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Part No.7106850



PA44

Operator & Parts Manual



WARNING

SAFETY PRECAUTIONS

- NEVER** ... permit inexperienced personnel to operate machine without supervision.
- ... stand under a raised bucket or grab.
- ... operate the machine with Hy-fi in stowage position except during initial attachment procedures.
- ... drill through or weld to any part of a safety cabframe.
- ... travel on the public highway without adequate front ballast.
- ALWAYS** ... ensure that bucket or grab is resting on the ground before carrying out any adjustments.
- ... ensure that legs are on firm ground and extended for maximum stability before operating.
- ... fit and secure transport strut using both lynch pins whenever machine is taken on the public highway.
- ... ensure lift link lock is fully engaged after completing any loader action adjustment.
- ... closely observe the instruction sequence when changing machine's operating geometry to prevent the collapse of machine arms.
- ... prior to carrying out any operation ensure there is adequate clearance around and above the PA 44 and tractor cab/safety frame.
- ... Strictly observe instructions for offsetting the main body especially references to the offset securing pin.
- ... ensure all spring cotters, spring dowels, split pins and lynch pins are securely fitted in their respective positions.
- ... ensure that tractor hydraulic controls are in correct position before engaging the PTO pump drive.
- ... check that hoses are not pinched or chafed and that there is clearance between PTO pump assembly and lift frame.

INTRODUCTION

Read this manual before fitting or operating the machine. Whenever any doubt exists contact your dealer or the McConnel Service Department for assistance.

Use only McConnel spare parts on McConnel equipment and machines. This manual includes an illustrated spare parts breakdown and the interpretation which precedes it should be read before ordering replacement components.

DEFINITIONS

The following definitions apply throughout this manual:

WARNING

An operating procedure, technique etc., which can result in personal injury or loss of life if not observed carefully.

CAUTION:

An operating procedure, technique etc., which can result in the damage of either machine or equipment if not observed carefully.

NOTE:

An operating procedure, technique etc., which is considered essential to emphasise

Left and Right Hand

This term is applicable to the machine when fitted to the tractor and viewed from the rear. This also applies to tractor references.

Record the serial number of your machine on this page and always quote this number when ordering spares. Whenever information concerning the machine is requested remember to also state the type of tractor to which it is fitted.		
MACHINE SERIAL NUMBER		INSTALLATION DATE
MODEL DETAILS		
DEALERS NAME		
DEALERS TELEPHONE NUMBER		

LIMITATIONS

The McConnel Warranty specifically excludes any hydraulic pump and controls supplied with the machine if they are used to power equipment other than the McConnel machine for which they were supplied. Prior confirmation and warranty cover that the pump is suitable for any other purpose must be obtained from the hydraulic manufacturers.

FITTING

Hydraulic Requirements

If the machine is to be powered from the tractor integral pump, a minimum tractor relief valve pressure of 2500 psi (170 Bar) is required.

A minimum flow rate of 2½ gpm. (11.5 lit/min) is required for hedgecutting and flail work, and 4 gpm. (18 lit/min) is required for other operations.

Hydraulic Fittings

To protect the new machine, drain, flush and refill the hydraulic system on older model tractors.

CAUTION: For tractors without independent auxiliary service control, a hydraulic linkage isolation valve is necessary when the machine is powered by the integral pump.

A male half self-seal coupling should be fitted to the auxiliary service port or trailer pipe connection.

Install the correct tractor return connection. On some tractors this will mean replacing the gearbox filler plug or the transmission filler plug depending on the model. On others, a return tapping is provided.

In all cases back pressure of the return oil flow must be kept to a minimum. Use of a self-sealing coupling in the return line which can substantially increase back pressure should be avoided. There is always the danger of the coupling being incorrectly connected, resulting in a 'locked line' when tractor auxiliary service is operated. This can lead to a burst filter housing and/or damaged PTO pump shaft seal.

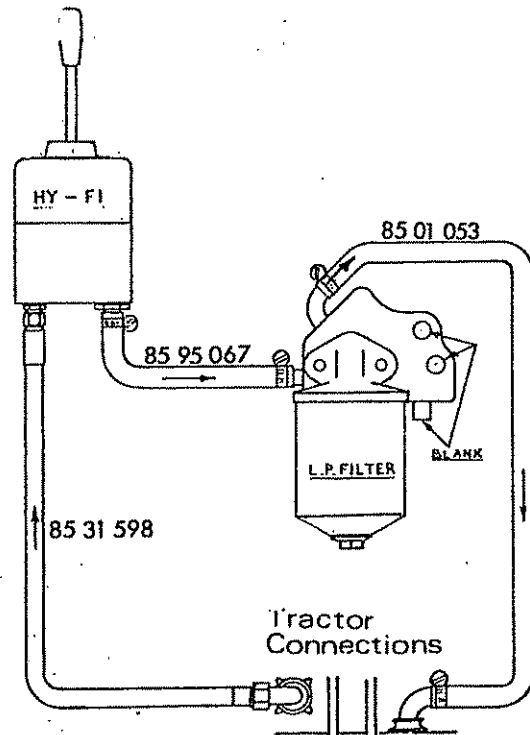
The return hose should be carefully routed to avoid sharp bends and kinks and the hose length should be kept to a minimum.

CIRCUIT I

Basic system. Machine powered by tractors hydraulic pump.

Minimum requirements 2500 psi & 4 gpm.

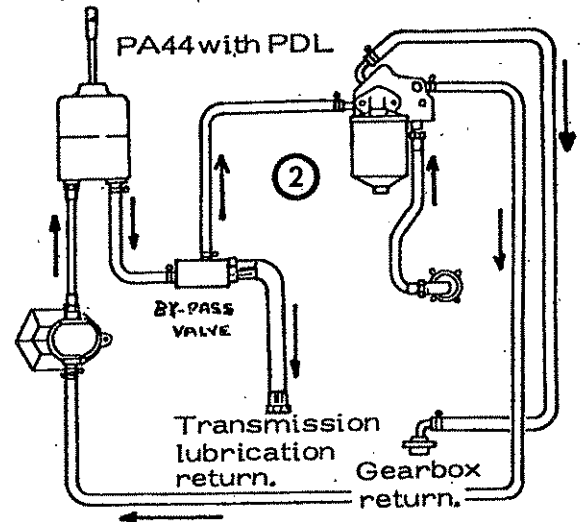
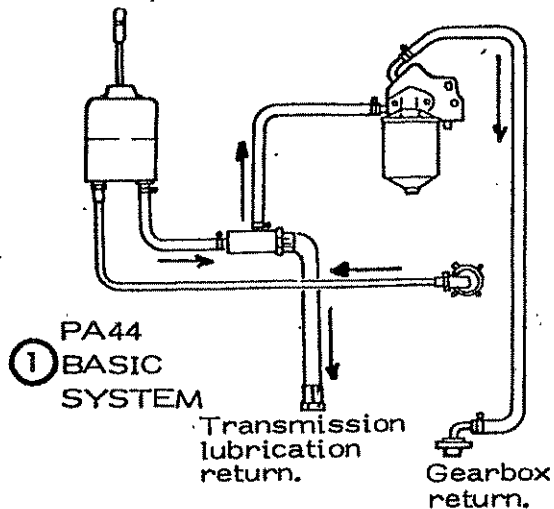
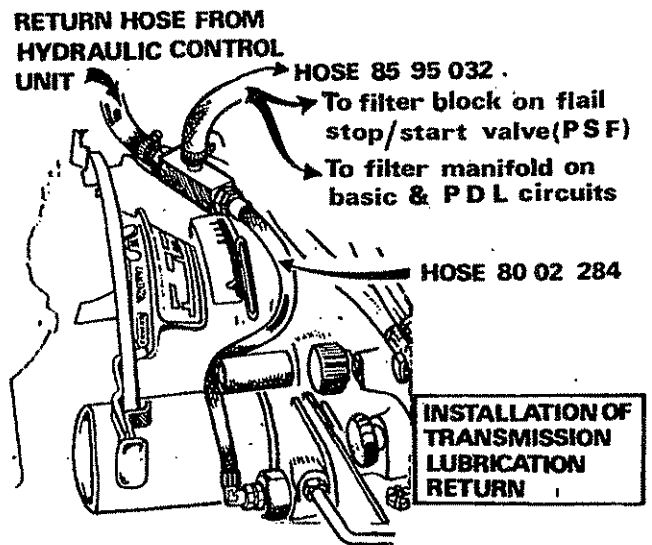
Linkage isolation essential.



TRACTOR HYDRAULIC VARIATIONS

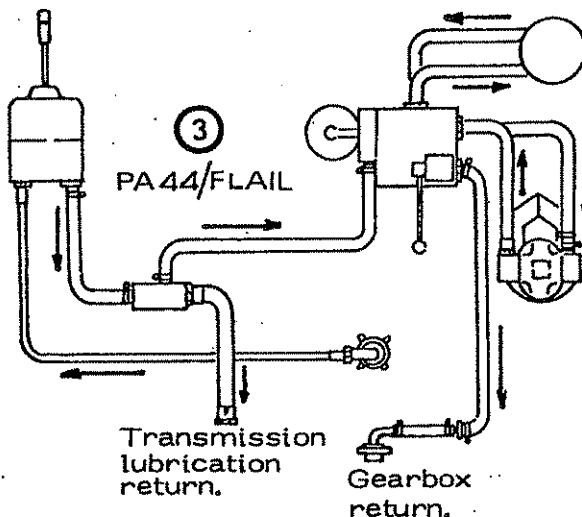
Ford 5000 DP and 7000 DP, 7000 Load Monitor, 5600 with pressure lubrication of front transmission, 7600 Dual Power/Load Monitor.

The above tractors require a minimum of 1½ gpm pressure lubrication to the front transmissions system. This is achieved by the introduction of a return oil bypass valve kit No. 80 02 279 into the return line from the implement. This splits the oil sending 1½ gpm to the transmission lubrication return and the remaining return oil to either the tractor gearbox or the rear axle filler cap via the low pressure filter block. The kit No. 80 02 279 is used in conjunction with the existing return line kit 80 02 284 (see diagrams for installation). For further information refer to service bulletin Hy04.



Circuit 1
PA44/Digger loader basic circuit.
Linkage isolation essential.

Circuit 2
PA44 Digger/loader when powered with PDL pump.
Linkage isolation desirable but not essential.

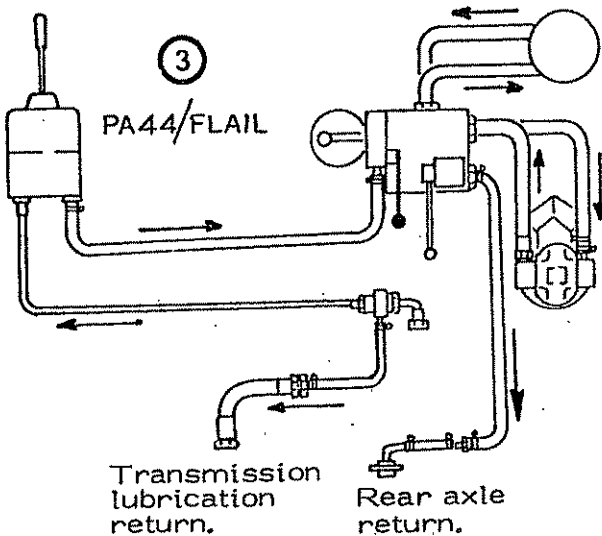
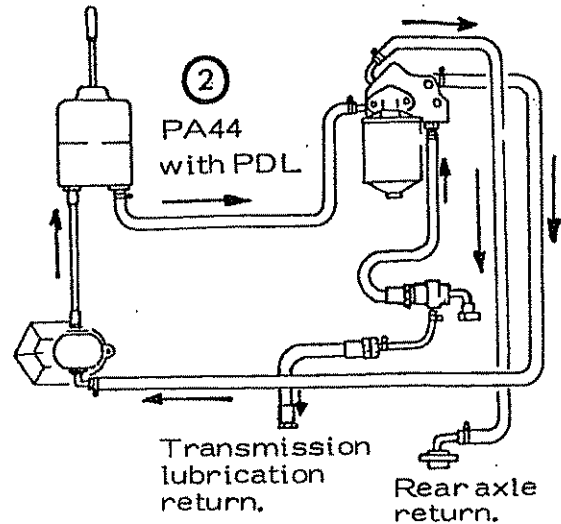
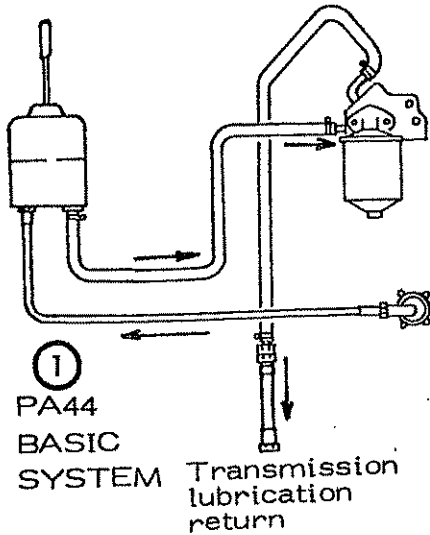
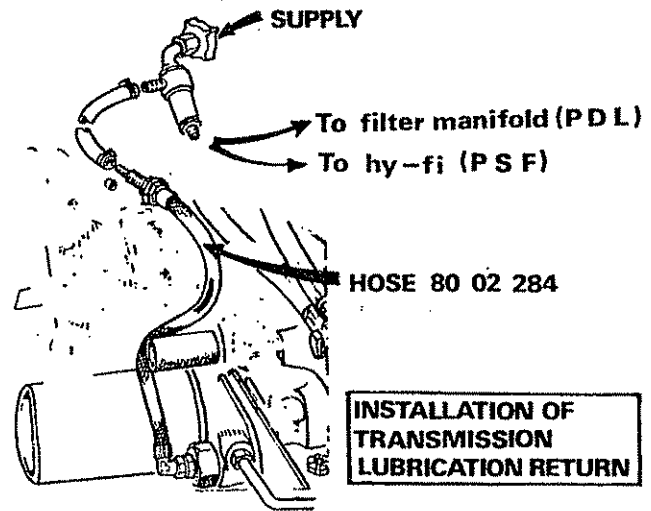


Circuit 3
PA44/Flail. For float kit attachment see Page 34.
Linkage isolation essential.

Return oil By-pass valve required in all cases. A measured amount of oil is returned to the transmission lubrication return. The remainder is returned to the tractor gearbox.

Ford 5600 Dual Power, 6600 all, 6700 all, 7600 all, 7700 all
County & Roadless versions of above models.

These tractors require lubrication of front transmissions but also have high oil flow rates. To avoid back pressure and resulting damage to the pump and motor shaft seals a flow control valve pt. No. 81 04 011 is inserted into the supply line splitting the oil. A regulated 3 gpm is passed to the Hy-Reach the remainder being returned to the transmission lubrication return i.e. filter nut. The oil from the implement is returned to the tractor rear axle. The complete fitting kit 80 02 289 consisting of flow control valve and unions is used in conjunction with the existing return line kit 80 02 284 (see diagrams for installation). For further information refer to service bulletin Hy04.



Circuit 1

PA44 - Digger/loader basic system. Flow control valve not required. All oil returned to the transmission lubrication return. Linkage isolation essential.

Circuit 2

PA44 - Digger/loader when powered by PDL pump. Flow control valve required. A measured amount of oil is returned to the transmission lubrication return the remainder is returned to the rear axle. Linkage isolation desirable but not essential.

Circuit 3

PA44 - Flail. Flow control valve is required. A measured amount of oil is returned to the transmission lubrication return the remainder is returned to the rear axle. For float kit attachment see page 34. Linkage isolation essential.

John Deere

The John Deere tractors hydraulic system operates on a closed centre principle. When digging/loading the circuit is connected as in Fig. 1 the oil being returned to the tractor return or the John Deere third return connection.

When operating the PA44 with a flail the hydraulic system of the tractor also necessitates the use of an oil metering valve kit No. 71 05 114 in conjunction with the third return connection and is connected up as in Fig. 3

The flip lever on the Hy-Fi should be in the closed centre position for both circuits.

Third return connection

This is a John Deere supplied component (sometimes called a Motor Return Connection) which must be fitted to enable a continuous hydraulic oil supply to be taken from the tractor.

Tractor Model

1120, 2020, 2120

1130, 1630, 2030, 2130

3120, 3130

John Deere Part No.

AL24717 with John Deere hydraulic coupler.

AL27077 with I.S.O. hydraulic coupler.

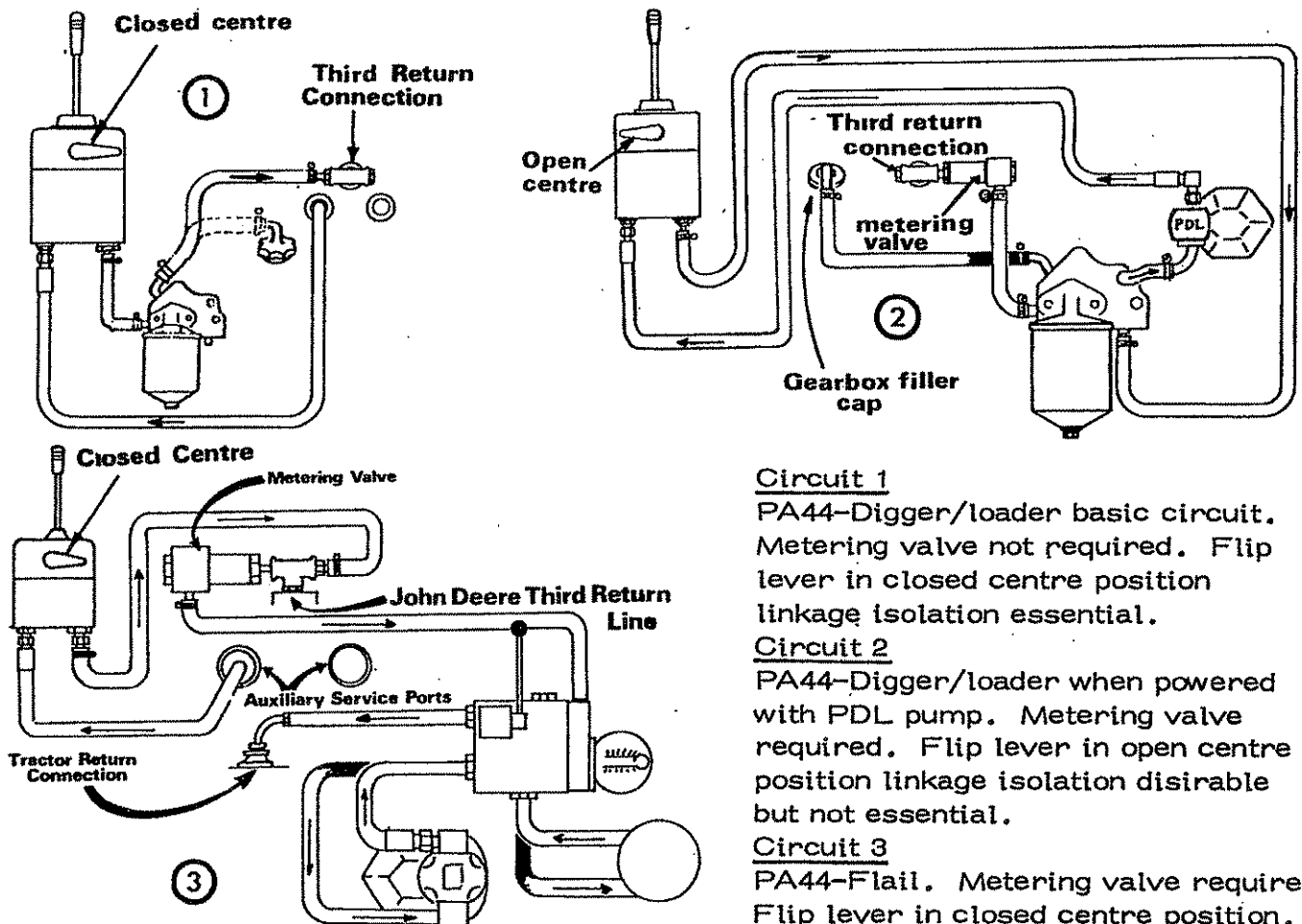
AL24696 with John Deere hydraulic coupler.

AL27082 with I.S.O. hydraulic coupler.

The metering valve part no 71 05 114 is fitted onto the third return connection to take out of the John Deere hydraulic circuit a carefully controlled flow of oil to prime and cool the PTO pump circuit.

When connecting to tractor the return from the pump circuit must be made to the gearbox casing via the McConnell gearbox filler plug connection.

For further information refer to service bulletin HY02.



Tractors with high oil flow rates

Where hydraulic flows are in excess of 6 GPM at 450 RPM the fitting of a flow control valve is strongly recommended to prevent back pressures causing damage to the pump and motor shaft seals.

The flow control valve is introduced into the supply line. It splits the oil allowing a regulated 3 GPM for the PA44, the remainder is returned via one side of a 'T' piece to the tractors reservoir or via a self seal coupling to the tractors spool valve. The return oil from the implement is returned to the tractors reservoir via the other side of the 'T' piece or a single return connection.

