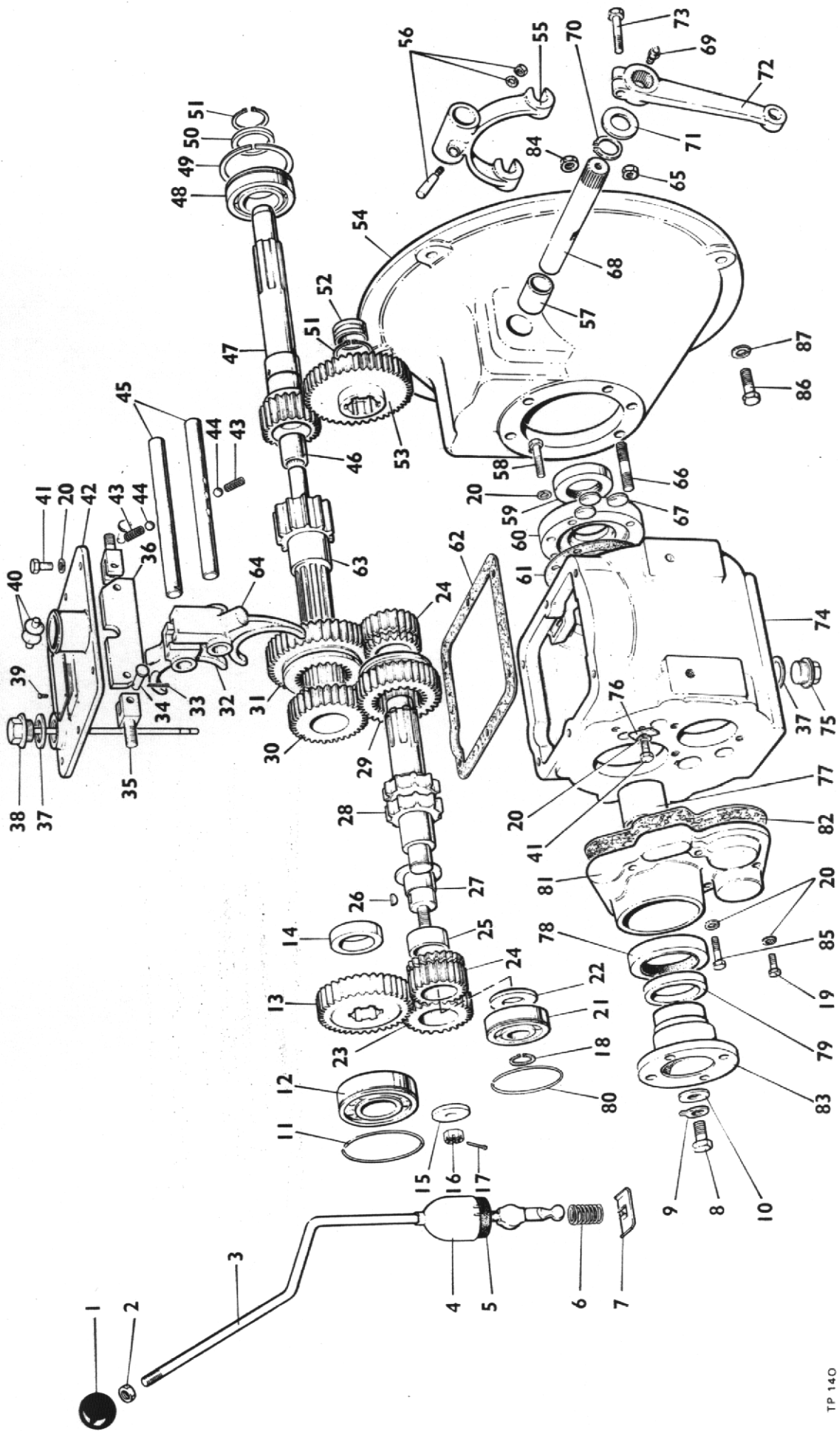
## FLYWHEEL AND CLUTCH ASSEMBLY



TP 306

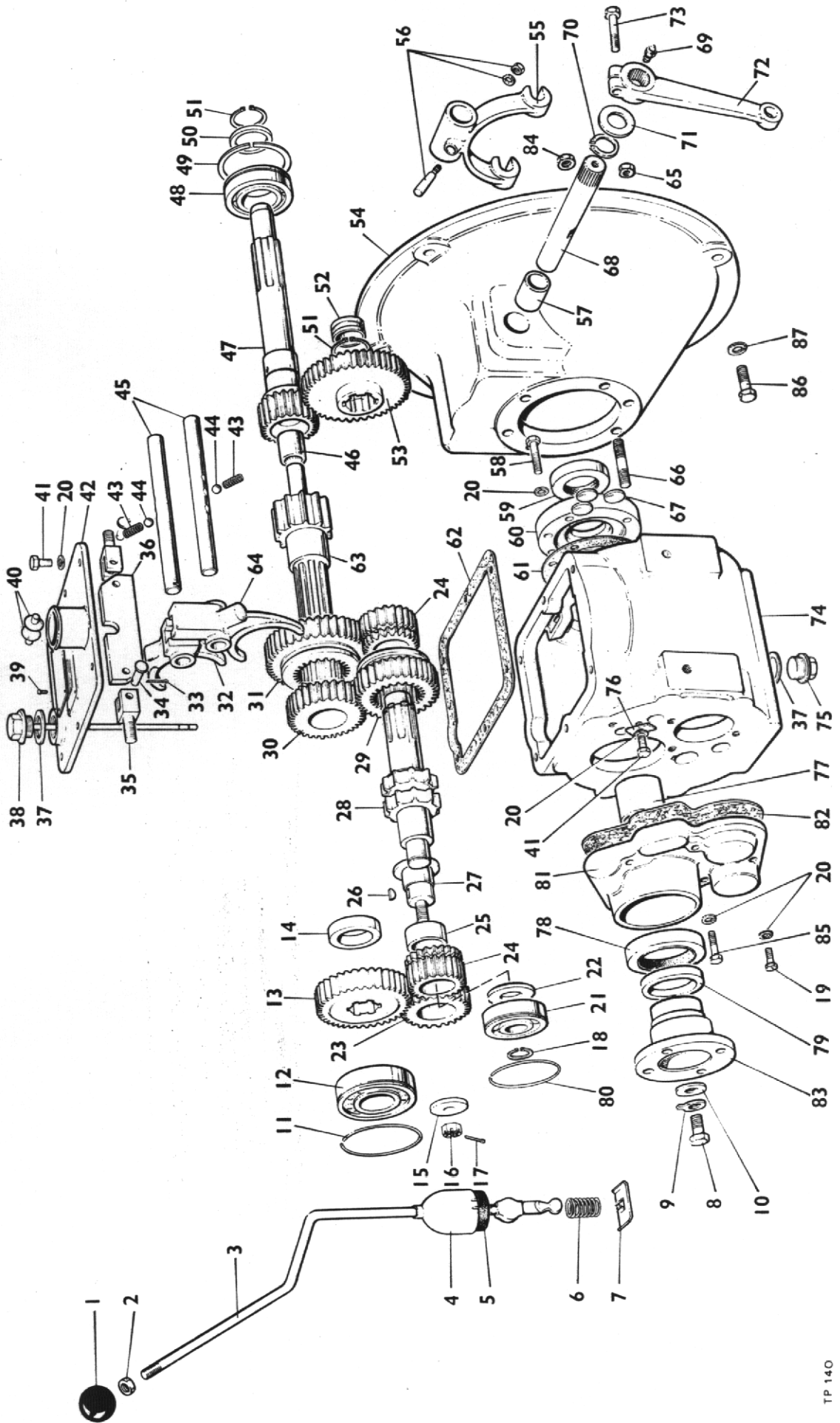
Item No.	Part No.	Description	Qty.
1	10579A01	Clutch Release Bearing	1
2	28S02D	Screw Set	6
3	41S04	Washer Spring	10
4	10597A01	Cover Assembly	1
5	10579A101	Retainer Spring	2
6	10598A02	Drive Plate	1
7	10580A0101	Bush	1
8	10580A02	Flywheel Assembly (comprises of items 7, 8, & 11)	1
9	1S02C	Bolt, Petter PH Engine (drill for locking wire)	4
9A	6S02B	Bolt, Lister Engine (drill for locking wire)	4
10	C321	Dowel	1
11	10580A0102	Dowel	2
	10948A02	Clutch Kit (comprises of items 1, 4, 5 & 6)	1

It is recommended that instead of drilling the head of the bolts (item 9) for locking wire that one of each of tabwashers part no's 10531A02 and 10531A03 are used to prevent the bolts working loose.



## GEARBOX (40M-2-589 INV. 372)

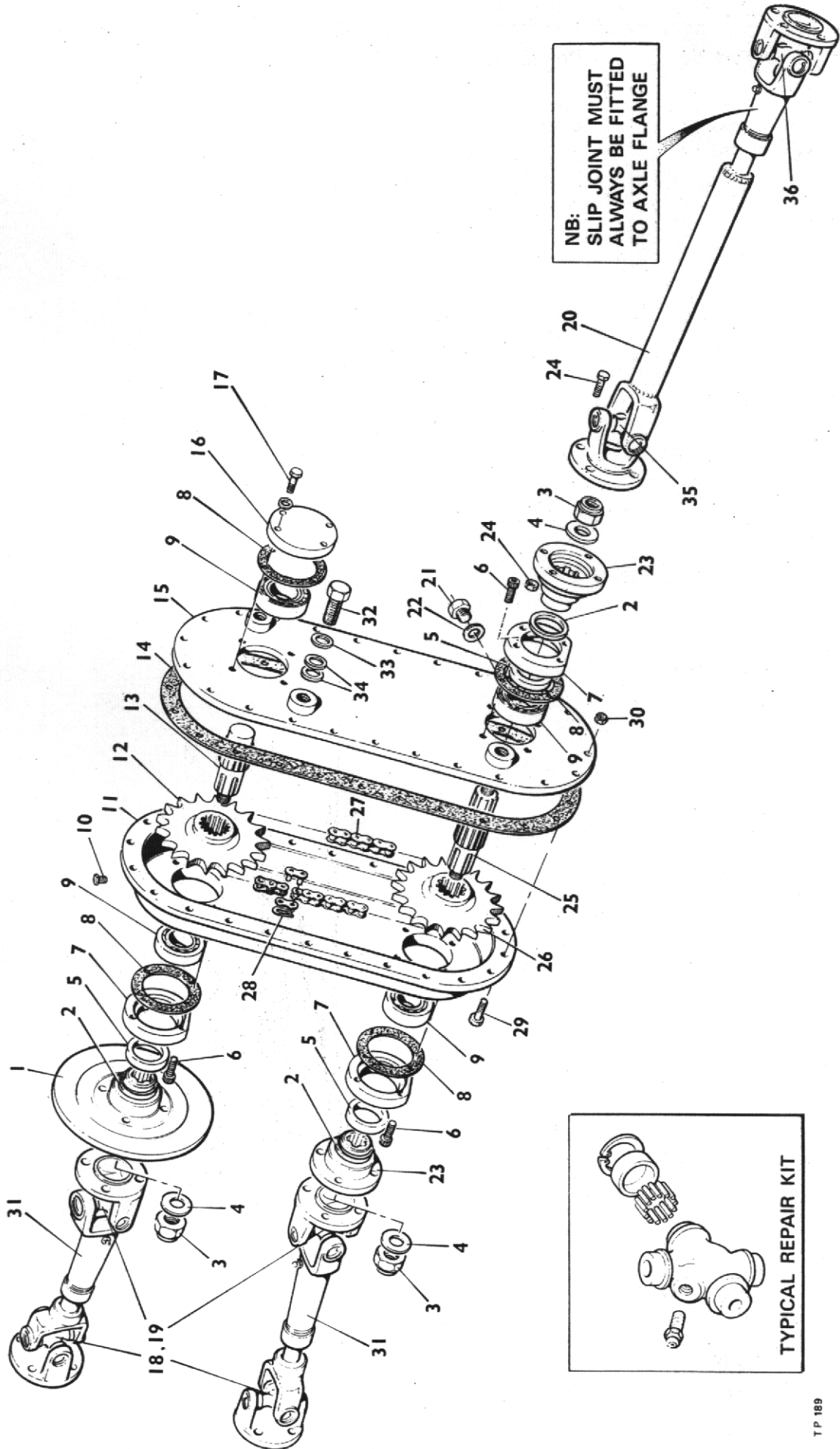
Item No.	Part No.	Description	Qty.
1	40M-133	Gear Lever Knob .....	1
2	UN512	Gear Lever Locknut .....	1
3	40M 372	Gear Lever .....	1
4	40M-377	Gear Lever Cap .....	1
5	40M-129	Gear Lever Cover .....	1
6	40M-367	Gear Lever Spring .....	1
7	40M-245	Gear Lever Retaining Plate .....	1
8	USF 55	Bolt .....	1
9	CM2050	Tab Washer .....	1
10	CM2123	Washer .....	1
11	CM2060	Snap Ring .....	1
12	CM2052	Bearing, Mainshaft Rear .....	1
13	40M-110	Output Gear .....	1
14	40M-128	Output Gear Spacer .....	1
15	40M-155	Reverse Pinion Shaft Washer .....	1
16	UN507	Reverse Spindle Nut .....	1
17	CP1004	Split Pin .....	1
18	40M-148	Circlip .....	1
19	USF 31	Bolt .....	3
20	W104	Spring Washer .....	17
21	40M-146	Layshaft bearing .....	1
22	40M-130	Bearing spacer .....	1
23	40M-111	Reverse pinion .....	1
24	40M-114	Reverse speed gear .....	2
25	40M-161	Reverse pinion bush .....	1
26	40M-222	Reverse pinion shaft key .....	1
27	40M-119	Reverse pinion shaft .....	1
28	40M-118	Layshaft .....	1
29	40M-116	2nd. Speed sliding gear .....	1
30	40M-113	Second speed gear .....	1
31	40M-115	1st Speed gear .....	1
32	40M-502	2nd. and 3rd. Selector fork .....	1
33	40M-244	Split pin, interlock .....	2
34	40M-232	Clevis pin, interlock .....	2
35	40M-231	Stud, interlock .....	2
36	40M-505	Interlock plate .....	1
37	CP-1068	Sealing washer .....	2
38	40M-153	Dipstick .....	1
39	CP 1003	Drive screw .....	4
40	40M-254	Gear lever pad .....	2
41	USF 21	Bolt .....	7
42	40M-220	Top cover .....	1
43	CM 2103	Detent spring .....	2
44	CM 1077	Detent ball .....	2
45	40M-135	Selector shaft .....	2
46	40M-513	Bearing, Primary shaft .....	1
47	40M-117	Primary shaft .....	1



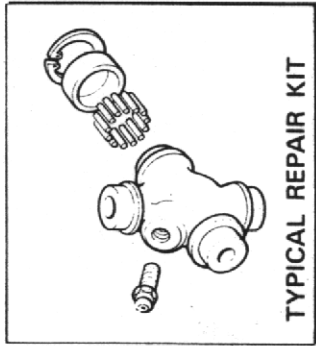


## GEARBOX (CONT'D)

Item No.	Part No.	Description	Qty.
48	40M-143	Input bearing .....	1
49	40M-252	Snap ring .....	1
50	40M-174	Bearing spacer .....	1
51	CM2053	Circlip .....	2
52	40M-162	Layshaft bush .....	1
53	40M-360	1st. Reduction gear .....	1
54	40M-392	Clutch housing .....	1
55	CM2083	Clutch release fork .....	1
56	CM2084 S/A	Cotter, nut and washer S/A .....	1
57	CM2179	Cross shaft bush .....	2
58	UBF 71	Front cover bolt .....	4
59	40M-150	Oil seal, input .....	1
60	40M-126	Front cover .....	1
61	40M-172	Front cover gasket .....	1
62	40M-169	Top cover gasket .....	1
63	40M-514	Mainshaft .....	1
64	40M-501	1st. and reverse selector fork .....	1
65	UN501	Clutch lever nut .....	1
66	40M-177	Clutch housing stud .....	6
67	CM2113	Welch plug .....	3
68	40M-394	Clutch cross shaft .....	1
69	CP 1069	Grease nipple .....	2
70	CP 1006	Circlip .....	1
71	40M-398	Cross shaft washer .....	1
72	CM 2090	Clutch release lever .....	1
73	UBF 91	Clutch lever bolt .....	1
74	40M 101-B	Gearcase .....	1
75	CP 1189	Drain plug .....	1
76	40M-136	Selector locking strip .....	1
77	40M-138	Spacer .....	1
78	40M-167	Rear oil seal .....	1
79	CM 2537	Dust shield .....	1
80	40M-203	Snap ring .....	1
81	40M-107	Output cover .....	1
82	40M-171	Output cover gasket .....	1
83	40M-589	Coupling .....	1
84	UN516	Nut (Clutch housing) .....	6
85	USF 51	Bolt .....	2
86		Bolt 3/8" BSF x 1" long .....	6
87		Springwasher 3/8" dia. ....	6