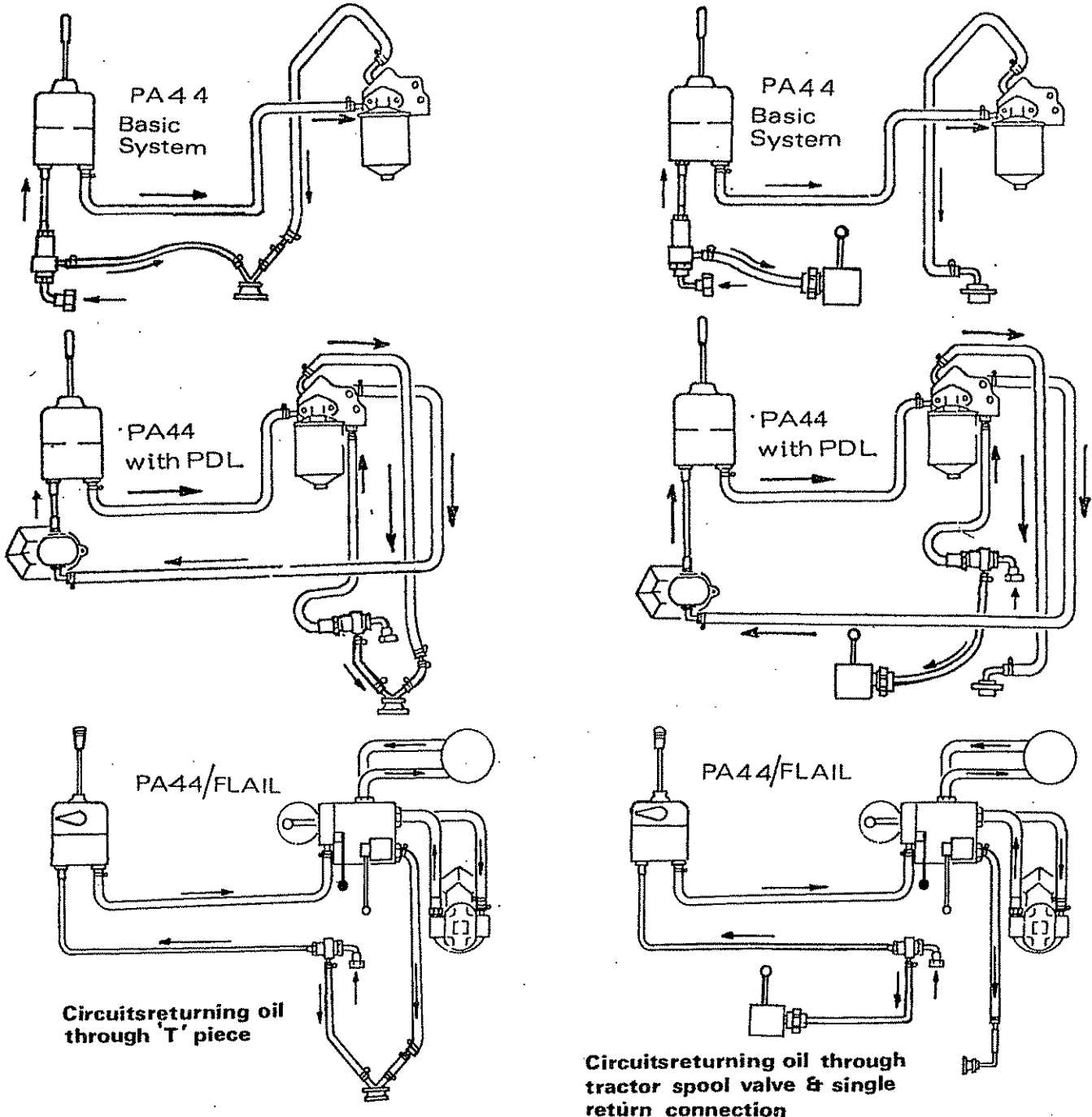
Complete kit utilising 'T' piece for return to tractors reservoir.

IH 614, 634 - 80 02 276

IH 2400, 2500, 454, 474, 574, 674 and '8' series - 80 02 277.

The flow control valve kit No 80 02 277 for certain International Harvester tractors is used in conjunction with the return hose assembly No. 80 02 283. This connects to the threaded connection on the 'T' piece and returns the oil to the tractors transmission, below and in front of the right hand side of the rear axle.

Complete kit for utilising return to tractors spool valve - 80 02 291.



MOUNTING THE HY-FI IN THE TRACTOR CAB

The Hy-Fi can be mounted in the tractor's cab using three different methods. These are as follows:-

Mudwing Mounting Bracket

This is a small bracket Part No. 71 06 189 which is bolted to the tractor's mudwing and onto which the Hy-Fi slots.

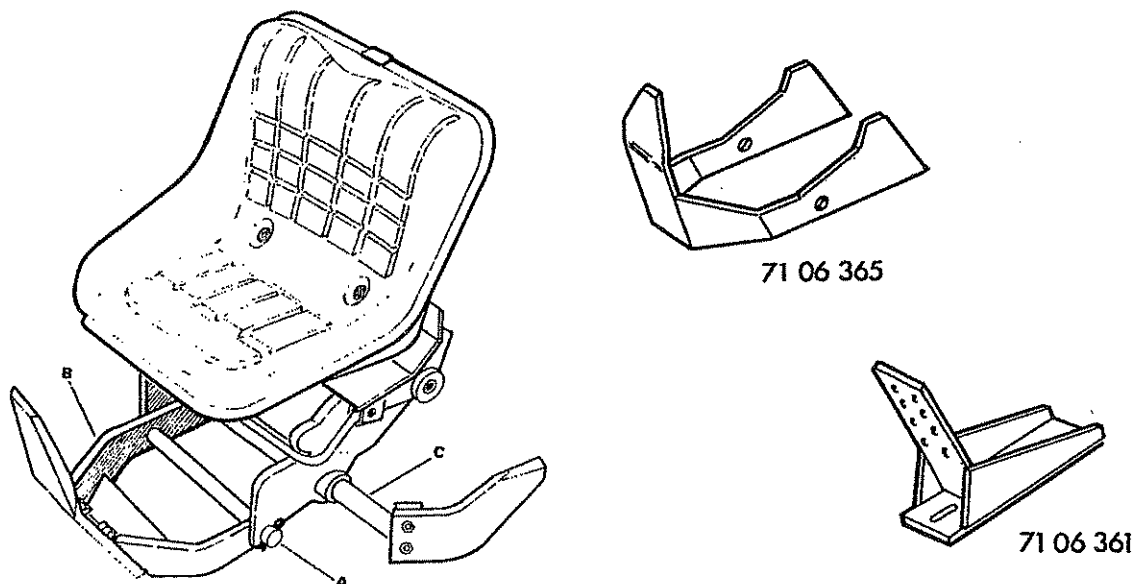
It can be fitted to tractors equipped with a safety frame or a safety cab (not 'Q' cab) and is suitable for flailing, sawhead work or ditching.

Tip-over Seat

The McConnel tip-over seat is widely used as an alternative to the above. However, where the tractor is fitted with a 'Q' cab and drilling the mudwing is not allowed, or where it is required to dig trenches the tip-over seat is a necessity.

Three alternative positions are provided for mounting the Hy-Fi. Two positions are on either side of the seat and are adjustable; the third position is rearward facing and is also adjustable for height.

The tip-over seat is suitable for all types of operation.



The seat assembly 71 06 340 is fitted as above in conjunction with mounting brackets except in the following cases where modifications have to be made.

1. All Zetor Tractors
Remove pin 'A' discard bracket 'B' remount the seat through the holes in the Zetor attachment brackets.
2. International 2400, 2500, 454, 474, 574, 674, Same Leone
Remove Hy-Fi swivel mounting assembly 'C' and reassemble in cross tube on the attachment pillar.
3. International B250, 275, 414, B434, 354, 444, 614, 634
Remove pin 'A' locate attachment bracket inside bracket 'B', refit pin 'A'.

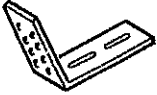
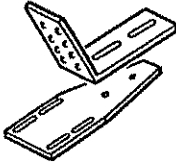
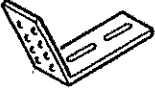
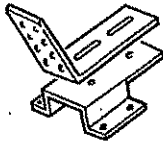
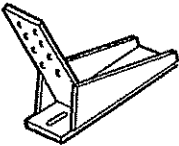
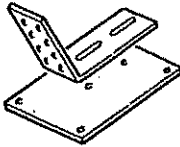
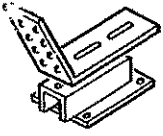

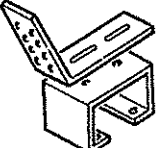
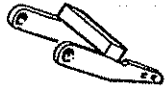

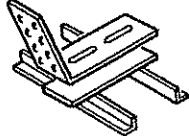
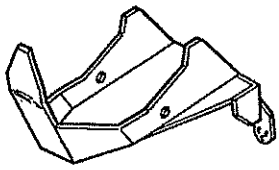
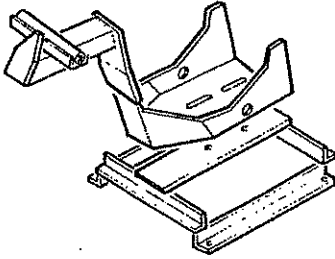
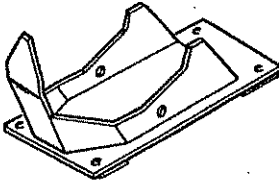
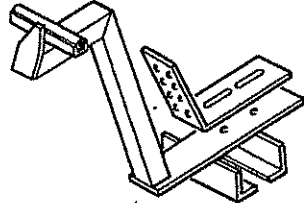
SUSPENSION UNIT

A suspension unit 71 06 374 is available, which bolts directly onto tractors having a flat mounting base marked * no mounting brackets are necessary.

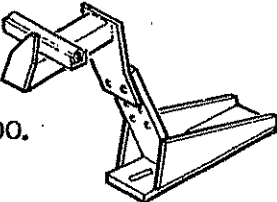
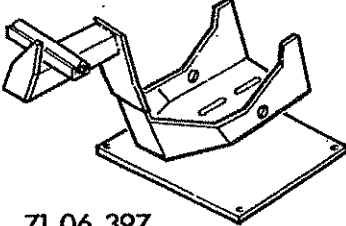
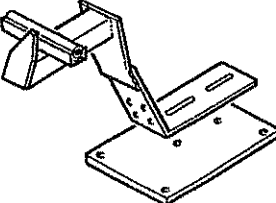
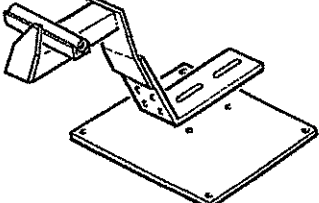
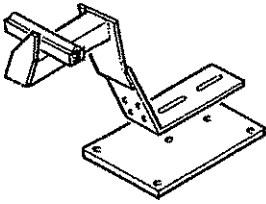
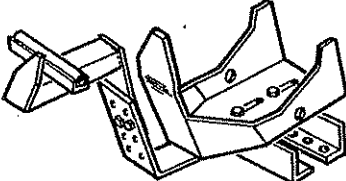

This unit also bolts to the tip-up seat after the following modifications to the seat have been made.

1. For small tractors - remove pin 'A', discard bracket 'B' and replace with bracket 71 06 365.
2. For large tractors - bolt bracket 71 06 361 to bracket 'B'.

Tip over seat mounting brackets.

<p>FORD * Dexta, S/Dexta, N/Major, P/Major, S/Major, 2000, 3000, 4000, 5000, 7000, County & Roadless versions.</p>	 71 06 172	<p>NUFFIELD * 3/45 & 4/65</p> <p>LEYLAND * 255/344, 270/384, 245/253 262/272.</p>	 71 06 382
<p>MASSEY FERGUSON * 20, 35, 40, 135, 140, 148.</p>	 71 06 172	<p>FIAT * 540, Someca 400; 450, 500, 550, 600, 640, 650, 750, Universal 445.</p>	 71 06 381
<p>MASSEY FERGUSON * 165 H.C. 175, 178, 165 sq. axle. 168, 185, 188, 50.</p>	 71 06 361	<p>FIAT * Someca 850, 1000 & 1300</p>	 71 06 380
<p>MASSEY FERGUSON * 152, 158, 65 - 165 St'd.</p> <p>DAVID BROWN * 770, 780, 880, 885, 990, 995, 996.</p>	 71 06 388	<p>JOHN DEERE 1020, 1120, 1130, 2020, 2030, 2120, 2130, 3120, 3130.</p>	 71 06 385
<p>DAVID BROWN 1200, 1210, 1212, 1410, 1412</p>	 71 06 389	<p>INTERNATIONAL B250/275/414. B434, 354, 444, 614, 634.</p>	 71 06 359
<p>NUFFIELD * 3 & 4, 342 & 460, 10/42 & 10/60</p>	 71 06 383	<p>INTERNATIONAL * 523, 624, 724.</p>	 71 06 384
<p>ZETOR * 3011, 3045, 3511, 3545, 4011, 4012, 4018, 4511, 4711, 4712, 5511, 5545, 5711, 5712, 5745, 6711.</p>	 71 06 357	<p>INTERNATIONAL * 2400, 2500, 454, 474, 475, 574, 674.</p>	 71 06 394
<p>ZETOR 8011, 8045, 12011, 12045, Crystal - Ursus 385, 6718, 6748.</p>	 71 06 378	<p>SAME LEONE * Saturno</p>	 71 06 387

Tip over seat mounting brackets for use with quiet cabs.

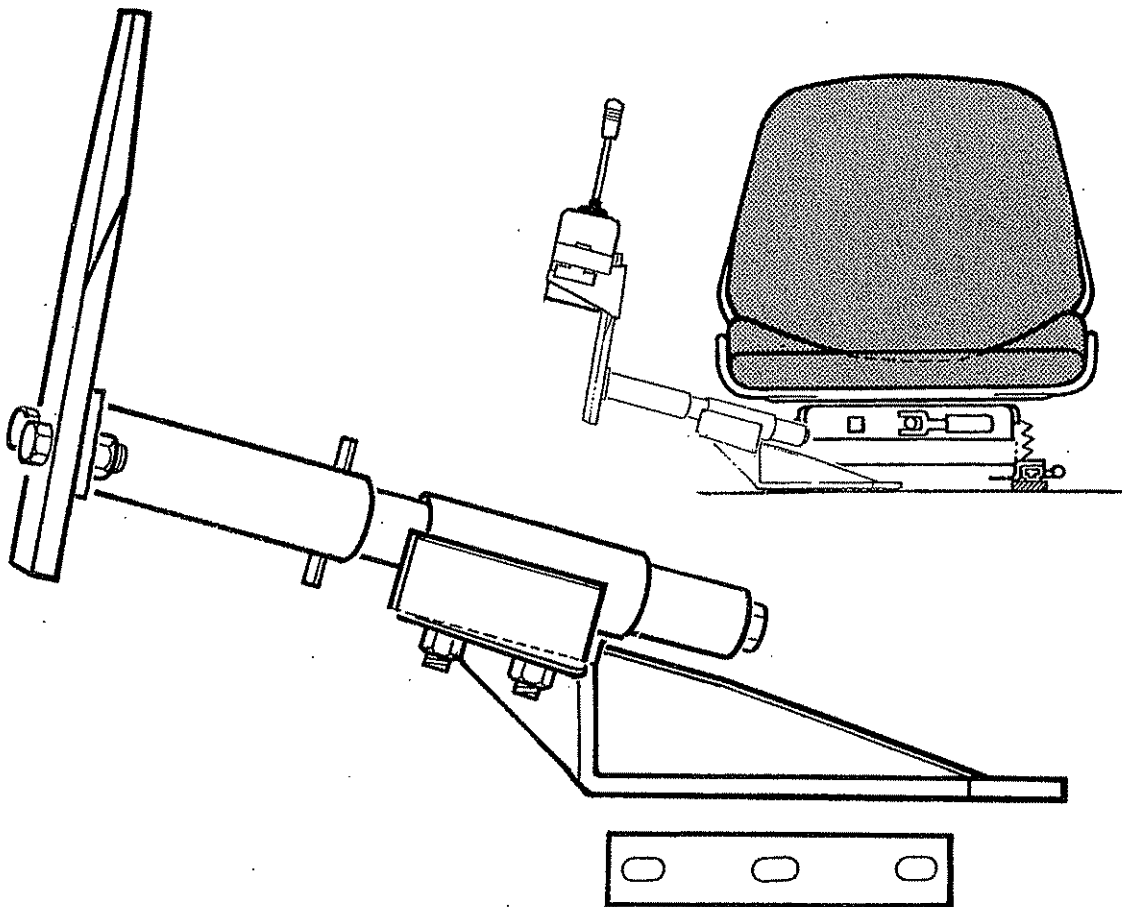
<p>FORD * 2600, 3600, 4100, 4600, 5600, 6600, 7600.</p>  <p>71 06 401</p>	<p>INTERNATIONAL * 454, 474, 475, 574, 674</p>  <p>71 06 397</p>
<p>MASSEY FERGUSON * 550, 565, 575, 590.</p>  <p>71 06 400</p>	<p>INTERNATIONAL * 454, 474, 475, 574, 674</p>  <p>71 06 398</p>
<p>DAVID BROWN *</p>  <p>71 06 399</p>	<p>SAME LEONE *</p>  <p>71 06 395</p>
<p>LEYLAND 285, 2100, 485, 4100</p>  <p>71 06 396</p>	

Sandwich mounted Hy-Fi Stalk

In certain cases the side mounting bracket attached to the tip-over seat may be found unsuitable as it can interfere with the tractor quadrant levers or control system. The alternative has been to drill the mudwing to install the Hy-fi mounting bracket. This practice cannot be carried out where the mudwing is an integral part of the 'quiet' cab and covered in sound absorbent cladding. In such circumstances a 'sandwich mounted Hy-fi stalk' which is a bracket attached to a base plate, can be trapped by the seat mounting bolts.

Extra holes can be drilled in the base plate to suit individual circumstances and clamp plate used as necessary for packing or clamping when replacing the tractor seat. Base plates are available for left hand or right hand working positions.

The sandwich mounted Hy-Fi stalk is suitable for flailing, sawhead work and ditching.



Hose extension sets will probably be required for use with this assembly as valve chest is positioned forward of tractor control quadrant.

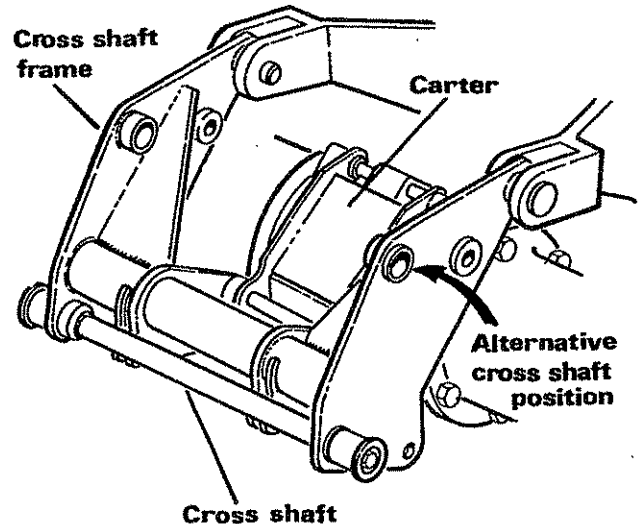
'Q' type cabs.

Introduction of 'quiet' cabs has created additional problems for operation of the Power Arm 44 from within the cab. In some cases routing of the hoses to the Hy-fi can be accomplished by simply opening the rear window. In others it may be necessary to route hoses through the access hole used for the linkage levelling box. For forward control ie., when operating a hedgetrimmer, it may be necessary to install a hose extension kit before a comfortable operator position can be found.

Machines manufactured after the 21st March 1977 will be equipped with all hoses lengthened by 12".

Tractor fittings

Two new ranges of tractor fittings on which the PA.44 can be mounted are being introduced. These replace the earlier type fittings which in many instances are attached to axle brackets which utilize the mudwing or safety cab mounting bolts. A typical Series 40 fitting layout is illustrated showing the assembly of the Cross shaft, Carter and Cross shaft frame. Detailed fitting sheets are supplied with individual sets of fittings.



The higher cross shaft position should be selected for hedging and loading, while the lower position should be used for digger operations.

Series 40

These fittings provide a horizontal cross shaft rigidly mounted across the rear of the tractor in two alternative positions. As far as possible the lower position is a standard height of 30" to 34" above ground level; the higher position gives the maximum possible increment of height for each range of tractor models.

The two ends of the crossbar in conjunction with the standard tractor draft links, provide a rigid 4 point mounting base for the Power Arm 44.

Series 45

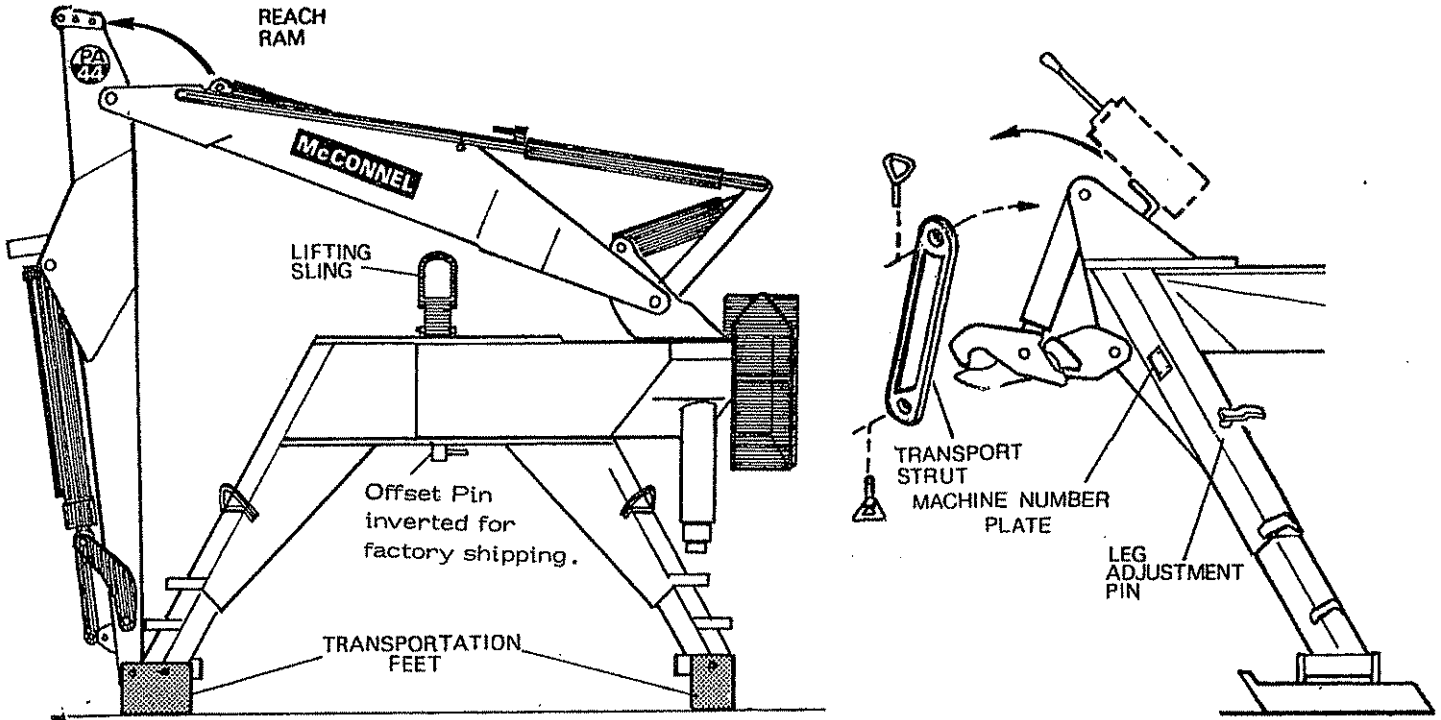
These fittings combine the cross shaft and also 'bolt on' facilities to allow different classes of implement to be used. They are produced to fit tractors of 50 H.P. or more. Series 45 fittings are used where an alternative implement such as a fork lift is to be fitted in place of the PA 44. It is most important that no attempt is made to modify or adapt these brackets in any way, making it possible to fit too large or powerful an implement to too small a tractor.

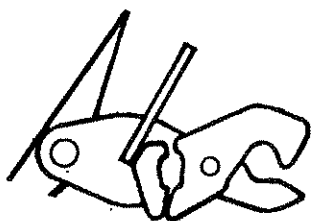
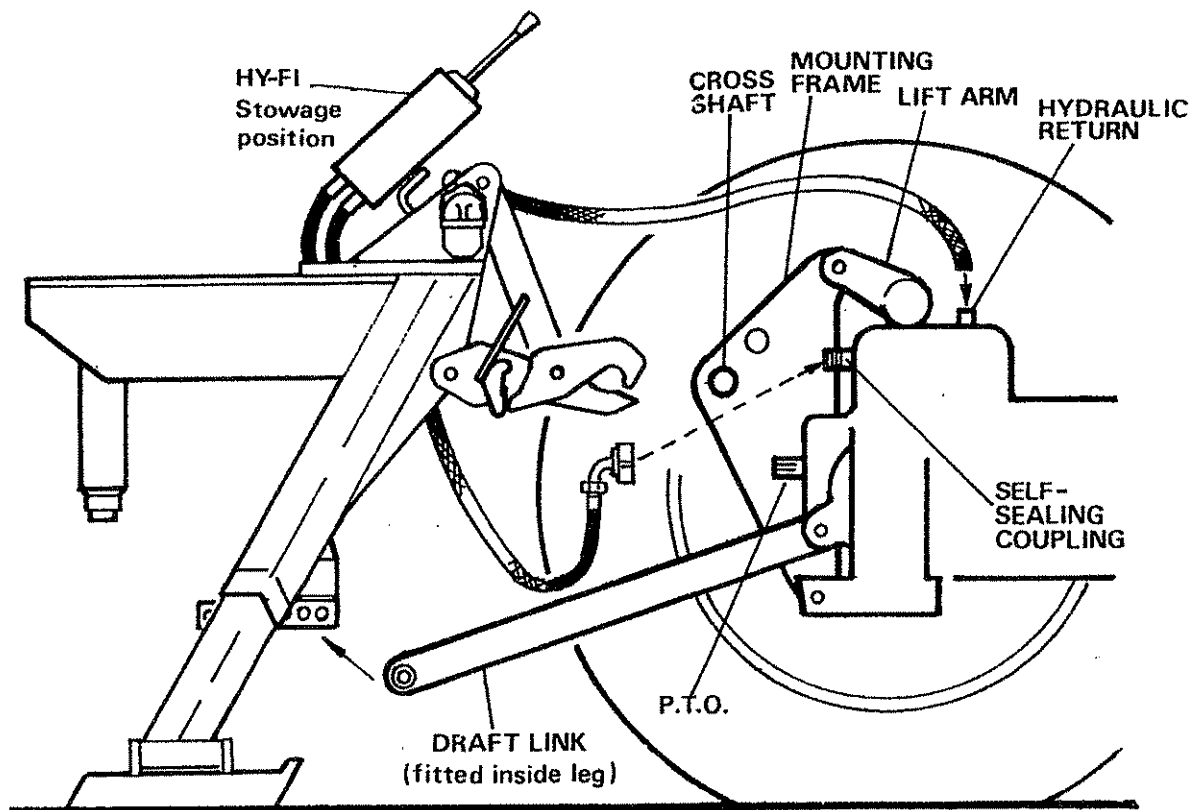
Use of any fitting set means the removal of tractor drop links and locking of the hydraulic lift arms by the cross shaft frame.

For reversion to normal 3 point linkage operation, it should only be necessary to remove the cross shaft frame and reconnect the drop links to the lift arms. Carters, brackets etc., can usually be left in place on the tractor after checking that they do not interfere with the normal operation of the linkage pick-up hitch etc.

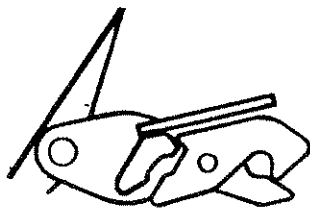
Attachment to tractor.

The Power Arm 44 is delivered from the factory suitably packed so that the minimum amount of work has to be carried out to assemble. The machine legs are retracted to minimum dimensions to reduce freight charges so that in circumstances where the machine is to be installed in the higher cross shaft position on the tractor it should be lowered onto lengths of timber or the leg adjustment lengthened before placing the machine on the ground. The lifting sling and transportation feet are discarded once the machine is installed and the offset pin is reinstated down through the cradle and main body.

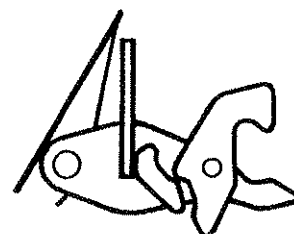




HITCH



LOCK



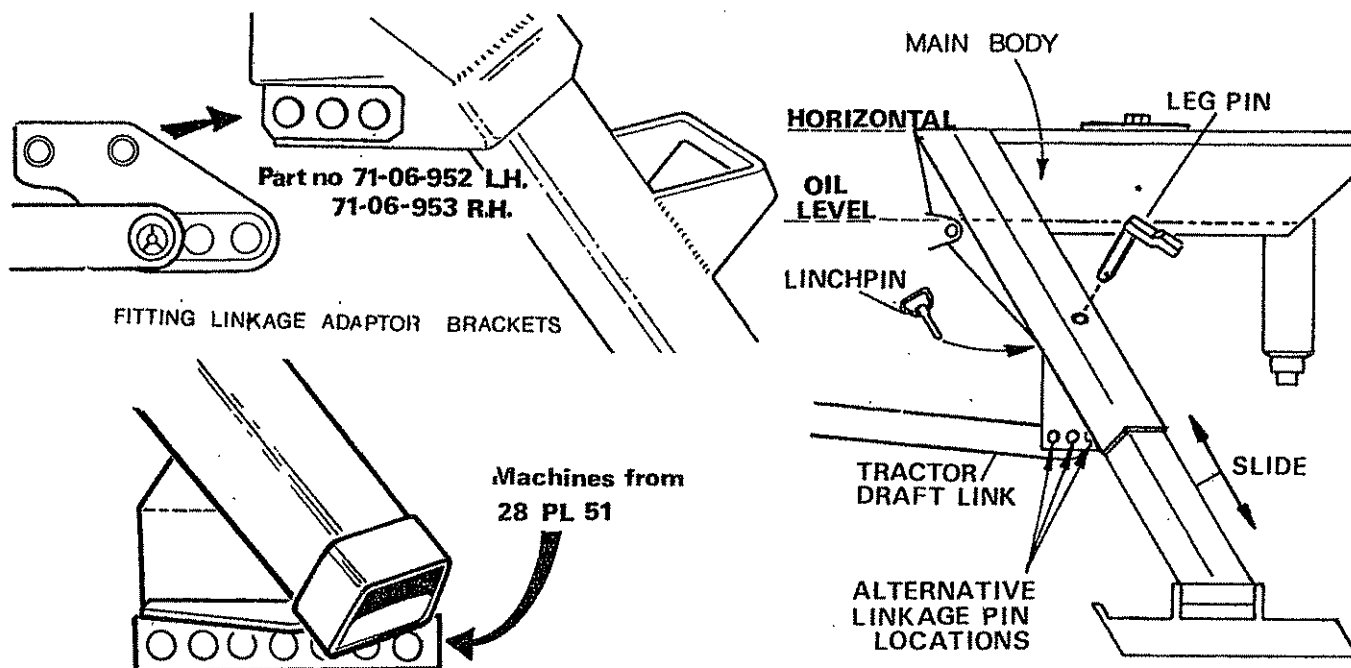
RELEASE

Assembly

- a) Set the locking catch of the lift frame to the HITCH position as shown.
- b) Reverse tractor squarely to the machine until the tractor crossshaft is close to the lift frame.
- c) Remove protective blanks from the return hose and fit to tractor return connection with hose clips.
- d) Connect up the oil supply making sure the self-seal coupling is fully engaged.
- e) Isolate tractor linkage, select oil supply to the machine and allow the oil to circulate for at least 2 minutes to prime the machine before operating any levers.
- f) Operate central control lever of the Hy-fi to obtain alignment with tractor cross shaft and reverse tractor to fully engage latches which should be equally spaced on the shaft.
- g) Snap shut the locking catches as shown.
- h) Attach tractor draft links to the inside of machine legs using Cat. I or Cat. II pins according to model. Use adaptor sleeves for Cat. II Raising or lowering the machine with central control lever will help alignment.
- j) Raise machine to remove packing strips and wire. Engage reach ram rod into upper dipper arm location with greaser on top and assemble the feet to the machine.

Linkage adaptor brackets

For all digging and loader operations it is essential that the main body remains horizontal to effectively lubricate the slewing mechanism. If sufficient adjustment cannot be made with the alternative linkage pin locations in the frame, then linkage adaptor brackets will be required. On some tractors that have extra long draft links, these brackets are essential.



Oil Check

- a) Replenish hydraulic oil to level mark in tractor.
- b) With the main body of machine level, oil level inside should be approximately 1" deep...capacity 5 - 6 pints. This can be easily checked by using the lid holding down bolt as a dipstick.

Removing PA 44 from Tractor

- i) With the machine's feet on firm ground fully extend dipper arm to the rear and lower bucket.
- ii) Disconnect draft links and set locking catch to 'RELEASE' position. (see page 6).
- iii) Drive tractor forward about 18" and apply parking brake.
- iv) Disengage PTO and set tractor quadrant lever to neutral.
- v) Disconnect hydraulic supply and return hoses at the tractor and protect the ends.
- vi) Refit Hy-fi to machine stowage point.
- vii) Remove PTO pump if fitted and replace tractor PTO spline guard.

OPERATION

Levelling and Stability

When travelling, front ballast is recommended.

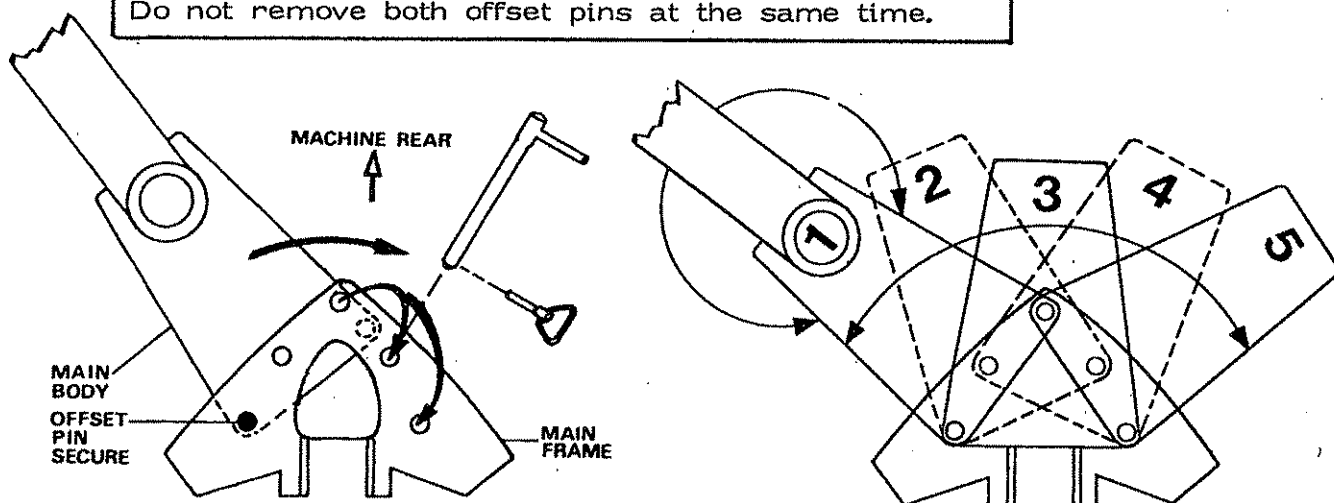
Tractors below 65 HP - 280 pounds ballast)
Tractors above 65 HP - 200 pounds ballast) minimum

- a) When loading or digging, it is important to set the machine's feet for adequate stability with the tractor's weight taken off the back wheels.
- b) Each leg can be individually adjusted for working across sloping ground.
- c) It is important to adjust the legs to maintain the main body in a horizontal position. Apparent loss of power on the slewing circuit is very often due to the main body being used at a sloping angle.
- d) For maximum loading height, select the upper position of the cross shaft frame. It may be necessary to use linkage adaptor brackets (see page 15) to return the main body to a horizontal position.
- e) The upper cross shaft position will give increased clearance at the drawbar when using the machine in conjunction with a trailer or power driven implement. To avoid damage to trailer headboard, drawbar or PTO shaft the limitations of movement should be checked before moving off. Further clearance of the king post to the PTO shaft can be made by using the machine in offset position.
- f) When digging in hard ground, the feet can be turned through 90° and repinned to the legs to increase ground adhesion.

Offset of Main Body

WARNING

Rest bucket or grab on ground before adjusting offset.
Do not remove both offset pins at the same time.



Method

- i) Position bucket on ground in line with main body.
- ii) Adjust lift ram to take weight off the offset pins.
- iii) Remove ONE or OTHER of the pins and operate slew lever to the left or right as required and refit pin.

Note:

It is not possible to offset through full arc in one movement.

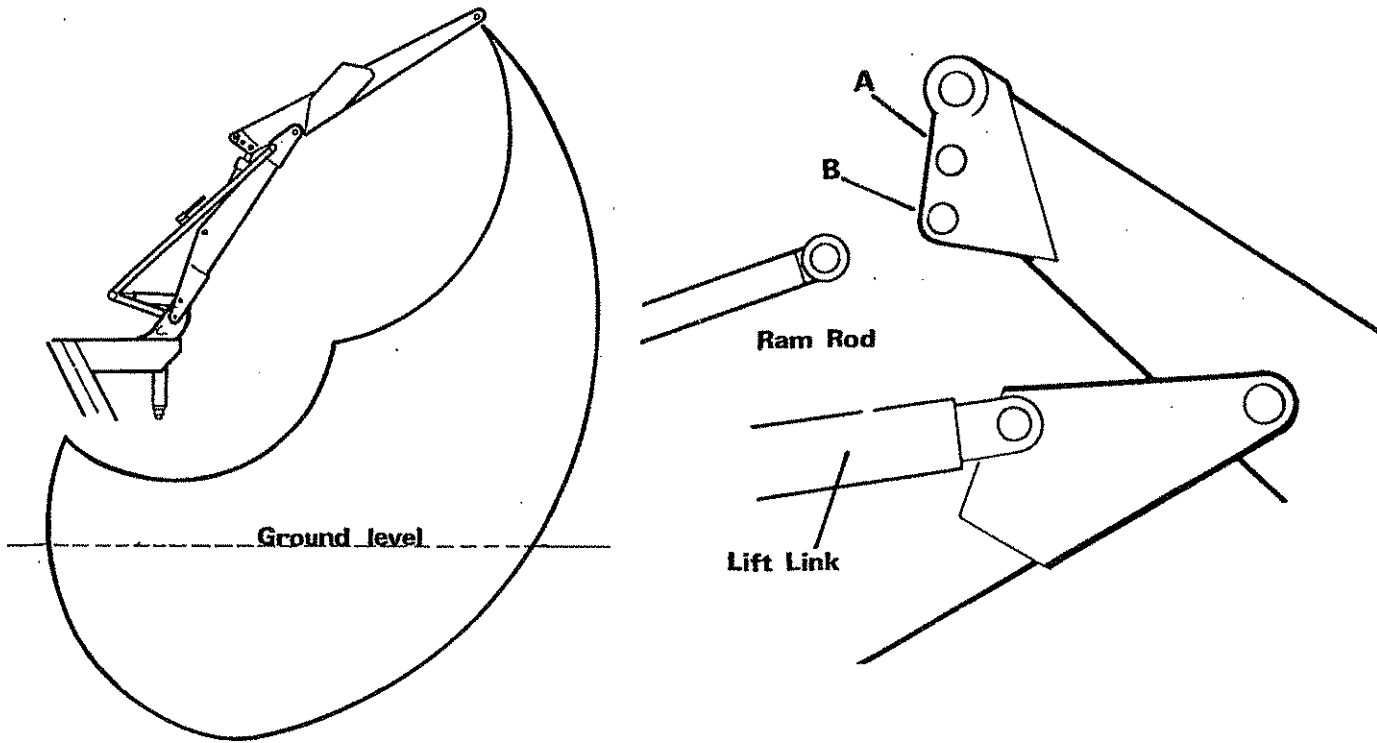
Duo-geometry arm

Two different operating actions can be carried out using the same arm.

a) Digger action

Used for all operations requiring buckets, scarifiers etc, and for face shovel work. Two positions on the upper drop arm are provided for the reach ram rod.

- i) Position (A) gives greater power and limited movement.
- ii) Position (B) gives less power but greater travel.



DIGGING GEOMETRY

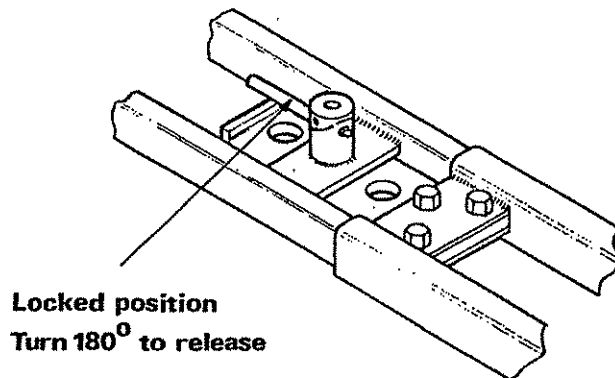
CAUTION: Bucket should be placed on ground before altering pin position or making any adjustments.

Adjustable lift link.

The lift link can be adjusted to three positions to gain maximum depth or discharge height of bucket.

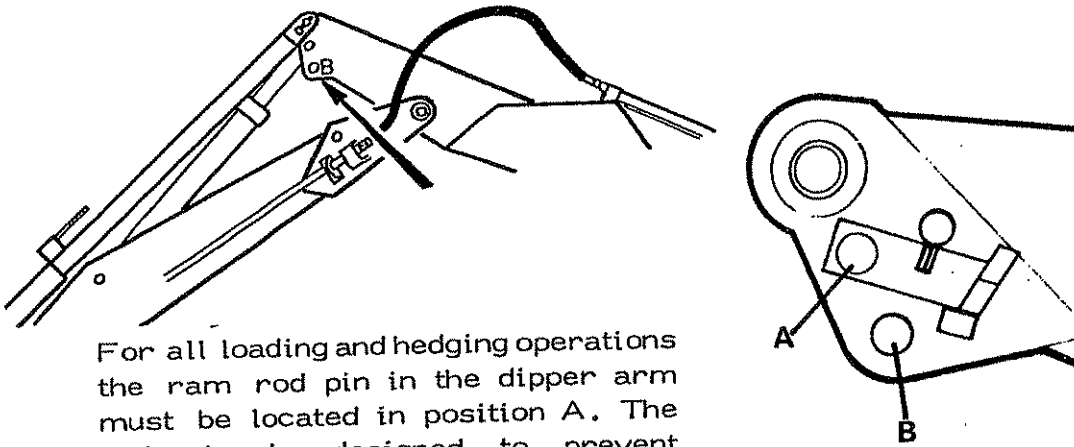
The locking plunger is spring loaded and must be turned 180° to release—slight movement of the lift ram can make this operation easier.

The machine may also be used with the lift link unlocked which will give a 'floating' action to the lift ram for easier grading of trench.



b. Loader Action

This geometry is used for all types of grab loading and also for flail. The parallel action of the linkage allows approximately 90 degrees to be maintained beneath the armhead whether the arm is in retracted or fully extended.



For all loading and hedging operations the ram rod pin in the dipper arm must be located in position A. The rod pin is designed to prevent position B being used as its tail obstructs the lift link pin. Earlier machines had a plunger operated metal flap that prevented position B from being used.

Height Adjustment

As well as adjustment on the sliding legs the depth as well as the angle is altered by the three positions in the frame of the lift link.

WARNING

Do not attempt to operate loader with lift link in 'float' position.

Adjustment is made by placing the grab on the ground, releasing the plunger by turning through 180° to the 'float' position and operating the lift link. Rotate lever back to lock position and again operate lift ram. The loaded plunger is re-engaged.

Inverted dipper arm

A further increase in loader height of approximately 18" can be achieved by inverting the lower half of the dipper arm. The knuckle assembly must be removed before carrying out this conversion. Some capacity loss must be expected.

Extra long drop arm

Use of the extra long drop arm can increase the loader reach. Some decrease in lift capacity must be expected. An extension kit 73 12 298 is required when making this conversion.

Conversion from Digger to Loader

The armhead geometry can be converted by using a hammer and punch only.

Method

- i) With the bucket placed on the ground drive the retaining roll pin far enough through its lug to release the head of the ram rod pin.
- ii) Reposition ram rod to position A and refit pin so that roll pin can secure it.
- iii) Release the locking plunger on the lift link and refer to Diagram B for removal of lift link pivot pin.
- iv) Reposition lift link to the top of dipper arm and refit pin.
- v) Re-engage lift lock plunger.