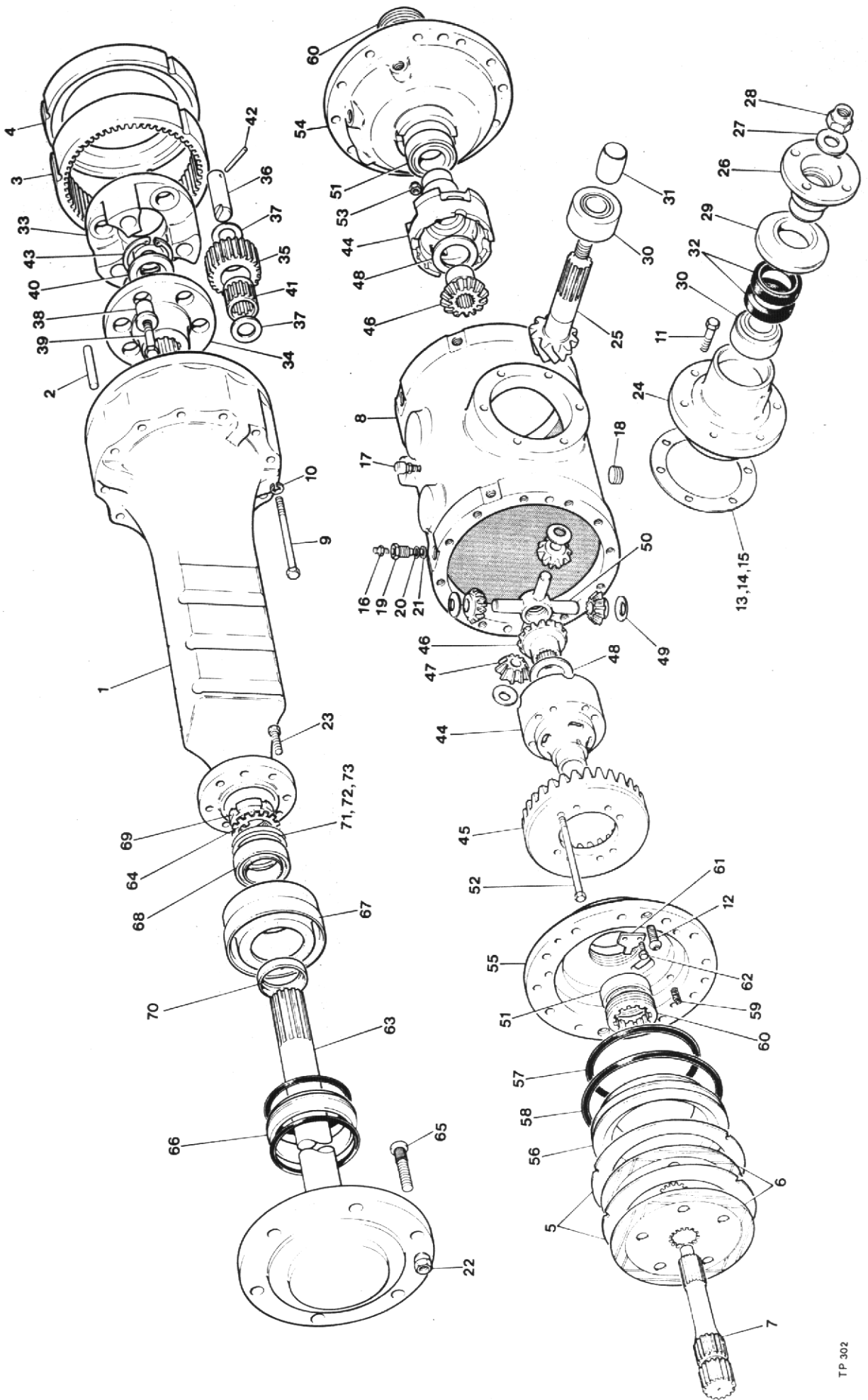


NB:  
SLIP JOINT MUST  
ALWAYS BE FITTED  
TO AXLE FLANGE



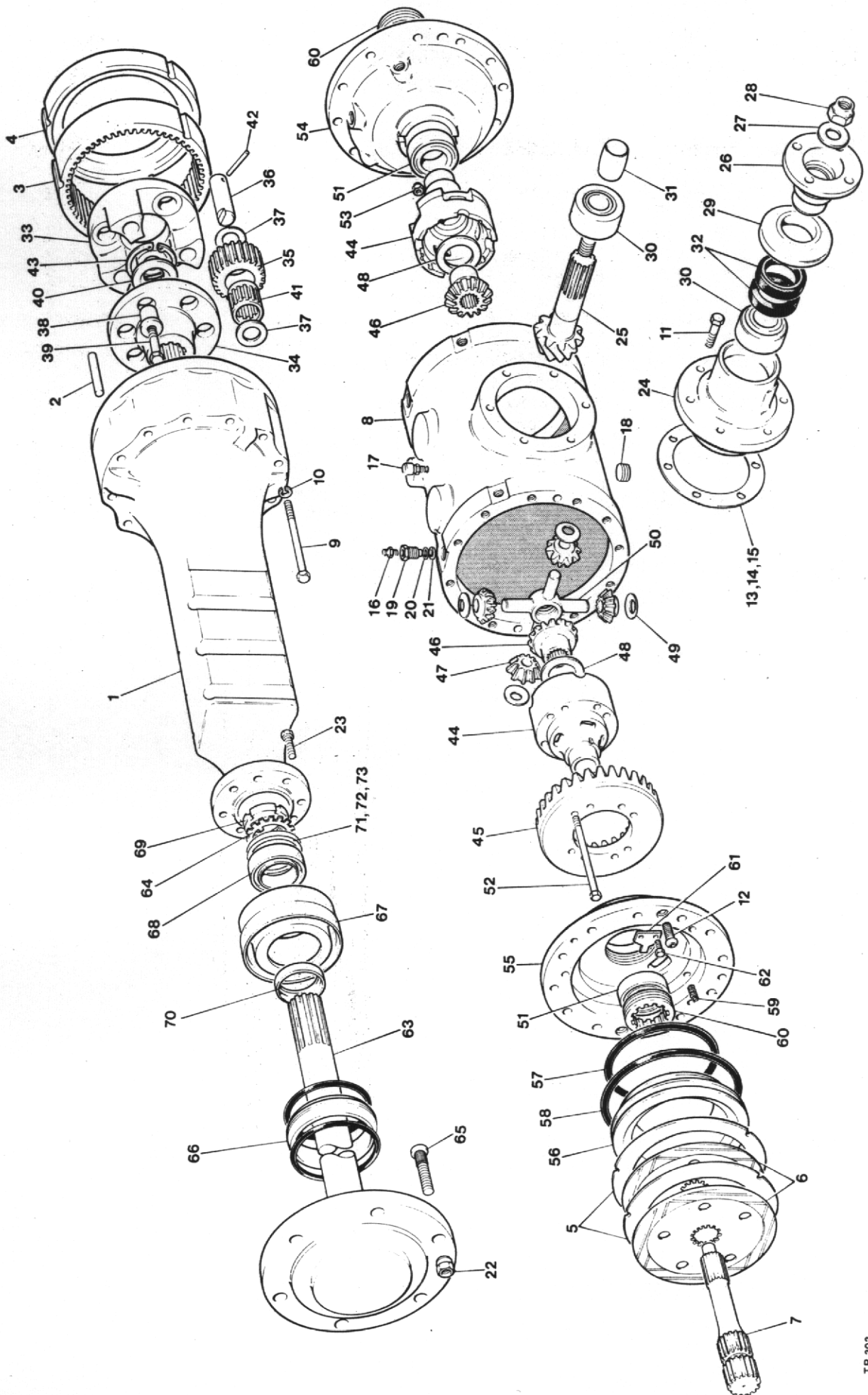
## TRANSFER BOX AND PROP SHAFTS

Item No.	Part No.	Description	Qty.
	CSE 124	Transfer Box (15/19 Teeth) Complete with disc	1
1	CSE 164	Brake Disc (222mm dia)	1
2	CM 2537	Dust Shield	3
3	UN 580	Self Locking Nut ¾" UNF	3
4	CP 1264	Thick Washer ¾" dia.	3
5	40M-167	Oil Seal	3
6	UFC 416	Cap Screw	12
7	4-35-102	Oil Seal Housing	3
8	CM 2073	Gasket	4
9	CM 2068	Bearing	4
10	CM 2106	Breather	1
11	4-35-96	Main Case	1
12	4-35-380	Chain Wheel (15 Tooth)	1
13	4-60-252	Input Shaft	1
14	4-35-20	Gasket	1
15	4-35-381	Main Case Cover	1
16	CM 2528	End Cover	1
17	UBF 51	End Cover Screws	4
18	K-5-GB-18	Repair Kit	4
19	94-GB-2459	Grease Nipple	4
20	CSE 146	Prop Shaft	1
21	CP 1189	Level/Filler Plug	1
22	CP 1068	Fibre Washer	1
23	40M 589	Companion Flange	2
24		Bolt, 7/16" BSF x 1¼" long & Nut	24
25	4-60-253	Output Shaft	1
26	4-35-17	Chain Wheel (19 Tooth)	1
27	4-35-353	Drive Chain (15/19 Teeth)	1
28	4-35-18A	Chain Connecting Link	2
29	UBF 71	Housing Screw	24
30	UN 501	Nut	24
31	1350 YSA	Prop Shaft Assembly	2
32		Bolt ½" BSF x 1¼" long (drilled for Wire Locking)	3
33		Flat Washer ½" dia.	3
34		Flat Washer ½" dia.	A.R.
35	K5-195	Repair Kit	1
36	K5-179	Repair Kit	1



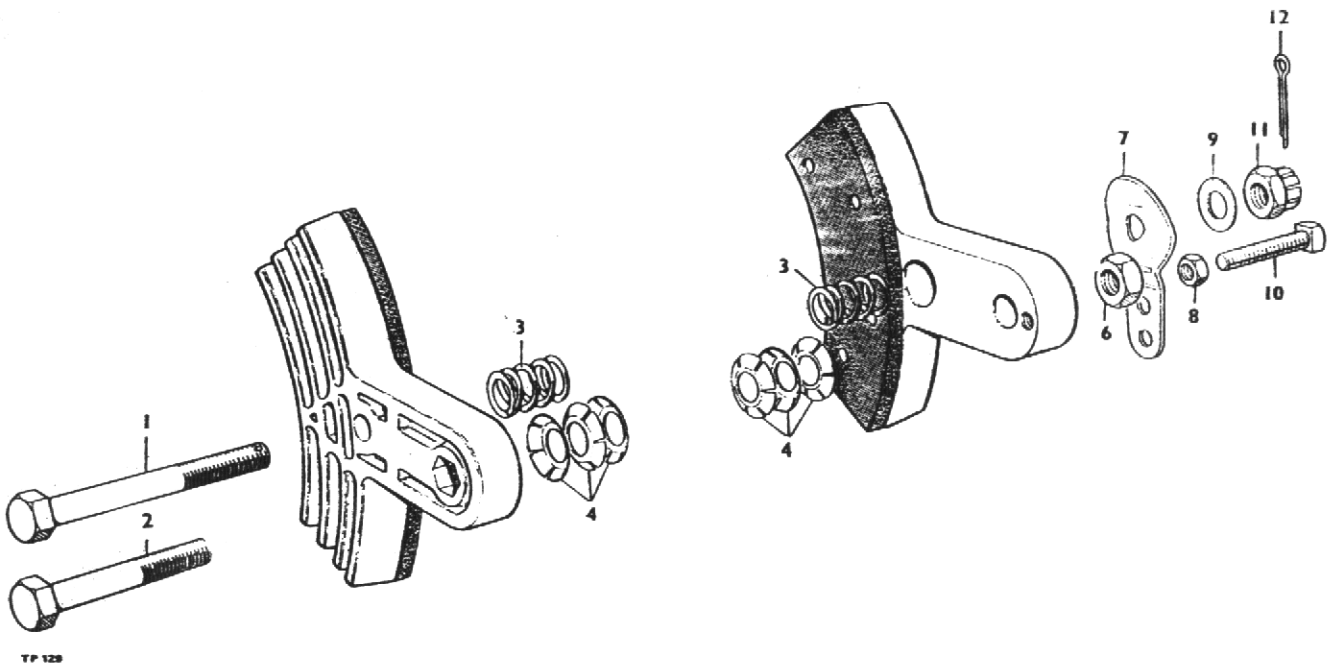
**DRIVE AXLE  
(250 SERIES)**

Item No.	Part No.	Description	Qty.
1	250-0020	Axle Arm .....	2
2	010-0060	Pin .....	6
3	250-0070	Annulus .....	2
4	253-0880	Brake Spacer Plate .....	2
5	250-0890	Brake Fixed Plate .....	2
6	250-0750	Oil Immersed Brake Disc .....	2
7	250-0090	Sun Gear .....	2
8	257-0011	Main Axle Casing .....	1
9	004-0090	Bolts - Main Axle Casing .....	24
10	009-0010	Spring Washer .....	24
11	012-0030	Hex. Screw .....	6
12	006-0280	Hex. Socket Button Head Screw .....	4
13	250-2350	Pinion Adjuster Shim (0.25 Thick) .....	A/R
14	250-2290	Pinion Adjuster Shim (0.075 Thick) .....	A/R
15	250-2210	Pinion Adjuster Shim (0.050) .....	A/R
16	008-0090	Brake Bleed Valve .....	2
17	008-0070	Relief Valve 1/8" BSP .....	1
18	008-0020	Hex. Socket BSPT Plug - 3/4" BSPT .....	2
19	400-1070	Brake Pipe Adaptor .....	4
20	002-0200	'O' Ring .....	4
21	009-0100	Dowty Washer .....	4
22	CSE 197	Wheel Nut .....	12
23	012-0030	Hex. Screw .....	16
24	250-2300	Input Pinion Cartridge .....	1
25	250-2000	Spiral Bevel Pinion .....	1
26	250-2180	Drive Flange .....	1
27	009-0090	Drive Flange Washer .....	1
28	007-0130	Drive Flange Nut .....	1
29	250-0910	Oil Seal Cover .....	1
30	001-0110	Pinion Bearing .....	2
31	250-1050	Pinion Bearing Spacer .....	1
32	002-0030	Pinion Oil Seal .....	2
33	250-0060	Planet Carrier .....	1
34	250-0260	Carrier Drive Flange .....	1
35	250-0080	Planet Gear .....	3
36	250-0250	Planet Pins .....	3
37	250-0270	Planet Thrust Washer .....	6
38	250-0370	Planet Carrier Bush .....	3
39	012-0070	Planet Carrier Bolt .....	3
40	250-1320	Axle Shaft Thrust Spacer .....	1
41	001-0160	Planet Cage Roller .....	3
42	010-0070	Spring Dowel .....	3
43	003-0140	Circlip .....	1
44	250-9520	Diff. Case Process Assembly .....	1
45	250-2010	Spiral Bevel Wheel .....	1
46	250-2090	Diff. Wheel .....	2
47	250-2100	Diff. Pinion .....	4
48	250-2110	Diff. Wheel Thrust Washer .....	2
49	250-2120	Diff. Pinion Thrust Washer .....	4
50	250-2130	Diff. Spider .....	1
51	001-0100	Diff. Bearing .....	2
52	004-0090	Bolts .....	8
53	007-0100	Nyloc Nuts .....	8
54	253-0761	Brake Cylinder (R.H.) .....	1
55	253-0771	Brake Cylinder (L.H.) .....	1
56	250-0780	Brake Piston .....	2