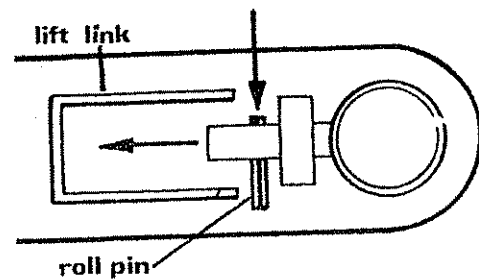
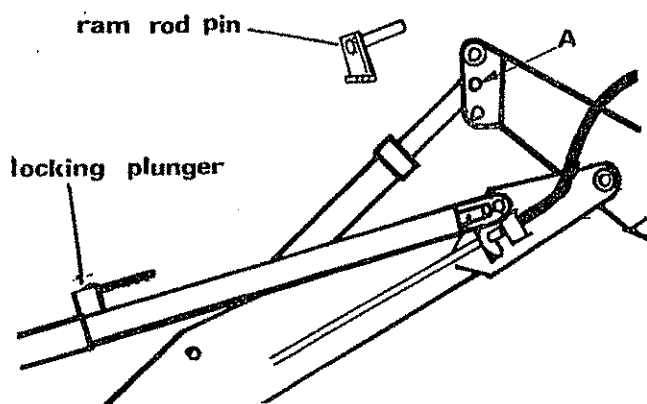
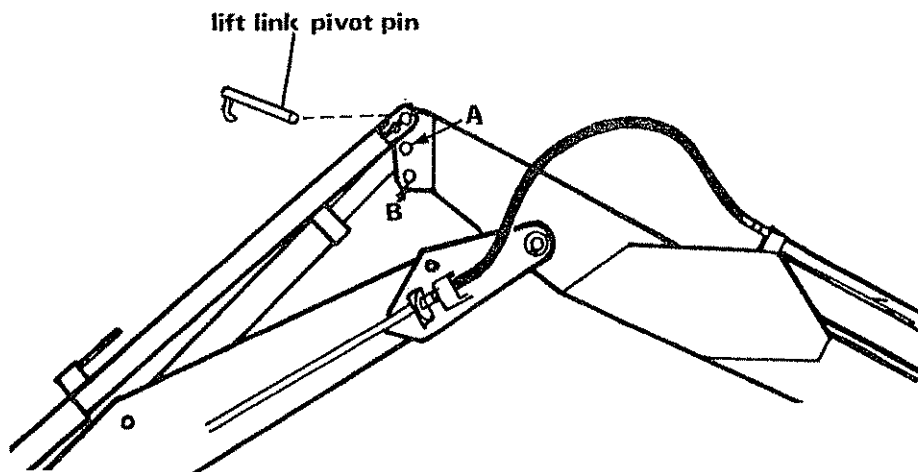


Diagram B

DIGGER



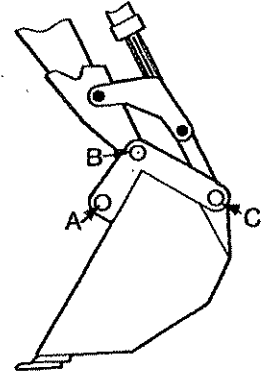
LOADER

Buckets

The pick tine and all buckets except ejector buckets use the same two pivot pins to attach to the dipper arm and slave link. To fit, place bucket on ground facing in required direction, lower dipper arm end into position between pivot plates and fit bucket pivot pin. Lift bucket clear of ground, adjust stroke of bucket ram, and fit slave link pivot pin. Ensure that the tails of both pins are properly located between the spring dowel boss and stop pegs to prevent rotation relative to bucket, and drive the spring dowel over the tail to lock pin in position. Buckets may be used in the following positions:-

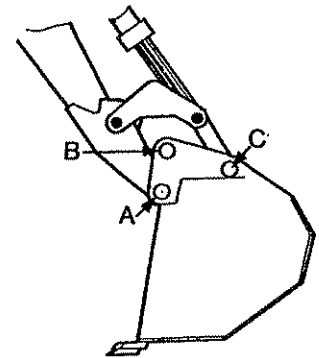
a) Ditching Buckets (1.5 m., 1 m., & 800 mm)

Use	Dipper Arm Pivot
Backhoe Action	A
Square hole action	B
Face Shovel (reversed)	C



b) Excavating Buckets (600 mm & 400 mm)

Use	Dipper Arm Pivot
Normal digging	A
Square hole action	B

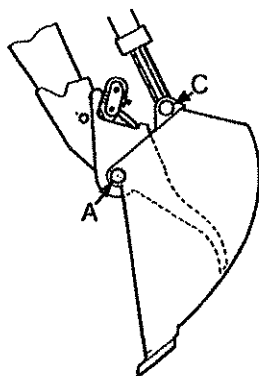


It is not possible to reverse these buckets for use as face shovel.

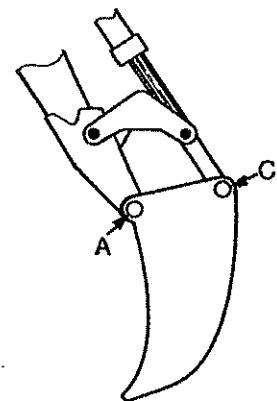
Note: Some loss of power must be expected when the bucket is used in the square hole geometry.

c) Trenching Buckets

Remove slave link and radius arm and fit ejector latch as shown if required. Fit dipper arm at "A" and bucket ram rod end at "C" using special pins supplied with bucket.



d) Pick Tine



Grabs

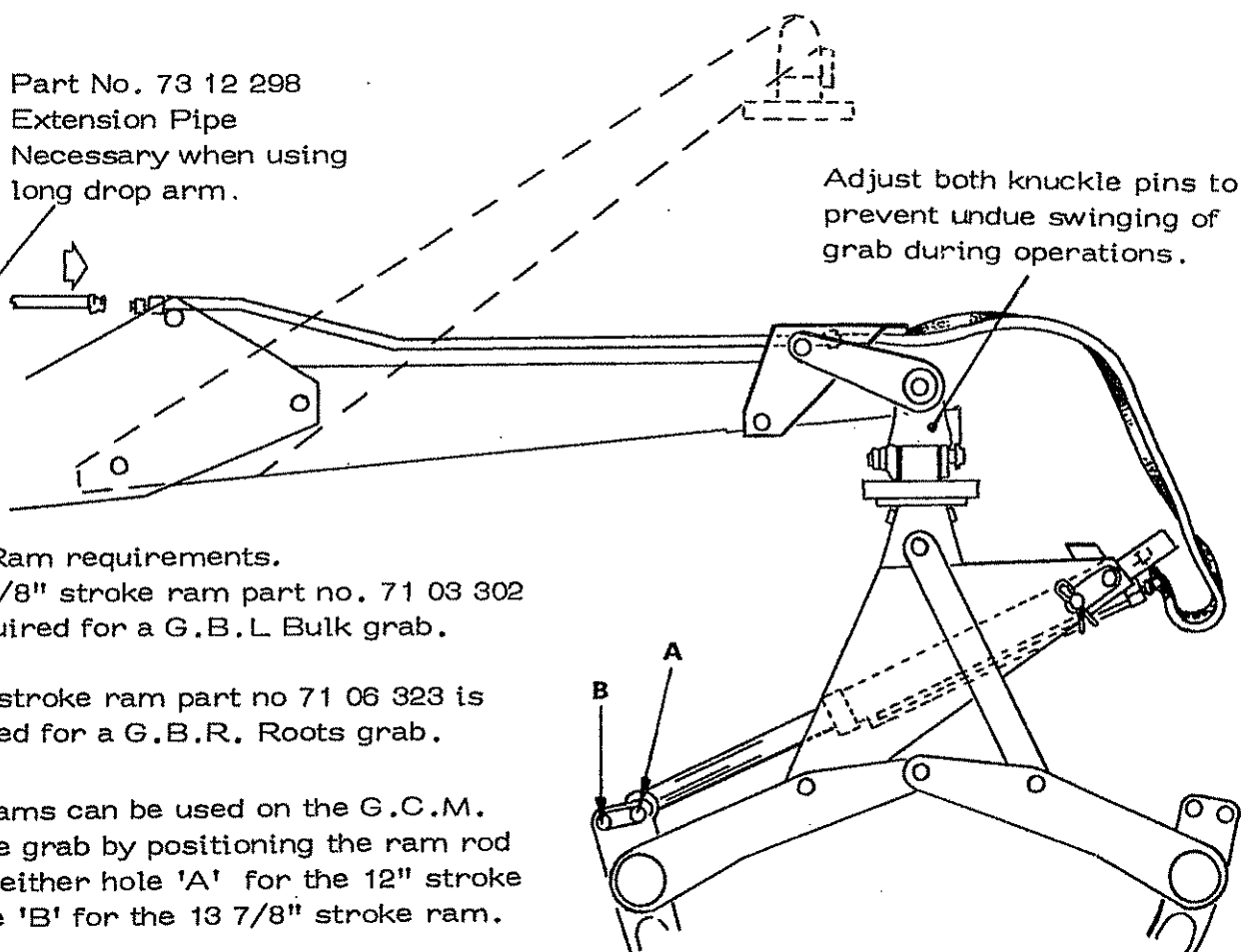
Two ranges of grab are currently available for use with the Power Arm 44.

a) 2¼" bore inclined ram operated.

This grab is attached to the lower dipper arm by the K44 swivel assembly which is pinned through the bucket pivot point. The arc of rotation of the grab is restricted so that hoses are not damaged by twisting.

Fitting Instructions Inclined Ram

- i) Fit the knuckle/damper assembly to grab.
- ii) Position dipper arm above knuckle.
- iii) Stop tractor engine to minimise oil loss then fit rigid pipes using bucket pivot pin and connect up hoses.
- iv) Lower dipper arm into knuckle and fit pivot pin ensuring peg on torque arm secures pipe bracket to dipper arm lugs.
- v) Check arc of rotation to see that base end of ram cannot get under the dipper arm.
- vi) Check full range of machine movement for adequate clearance around tractor cab.



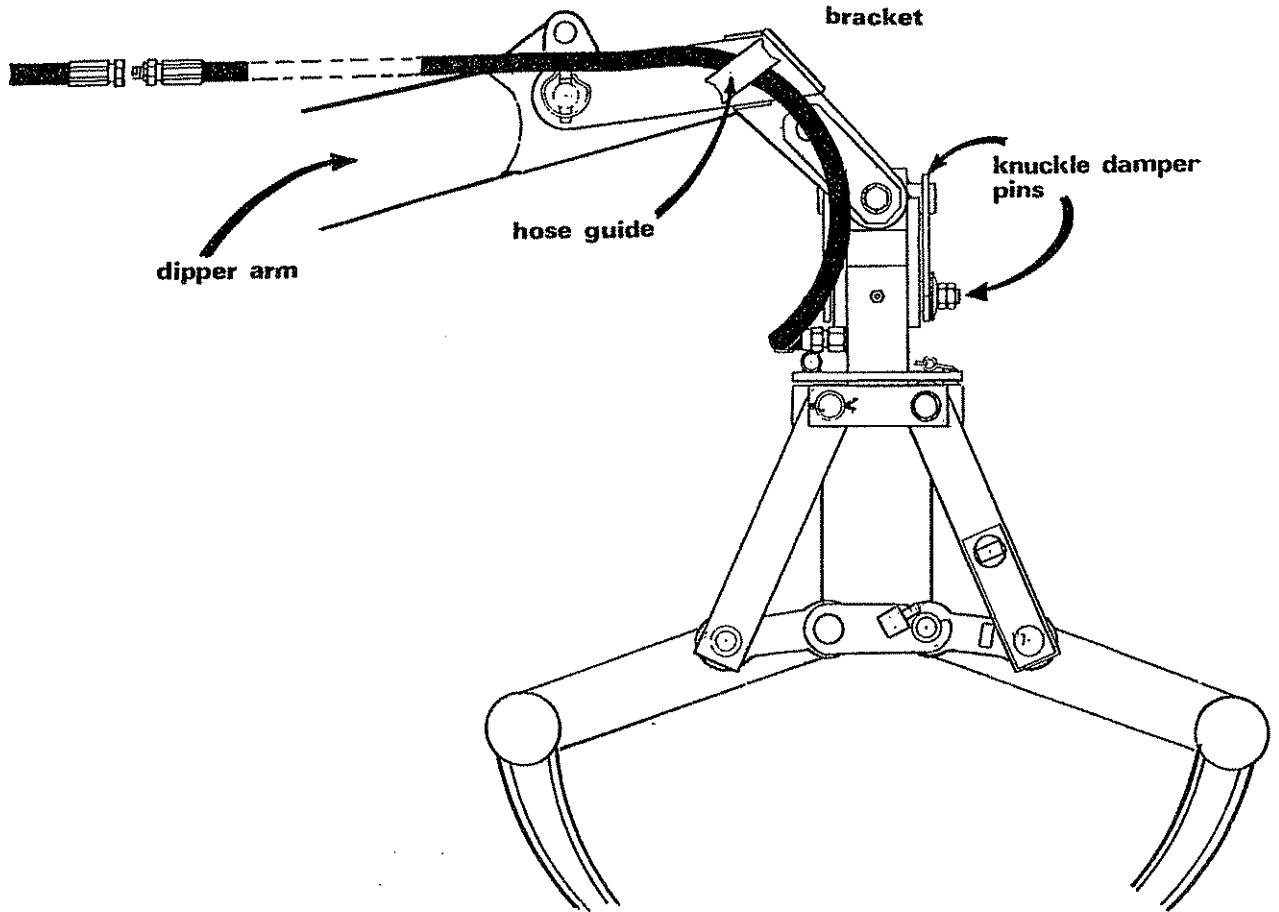
A white painted base end identifies the 12" stroke ram.

A collar Part No 72 14 048 is available which converts ram 71 03 302 to ram 71 06 323.

The ram must be dismantled and the collar inserted over the ram rod between the ram piston and the gland housing.

b) 4" bore vertical ram operated

Oil supplying this ram passes through the hollow centre of the ram rod which enables the hoses to remain stationary if the grab is rotated. The hoses are thus afforded more protection against accidental damage, and no restriction is put on the arc of rotation.



Fitting Instructions

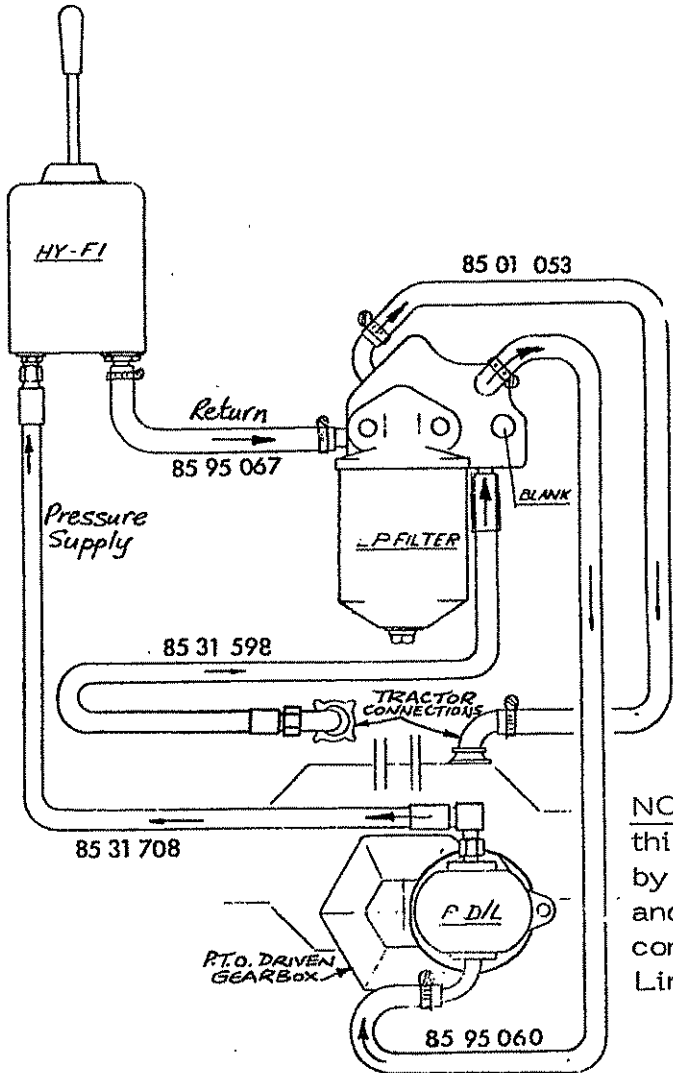
- i) The nose of the dipper arm sockets into the bracket which is then held in position by a pin through the arm.
- ii) Stop tractor engine to minimise oil loss and connect up the grab ram hoses to the bucket ram hoses, ensuring that they are routed through the hose guide on the bracket.
- iii) Start tractor, raise grab and check its action through full range of movement.
- iv) Adjust knuckle damper pins by releasing the locknuts and tighten the inner nuts sufficiently to stop undue swinging of the grab during operation. Retighten locknuts.

GRAB STOWAGE

When the machine is continually being used over rough ground, long distances and public highways it is recommended that the grab is supported to reduce wear. A simple form of cradle or support can be fitted to the side or over the tractor engine. Because of the great variety of tractors it is not possible for F. W. McConnel Limited to supply such a support which can be fabricated by your local blacksmith or dealer.

OPTIONAL EXTRA

Where the tractors hydraulic supply is incapable of maintaining 2500 psi the range of armhead movement will be reduced increasingly as pressure falls. Where this loss of power is unacceptable or when maximum height and reach are necessary for the work a PTO driven pump and gearbox is available.



PDL system

Machine powered by PTO driven pump
Used where tractor hydraulic requirement is insufficient.
Digger and Loader applications.
Linkage isolation not essential.

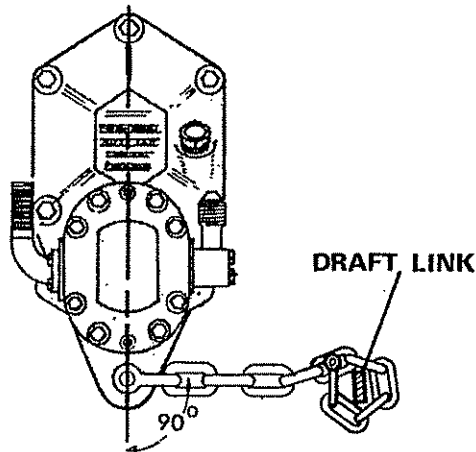
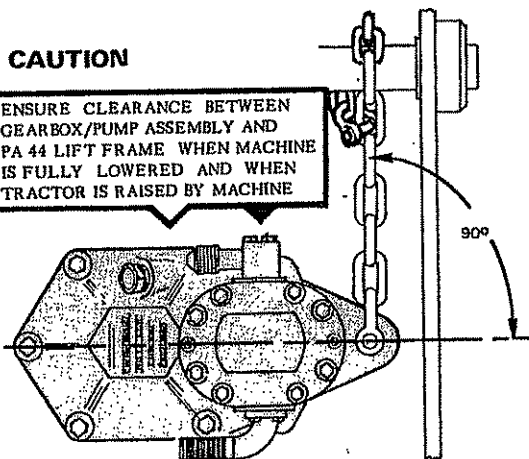
Caution.

Do not use a 'closed centre' diverter or control valve without a return feed to L.P. filter in neutral position.

NOTE In the event of PTO pump failure this circuit can be converted to CIRCUIT I (page 3) by fitting 2 additional blanks on manifold and switching hose No. 85 31 598 to the Hy-Fi control valve.
Linkage isolation would then be required.

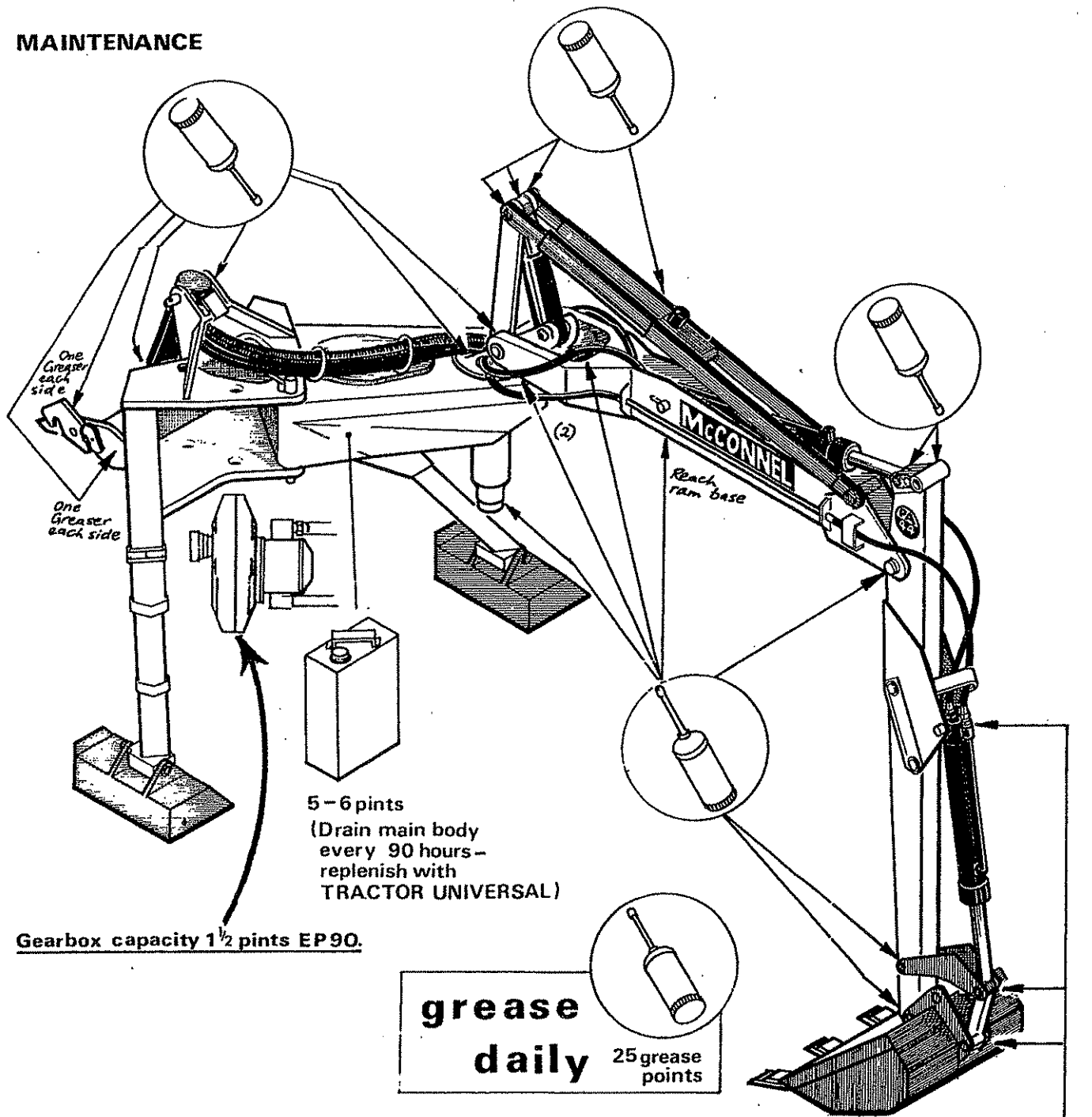
CAUTION

ENSURE CLEARANCE BETWEEN GEARBOX/PUMP ASSEMBLY AND PA 44 LIFT FRAME WHEN MACHINE IS FULLY LOWERED AND WHEN TRACTOR IS RAISED BY MACHINE



Great care must be taken to ensure that after installing the pump clearance exists between the gearbox/pump and the lift frame when the machine is fully lowered. Adjustment of torque chain length can sometimes give additional clearance.
Two positions for pump mounting are shown. In the vertical position the torque chain is wrapped around the draft link and secured.