**DRIVE AXLE (Cont'd.)**

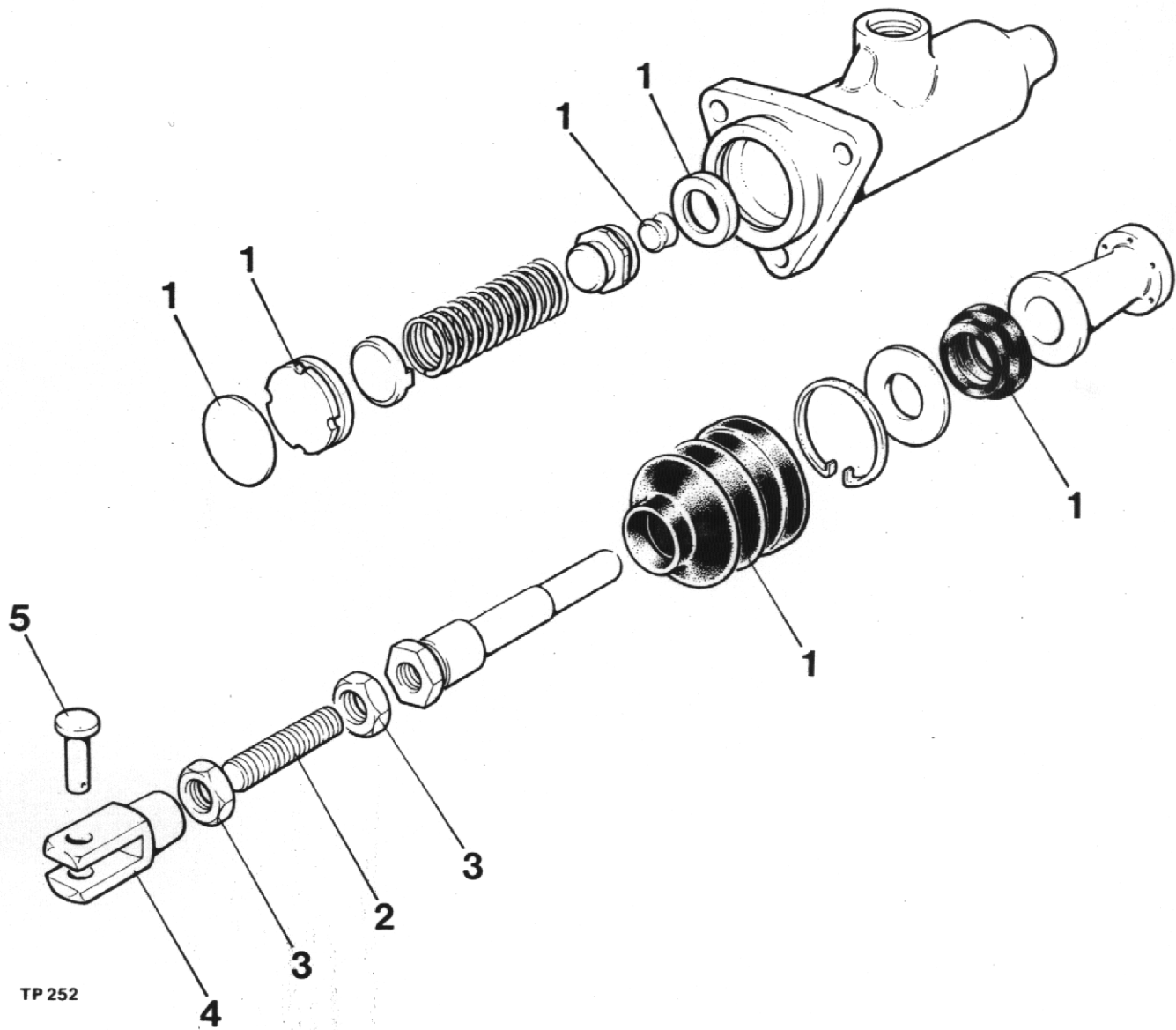
Item No.	Part No.	Description	Qty.
57	002-0100	Piston Oil Seal .....	2
58	002-0110	Piston Oil Seal .....	2
59	011-0010	Compression Spring .....	6
60	250-2150	Bearing Adjusting Nut .....	2
61	400-2160	Lock Plate - Bearing Adjusting Nut .....	2
62	012-0010	Screw - Lock Plate .....	4
63	250-9790	Axle Shaft and wheel flange assembly .....	2
64	250-0980	Clamp Washer .....	2
65	250-0450	Wheel Stud .....	12
66	002-0130	Shaft Oil Seal .....	2
67	250-0140	Oil Seal Housing .....	2
68	001-0090	Shaft Bearing .....	2
69	250-0800	Locking Collar .....	2
70	250-1610	Axle Shaft Distance Piece .....	2
71	250-1240	Bearing Dist. Shim (0.25) .....	A/R
72	250-1630	Bearing Dist. Shim (0.30) .....	A/R
73	250-1640	Bearing Dist. Shim (0.38) .....	A/R
257		Drive Axle Complete (2 per m/c)	



### CALIPER, parking brake

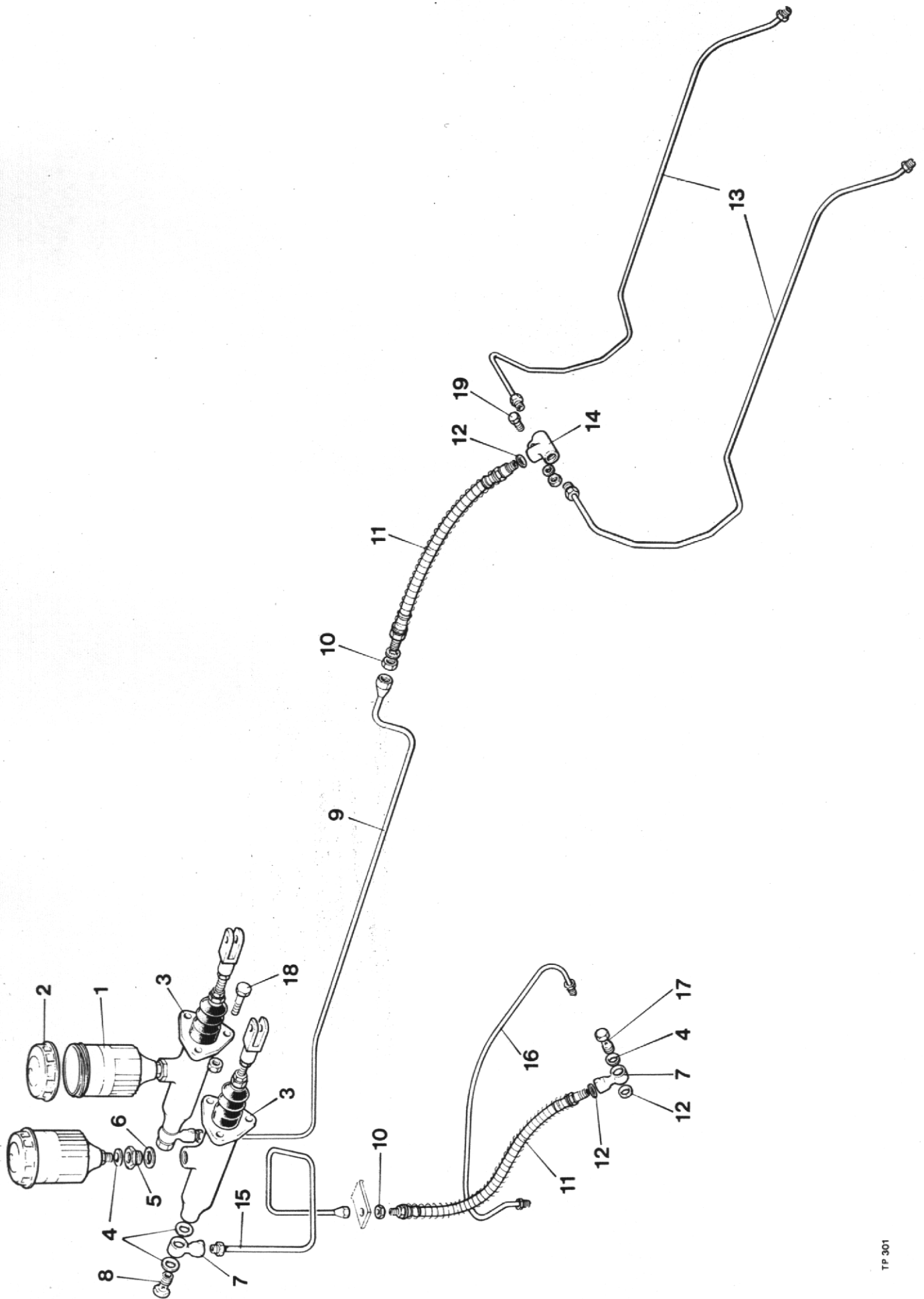
Item	Part no	Description	Qty
1A	10578A01	CALIPER, one pair, assembly	1
1	28S02T	SCREW	1
2	28S02P	SCREW	1
3	10578A0101	SPRING, centring	2
4	10578A0102	WASHER, tension	6
6	9S02	NUT	1
7	10578A0104	CAM	1
8	230S01	NUT, locking	1
9	10578A0105	WASHER	1
10	66S01H	SCREW, set	1
11	227S02	NUT, castle	1
12	44S01C	PIN, cotter	1
13	1072A4	PAD c/w rivets	2





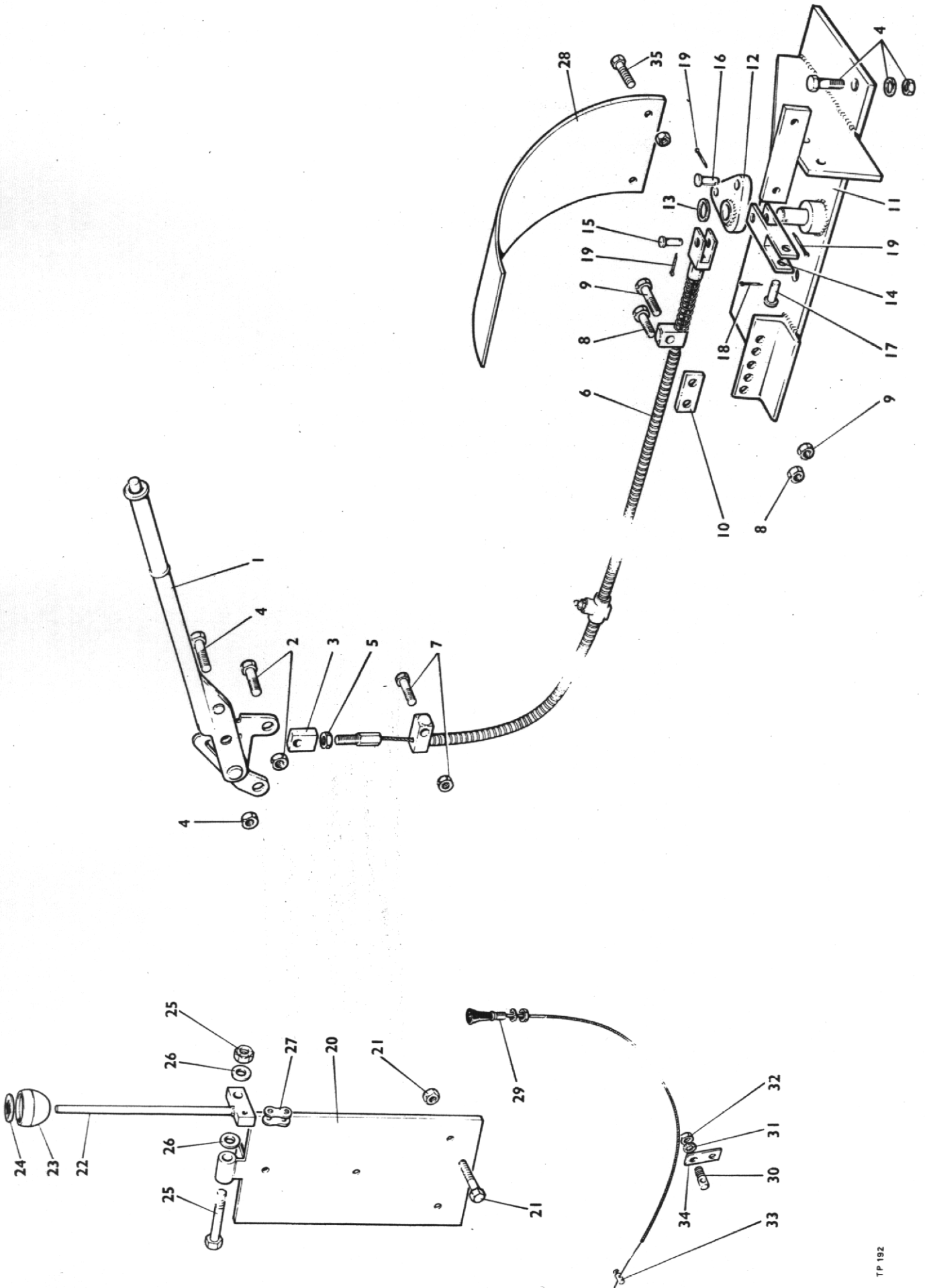
### BRAKE MASTER CYLINDER

Item No.	Part No.	Description	Qty.
	22128-3	Master cylinder Assembly (less items 2 to 5 inc.)	2
1	SSB 793	Seal Kit	A/R
2	ESE 189	Threaded Rod	1
3		Nut 7/16" UNF	2
4	4-60-339	Clevis	1
5	FSE 375	Clevis Pin	1



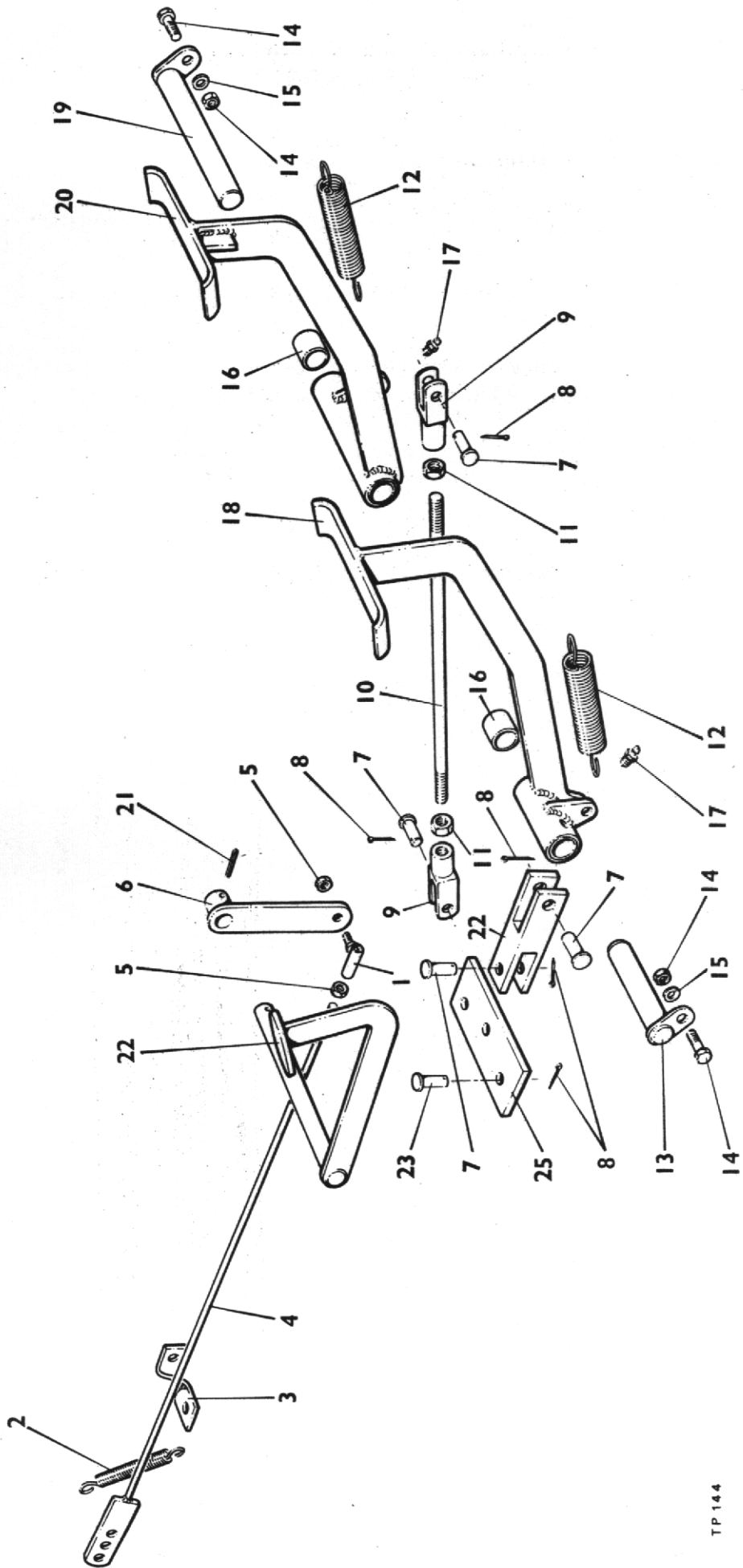
### BRAKE PIPES & FITTINGS

Item No.	Part No.	Description	Qty.
1	64046158	Header Tank c/w Cap. ....	2
2	64474602	Cap .....	2
3	22128-3	Master Cylinder (See Master Cyl. Page) .....	2
4	378700	Washer .....	7
5	ESE 187	Adaptor .....	2
6	KL 44532	Washer .....	2
7	64474287	Banjo .....	3
8	64473063	Banjo Bolt .....	2
9	DM79-3	Pipe 3/16" dia. x 38" long .....	1
10	64100050	Thin Nut .....	2
11	64047903	Flex. Pipe 11" long .....	2
12	378703	Washer .....	3
13	DM78-13	Pipe 3/16" dia. x 39½" long .....	2
14	64474341	Tee .....	1
15	DM 79-2	Pipe 3/16" dia. x 19" long .....	1
16	DM78-16	Pipe 3/16" dia. x 13½" long .....	1
17	376102W	Banjo Bolt .....	1
18		Bolt M8 x 30mm long & Nut .....	6
19		Bolt M6 x 40mm long & Nut .....	1