MAINTENANCE



MAINTENANCE

Pivot Pins and Bushes

Inspect all pivot pins and bushes periodically for signs of wear, and replace as necessary. Fit the correct spares. Use of wrong or incorrectly locked pins will cause rapid wear of the supported and more expensive parts.

Cleaning

The top of the main body and around the lid should be kept clear of dirt and rubbish to allow water to drain off.

Do not direct a pressure hose around the lid, as water and grit will be forced past the 'O' ring seals into the main body and cause rapid wear in the slewing mechanism.

SERVICING OF MAIN BODY

Before any dismantling takes place, it is important to ascertain what the problem is. Note that failure to hold a selected slew position may be due to a control valve fault. This possibility should be eliminated first.

Three possible faults can occur within the main body.

Hydraulic Leakage

Early warning of this fault is a frequent need to top up the tractor transmission housing with oil. The slew will also fail to hold a selected position. Check by removing the long centre bolt holding down the lid, and use as a dipstick on an engine. The normal oil level should be about 1". If the level is appreciably greater than this then either of the slew rams or the slew ram hoses inside the body are leaking. Where considerable leakage has taken place the main body can fill with oil and overflow through the slewing head.

To identify which ram or hose is leaking, fully extend machine with bucket just clear of ground and stop engine. Manually attempt to push bucket round in a semicircle. If movement occurs under steady pressure, then either the ram or hose is leaking on the side from which the bucket is being pushed. Carry out this test in both directions. Partially raising the lid will enable leaks at hose connections under the lid to be seen.

Leakage from base end hose connection cannot be determined without removal of ram as follows:-

1. Offset main body in cradle to improve access, lower bucket to ground and stop engine.
2. Disconnect hoses under side of lid.
3. With suitable pry-bar collapse ram to discharge oil and slacken chain.
4. Remove split pin and disconnect chain joining link.
5. With large screwdriver or pry-bar prise the roller frame away from the ram rod. Note that it plugs into the end of the ram rod and is held in place by an internal spring circlip.
6. Lift out roller frame and after removal of retaining spring clip the ram complete with hose can be lifted out.

Refitting of ram is reversal of above procedure but care should be taken that the spring circlip on the roller frame shaft is correctly located in its groove when levering back into position.

Servicing Slew Ram

- (i) Close down ram to discharge any oil in cylinder and note that although only a single acting ram the gland end also is filled with oil which is discharged to lubricate the chains.
- (ii) Hold ram firmly in soft jawed vice (do not overtighten)..
- (iii) Grip and rotate head bush to expose tail end of locking wire in slot.
- (iv) Raise wire slightly and again rotate the head bush in the opposite direction to wind out the locking wire from the recess. The head bush can now be withdrawn from the cylinder. Do not lose the ½" steel ball bearing that acts as a check valve in the suction pipe.
- (v) Examine 'O' ring and wiper seal - if any sign of damage - replace.
- (vi) Withdraw piston assembly. The seal can be levered off with small screwdriver. Renew seal and nylon ring using a smear of grease to facilitate assembly

- (vii) Examine interior of cylinder for scoring – remove any sharp burrs before re-assembly.
- (viii) In the unlikely event that the slew cushion device requires attention it can be removed after taking out the Spirolux ring. Later slew cushion valves should be service exchanged if found faulty.

Re-assembly

When fitting slew hose to ram base ensure the 90° end is aligned to the underside connection of lid, before tightening up.

WARNING

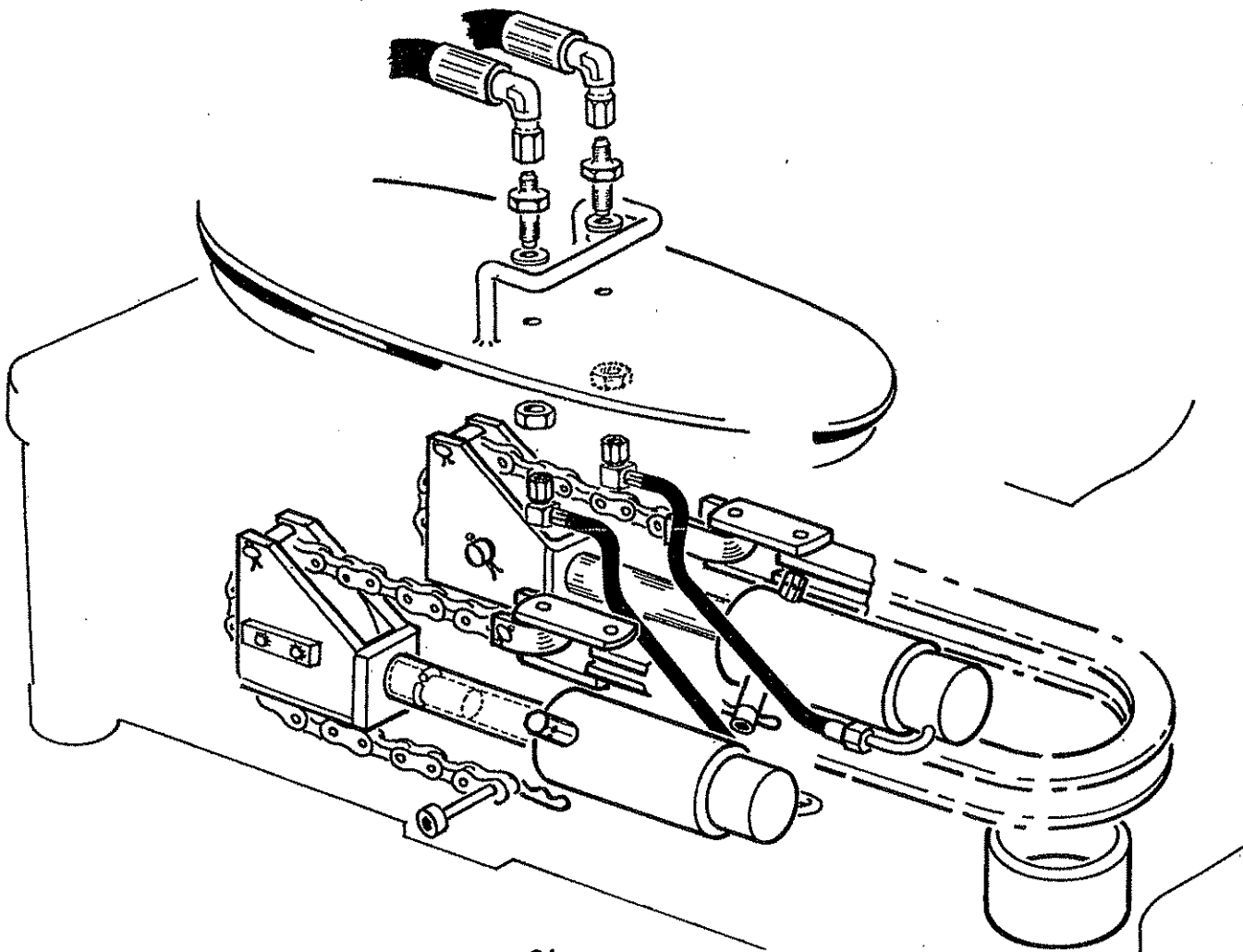
After carrying out any work on the main body which has involved discharging oil from the slew rams, the rams should be re-pressurised with the bucket firmly on the ground.

Chain Failure

It is not necessary to remove rams when taking out the triple chains, 3" pitch chain, or the king post.

To remove triple chain proceed as follows:

- (i) Offset main body to improve access.
- (ii) Extend arm, lower bucket to ground and stop engine.
- (iii) Disconnect slew hose on underside of lid and collapse ram with pry-bar.
- (iv) Remove chain connecting link and withdraw spring clip that retains chain anchor pin at bottom of main body.
- (v) Remove allen plug from outside of casing and drift out anchor pin; chain can now be unthreaded from roller frame and lifted clear.



To remove 3" pitch chain

- (i) Carry out operations (i) to (iv) as for triple chain.
- (ii) Remove reach link.
- (iii) Label and disconnect hose ends at the bucket, reach and lift rams. Cap ends to prevent entry of dirt.
- (iv) Remove lift ram.
- (v) Support main arm and after removing spring dowels, drive out pivot pin; lift off rocker arm and lower main arm to ground.
- (vi) Rotate king post to wind chain off the sprocket inside the slew casing.

Replacing 3" pitch chain

It is important that the chain is correctly timed to the king post.

- (i) Position king post to face front corner of main body.
- (ii) Fold up chain and offer up one end to the sprocket.
- (iii) Maintaining pressure on the first link until sprocket tooth locates, gently rotate the king post. To avoid accidents, this is best done without assistance
- (iv) Rotate king post full circle to rest in the straight ahead position and check that both ends of the chain are the same length.
- (v) Further reassembly is the reverse of removal.

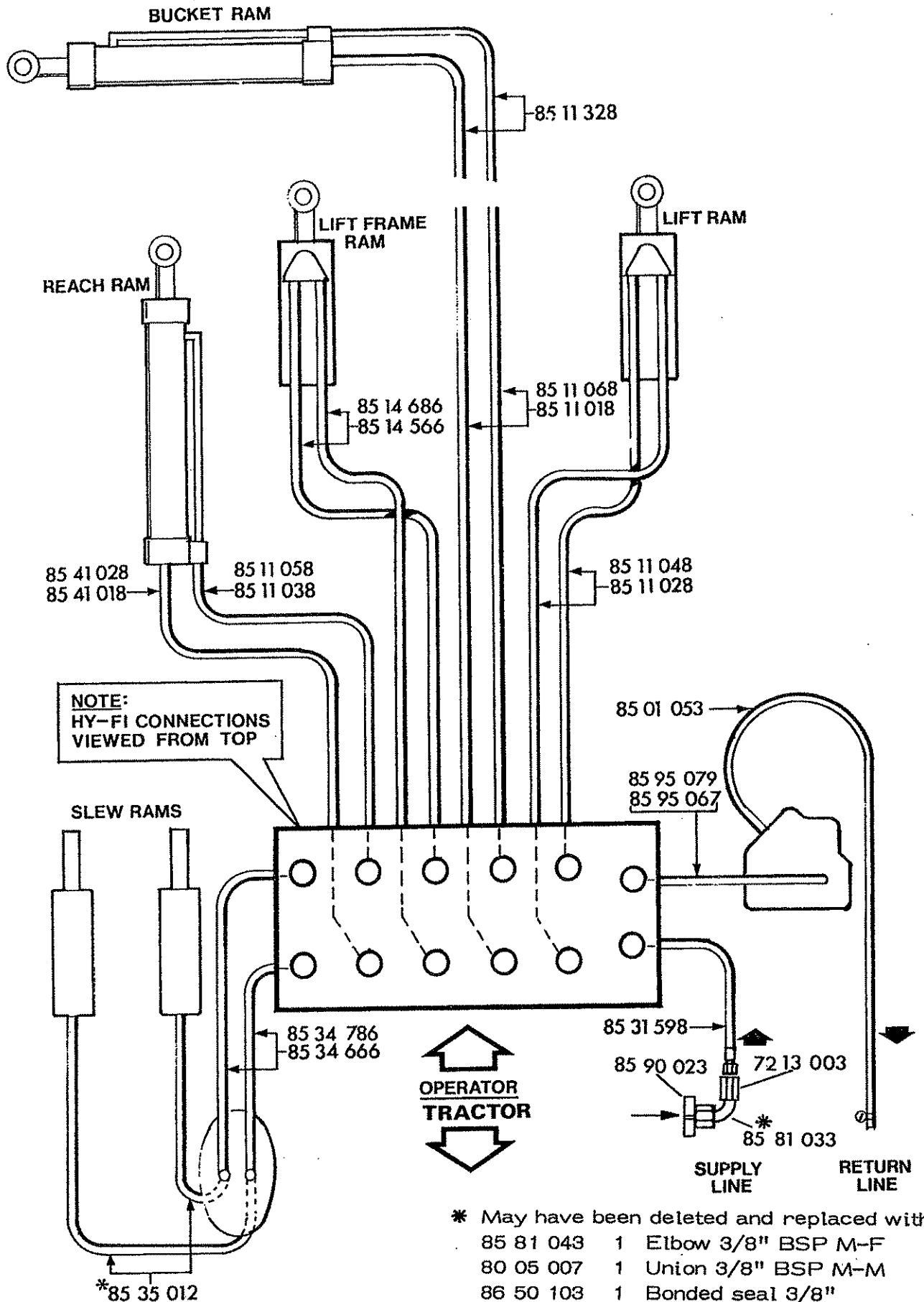
King Post Bush failure

Worn bushes can be difficult to detect as the chain can keep the king post tight against the side of a badly worn bush. Maximum tolerance allowed should not exceed 3/16" movement between king post and top bush.

To Renew King Post Bushes

- (i) Carry out operations as for removal of 3" pitch chain
- (ii) Remove roll pin and collar at base of king post
- (iii) Place bar through rocker pivot pin holes and with assistance lift king post out of housing
- (iv) Remove top bush by cutting with a carpenters chisel or knife, taking care not to damage the housing
- (v) Offer up new bush and drive into position using a block of hard wood to protect the bush. Leave the bush protruding about 3/16" for the location of a new thrust washer.
- (vi) Removal and replacement of the lower bush is done in a similar manner, except that the bush should be driven in sufficiently beyond the end of the housing to allow the seal to be located in position.
- (vii) Examine king post for roughness and burrs around the bearing surfaces; remove with fine emery cloth.
- (viii) Liberally smear bearing surfaces with grease and lower into position and replace 'O' ring by raising king post up slightly with pry-bar.
- (ix) Refit collar and roll pin at base of column.

DIAGRAMMATIC VIEW OF P.A.44 HYDRAULIC HOSE LAYOUT



Note: Machines after March 1977 use hoses 12" longer which are identified as the upper set of figures in the diagram.

* Note: Previous to machine serial number 05 PL 51 use 85 34 186.

Hoses

The condition of all hoses should be carefully checked during routine service of the machine. Hoses that have been chafed or damaged on their outer casing should be securely wrapped with waterproof adhesive tape to stop the metal braid from rusting. Hoses that have suffered damage to the metal braid should be changed at the earliest opportunity.

Hose replacement

- a) Replace one hose at a time to avoid the risk of wrong connections.
- b) Where the hose is screwed to an additional fitting or union, use a second spanner on the union to avoid breaking both seals.
- c) Do not use jointing compound on the threads.
- d) Avoid twisting the hose. Adjust the hose line to ensure freedom from rubbing or trapping before tightening hose end connections.

Hydraulic Rams

a) Ram seal replacement – general information:

- i) Whenever possible the ram should be removed from the machine and cleaned-off before dismantling on a clean work-bench.
- ii) When using a bench vice do not apply excessive pressure to the ram cylinder – use soft metal jaws when grasping the ram-rod.
- iii) Remove scores and nicks on the ram-rod by using a fine oil stone.
Do not use a file or emery cloth.

b) Angling and Reach Rams

Unscrew gland nut and withdraw the complete rod assembly.
Remove locking wire from groove of ram nut and unscrew nut.
Remove piston, piston seals and gland housing assembly from rod.
Renew all seals including the 'O' ring behind piston.
Lubricate all seals on assembly and do not overtighten ram nut.
The piston seals should be capable of being rotated.
Tighten gland nut securely – if the gland nut has any tendency to become unscrewed, retighten and centre-pop the thread joint.

c) Lift ram

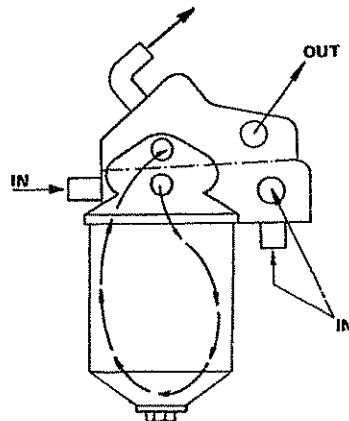
To dismantle, grip the cylinder in a bench vice and rotate the gland retainer to expose the tail of the locking wire. Pry-up with a file tang or similar tool and counter rotate to wind the wire completely out of the groove. The gland retainer together with gland seal housing can now be withdrawn with the rod.
(see exploded parts diagram).

Low Pressure Filter Manifold assembly.

Renew filter element after the first 50 hours use and then after every 250 hours.

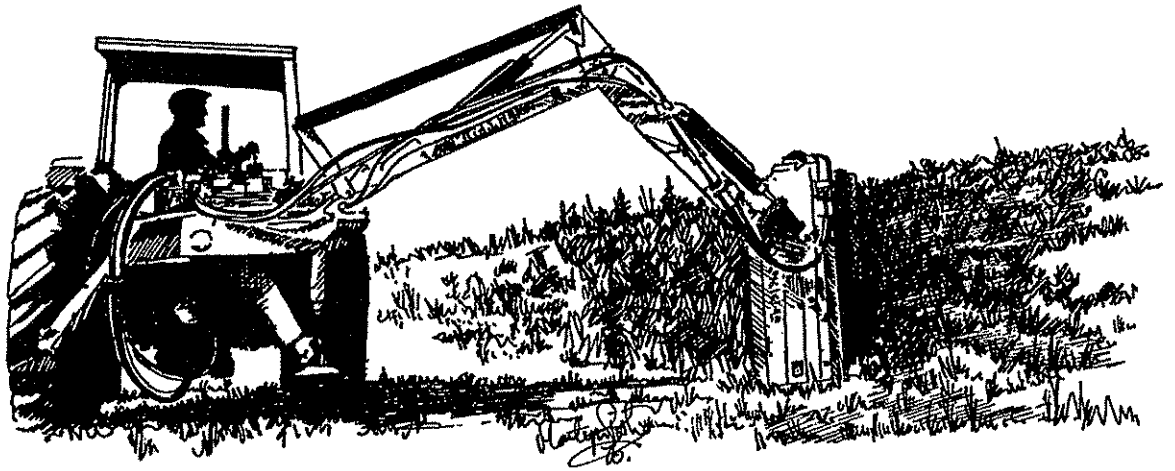
This diagram shows the oil flow to and from the filter manifold.

Filter element part No. 71 03 102.



Book two

Concerning fitting, operation and maintenance of the PA44 when used in conjunction with the metric flail.





SAFETY PRECAUTIONS

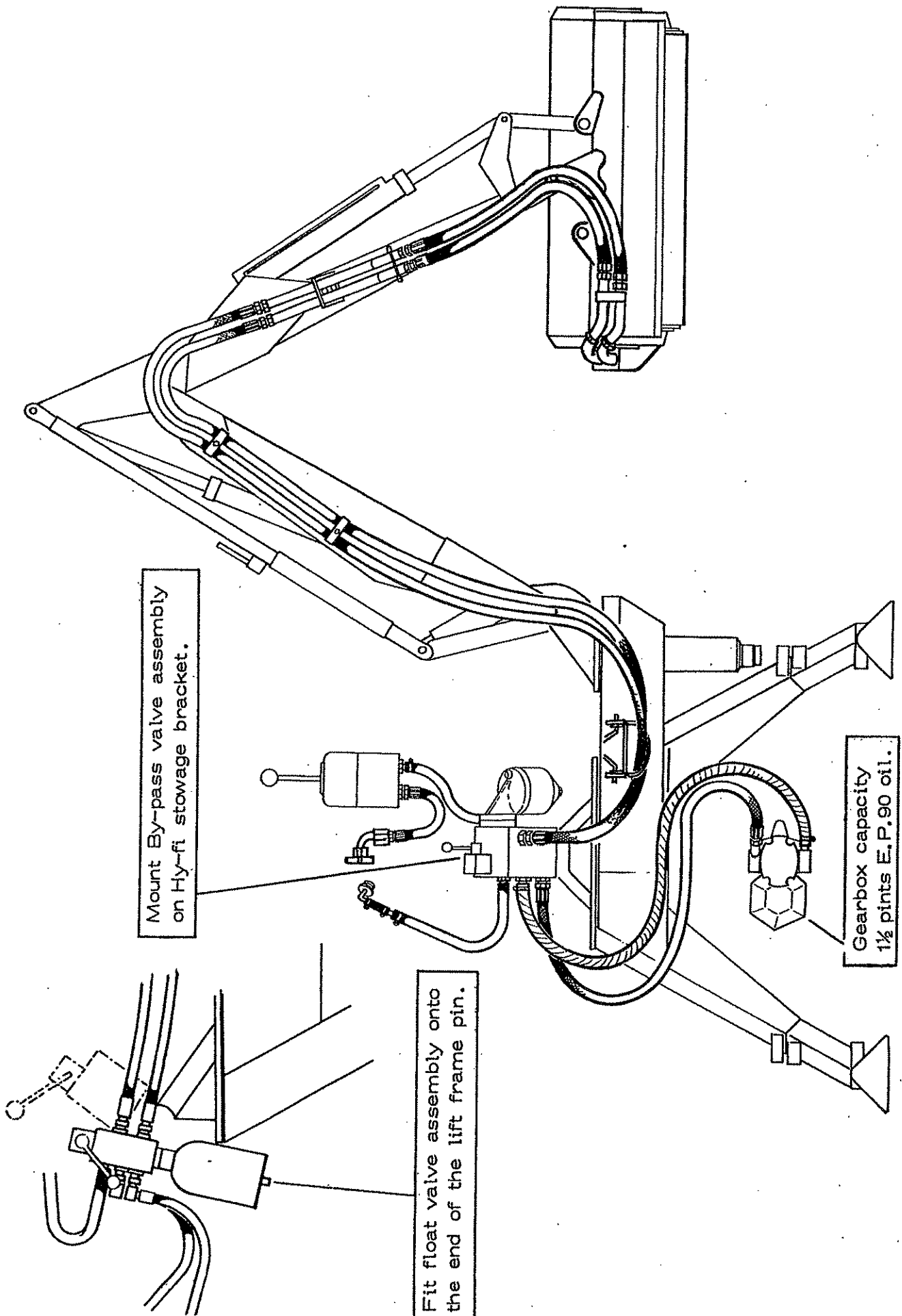
Any machine that is designed to cut must be sharp, therefore it is dangerous if it is operated or handled carelessly.

NEVER

- ...Cut over the far side of a hedge with the flail cutting towards the operator.
- ...Leave the tractor seat with the flail still rotating.
- ...Operate the flail without the correct hood properly fitted in position.
- ...Exceed 540 RPM on the PTO shaft.
- ...Stop the tractor engine with the PTO engaged.
- ...Attempt to operate the 1.2 metre flail fitted to the extra long dipper arm.
- ...Never operate machine without a safety guard.