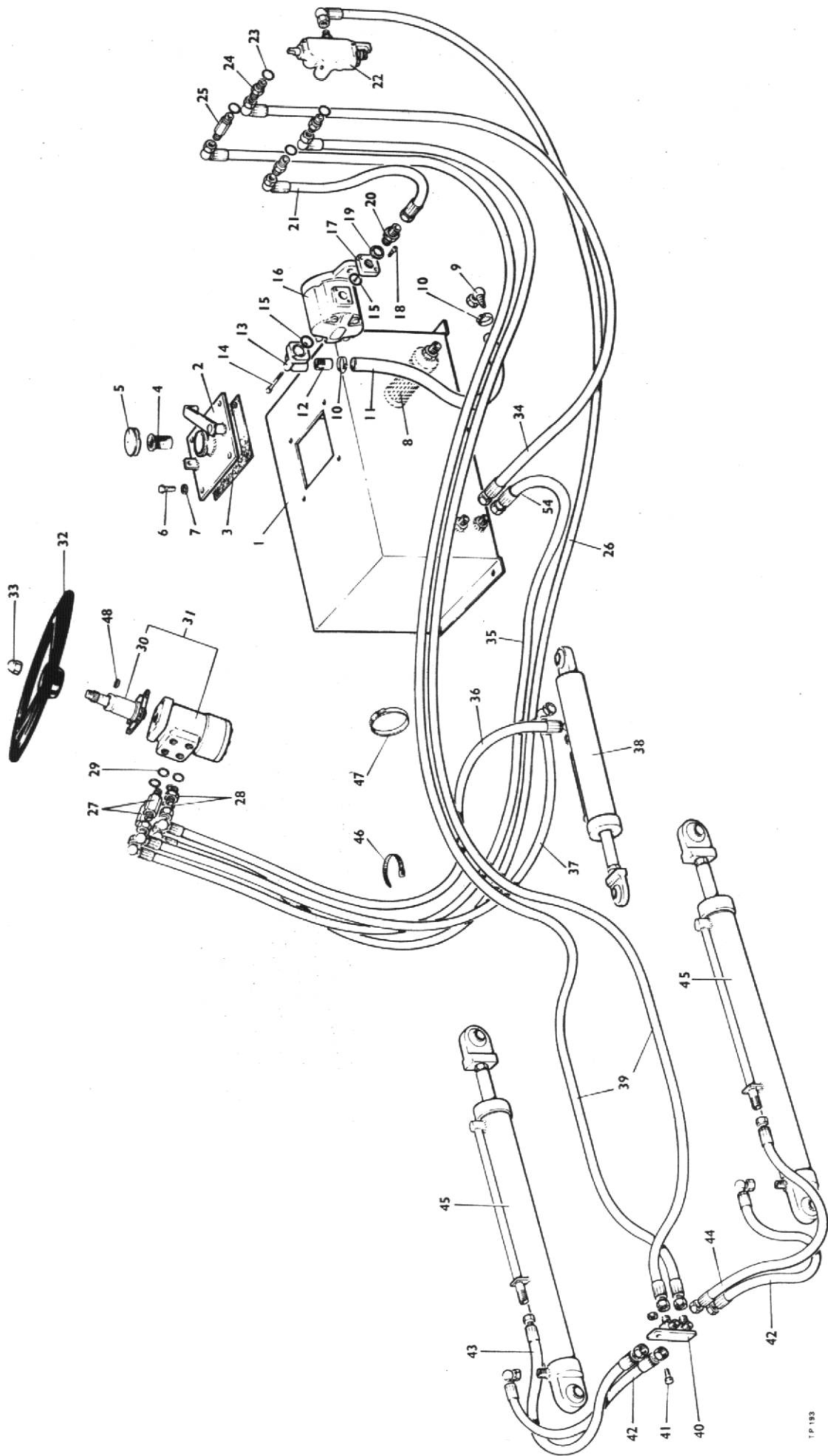
**HANDBRAKE VALVE CONTROL LEVER &  
ENGINE STOP CONTROL**

Item No.	Part No.	Description	Qty
1	303	Handbrake lever .....	1
2		Bolt M10 x 25mm long & locknut .....	2
3	L309	Block .....	1
4		Bolt M10 x 40mm long & locknut .....	4
5		Nut 3/8" BSF .....	1
6	4-35-111	Handbrake cable .....	1
7		Bolt M8 x 35mm long & locknut .....	1
8		Bolt M8 x 25mm long & locknut .....	1
9		Bolt M8 x 45mm long & locknut .....	1
10	4-35-349	Disc Brake adjusting Plate .....	1
11	CSE 166	Transmission Brake Mounting Bracket .....	1
12	4-35-256	Bell crank .....	1
13		Flat washer 1/2" dia .....	1
14	4-35-253	Double clevis .....	1
15	C174X	Clevis Pin .....	1
16	C174Y	Clevis Pin .....	1
17	4-35-264	Clevis Pin .....	1
18		Split Pin 1/16" dia .....	1
19		Split Pin 3/32" dia .....	3
20	F4-45-173	Hydraulic Valve Mounting Bracket .....	1
21		Bolt M10 x 30mm long & locknut .....	2
22	F4-45-185	Hydraulic Valve Lever .....	1
23	F4-45-184	Knob .....	1
24	DM156	Label .....	1
25		Bolt 3/8" BSF x 2 1/4" long & 2 locknuts .....	1
26		Flat washer 3/8" dia .....	2
27	4-60-178	Connecting Link .....	1
28	CSE 165	Handbrake Disc Guard .....	1
29	4-60-239	Engine stop control cable assembly .....	1
30	4-60-242	Clamp Screw .....	1
31		Springwasher 3/8" dia .....	1
32		Nut 3/8" UNF .....	1
33	4-35-196	Solderless nipple .....	1
34	CSE 145	Stop Control cable bracket .....	1
35		Bolt M6 x 20mm long & locknut .....	2



## PEDALS AND CONTROLS

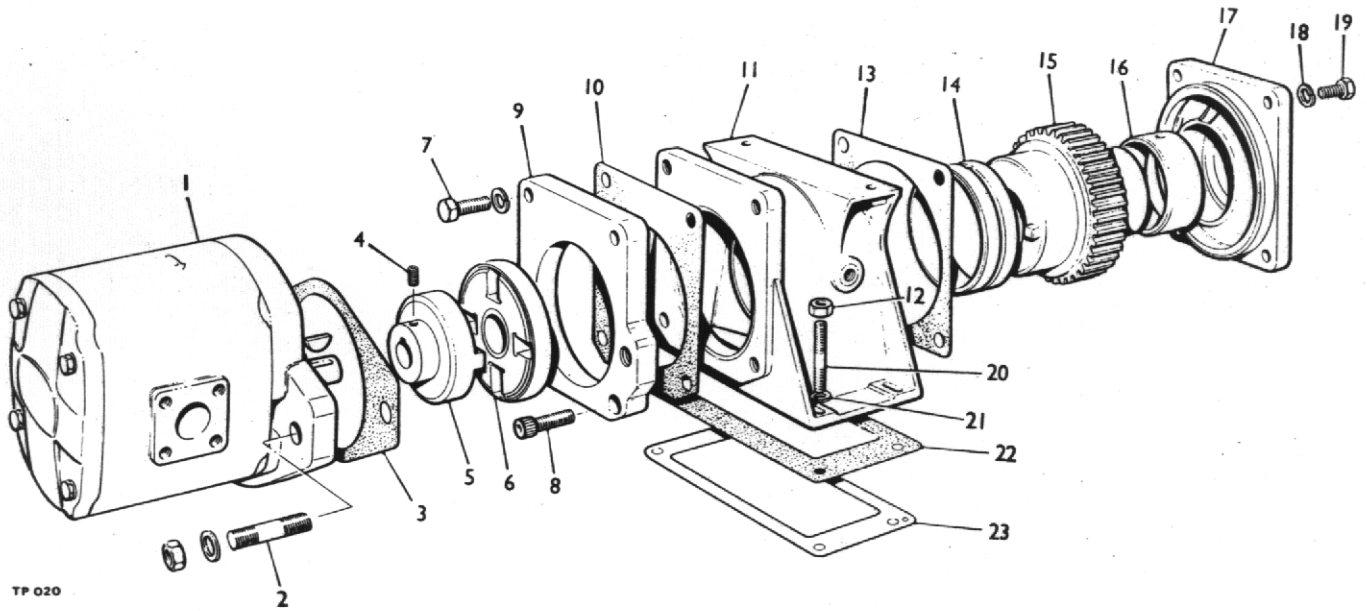
Item No.	Part No.	Description	Qty.
1	C160B	Accelerator Rod Ball End .....	1
2	C173D	Spring .....	1
3	C163	Spring Attachment Bracket .....	1
4	CSE 188	Accelerator Rod .....	1
5		Nut 1/4" BSF .....	2
6	C129	Accelerator Lever .....	1
7	C174X	Pin .....	4
8		Split Pin 3/32" x 1" .....	6
9	C174A	Clevis .....	2
10	T21A	Clutch Rod 3/8" BSF x 12 1/2" long .....	1
11		Nut 3/8" BSF .....	2
12	C173B	Spring .....	2
13	CSE 114	Brake Pedal Pivot Pin .....	1
14		Bolts M8 x 25mm long & Nuts (Pedal pins) .....	2
15		Plain Washer M8 .....	2
16	WB1010	Bush .....	4
17	T-ST	Grease Nipple .....	2
18	CSE 120	Footbrake Pedal .....	1
19	CSE 113	Clutch Pedal Pivot Pin .....	1
20	CSE 108	Clutch Pedal .....	1
21	C129A	Tension Pin .....	1
22	CSE 148	Brake Compensator Clevis .....	1
23	C174Y	Clevis Pin .....	2
24	CSE 111	Accelerator Pedal .....	1
25	CSE 147	Brake Compensator .....	1





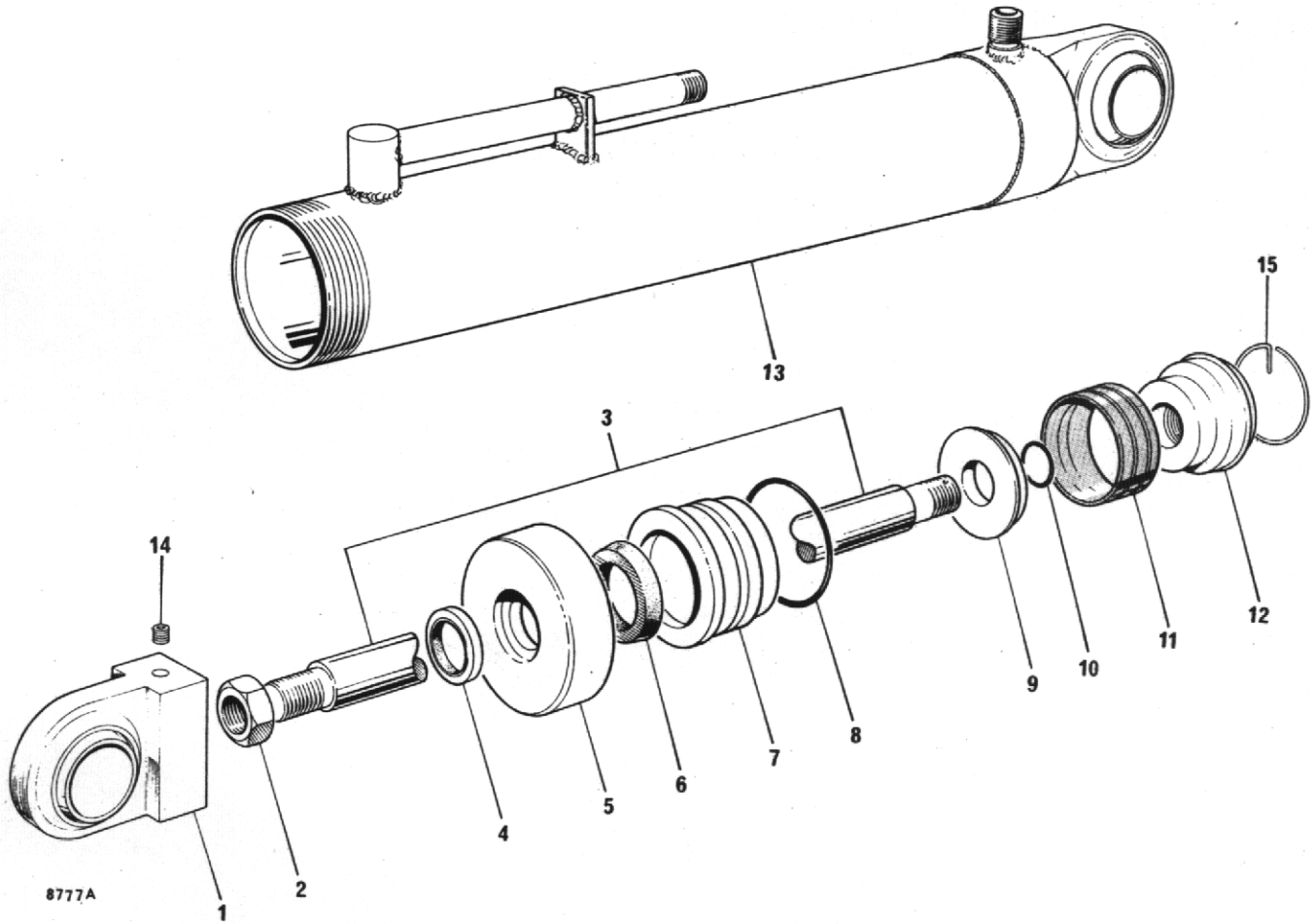
## HYDRAULIC PIPES AND FITTINGS

Item No.	Part No.	Description	Qty.
1	CSE 123	Hydraulic Tank	1
2	4-35-187	Cover Plate Assembly	1
3	T18B	Gasket	1
4	P1145	Strainer	1
5	P2578-2	Cap	1
6		Bolt 5/16" UNF x 3/4" long	4
7		Shakeproof Washer 5/16" dia	4
8	UC1457	Filter	1
9	BSE 109	90° Hose Fittings 3/4" BSP	1
10	T63M	Hose Clip	2
11	4-60-160	Hose 3/4" Cotton Braid x 30'	1
12	T48	Pump Inlet Adaptor	1
13	1PE4	Pump Elbow	1
14		Cap Screw 5/16" UNC x 2 1/4" long	2
15	DH69A5	'O' Ring	2
16	IP3072-CPSFB	Pump (See Page 46)	1
17	4-35-261	Adaptor	1
18		Cap Screw 5/16" UNC x 1" long	2
19	T14I	Seal 3/8" BSP	1
20	T14J	Adaptor 3/8" BSP x 3/8" BSP	1
21	F4-45-176	Hose 3/8" x 410mm ST-90°	1
22	305-011-AAB	Hydraulic Control Valve (See Page 51)	1
23	S.9698	'O' Ring	4
24	CSE 186	Adaptor 3/8" BSP x 7/8" UNF (Short)	3
25	4-60-158	Adaptor 3/8" BSP x 7/8" J.I.C. (Long)	1
26	4 SHL 86	Hose 3/8" x 98" 90° - 90°	1
27	4-60-115	Adaptor 3/8" BSP x 3/4" UNF (Long)	2
28	4-35-40K	Adaptor 3/8" BSP x 3/4" UNF (Short)	2
29	2ST 72J	'O' Ring	4
30	099-530063	Steering Column	1
31	CSE 178	Steering Valve Complete	1
32	347K	Steering Wheel	1
33	C318	Domed Nut 5/8" UNF	1
34	4-60-133	Hose 3/8" x 48" ST - 90°	1
35	4-35-246	Hose 3/8" x 67" ST - 90°	1
36	CSE 138	Hose 3/8" x 62" 90° - 90°	1
37	CSE 137	Hose 3/8" x 68" 90° - 90°	1
38	TD 3894	Hydraulic Ram	1
39	F4-45-177	Hose 3/8" x 3050mm ST-90°	2
40	4-35-388	Tee Assembly (FWD Tip & High Discharge)	1
	5ST93	Tee Assembly (Turntable) (not illustrated)	1
41		Bolt M6 x 25mm long & nut (FWD Tip & High Discharge)	1
		Bolt M6 x 65mm long & nut (Turntable) (not illustrated)	1
42	4-35-365	Hose 3/8" BSP x 20" long ST - 90° (FWD Tip & High Disch.)	2
	5ST 87	Hose 3/8" x 27" 90° - 90° (Turntable) (not illustrated)	2
43	4-35-40E	Hose 3/8" x 25" ST - ST, (FWD Tip & High Discharge)	1
	5ST 85	Hose 3/8" x 27" 90° - 90° (Turntable) (not illustrated)	1
44	4-35-40E	Hose 3/8" x 25" ST - ST (FWD Tip & High Discharge)	1
	5ST86	Hose 3/8" x 27" 90° - 90° (Turntable) (not illustrated)	1
45	4-35-295	Hydraulic ram (FWD Tip & Turntable) (See Page 47)	2
	BE-3	Hydraulic ram (High Discharge) (See Page 48)	2
46	177	Cable Tie	1
47		Jubilee Clip 32/48mm	1
48	CSE 182	Spacer	2



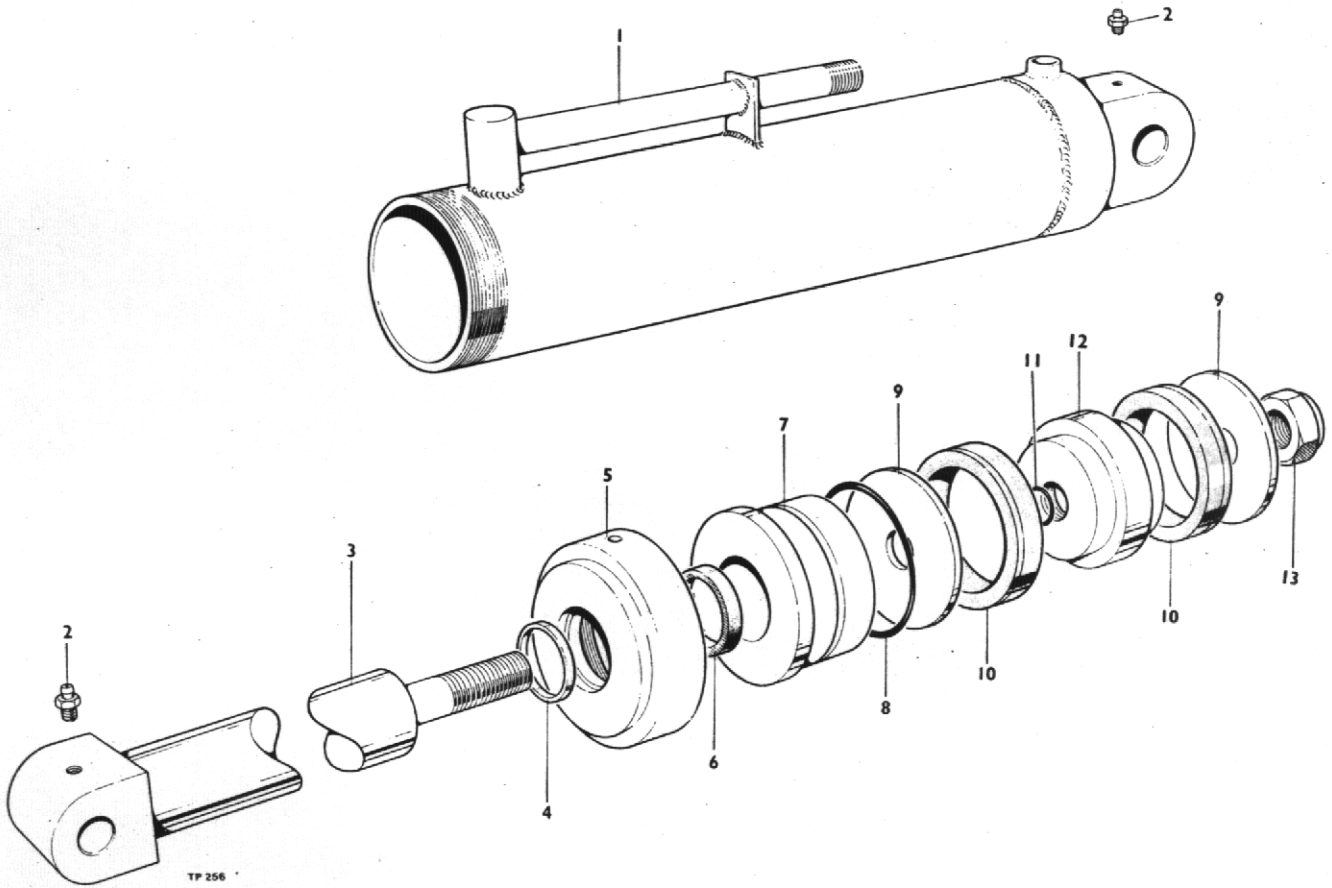
### HYDRAULIC PUMP & DRIVE

Item No.	Part No.	Description	Qty.
1	IP3072CPSFB	Pump complete	1
2		Stud, Washer & Nut	2
3	334932	Joint	1
4	724202	Socket Screw 1/4" BSF x 5/16" long	1
5	334967	Coupling (Pump Half)	1
6	266185	Coupling Assy	1
7	725049	Bolt 3/8" BSF x 1" long	2
8	724056	Cap Screw 3/8" BSF x 3/4" long	2
9	292709	Spigot Plate	1
10	266159	Joint	1
11	2-197597	Pump Housing	1
12	726003	Nut 3/8" BSF	4
13	264702	Joint	1
14	2-264704	Bearing	1
15	334968	Gearwheel	1
16	2-202485	Bearing	1
17	264701	Cover - Pump Housing	1
18	786029	Spring Washer - 5/16"	4
19	722024	Bolt 5/16" BSF x 5/8" long	4
20	760061	Stud 3/8" BSF x 1 3/8" long	4
21	786030	Spring Washer - 3/8"	4
22	264700	Joint	1
23	264706	Shim	A/R



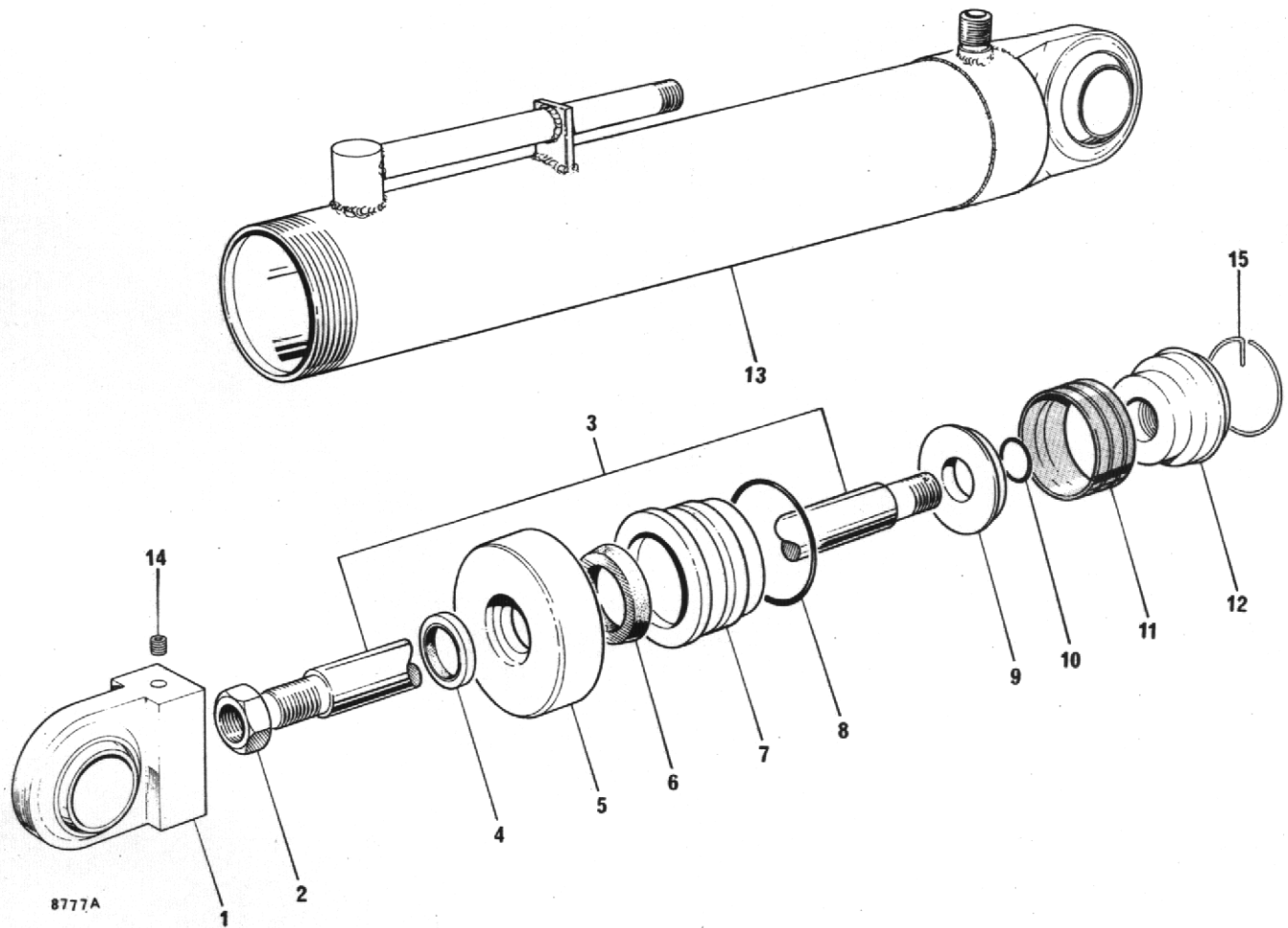
### HYDRAULIC RAM (FORWARD TIP & TURNTABLE)

Item No.	Part No.	Description	Qty.
	4-35-295	Ram Complete (2 per M/c except High Discharge M/c's)	
1	K1/11	Piston Rod Fitting	1
2	K1/19	Locknut	1
3	TD3890	Piston Rod	1
4	K1/18	Wiper	1
5	K1/4	Tube Cap	1
6	K1/17	Sleeve Seal	1
7	K1/5	Sleeve	1
8	K1/16	Sleeve 'O' Ring	1
9	K1/15	Backing Washer	1
10	K1/13	Piston 'O' Ring	1
11	K1/12	Piston Seal	1
12	K1/14	Piston Head	1
13	TD 6531	Cylinder, Bosses & End Cap	1
14	K1/21	Grub Screw	1
15	K1/22	Spring Ring	1



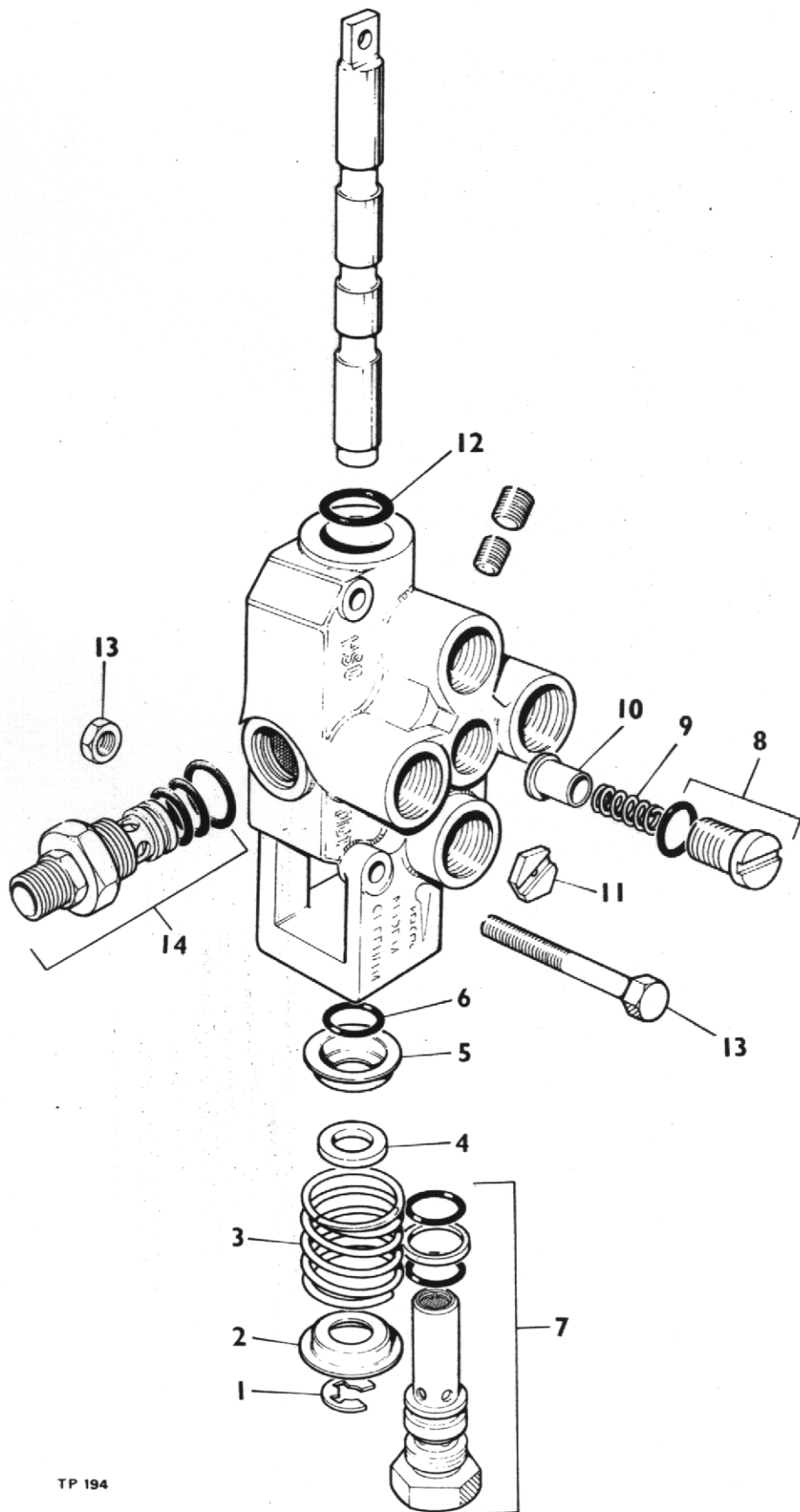
### HYDRAULIC RAM (HIGH DISCHARGE)

Item No.	Part No.	Description	Qty.
	BE-3	Ram Assembly Complete (Two per high discharge m/c's only)	
1	BE3-21	Ram Body .....	1
2	BE3-20	Grease Nipple .....	2
3	BE3-22	Piston Rod Assembly .....	1
4	BE3-15	Wiper .....	1
5	BE3-6	Tube Cap .....	1
6	BE3-16	Sleeve Seal .....	1
7	BE3-7	Sleeve .....	1
8	BE3-13	Sleeve 'O' Ring .....	1
9	BE3-10	Backing Washer .....	2
10	BE3-14	Piston Seal .....	2
11	BE3-12	Piston 'O' Ring .....	1
12	BE3-9	Piston Head .....	1
13	BE3-11	Lock Nut .....	1
	CSE 190	Seal Kit (comprising items 4,6,8,10 & 11) .....	A/R



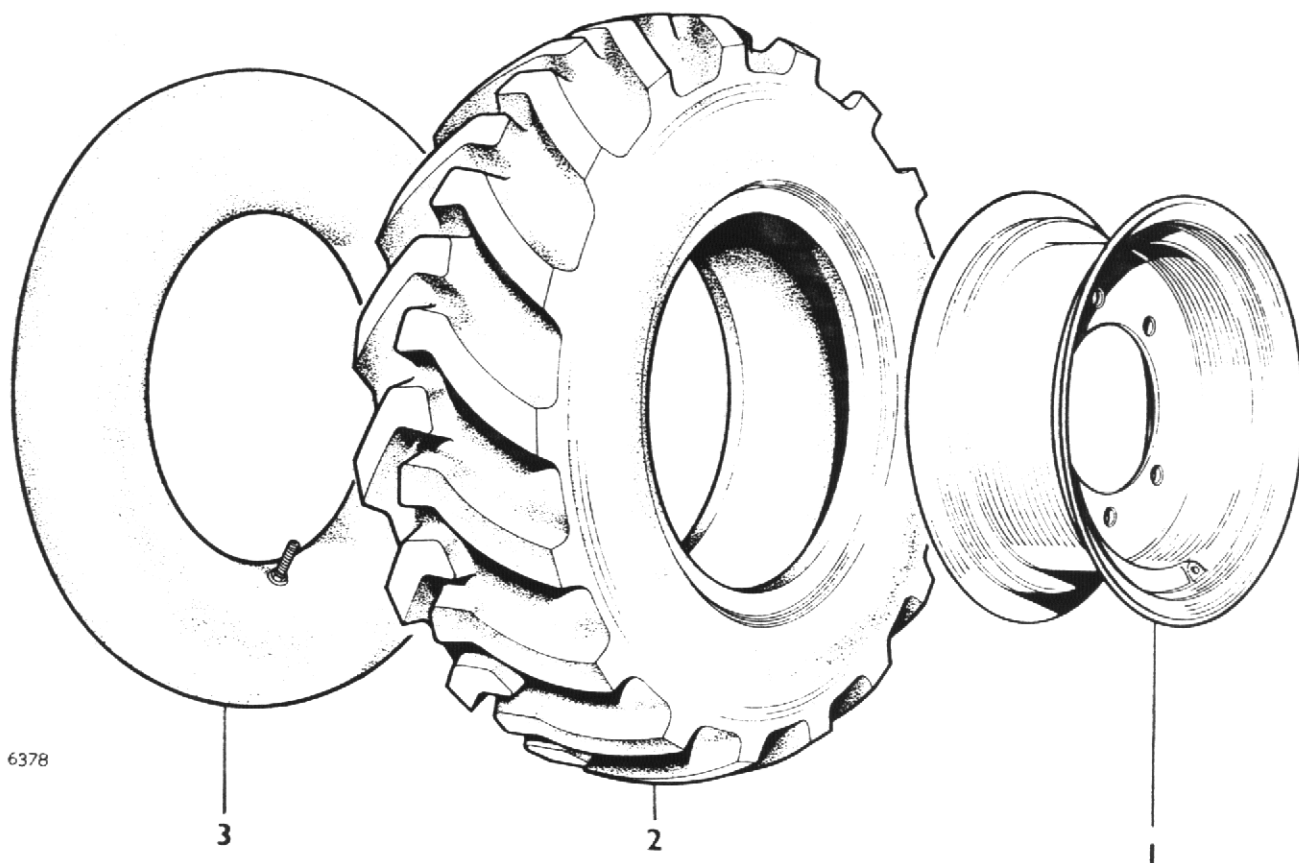
### STEERING RAM

Item No.	Part No.	Description	Qty.
	TD3894	Ram Complete (1 Per Machine)	
1	K1/11	Piston Rod Fitting .....	1
2	K1/19	Locknut .....	1
3	K1/2	Piston Rod .....	1
4	K1/18	Wiper .....	1
5	K1/4	Tube Cap .....	1
6	K1/17	Sleeve Seal .....	1
7	K1/5	Sleeve .....	1
8	K1/16	Sleeve 'O' Ring .....	1
9	K1/15	Backing Washer .....	1
10	K1/13	Piston 'O' Ring .....	1
11	K1/12	Piston Seal .....	1
12	K1/14	Piston Head .....	1
13	K1/20	Cylinder, Bosses & End Cap .....	1
14	K1/21	Grub Screw .....	1
15	K1/22	Spring Ring .....	1
	CSE 189	Seal Kit (comprising items 4,6,8,10 & 11) .....	A/R