ALWAYS

- ...Before starting work carefully inspect the work area or hedgerow for wire, steel posts, large stones, bottles and other dangerous materials and remove.
- ...Ensure that bystanders are kept well away from the machine during all flailing operations.
- ...Check frequently nuts and bolts for tightness and also check roll pins, shackles and flails for security.
- ...Replace missing or damaged flails as soon as possible to avoid vibration and damaging machine.



METRIC FLAIL HEAD - General Assembly

FITTING

Refer to pages 3 - 12 for fitting instructions concerning mounting the Hy-Fi, oil supply, varying tractor hydraulic requirements, and tractor fittings.

In addition the following instructions have to be carried out.

FITTING OPERATOR GUARD

Each PA44 is supplied with an operator guard kit part number 73 13 324 which must be fitted to the tractor before commencing work.

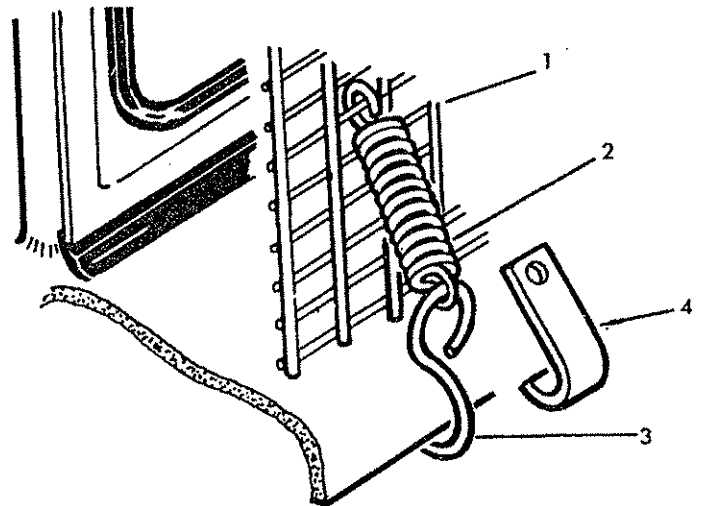
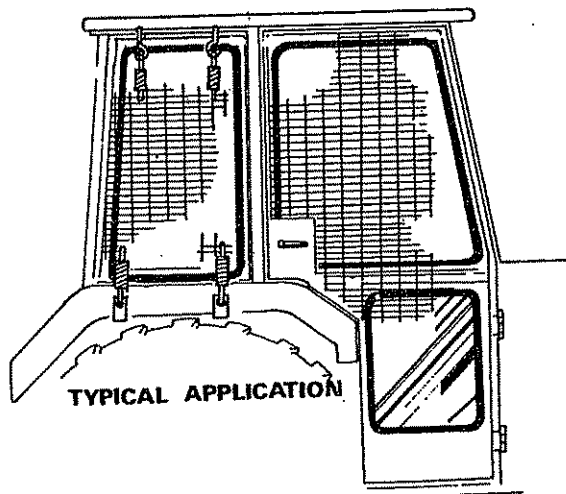
It consists of two areas of wire mesh which are then shaped to suit and secured against the cab window with spring loaded hooks, the upper edge being anchored around the cab gutter and the lower edge around the mudwing.

Owing to the great range of cabs it may be necessary to adapt or make brackets to secure the mesh.

Where the flail is operated on a tractor which is equipped with a safety frame a frame must be made and fixed to the tractor onto which the guard mesh can then be secured.

Owners are reminded that it is illegal to operate a flail without an operator guard.

CAB GUARD



Ref	Part No	Qty	Description
	73 13 324	1	CAB GUARD KIT comprising:-
1	73 13 049	1	.Guard panel large
1	73 13 050	1	.Guard panel small
2	60 01 064	12	.Spring
3	60 01 065	6	.Hook
4	73 13 051	6	.Hook

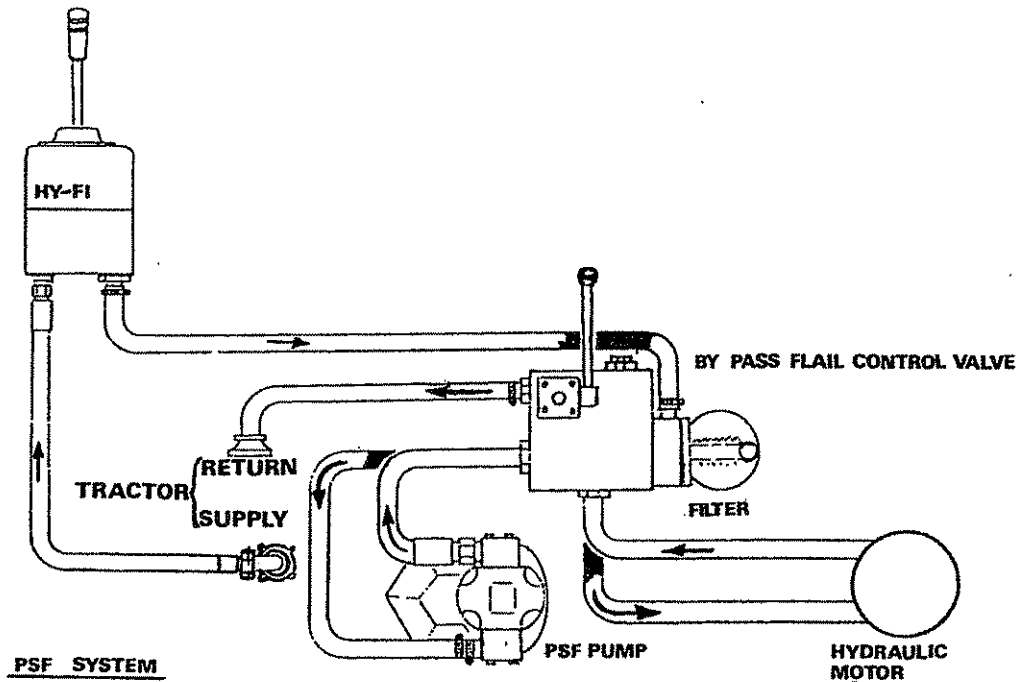
Spares for the previous operator guard kit part number 73 13 320 which was used on safety cabs (not Q cabs) are still available (see page 99).

OPTIONAL EXTRA

Operator guarding consisting of sheets of polycarbonate unbreakable glazing are available. These have to be cut to shape and are secured to the inside of the tractor cab windows using velcro fastening.

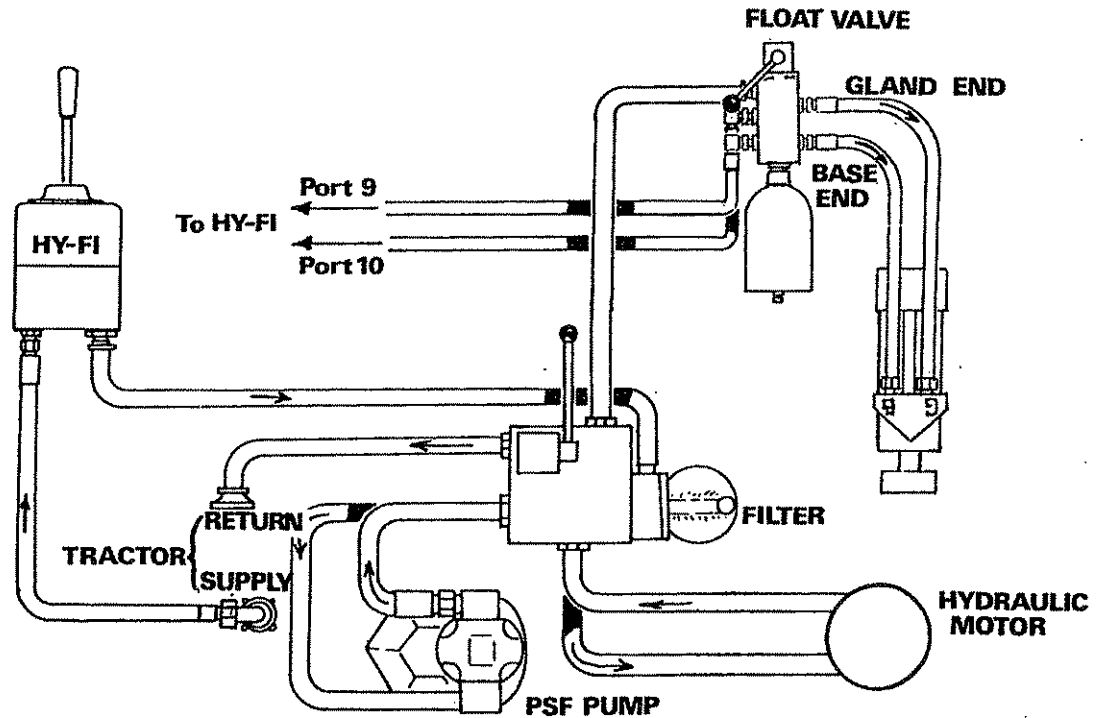
BASIC HYDRAULIC CIRCUITS FOR PA44/FLAIL

Check that the tractor is not listed in the "Tractor hydraulic variation" section on pages 4 - 7 before connecting up the hydraulic circuit.



P.S.F. System Linkage isolation essential.

Used for all hedge cutting work. The machine arms are powered by the tractor's integral pump, and the flail head is driven by the pto operated pump.



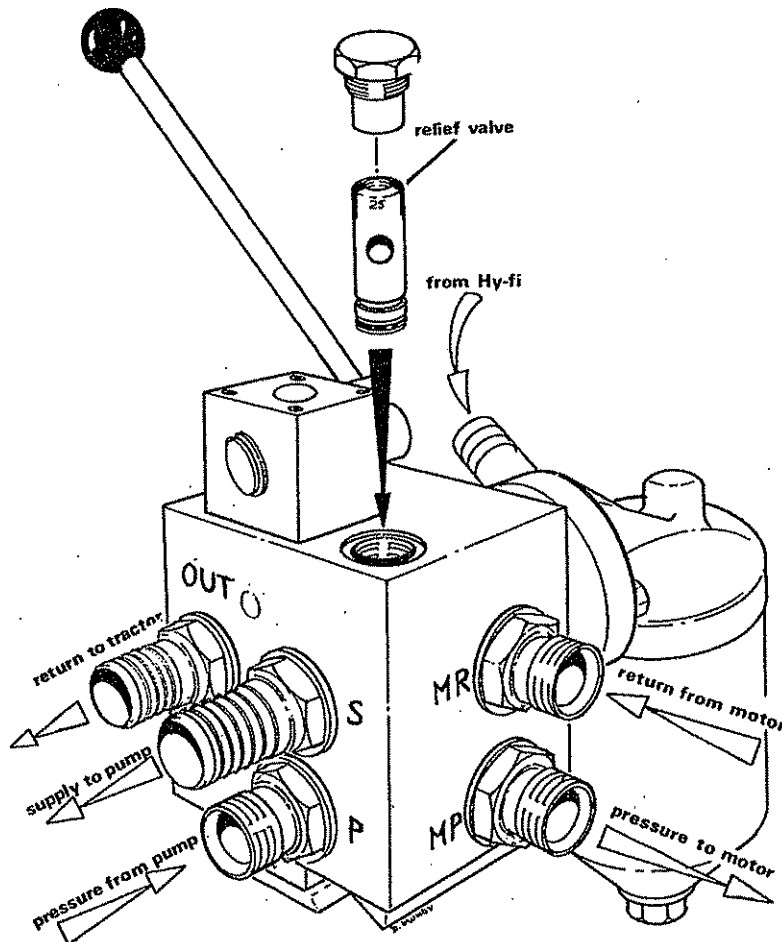
P.S.F. system with 'Float' Linkage isolation essential.

Only used for grass flailing. Avoids the risk of 'weight transfer' when the flail head rides over undulating ground.

Referring to the hydraulic circuit diagram connect up hoses as illustrated. The existing PA44 low pressure filter and manifold assembly are not required and can be removed completely and stored suitably protected in a plastic bag.

Install flail control valve to the stowage bracket on the main frame and connect hoses to and from flail head. Do not twist the hoses when tightening connections and do not tighten hose mounting clamps at this stage.

FLAIL BY-PASS CONTROL VALVE



Conversion of Digger Circuit Operating off Tractor Hydraulics
(i.e. Basic system without the PTO pump)

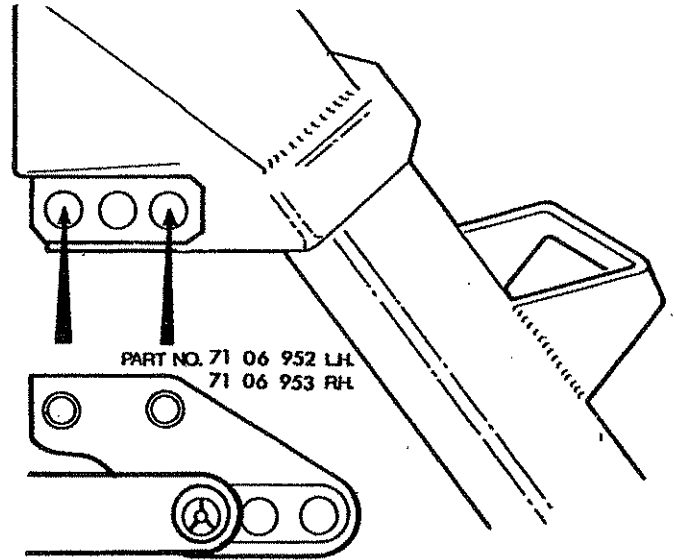
- (a) Disconnect the Hy-fi return hose at the filter manifold block and reconnect to the by-pass valve filter block.
- (b) Connect up the return hose from the by-pass valve into the tractor return connection.

Conversion of Digger Circuit (PDL) for Flail Operation

- (a) Remove PDL pump assembly complete with pressure hose, suction hose and low pressure filter and manifold assembly.
- (b) Fit the PSF pump assembly and install the by-pass control valve assembly onto the Hy-fi storage point on the main frame.
- (c) Connect tractor pressure supply hose to Hy-fi inlet connection.
- (d) Connect Hy-fi return hose to connection on by-pass valve filter block.

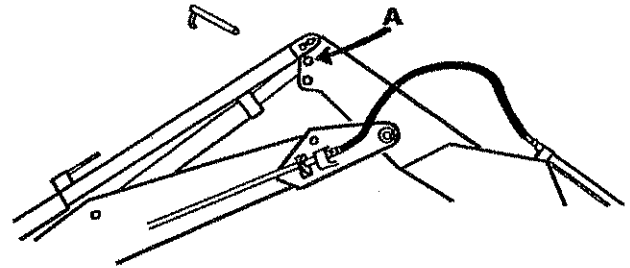
Where there is an alternative cross shaft location on the Power Arm 44 tractor mounting plates, select the higher position.

Unlike digger and loader operations when the feet are resting on the ground, for flail or sawhead work the machine is carried in a raised position. On some tractors this can result in the main body being at an angle and not parallel to the ground making it difficult to obtain the correct flail pitch adjustment. (Under these conditions it is necessary to fit linkage adaptor brackets as shown in diagram, Part nos. 71.06.952 and 71.06.953.



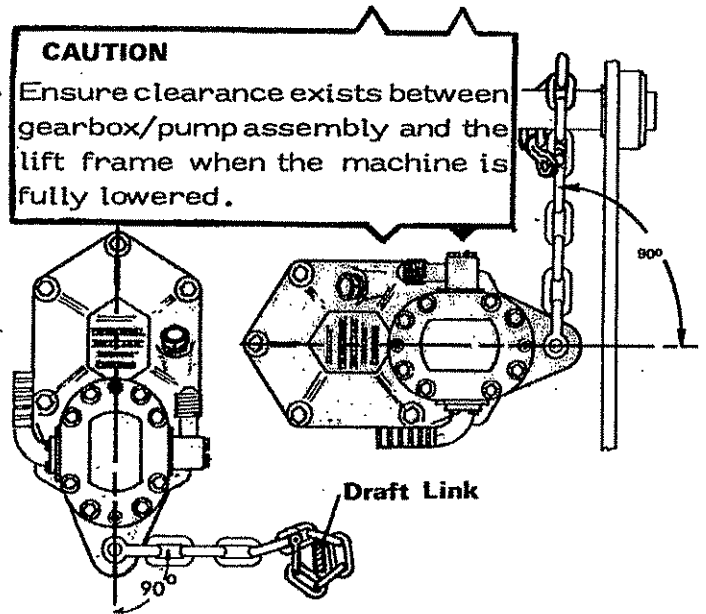
FITTING LINKAGE ADAPTOR BRACKETS

Set machine to the loading arm geometry. This is most important as it gives the flail head a parallel action. The reach ram rod must be located in position A.



Fit flail head assembly to the standard drop arm and secure by driving the retainer roll pin against the pivot pin. Fit slave link in a similar manner.

Fit PSF pump to the PTO gearbox assembly and adjust length of torque chain to give an approximate 90° angle on a line through the PTO shaft. Note that the pump connections can be unbolted and rotated to suit individual requirements. To avoid damage and possible breakage of the tractor's PTO shaft it is essential that when fully lowered, the lift frame does not contact the pump connections or the gearbox housing. Altering the chain length slightly can sometimes improve clearance.



Hy-Fi Mounting

Three methods of mounting the Hy-Fi in the tractors cab are available. These are as follows:- mudwing bracket, tip over seat, and sandwich mounted Hy-Fi stalk.

For their particular fitting and operating applications see pages 8 - 11 inclusive.

Functional Check

- (a) To avoid the hoses being tightly looped and twisted when in the working position - fold the flail head into transport position before tightening the hose clamping nuts. It may be necessary to loosen the hose ends to relieve any twist in the hose.
- (b) Care must be taken to see that hoses do not rub and chafe through against any part of the machine. Hoses should be strapped up or supported where contact is made against the cradle and main body. Where the hoses are liable to come in contact with the flail head pivot pin, the connections should be loosened and hoses twisted away from the pin and retightened.
- (c) Because of the possibility of the introduction of dirt during assembly, it is most advisable to run up the machine for at least 15 minutes before applying any load. This gives the filter an opportunity to trap any loose grit or material floating round in the system.
- (d) Although the circuit is self-priming, do not forget to 'top up' the tractor's hydraulic reservoir to the full mark before starting work.

OPERATION

PA44/FLAIL

Preparation

Before commencing work the operator should read the instruction manual thoroughly paying particular attention to the sections relating to safety and operation. Instructions in these sections are vital to the safe and efficient operation of the PA.44 and should be strictly adhered to. In addition, if working on the public highway the operator should familiarise himself with National, and bye-laws relating to this and ensure that his equipment and operating techniques comply with the law.

Check that all nuts and bolts are tight and that spring cotters, roll pins etc are firmly in place.

Examine flails and their mountings for security and damage. Replace any that are suspect remembering to replace the opposite one also to maintain rotor balance.

Carefully inspect the work area or hedgerow for wire, steel posts, large stones, bottles and other dangerous material and remove them.

Operator Guard (see page 33)

An operator's guard is supplied as standard equipment for all flails and attaches to the tractor cab with spring loaded hooks. The guard can be fitted to either side of the cab, and where the machine is frequently used on either side of the tractor, two guards, one on each side could be fitted.

Owners are reminded that it is illegal to use a flail without an operator guard.

Operating Speed

It is not necessary to operate the flail at a speed of 540 rpm on the PTO shaft. As a guide the machine should be run at a speed no higher than is needed to make a clean cut with no fall off in rotor speed. For the average tractor this will mean running the engine at about two thirds of the rated PTO speed, i.e. where 2100 engine rpm = 540 PTO then run engine at 1400 rpm.

1900 " " = 540 " " " " " 1270 "

Excessive speed especially when cutting downwards in heavy growth will result in excessive shattering and splitting of stems giving an untidy finish. The rotor and flails also are subject to unnecessary rough treatment. The high ratio gearbox 80 13 290 is particularly suitable for tractors that have a high forward speed in low gear as with a smaller throttle opening a lower forward speed can be maintained.

The toughcut flail is designed to be run at a higher speed than the triplecut and therefore should only be run by a high ratio gearbox.

Under no circumstances should a PTO speed of 540 RPM ever be exceeded.

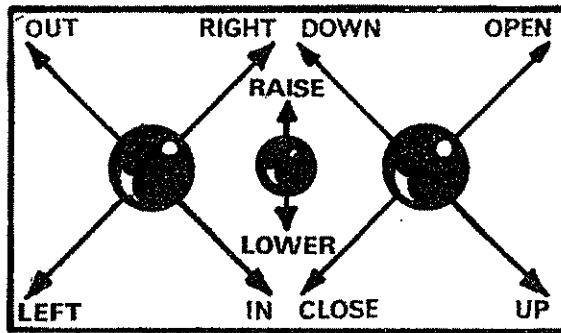
Engaging Drive

Select external services to allow the oil to flow around the priming circuit. Bring tractor engine to idling speed and engage the pto. Raise the flail control lever SLOWLY to start the rotor. When in the fully raised position, with the rotor running smoothly, increase tractor engine revolutions to the working speed. Become fully familiar with the hydraulic controls before moving the flail head into the work.

Forward ground speed is determined by common sense and experience. It should be slow enough to allow sufficient time for the flails to cut the work without overloading or straining the machine.

Remember always respect the dangerous aspects of the operation and remain alert. Familiarity can cause carelessness resulting in damage or injury.

HYDRAULIC CONTROLS



3-5S Hy-Fi

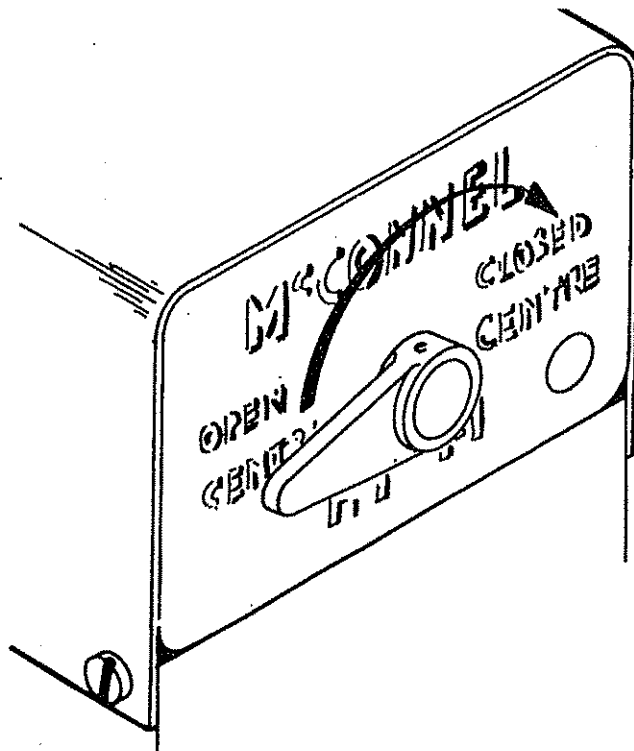
The Hy-Fi which is powered directly from the tractor's integral pump has three levers controlling five double acting services which are used to control arm movements.