## HYDRAULIC CONTROL VALVE

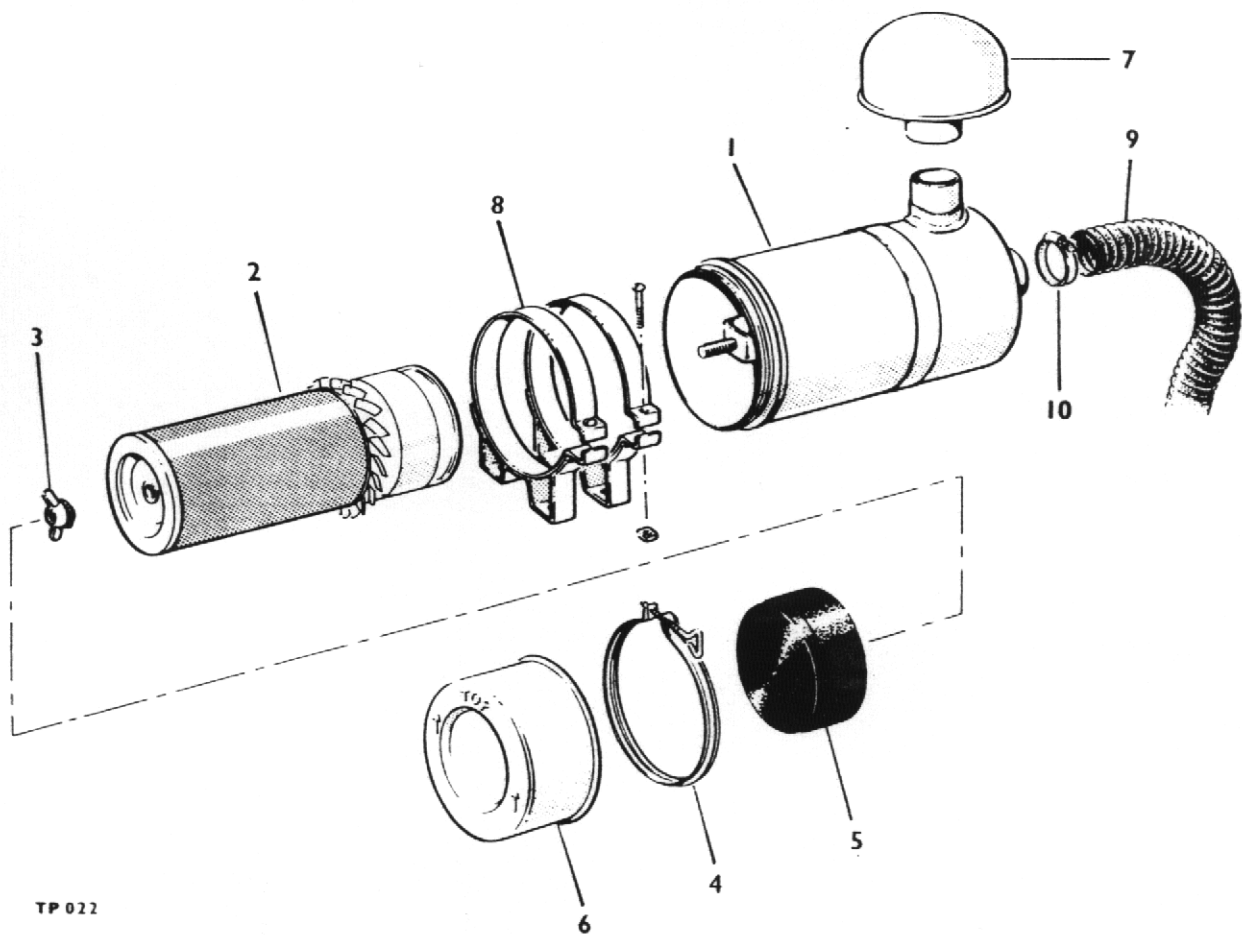
Item No.	Part No.	Description	Qty.
	305-011-AAB	Control Valve Assembly (1 Per M/c) .....	—
1	16124-50	Clip Ring (1/2" Shaft) .....	1
2	15546-6	Shallow Washer .....	1
3	30501-39	Spool Spring .....	1
4	16048-31	Washer Spacer .....	1
5	30501-10	Deep Washer .....	1
6	100-146-012	'O' Ring 3/32" x 5/8" I/D .....	1
7	300-055-J9A	Relief Valve Assembly .....	1
8	30501-17	Lift Check Plug Assembly .....	1
9	30501-13	Lift Check Spring .....	1
10	30501-12	Lift Check Plunger .....	1
11	16097-451	Orifice Plate .....	1
12	100-147-063	'O' Ring .....	1
13		Bolt 5/16" UNF x 2 1/2" long and Nut .....	2
14	326-001-SAA	Flow Control valve .....	1
15	32016-800	Seal Repair Kit (relief valve) .....	A/R
16	300-024-801	Seal Repair Kit .....	A/R



### WHEELS AND TYRES

Item No.	Part No.	Description	Qty.
	24S08	R/H Wheel Assembly	2
	24S07	L/H Wheel Assembly	2
1	30183A02	Wheel rim 9 x 18	4
2	20S02	Tyre 10.5 x 18-8 ply	4
3	23S04	Tube 10.05 x 18	4





TP 022

### AIR CLEANER

Item No.	Part No.	Description	Qty.
1	10532A02	Air Cleaner Assembly	1
2	10532A0101	Element	1
3	V600487	Nut & Gasket Kit	1
4	220229002	Clamp Body	1
5	220229003	Skirt, baffle	1
6	220229004	Cup	1
7	10534A02	Stack Cap	1
8	10533A02	Bracket	2
9	166S02	Hose Flexible 2" Bore x 17" Long	1
10	97S12	Clip Hose	1

# WINGET



## NEWAGE 250 & 400 SERIES AXLE SERVICE MANUAL

WINGET LIMITED

PO BOX 41

EDGEFOLD INDUSTRIAL ESTATE

PLODDER LANE

BOLTON

LANCS BL4 OLS

U.K.

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## **Introduction**

Winget Limited gratefully acknowledge the assistance given by Newage Transmissions Limited in the preparation of this manual, however neither Winget Limited or Newage Transmissions can be held responsible for any errors or omissions.

The procedures described within this manual should enable experienced service personnel to strip, repair and re-build Newage 250 & 400 series axles fitted to Winget Site Dumpers and Forklifts in a safe and competent manner. The procedures are not intended to be used by personnel who are unfamiliar with the product or mechanically inexperienced.

It is assumed that personnel are aware of the Health and Safety Regulations which should be applied but the following should act as a reminder.

Whenever possible any repairs or service should be carried out in a clean environment. If work must be carried out on site or in the field steps should be taken to ensure that dirt or foreign materials cannot enter the assembly.

Ensure all work tools are in good condition and only use the correct tool for the job in hand.

Always wear safety spectacles when using soft or hard faced hammers, chisels, drifts or when using air tools. Wear safety spectacles when cleaning components or when grinding.

Do not misuse air lines and be aware of the damage compressed air can cause if misused.

Always make sure lifting equipment is in good condition and the Safe Working Load exceeds the weight of the component to be lifted.

Always use suitable supports i.e. axle stands or baulks of timber in conjunction with hydraulic jacks etc. Never rely on hydraulic jacks alone to support a machine.

Be aware of hot surface temperatures and take care when draining hot oils. Always dispose of waste oils in accordance with local and national regulations.

Whenever possible always disconnect the battery or battery isolator when working on the machine to prevent electrical shorts and unauthorised starting.

Refer to the operators handbook for a guide to the correct sequence for assembling components and sub-assemblies.

Oils, fuels, silicone sealer etc can cause skin diseases if allowed to contaminate the skin. Always apply barrier creams, wear suitable protective clothing or when contamination is unavoidable clean the area with soap and water as soon as possible. Do not use thinners or other solvents to clean skin.

Health and Safety is a matter of common sense. If common sense is applied correctly the risk of accidents can be reduced.

Spares for Newage Axles fitted to Winget Equipment can only be obtained from Winget Limited or one of our authorised distributors and not from Newage Transmissions Limited. Always quote your machines serial number and model together with axle serial number and model when ordering spare parts.

250 & 400 Series axles are designed to operate under arduous conditions and providing they are regularly and correctly maintained they will provide long trouble free service.

Whilst every effort is made to ensure the contents of this manual are accurate Winget Limited and Newage Transmissions reserve the right to alter specification without prior notification and certain sections of this manual may then no longer apply.

## 250 SERIES AXLE

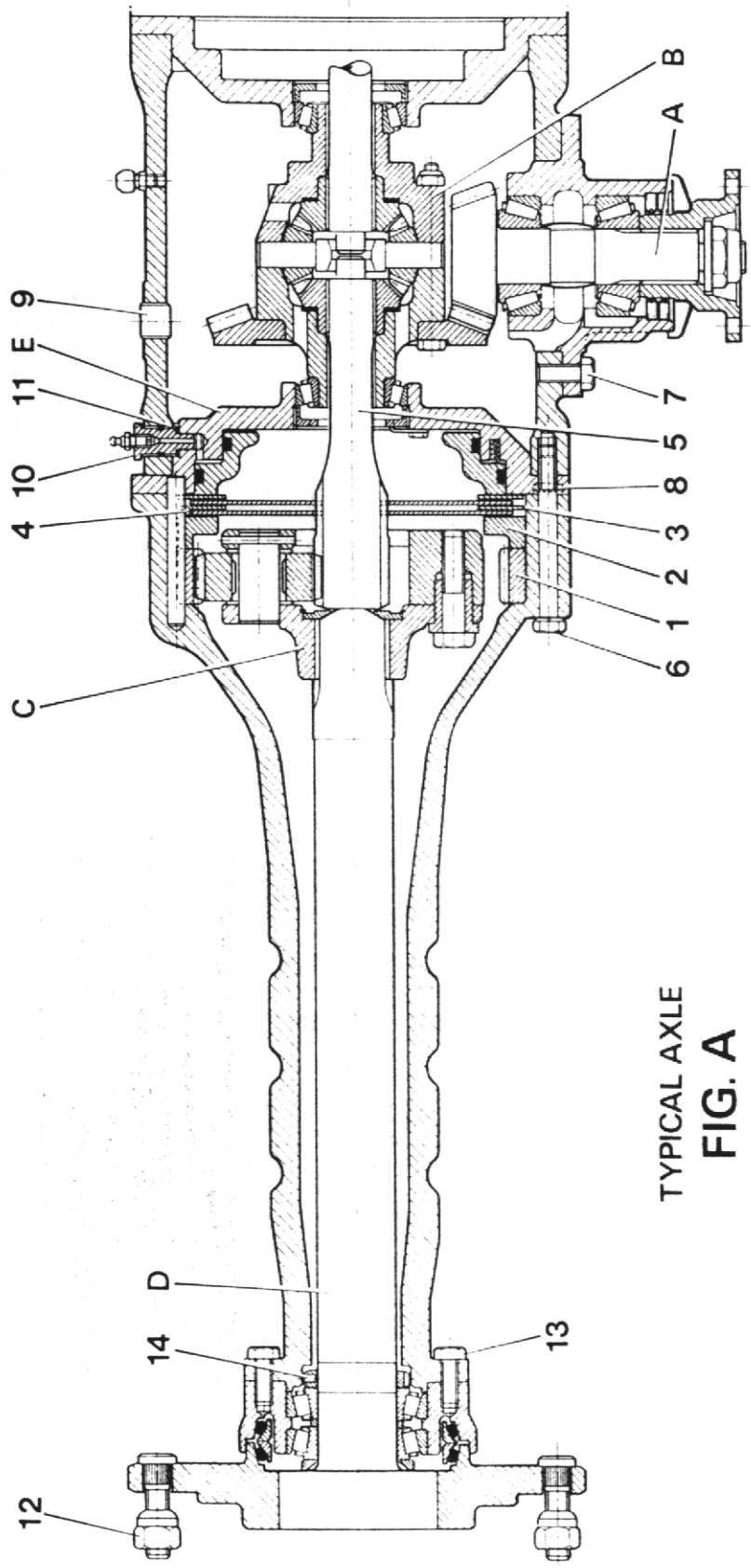
FITTED TO  
WINGET FOUR/45 C.D.P. DUMPER  
WINGET 4FL2500 ROUGH TERRAIN FORKLIFT

## 400 SERIES AXLE

FITTED TO  
WINGET FOUR/60 DUMPER  
WINGET 4FL5000 ROUGH TERRAIN FORKLIFT

# CONTENTS

Section	Page
PINION CARTRIDGE . . . . .	3
CROWNWHEEL AND DIFFERENTIAL . . . . .	4
SETTING UP CROWNWHEEL AND PINION . . . . .	5
PLANETARY GEARS . . . . .	6
BRAKES . . . . .	7
AXLE SHAFT ASSEMBLY . . . . .	8
SPIRAL BEVEL GEAR TOOTH CONTACTS . . . . .	10
TORQUE SETTINGS FOR ALL FASTENERS . . . . .	11



TYPICAL AXLE  
FIG. A

## DISMANTLING AND ASSEMBLING AXLE

### Pinion Cartridge

(See Fig. A)

1. Remove drain plug (9) and drain axle oil, remove screws (7) and pull out cartridge (A), using easing screws if required.

(See Fig. B)

2. Remove nut (5) in coupling flange, (3) holding flange with special tool (AA). Remove flange and knock out pinion (2).
3. If front bearing is damaged or worn, remove cone and roller assembly by splitting cage and using a bearing puller to remove the cone.
4. If required, bearing cups (7) and oil seals (9) can be drifted out from the pinion cartridge.

To re-assemble with new pinion, bearings, seals etc., the procedure is as follows:—

5. Press bearing cups and oil seals into cartridge.
6. Press front pinion bearing to pinion shaft.
7. Pack gap between seal lips  $\frac{3}{4}$  way round with grease.
8. Assemble pinion to cartridge, push on spacer (8) and tail bearing drive flange, washer and nut. (Check drive flange, seal wear surface is free from damage.)

NOTE: If new bearings are fitted, a new collapsible spacer (8) must be fitted.

9. Tighten nut (5) holding coupling flange with special tool, until bearing spacer collapses 21 kpm (150 lb. ft. min.) and continue to tighten until all pinion end float is removed.
10. Turn nut until a drag is felt when turning the coupling flange and check the bearing preload using a piece of string wound round the flange and a spring balance (see Fig. C).