The right hand lever controls the lift and flail angling services, the left hand lever controls the slew and reach services and the centre lever controls the raising of the machine. Once in the correct working position it should not be necessary to operate the centre lever.

On tractors with 'open-centre' hydraulic systems the flip lever should be set to 'OPEN' position to avoid overheating the oil.

On tractors equipped with 'closed-centre' hydraulic systems e.g. John Deere, the flip lever on the side of the Hy-fi should be moved to the 'closed' position.

Note. To maintain adequate gearbox lubrication on John Deere, the engine speed should not be allowed to fall below 1250 rpm.



Flail By-pass Control Valve

This valve controls the STOP/START action of the flail head thus making it unnecessary to disengage the P.T.O. pump to bring the flail head to a stop. When engaging drive the engine speed should be reduced, the control lever should be pushed up slowly until the drive is fully engaged and then the engine revolutions increased to operating speed.

Note: Until all the hoses and pipes have been fully primed with oil the rotor speed will fluctuate.

Pressure Relief Valve

Situated in the top of the By-pass control valve and pre-set 2,500 p.s.i.(170 Bar) the valve protects the P. T.O. pump against overload. The valve is non-adjustable.

Float Valve Assembly

Supplied as standard equipment with the grass flail only, the float valve allows the flail head to ride over undulating ground without trying to lift the back of the tractor. An accumulator attached to the valve absorbs any shock loads. The valve is located onto the outer section of the lift frame pivot pin and secured with a lynch pin.

For float operation, used when flailing banks, ditches and grass cutting generally, the operating lever should be engaged in the 'FLAIL' or 'FLOAT' position.

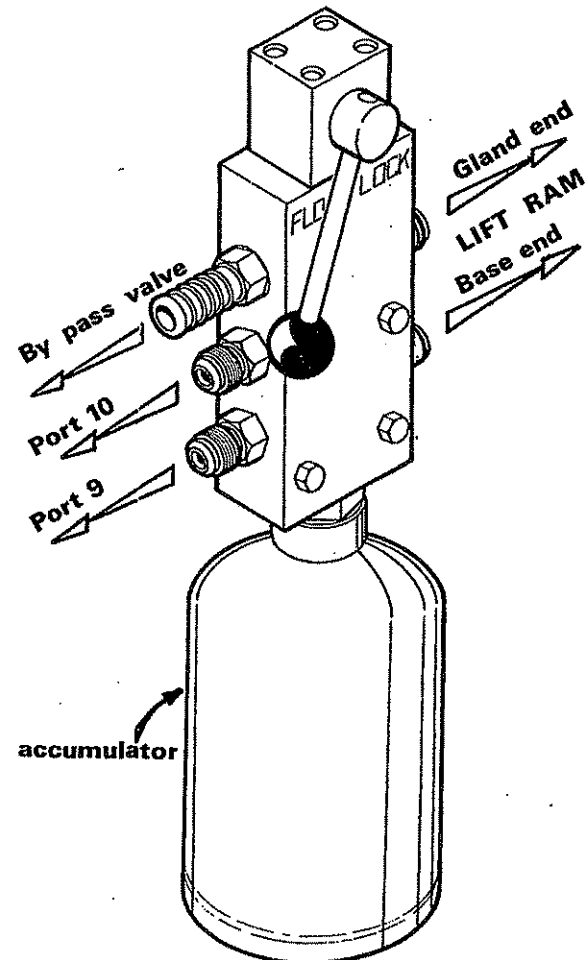
The float valve assembly can remain in place when converting to a hedger flail, but the operating lever must be engaged in the 'LOCK' position to isolate the float action.

WARNING

Do not attempt to operate float valve lever without placing the flail head on the ground.

The float valve should be removed completely if the machine is to be used for digging or loading.

A blanking plug is screwed into the by-pass valve when no float valve is fitted.



OPTIONAL EXTRA

Maximum oil requirement from the tractor's integral pump to ensure adequate power and smooth operation of the PA44 is 2½ - 3 GPM at the operating speed. Some tractors with high flow rates will exceed this figure. As oil flows increase difficulty will be experienced in maintaining precise control of the flail head; reducing the flow by cutting the tractor's engine speed will also reduce the power from the PTO driven pump and is therefore an unsatisfactory solution. Should the deterioration in handling become intolerable a hydraulic flow control valve is available which regulates the flow to the PA44 returning the excess oil direct to the tractor's reservoir (see page 7).

John Deere

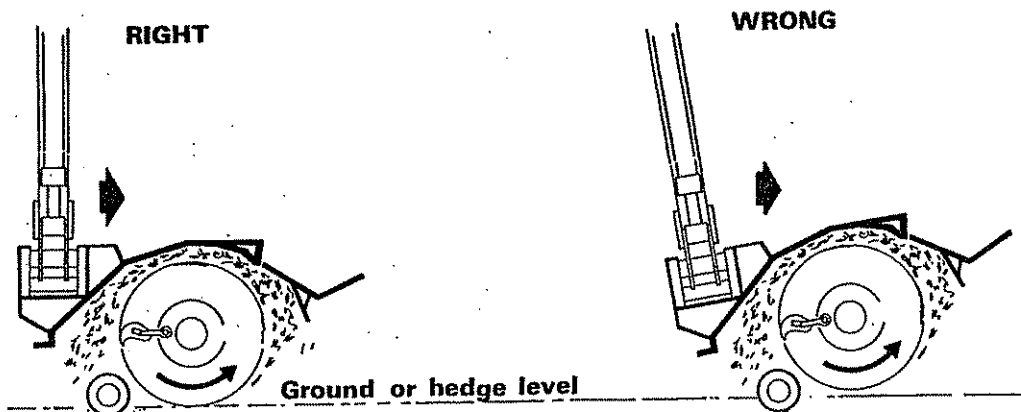
To maintain adequate gearbox lubrication on the John Deere the engine speed should not be allowed to fall below 1250 r.p.m.

Flail Offset

The flail head can be operated in any of the five working positions of the main body in conjunction with the cab guard kit. If the early type operator guard 73 13 266 is used, which pins onto the main body, the flail can only be operated on the right hand side of the tractor and in the full offset position. The early guard is still required if a sawhead is used.

Flail Pitch

The pitch of the flail head should be adjusted on the central Hy-fi lever so that the head is parallel with the ground. As far as possible this entails maintaining the main body in a horizontal position. Although it is not essential for lubrication purposes as the slewing mechanism is rarely used for flailwork it is important that the main and reach arms are used in a vertical plane so that no undue strain is placed on the pivots.



Long Drop Arm

The 1 metre (39") flail head can be used with the long drop arm which will give an additional 61 cms. (2 ft.) of reach. Additional wheel ballasting should be added on the opposite side to which the flail is being used, and extreme caution exercised when operating on sloping ground.

WARNING

The 1.2 metre (48") flail must not be used on the long drop arm.

HEDGE-CUTTING

Machine Limitation

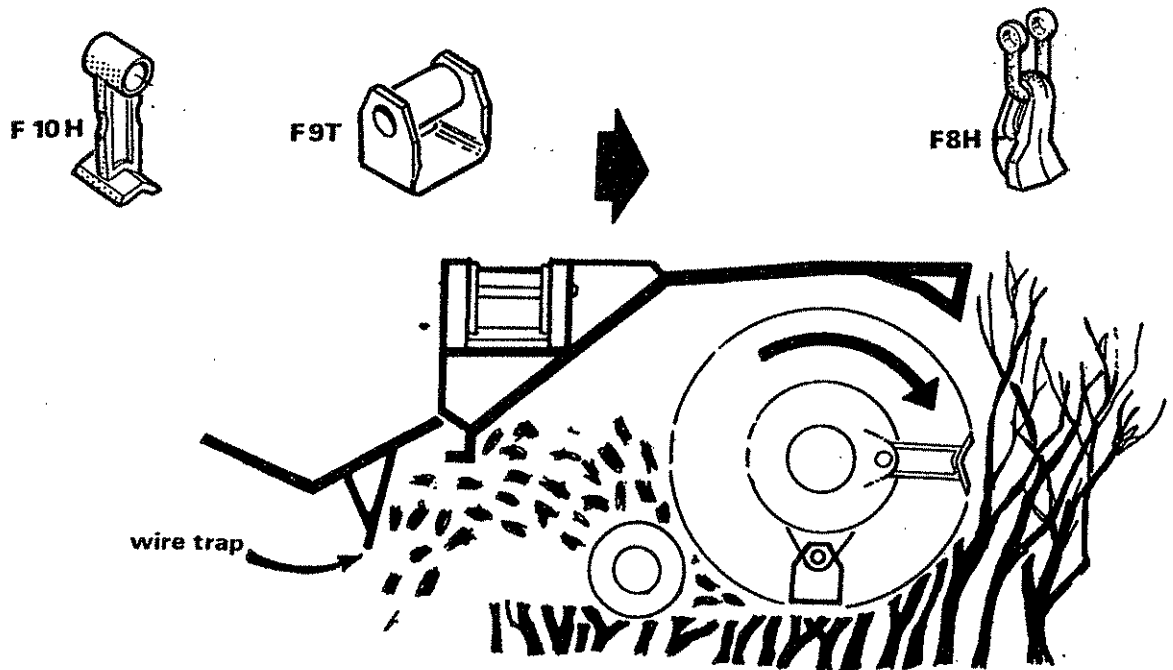
Bear in mind that the Multicut Hedging Flail is a maintenance tool designed to deal with a maximum of two to three years continuous growth. Larger bushes may be tackled occasionally by taking care, being patient and making several passes.

For continuous heavy growth the Toughcut Flail should be used.

Badly neglected hedges should be tackled with a sawhead and heavy timber felled with a chain saw.

Flail Rotation

For Hedging



The Flail Head is normally assembled at the factory for the flails to cut downward with the hedger hood complete with integral wire trap mounted on the rear of the Flail Head. It is recommended in the interests of increased safety that the Flail is operated in this configuration especially when working on the highway.

Cutting downwards is safer because it minimizes the risk of flying debris by throwing the cut chips into the bottom of the hedge. This limits the area of mess and requires very little tidying-up time afterwards.

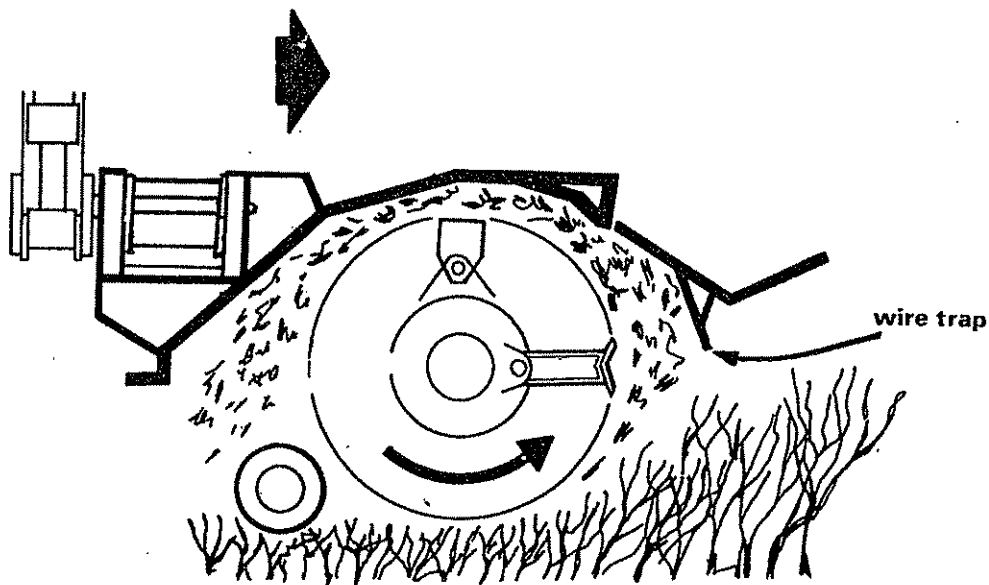
Current hedger flails are the F10H for the Multicut and the F9T for the Toughcut.

For spares purposes - old flails to fit the triple cut rotors are still available. (see page 84-87).

Should the finish become important through operator preference or necessity eg. when a clean cut in a light hedge is required to prevent frost entering the cut stems and causing die-back, the rotor can be reversed to enable the flails to cut upwards by interchanging the hoses to the hydraulic motor at the flail by-pass control valve connections. If old F8H flails are being used these must also be reversed on the rotor. In this position the flails cut with a smooth shearing action cutting the hedge cleanly. The hedgecutting cowl is fitted to the front of the flail head in this case.

When cutting upwards in heavy growth the depth of cut and the amount of passes required are determined by the amount of material which can pass under the front of the hedging cowl.

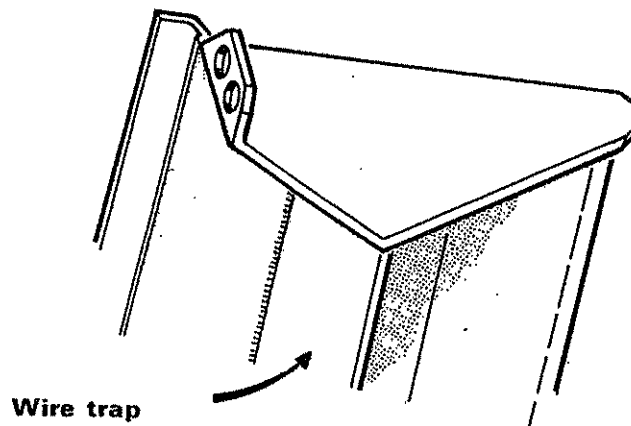
Extreme care must be taken to ensure that bystanders are kept well clear of any area where they may be hit by flying debris.



Wire trap

A steel plate is welded across the underside of the hedging cowl, to cut any loose ends of wire that are picked up on the rotor. This plate should not be interfered with or modified in any way.

This wire trap does not relieve the operator of the responsibility of checking and cleaning the flail when it is suspected that wire has been caught up in the rotor.



OPTIONAL EXTRA

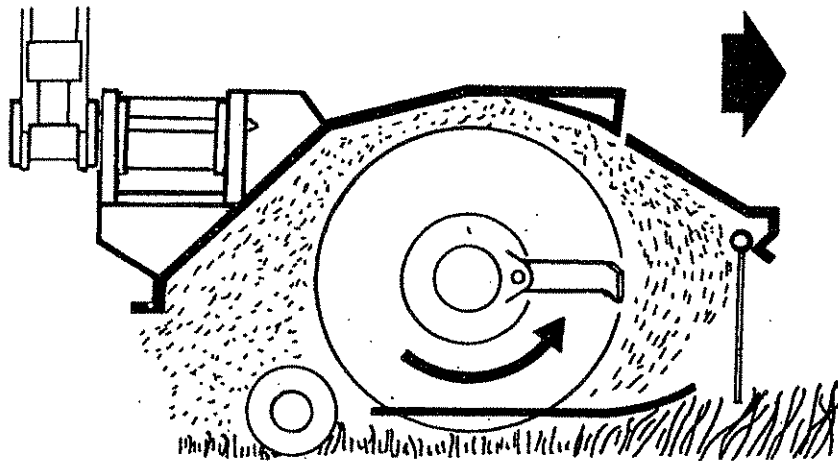
When cutting upward in a light hedge flying debris may cause a problem especially on the highway. A specially designed light hedging cowl Part No. 73 14 423 for the 1.2m and 73 14 424 for the 1m Hedging Flails are available which will minimize the danger to passers by and reduce mess. The light hedging cowl is fitted to the front of the Flail Head in place of the standard hedging cowl.

GRASS-CUTTING

Flail heads are assembled at the factory for the flails to cut upwards. This upward movement of the flails causes the grass to stand thus allowing a level finish to be achieved.

The grass cutting cowl is fitted on the front of the flail head completely enclosing the rotor and containing the cut grass and any debris under the flail hood.

The current grass flail is the F.10G. For spares purposes old flails (F7G) to fit triplecut rotors are still available. See pages 84-87



WARNING

Grass and hedging cowls must be used at all times and be fitted in the correct position for their respective flail rotation.

ROLLER ADJUSTMENT

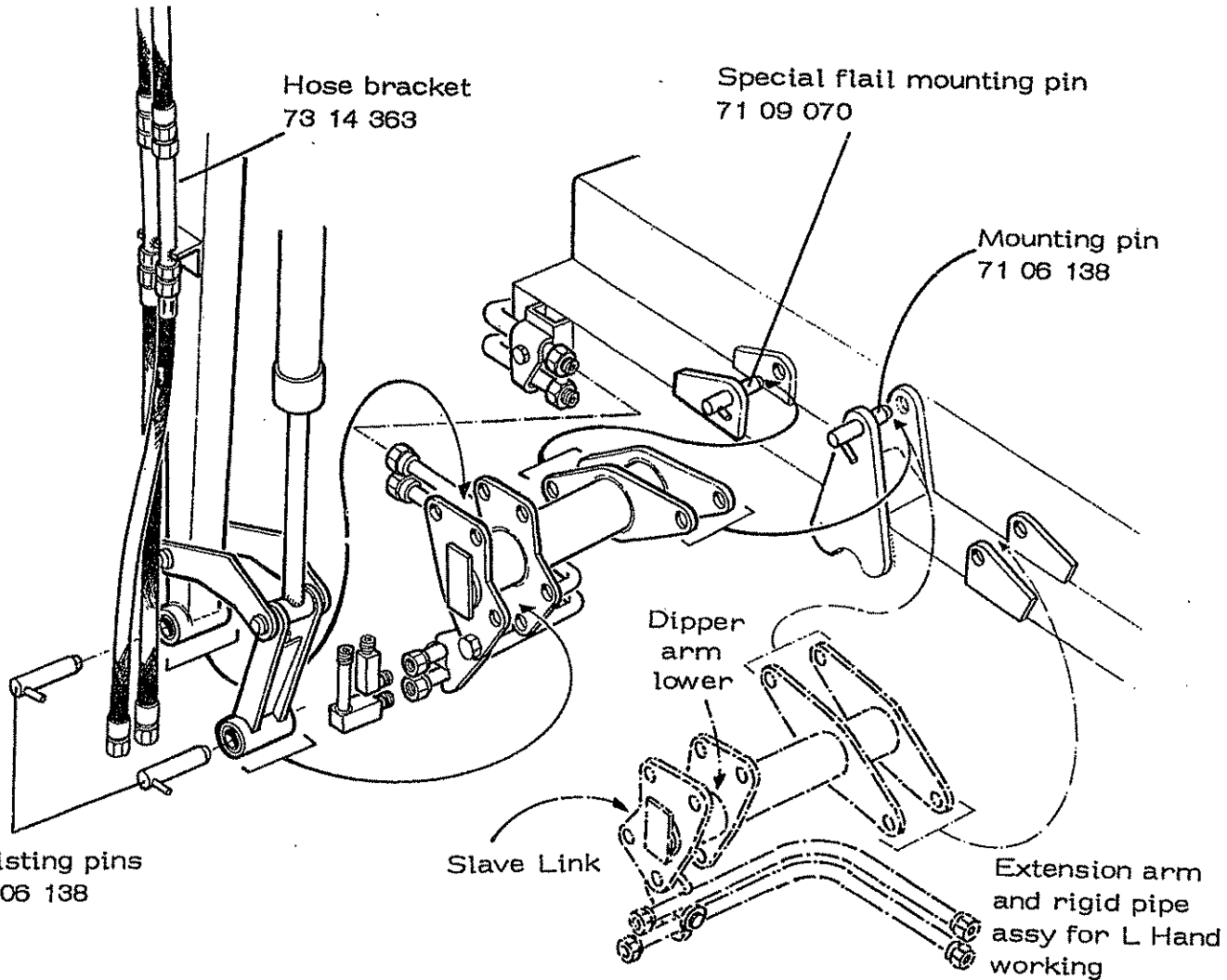
The roller can be adjusted to suit both hedge and grass flailing. When hedging, the roller is set higher than the flails. This shields the flail and prevents it bouncing and sinking in the hedge. For grass, the roller is set lower than the flails to give a level finish and to prevent the flails from scalping the ground.

OPTIONAL EXTRA

PA44 Forward extension set for 1 metre and 1.2 metre flail heads.

Enables the flail head to be carried further forward to give improved operator vision and a more comfortable working position.

The kit consists of extension arm, hose clamps, rigid pipes and mounting pins and is so constructed that it can be assembled to work on either the right or left hand side of the tractor.



Fitting

The existing pipe clamp 73 14 327 must be disconnected, removed from the dipper arm lower and replaced with clamp 73 14 363.

The lower hoses 85 01 060 must be disconnected from the motor rigid pipes.

The dipper arm lower and the slave link must be disconnected from the flail head.

Fit forward extension to flail head and assemble rigid pipes and clamp as shown.

Fit elbows,

Connect the dipper arm lower and the slave link into the forward extension in positions shown.

Connect hoses 85 01 060 to the elbows and the pipe clamp on the dipper arm lower.

Note. The illustration shows a right hand installation. The left hand assembly of the forward extension is shown dotted,

Should the need to convert from right hand to left or vice-versa arise the hydraulic motor and rigid pipes must be dismantled and assembled on the other end of the flail rotor.

OPTIONAL EXTRA

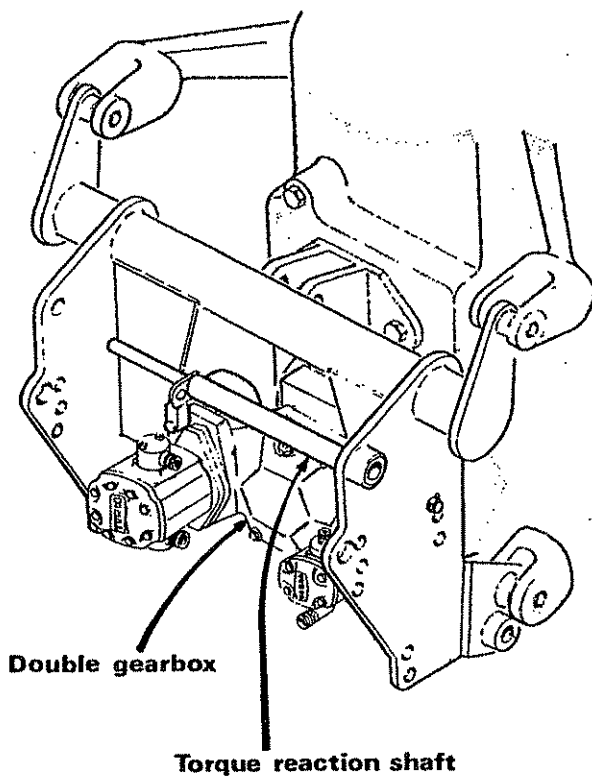
Should the tractors hydraulic system be incapable of maintaining 2500 psi the range of armhead movement will be reduced increasingly as pressure falls. The cutting efficiency of the flail head is unimpaired and work can be carried on within these limits if acceptable.

Where this loss of power is unacceptable or maximum reach and height are necessary for the work a double gearbox complete with PSF and PDL hydraulic pumps is available.

The PDL pump takes over from the tractors integral pump to provide the required pressure for a complete range of armhead movement.

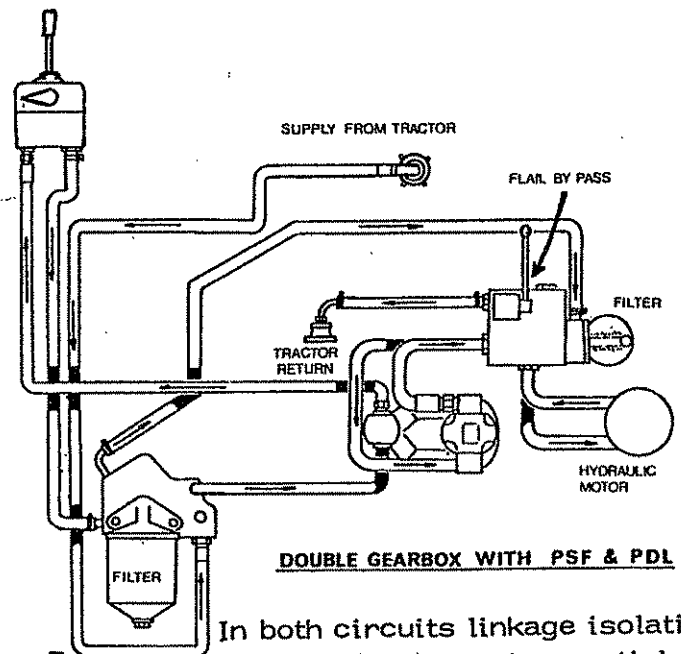
The double gearbox/pump is supplied together with a torque reaction shaft and the extra hose required to complete the circuit.

The gearbox is mounted horizontally on the tractor PTO and is held in place by a torque reaction shaft which pivots between the side plates of the cross shaft frame.

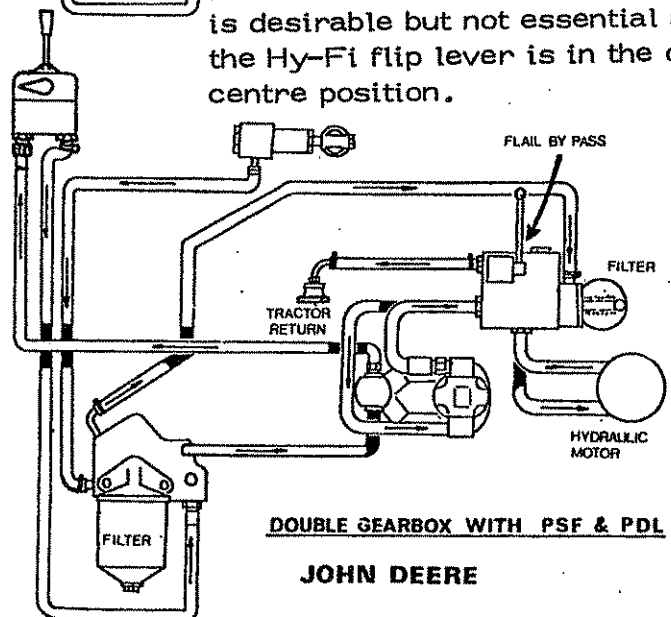


Typical installation of double gearbox/pump.

The above installation does not represent any one particular tractor or fitting circumstance.



In both circuits linkage isolation is desirable but not essential as the Hy-Fi flip lever is in the open centre position.



MAINTENANCE

Carry out the instructions detailed in the Power Arm 44 Manual and additionally observe the following items:-

1. Grease the rotor bearings daily when in use and prior to storage.
2. Ensure that the bearing housing and motor bolts and nuts are tight, and check frequently especially after long operating periods.
3. Periodically inspect the rotor assembly and check that all locking pins are securely in position.
4. If any iron or large stone has been encountered the machine should be stopped and the rotor examined for damage.
5. Blunt flails absorb a lot of power and leave an untidy finish to the work. They should be removed and periodically sharpened on a grindstone.
6. Do not run the rotor with flails missing. Inbalance will cause severe vibration and rapidly damage the rotor bearings and splined coupling. As an emergency measure if a flail is lost, remove another on the opposite side of the rotor to retain balance. To avoid mutilation of the securing roll pins they should always be driven with the aid of a heavy punch.

CAUTION: Replace flails in pairs and do not match a new replacement flail with one that has been worked for a long period or has been resharpened. Ensure opposite fitted flails are balanced for weight.

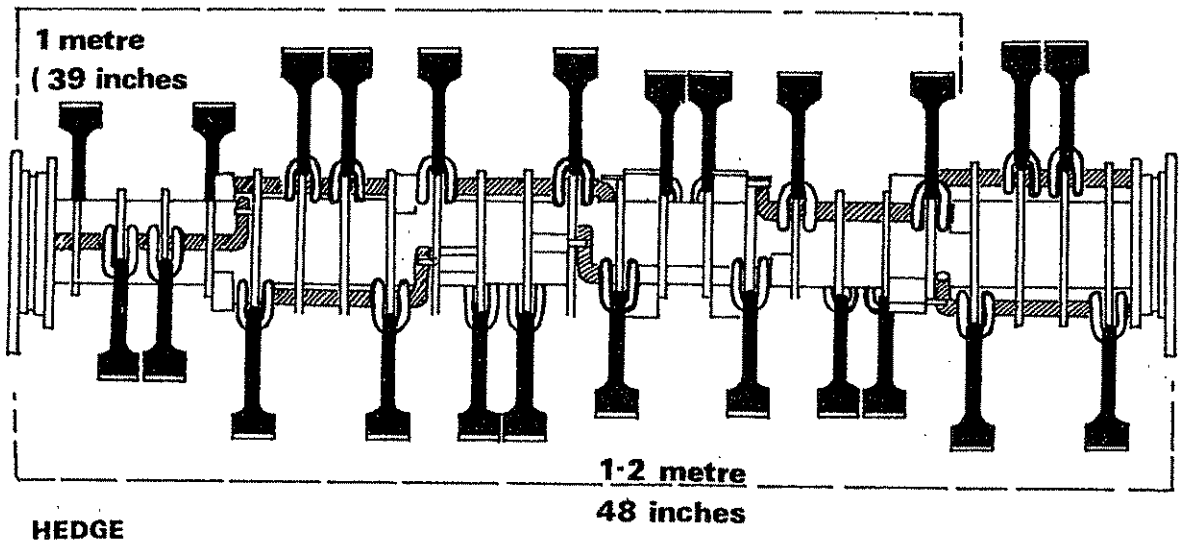
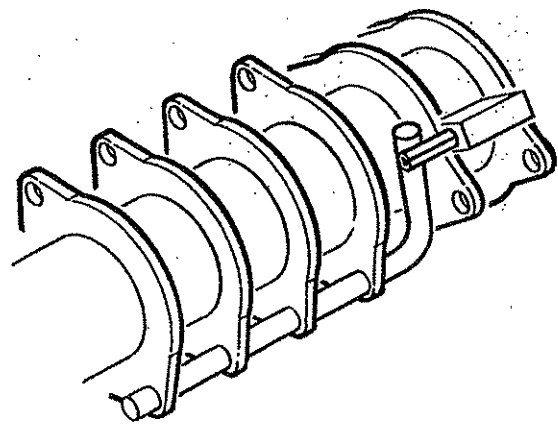
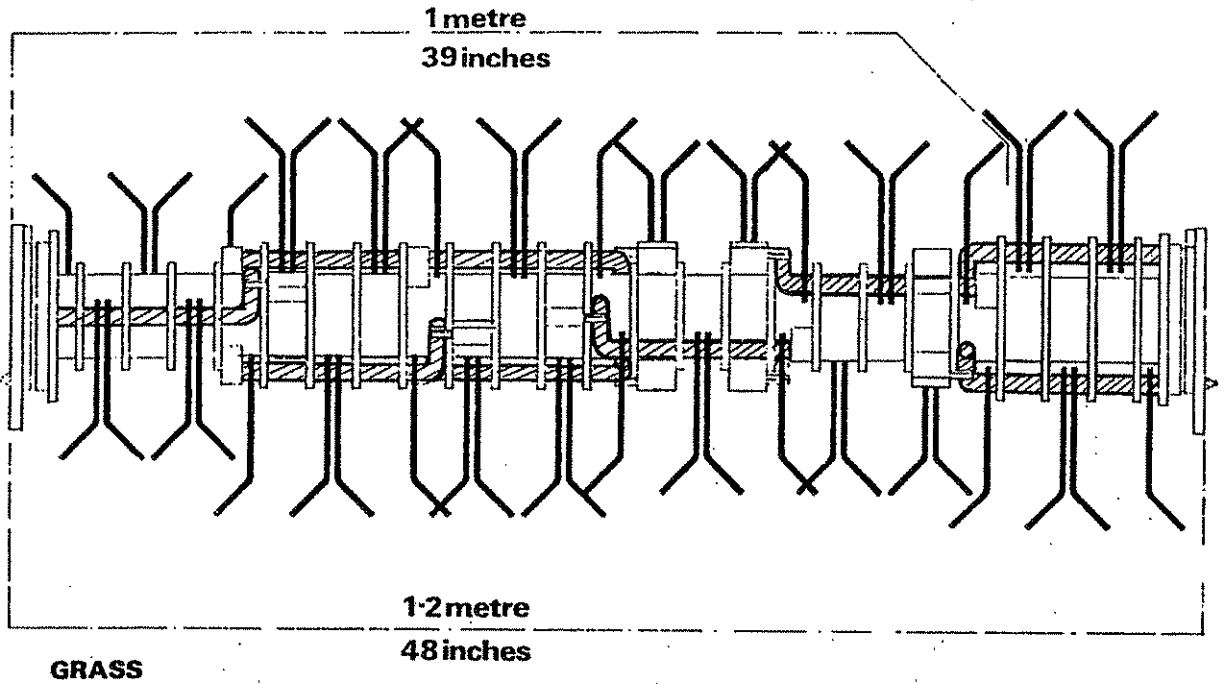
Storage

If the flailhead is to be removed in order that the Power Arm 44 can be operated as a digger or loader, it should not be necessary to dismantle any of the high pressure hoses.

The hoses on the PSF pump can remain in position when the pump is removed from the gearbox and similarly the flail control valve can be lifted off completely after the low pressure hose from Hy-fi to the filter block on the control valve has been disconnected. Plug the open end of the filter block and the return hose against dirt and leakage.

Place the pump into a plastic bag to protect the spline drive and store the complete unit in clean conditions under cover ensuring none of the hoses are trapped or 'kinked'.

FLAIL ARRANGEMENT OF TRIPLECUT ROTOR.



HYDRAULIC SYSTEM

Oil Supply

Check daily the tractor's hydraulic oil level and keep to the full mark. Use a 20/30 Multigrade or Universal type oil, or the oil specified by the tractor manufacturer. Avoid using a high detergent oil. Contamination of the oil by dirt will cause premature wear of hydraulic components.

Reduce contamination by:-

- a) Carrying out all hydraulic maintenance and servicing in clean, dust-free surroundings.
- b) Cleaning off around reservoir filler cap before removal.
- c) Using clean containers.
- d) Regular servicing of the filters.

Oil Filters

Low pressure filter. A full flow low pressure filter is situated on the side of the Flail control valve. The filter element (part no 71 03 102) should be replaced after the first fifty hours working and thereafter at 250 hour intervals. Do not overtighten the centre retaining bolt.

If the filter element is neglected and allowed to become choked, then a by-pass type ball valve will lift off its seat allowing unfiltered oil and the accumulated rubbish to circulate in the system.

PTO Gearbox and Pump Assembly

The gearbox holds approx. $\frac{1}{2}$ pints (.75 litre) of E.P.90 grade gear oil. It should be changed at 1000 hour intervals.

The oil level should be checked when carrying out routine maintenance on the machine and preferably when the machine has been at rest for some time. If the gearbox is mounted horizontally release the torque chain to allow the filler/level plug to adopt a vertical position.

If it appears that the gearbox is overfilled, then leakage from the hydraulic pump can be suspected.

A leaking pump shaft seal can result in the gearbox filling right up and forcing oil past the PTO shaft seal, or through the filler plug orifice.

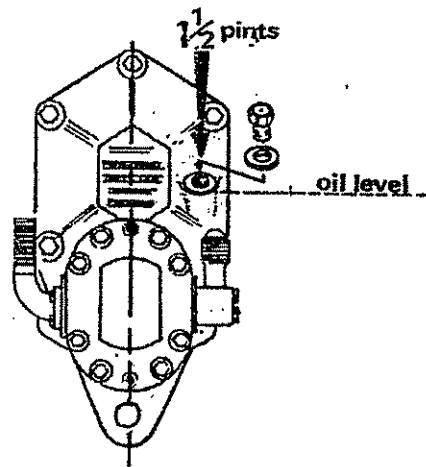
Float valve accumulator test

If a leak of Nitrogen is suspected a test with soapy water around the valve thread and core area should be carried out.

A replacement charge valve assembly can be fitted after the accumulator has been fully discharged. It is recommended that this work is carried out by the dealer or distributor who must have the facilities for recharging.

The accumulator can be removed for this purpose.

If oil is leaking from the area of the charge valve then the internal butyl bag is damaged and the accumulator is scrap.

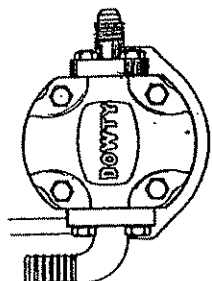


HYDRAULIC PUMPS AND GEARBOXES

From machine serial number 21PL27 the low ratio gearbox 80 13 260 has been superseded by a high ratio model 80 13 290.

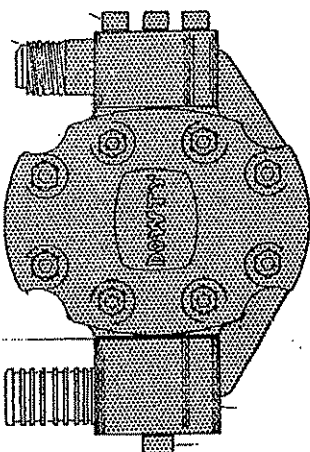
GEARBOX PUMP COMBINATIONS

All pumps are clockwise rotation and are supplied with a PTO driven gearbox as follows:-



82 01 481 PDL pump - high ratio gearbox supplies 6.6 gpm. (30 litres/min) at 540 RPM on the PTO shaft for digging and loading work.

80 13 265 PDL pump low ratio gearbox supplies 5 GPM (22.7 litres/min) at 540 RPM on the PTO shaft for digging and loader work.



82 01 478 PSF pump high ratio gearbox supplies 22 GPM (100 litres/min) at 540 RPM on the PTO shaft used for flail and sawhead work.

82 01 489 PSF pump low ratio gearbox supplies 17 GPM (77.3 litres/min) at 540 RPM on the PTO shaft for flail and sawhead work.

CAUTION:

On no account should this pump be adapted to operate machine as a digger/loader.

PUMP MAINTENANCE

Pump servicing is limited to replacing seals, gaskets and 'O' rings. Generally it is unwise to replace major components since they have to be matched in sets. Unless this is done the pump will be inefficient resulting in overheating and power loss. No detailed parts breakdown is shown but factory reconditioned pumps are available within our service exchange scheme.

To convert PDL systems to PSF and vice versa the following kits are available:-

82 01 490 PDL to PSF using high ratio gearbox.

82 01 488 PDL to PSF using low ratio gearbox.

82 01 491 PSF to PDL using high ratio gearbox.

82 01 482 PSF to PDL using lower ratio gearbox.

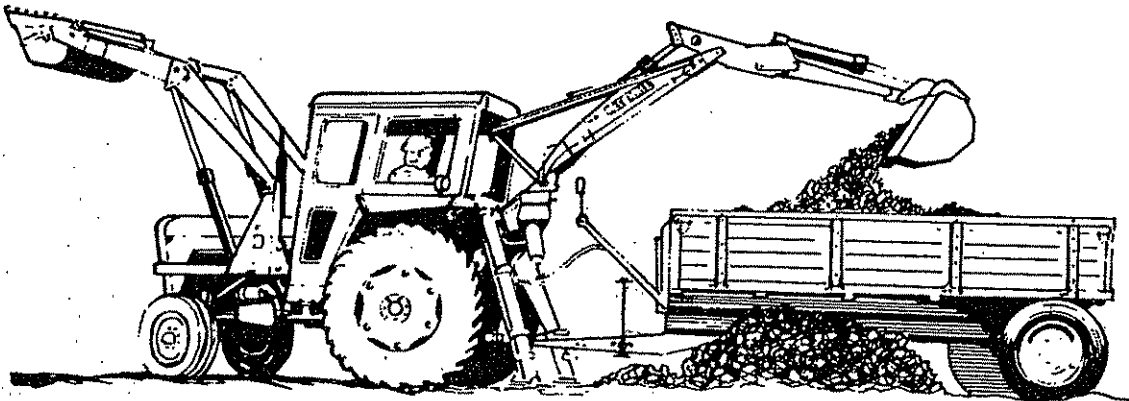
All conversion sets include splined coupling.

SPARE PARTS MANUAL

FOR

POWER ARM 44

digger - loader - flail



FOR BEST PERFORMANCE....

USE ONLY McCONNEL SPARE PARTS

To be assured of the latest design improvements purchase your genuine replacements from the original equipment manufacturer F.W. McConnell Ltd. through your local dealer or stockist.

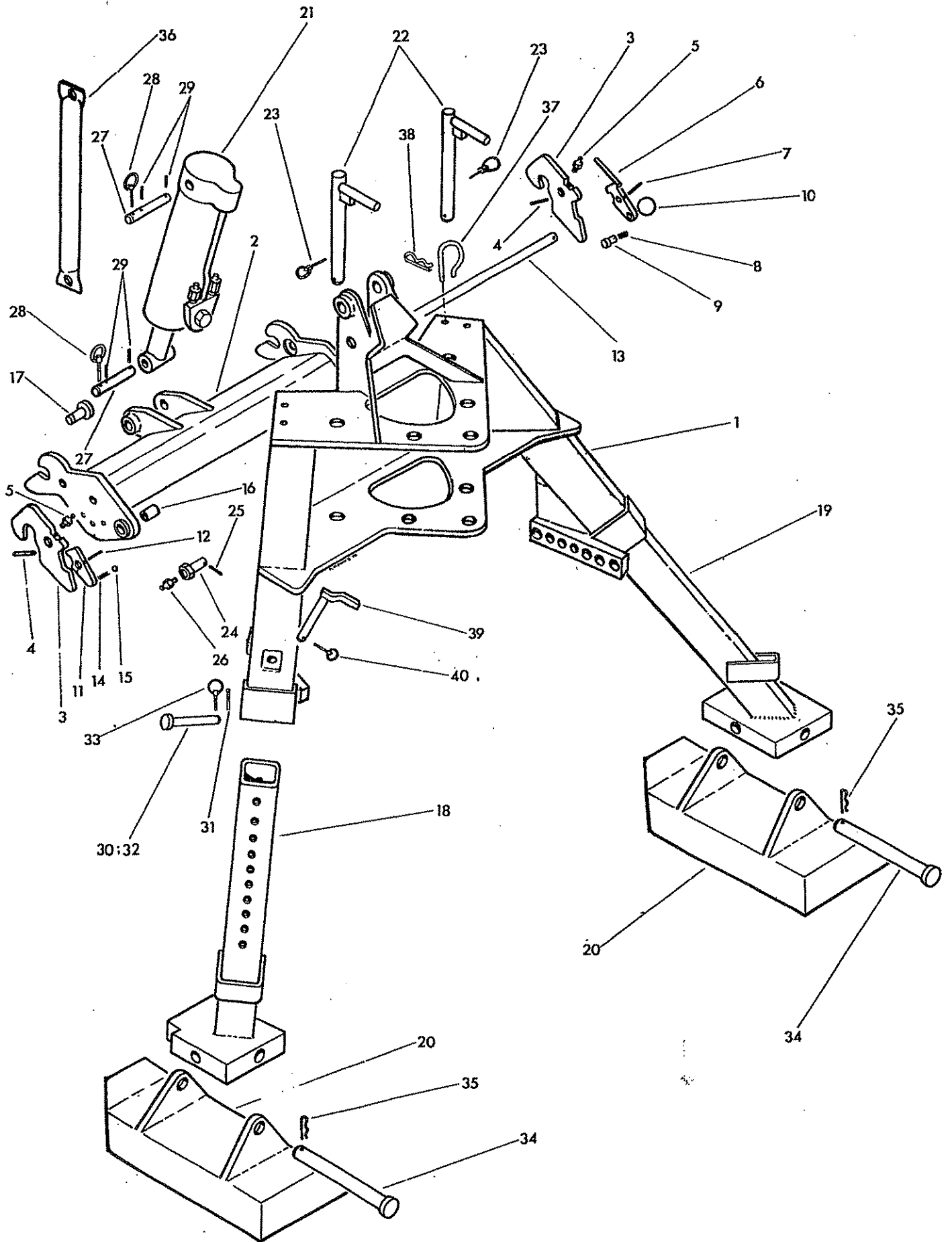
Always quote machine type and serial number as well as the part number.

Design improvement may have altered some of the parts listed in this manual - The latest part will always be supplied when it is interchangeable with an earlier one.

THE DOT SYSTEM

Many spares are supplied as Assemblies or as Sub assemblies and to help the customer determine the composition of an Assembly the Dot System is used. The Main Assembly will not show a dot preceding its description and is printed in BLOCK CAPITALS. Subsequent listed parts are preceded by one or more dots until the next major assembly is reached. An increase in the number of preceding dots indicates that the item is an associated part of the preceding item. Whenever the number of dots are decreased by one this indicates the termination of an assembly.