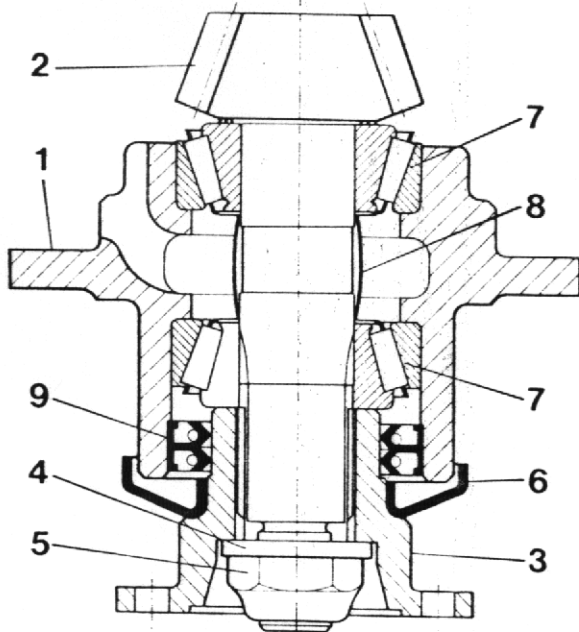


FIG. B

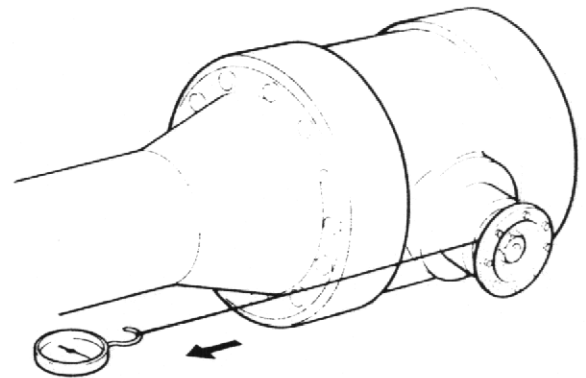


FIG. C

11. Pull the spring balance until the pinion turns smoothly and note the reading (should be 3.5–5.5 kg for new bearings and (1.75–2.75 kg) for old bearings on the 250 Series axle, and 4.5–6.5 kg for old bearings on the 400 Series axle).
12. Gradually tighten nut and re-check until correct reading is obtained.

NOTE: Above preload figures should not be exceeded.

13. Assemble pinion cartridge to centre casing, applying sealer between shims, centre case flange and cartridge flange.

NOTE: Ensure cartridge oil slot is in correct position (see Fig. D).

14. Tighten screws holding cartridge to main case.

### Crownwheel and Differential (Ref. B)

(See Fig.A)

1. Drain axle oil, remove screws (6) and pull off left hand axle arm assembly.
2. Remove brake feed and bleed adaptors (10).
3. Slacken screws (8) and remove brake cylinder (E) using easing screws if required.
4. Lift out crownwheel and differential assembly (B).
5. Slacken nuts (11) (See Fig. E), remove crownwheel and split differential unit.
6. Thrust washers (5) and (6) should be replaced if they show signs of damage or excessive wear.
7. Check all internal rubbing surfaces of diff. cases (1) for signs of wear.
8. Diff. bearing cone and roller assys. ( 9 ) can be pulled or drifted off diff. case halves.

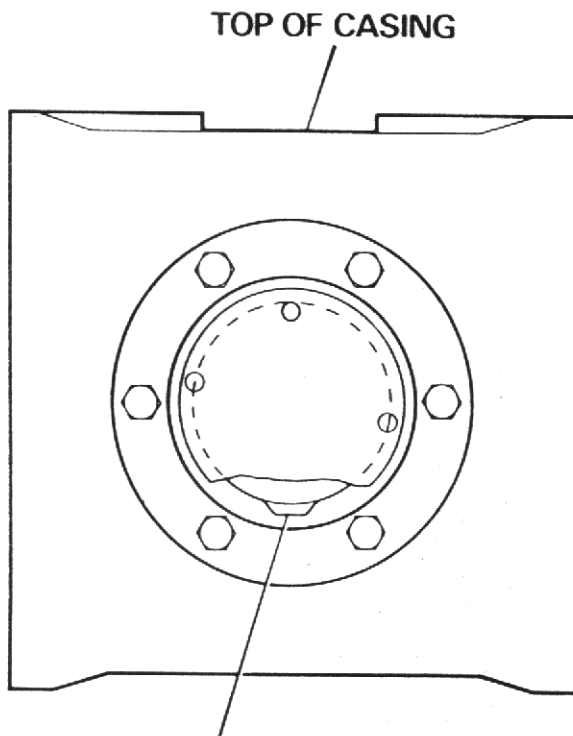


FIG. D

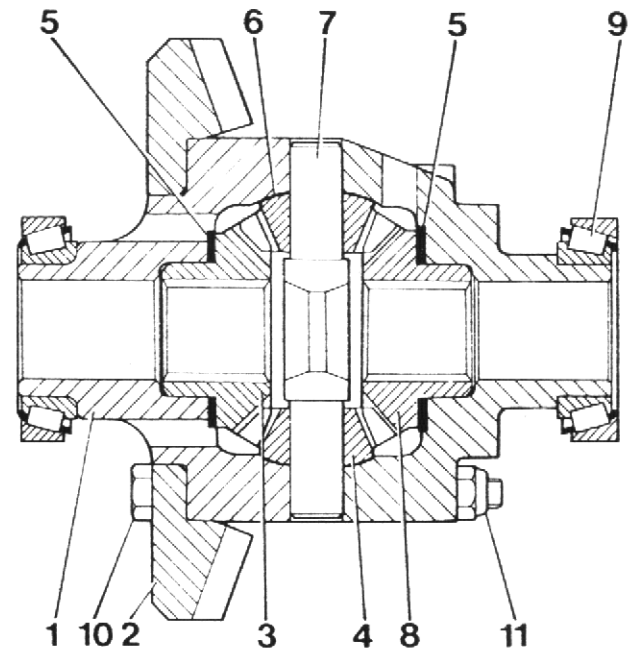


FIG. E

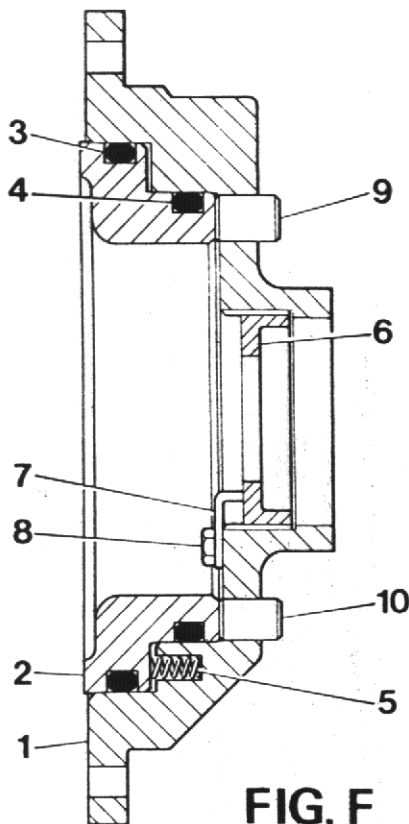
9. Re-assemble differential unit, ensuring that typed marks on diff. halves are aligned.
10. Assemble crownwheel, bolts (10) and torque up nuts (11).
11. Engage a sun gear (7) in a diff. gear and ensure that differential gears turn freely.
12. Press on new diff. bearings if required.
13. If diff. bearings are not replaced, then the diff. can be put back in the centre case and the brake cylinder replaced, without adjusting the bearing nuts (6). (See Fig. F)



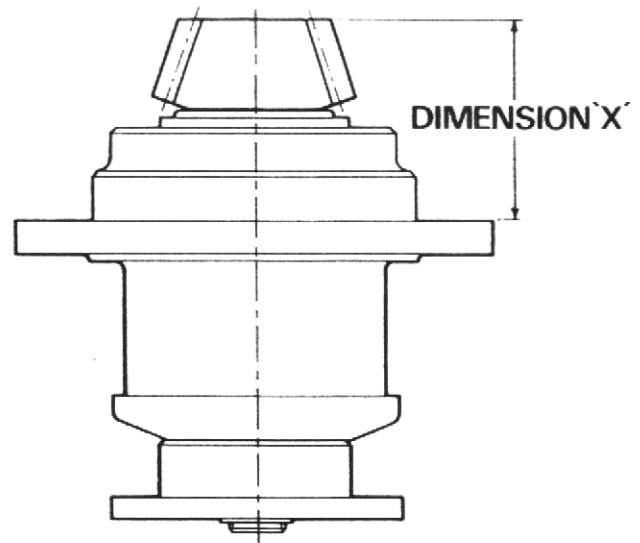
14. If the diff. bearings are replaced, then it will be necessary to reset the crownwheel backlash and the bearing preload. (See Crownwheel and Pinion Set Up.)
15. Brake cylinder, centre case and axle arm flange faces should be cleaned, oil sealer scraped off and new sealer applied prior to re-assembly.
16. Replace brake cylinder and axle arm assembly, all screws and bolts being tightened to the correct torque.

### Setting up Crownwheel and Pinion

1. Assemble pinion cartridge as described previously.
2. Assemble crownwheel and diff. assembly as described.
3. Assemble and seal one cylinder to main casing using screw (8) (See Fig.A). Push in diff. bearing cup and screw in lock ring (6) (See Fig. F).
4. Stand centre case on cylinder end and lower in diff. assembly, locating the diff. bearing halves together and ensuring that crownwheel and pinion are in mesh.
5. Seal and fit other brake cylinder and assemble bearing cup and lock ring.
6. Tighten lock ring until bearing end float is removed.
7. On pinion cartridge use a depth gauge to measure dimension 'X' from front face of pinion to cartridge flange (see Fig.G).



**FIG. F**



**FIG. G**

8. On centre case use a depth gauge to measure dimension 'Y' from pinion cartridge flange surface to ground diameter on differential casing (see Fig. H).
9. Read pinion mounting distance (M.D.) from front face of pinion. Pinion head thickness = (see front face of pinion), diff. case ground diameter = 129.50 mm. on the 400 series and 108.76 mm on the 250 series. Calculate as follows:

$$(\text{M.D.} - \text{Head thickness} - \frac{\text{Diff. case dia.}}{2}) = 'A'$$

$$('Y' - 'X') = 'B'$$

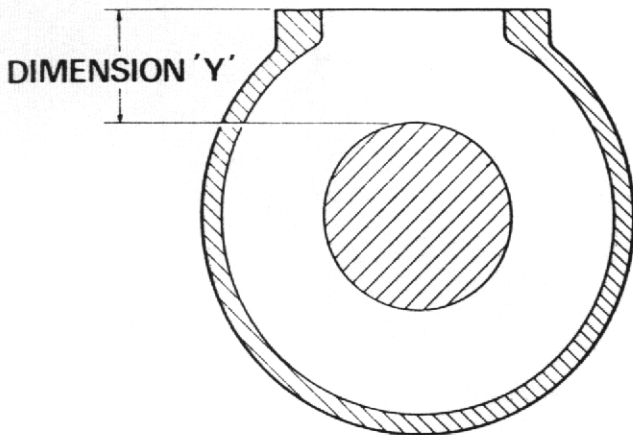
('A' - 'B') = Shim thickness to be placed between pinion cartridge flange and centre case flange.

10. Select shims, place on pinion cartridge and assemble cartridge to centre casing.

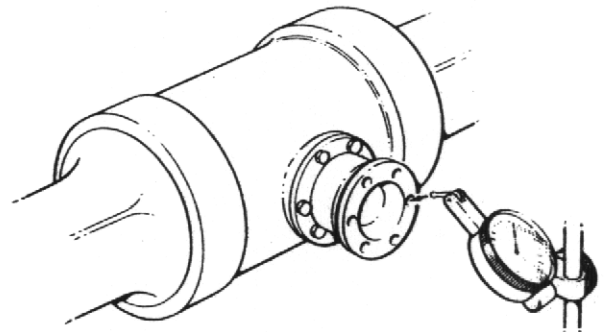
NOTE: It is required to know the spring balance reading required to turn pinion in its bearings, as described previously.

11. Adjust diff. bearing lock rings to give correct backlash between crownwheel and pinion.  
(See Page 11)

This can be measured by using a dial gauge with its pointer in a coupling flange hole (see Fig. J).



**FIG. H**



**FIG. J**

12. Tighten lock rings equally at each end of the differential to preload the bearings. The preload can be checked by turning the pinion coupling flange by means of string and spring balance as previously described. (Check that backlash is maintained.)

13. The additional spring balance load for the diff. bearings is shown.

14. Slacken and remove screws holding pinion cartridge in place and pull out cartridge. Brush on some paint, Engineers Blue etc. to a few crownwheel teeth and replace the pinion cartridge.

15. Turn the coupling flange a few turns in both directions then slacken screws and lift out.

16. Examine the contact on both sides of the crownwheel teeth and check that it is similar to that shown in fig. S and is similar to original factory marking shown on teeth.

17. If marking is satisfactory, replace pinion cartridge with sealer on flange surfaces and torque up screws.

(See Fig. F)

18. Put lock tabs (7) in place in cylinders and tighten screws (8). (Ensure that screws have locking compound applied.)

19. Bend over locking tabs into slots in lock rings (6).

#### **Planetary Gears (Ref. C)**

1. Drain axle oil and remove axle arm as explained previously.

(See Fig. A)

2. Lift out sun shaft (5), brake plates (2, 3 & 4) and planetary assembly.

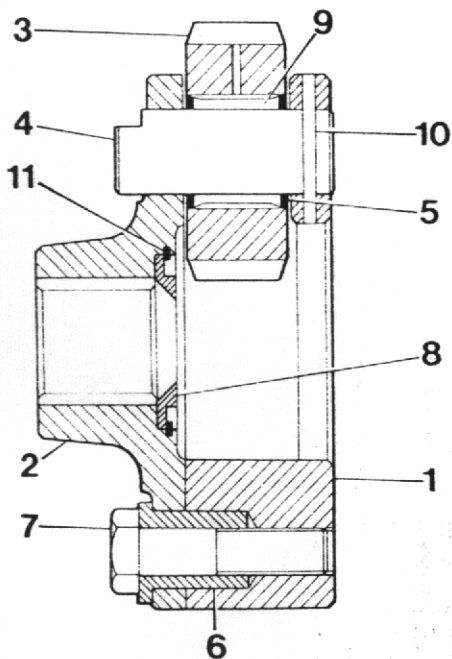
(See Fig. K)

3. Check planet gear (3) end float using feelers. (Should not be greater than 2mm.)

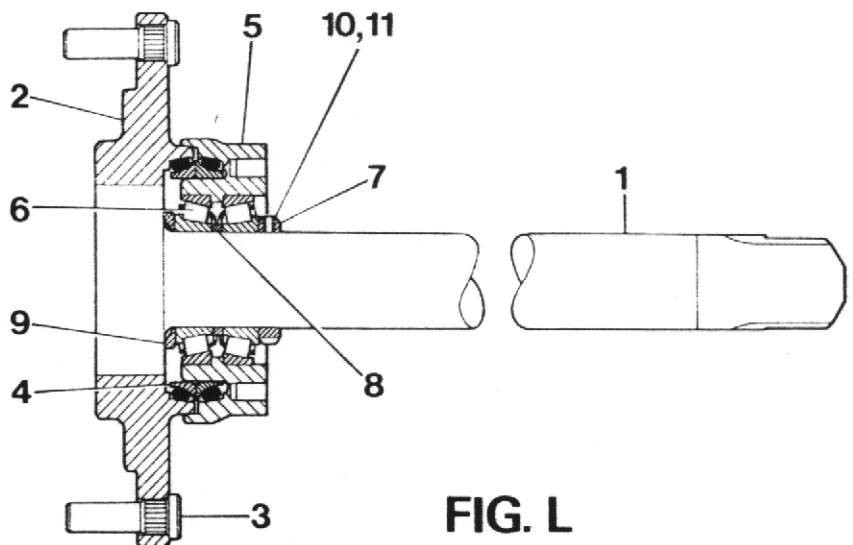
4. Remove lock wire where used, slacken bolts (7) and tap bolt heads to split planetary assembly.

5. Lift off planet gears (3), thrust washers (5) and needle bearings (9).

6. Inspect all parts for wear or damage and replace if required.
  7. If planet pins (4) are worn, remove by drifting out spring pin (10), and push planet pin from hole in planet carrier (1).
- NOTE: On re-assembly, tap in spring pin until flush with outside of planet carrier and peen over edge of hole.
8. To assemble, place gears, washers, bearings etc. on planet pins and locate carrier drive flange (2) on planet pins and push both halves together.
  9. Push dowels (6) home, tighten bolts and fit lock wire if required.
- (See Fig. A)
10. If annulus (1) shows signs of wear, remove using puller (BB) and fit new part. (Ensure that new annulus is fully home in its location bore.)
  11. Check axle shaft (1) (see Figs. L & N), splines for wear or damage and if satisfactory, locate planetary on splines.
  12. Re-assemble sun shaft, brake plates, etc. clean axle arm and brake cylinder flange faces, re-seal and assemble axle arm as previously described.



**FIG. K**



**FIG. L**

## Brakes

### IMPORTANT NOTE

It is essential that all cylinder bores, piston, seals, are kept clean and free from all lubricating oils. The seals can be lightly coated with brake fluid that conforms to SAE J1703 prior to assembly.

1. The dismantling procedure is the same as for the planetary gears.
2. When the sintered plates and the fixed plates are removed from the axle arm, examine both for excess wear. The thickness of the sintered plate should not be less than 4mm. The thickness of the fixed plate should not be less than 2mm.
3. To check the piston/cylinder assembly it is not essential to remove the cylinder from the centre case, but if required, remove brake feed and bleed fittings (10), screws, (8) (see Fig. A) and lift out cylinder from centre case using easing screws if required.

(See Fig. F)

4. Pull the piston (2) from the cylinder and examine the seals (3 & 4) and cylinder walls for signs of damage.

5. When refitting the piston to the cylinder ensure that the 3 springs (5) are in place in their holes in the rear of the cylinder.
6. Clean and seal cylinder and centre case flange surfaces and bolt cylinder in place with screws (8). (See Fig. A)
7. Examine brake plate splines for damage before assembling to sun shaft.

NOTE: When plates are assembled to sun shaft, ensure that holes line up to ensure an oil passage through the plates.

8. Assemble all brake plates and axle arm as previously described.
9. Re-fit, brake bleed and feed adaptors (10) if removed, ensuring that sealing washer (11) is properly located. (See Fig. A)

#### Axle Shaft Assembly (400 series axle)

(See Fig. A)

1. Slacken and remove screws (13) holding assembly to axle arm.
2. Tap rear of wheel flange to remove shaft assembly from axle arm.

(See Fig. L)

3. Slacken screw (11) in shaft locking ring (7) and unscrew locking ring using special tool (CC).
4. Tap seal housing (5) to remove from axle shaft.
5. Inspect bearings, oil seals and shaft for signs of wear or damage.
6. If a new oil seal is required, it is advisable to fit using the special tool (DD). (See Fig. M)
7. If new shaft bearings are required, they are supplied complete with the shaft spacer and are preset to give the correct running adjustment. Remove the old bearing cups (6) from the oil seal housing and fit new parts. Assemble the oil seal halves to the wheel flange and the oil seal housing.
8. Assemble the bearing/seal housing assembly to the axle shaft and tighten the locking ring behind the bearings.
9. Tighten the screw (11), compressing the nylon insert (10) onto the threaded part of the shaft.
10. Clean the rear surface of the oil seal housing and the axle arm flange surface. Reseal, fit the shaft assembly to the axle arm and tighten screws (13). (See Fig. A)

#### Axle Shaft Assembly (250 series axle)

(See Fig. A)

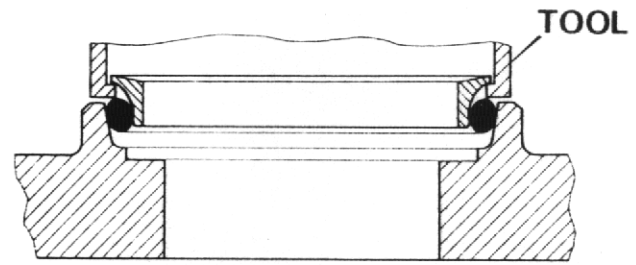
1. Slacken and remove screws (13) holding assembly to axle arm.
2. Tap rear of wheel flange to remove shaft assembly from axle arm.

(See Fig. N)

3. Slacken screw (15) in shaft locking ring (7) and unscrew locking ring using special tool CC.
4. Tap seal housing (5) to remove from axle shaft.
5. Inspect bearings, oil seals and shaft for signs of wear or damage.
6. If a new oil seal is required, it is advisable to fit using the special tool DD (see Fig. M).
7. A single unitised taper roller bearing is used and if a new unit is required, then it is necessary to adjust shims (10 to 13) to provide the correct clamping load on the bearing. The procedure is as follows:—
  - a) Remove old bearing from oil seal housing and fit new unit.
  - b) On small end of axle arm, use a vernier depth gauge to measure from the end of the spigot location on the flange (see Fig. P). Let this dimension be 'X'.
  - c) Measure the depth inside the oil seal housing, from the mating face with the axle arm to the end of the bearing outer race. Let this dimension be 'Y'. (See Fig. R)
  - d) The amount of shims to go adjacent to the bearing = ('Y' - 'X') + 0.075 mm (0.003").
  - e) Insert the necessary shims in the oil seal housing.

(See Fig. N)

8. Assemble the oil seal housing to the shaft (1) and tighten the locking ring (7).
9. Tighten the screw (15), compressing the nylon insert (14) onto the threaded part of the shaft.
10. Clean the rear surface of the oil seal housing and the axle arm flange surface. Reseal, fit the shaft assembly to the axle arm and tighten screws (13). (See Fig. A)



TOOL DD  
FIG. M

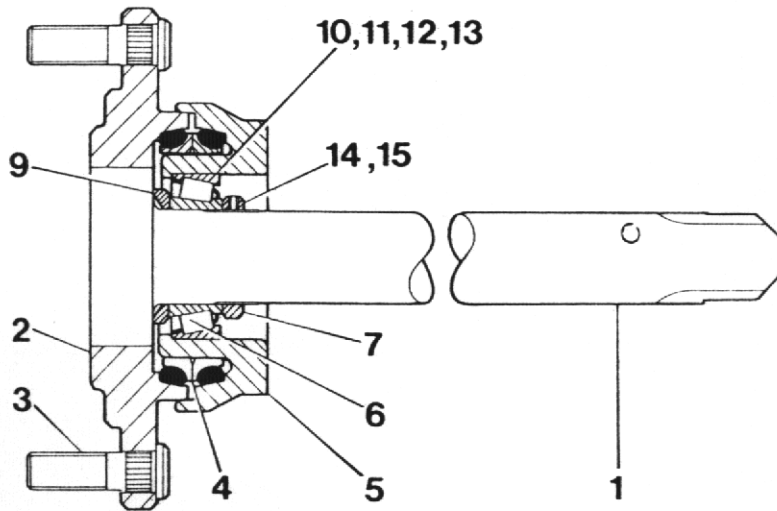


FIG. N

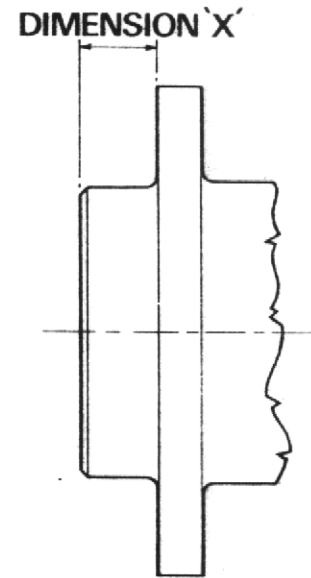


FIG. P

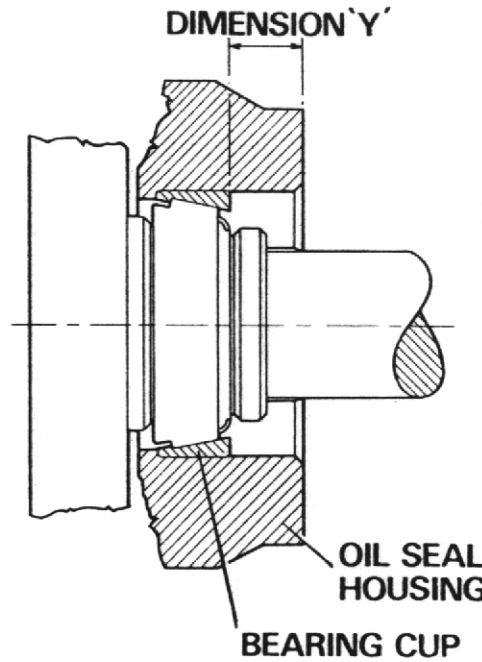


FIG. R

**Surfaces to be Sealed with Liquid Sealant**  
Use "Loctite Plastic Gasket" Grade 275  
"Avdelbond" Grade 120/121 OR Similar

1. Pinion cartridge flange to main casing.
2. Brake cylinder flanges to main casing.
3. Axle arm to brake cylinder.
4. Oil seal housing to axle arm flange.

Apply a thin film of sealant to one of the surfaces, having first cleaned the surfaces concerned. Assemble the parts and tighten fasteners.  
Having dismantled an assembly, scrape old sealant off the surfaces, clean and apply fresh solution.

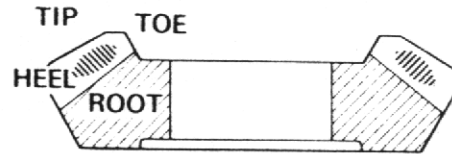
# SPIRAL BEVEL GEAR TOOTH CONTACTS

## CROWN WHEEL

### CONVEX FLANK & CONCAVE FLANK

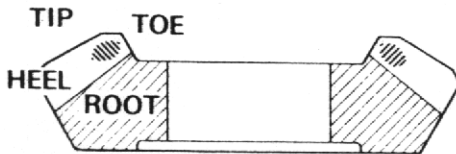
Contact may vary, but generally is approx, in the tooth centre, equispaced between root and tip. The marking may be towards toe on some gears on both flanks, or marking crossed slightly i.e. towards toe on convex flank and heel on concave flank or vice versa.

If, compared to the factory tooth contact, the contact appears as shown below, then corrective action should be taken as follows:



#### 1 CONVEX FLANK

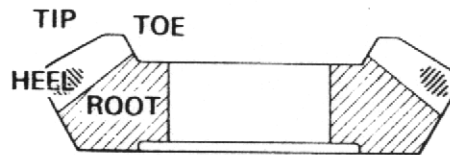
Contact further to toe and tip than factory marking.



#### CONCAVE FLANK

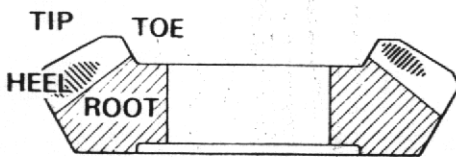
Contact further to heel and tip than factory marking.

ERROR: Pinion too far out of mesh, recheck and decrease shims below pinion cartridge flange.



#### 2 CONVEX FLANK

Contact further to heel and root than factory marking.



#### CONCAVE FLANK

Contact further to toe and root than factory marking.

ERROR: Pinion too far into mesh, recheck and increase shims below pinion cartridge flange.

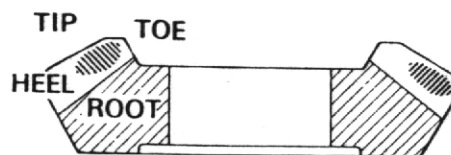


FIG.S

**ADDITIONAL LOAD ON SPRING BALANCE FOR DIFFERENTIAL BEARING PRELOAD WHEN CROWN WHEEL & PINION ARE IN MESH.**

400

No. Teeth Pinion	No. Teeth Wheel	Additional Spring Balance Pull (Kg)	
		New Brgs.	Used Brgs.
11	31	2.75-3.25	1.4-1.8
11	29	3.0 -3.4	1.4-1.8
18	33	4.0 -5.0	2.0-2.5

250

No. Teeth Pinion	No. Teeth Wheel	Bolt Circle Dia. Coupling Flange (mm)	Additional Spring Balance Pull (Kg)	
			New Brgs.	Used Brgs.
11	29	95	3.8-5.2	2.0-2.7
17	29	95	5.9-8.0	3.0-4.1
11	29	80	4.1-5.7	2.0-3.0
17	29	80	6.6-8.8	3.2-4.3

**TORQUE SETTINGS FOR ALL FASTENERS (SERIES 250)**

Fastener Ref. No. Fig. A.	Description	Tightening Torque	
		Kpm.	(lb. ft.)
(Diff. Assy.)	M10 Bolt + Nut	5.6	( 40)
(Planetary Assy.)	M12 Bolt	10	( 72)
(Brake Cyl. Assy.)	M12 Cap Screw	10	( 72)
6	Axle Arm—Main Case Bolts	5.6	( 40)
7	Pinion Cart.—Main Casing Screws	5.6	( 40)
8	Brake Cyl.—Main Case Screws	5.6	( 40)
10	Brake Pipe Adaptor—Brake Cyl.	2.7	( 20)
12	Wheel Nut (18 mm)	28	(200)
	Wheel Nut ( $\frac{7}{8}$ " BSF)	42	(300)
13	Axle Arm—Oil Seal Housing	5.6	( 40)
14	Axle Shaft Locking Ring		(350)

**TORQUE SETTINGS FOR ALL FASTENERS (SERIES 400)**

Fastener Ref. No. Fig. A.	Description	Tightening Torque	
		Kpm.	(lb. ft.)
(Diff. Assy.)	M10 Bolt + Nut	5.6	( 40)
(Planetary Assy.)	M16 Bolt	25	(180)
(Brake Cyl. Assy.)	M12 Cap Screw	10	( 72)
6	Axle Arm—Main Case Bolts	10	( 72)
7	Pinion Cart.—Main Casing Screws	10	( 72)
8	Brake Cyl.—Main Case Screws	10	( 72)
10	Brake Pipe Adaptor—Brake Cyl.	2.7	( 20)
12	Wheel Nut (18 mm)	28	(200)
	Wheel Nut ( $\frac{7}{8}$ " BSF)	42	(300)
13	Axle Arm—Oil Seal Housing	10	( 72)
14	Axle Shaft Locking Ring	62	(450)

**LIST OF BACKLASH FIGURES FOR DIFFERENT RATIOS ETC.**

400	No. Teeth Pinion	Backlash Measured via Hole in Flange (mm)
	11	0.31-0.39
	18	0.21-0.26

250

No. Teeth Pinion	Bolt Circle Dia. on Flange	Backlash Measured via Hole in Flange (mm)
11	95	0.27-0.36
17	95	0.17-0.23
11	80	0.22-0.30
17	80	0.14-0.19

## DECIMAL, FRACTIONAL AND METRIC EQUIVALENTS

Inches		Milli- metres	Inches		Milli- metres
Fractions	Decimals		Fractions	Decimals	
1/64	0.015625	0.397	33/64	0.515625	13.097
1/32	0.03125	0.794	17/32	0.53125	13.494
3/64	0.046875	1.191	35/64	0.546875	13.891
1/16	0.0625	1.588	9/16	0.5625	14.288
5/64	0.078125	1.984	37/64	0.578125	14.684
3/32	0.09375	2.381	19/32	0.59375	15.081
7/64	0.109375	2.778	39/64	0.609375	15.478
1/8	0.125	3.175	5/8	0.625	15.875
9/64	0.140625	3.572	41/64	0.640625	16.272
5/32	0.15625	3.969	21/32	0.65625	16.669
11/64	0.171875	4.366	43/64	0.671875	17.066
3/16	0.1875	4.763	11/16	0.6875	17.463
13/64	0.203125	5.159	45/64	0.703125	17.859
7/32	0.21875	5.556	23/32	0.71875	18.256
15/64	0.234375	5.953	47/64	0.734375	18.653
1/4	0.250	6.350	3/4	0.750	19.050
17/64	0.265625	6.747	49/64	0.765625	19.447
9/32	0.28125	7.144	25/32	0.78125	19.844
19/64	0.296875	7.541	51/64	0.796875	20.241
5/16	0.3125	7.938	13/16	0.8125	20.638
21/64	0.328125	8.334	53/64	0.828125	21.034
11/32	0.34375	8.731	27/32	0.84375	21.431
23/64	0.359375	9.128	55/64	0.859375	21.828
3/8	0.375	9.525	7/8	0.875	22.225
25/64	0.390625	9.922	57/64	0.890625	22.622
13/32	0.40625	10.319	29/32	0.90625	23.019
27/64	0.421875	10.716	59/64	0.921875	23.416
7/16	0.4375	11.113	15/16	0.9375	23.813
29/64	0.453125	11.509	61/64	0.953125	24.209
15/32	0.46875	11.906	31/32	0.96875	24.606
31/64	0.484375	12.303	63/64	0.984375	25.003
1/2	0.500	12.700	1	1.000	25.400

## INCHES INTO MILLIMETRES

Inches	0	1	2	3	4	5	6	7	8	9
0	0	25.40	50.80	76.20	101.60	127.00	152.40	177.80	203.20	228.60
10	254.00	279.40	304.80	330.20	355.60	381.00	406.40	431.80	457.20	482.60
20	508.00	533.40	558.80	584.20	609.60	635.00	660.40	685.80	711.20	736.60
30	762.00	787.40	812.80	838.20	863.60	889.00	914.40	939.80	965.20	990.60
40	1016.00	1041.40	1066.80	1092.20	1117.60	1143.00	1168.40	1193.80	1219.20	1244.60
50	1270.00	1295.40	1320.80	1346.20	1371.60	1397.00	1422.40	1447.80	1473.20	1498.60
60	1524.00	1549.40	1574.80	1600.20	1625.60	1651.00	1678.40	1701.80	1727.20	1752.60
70	1778.00	1803.40	1828.80	1854.20	1879.60	1905.00	1930.40	1955.80	1981.20	2006.60
80	2032.00	2057.40	2082.80	2108.20	2133.60	2159.00	2184.40	2209.80	2235.20	2260.00
90	2286.00	2311.40	2336.80	2362.20	2387.60	2413.00	2438.40	2463.80	2489.20	2514.61

Use in conjunction with above table.

Example: Find equivalent mm. for 84 5/8".

$$84'' = 2133.60 \text{ mm.}$$

$$5/8'' = 15.875 \text{ mm.}$$

$$84 \text{ } 5/8'' = 2149.475 \text{ mm.}$$



# **CALIFORNIA**

## **Proposition 65 Warning**

**Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm**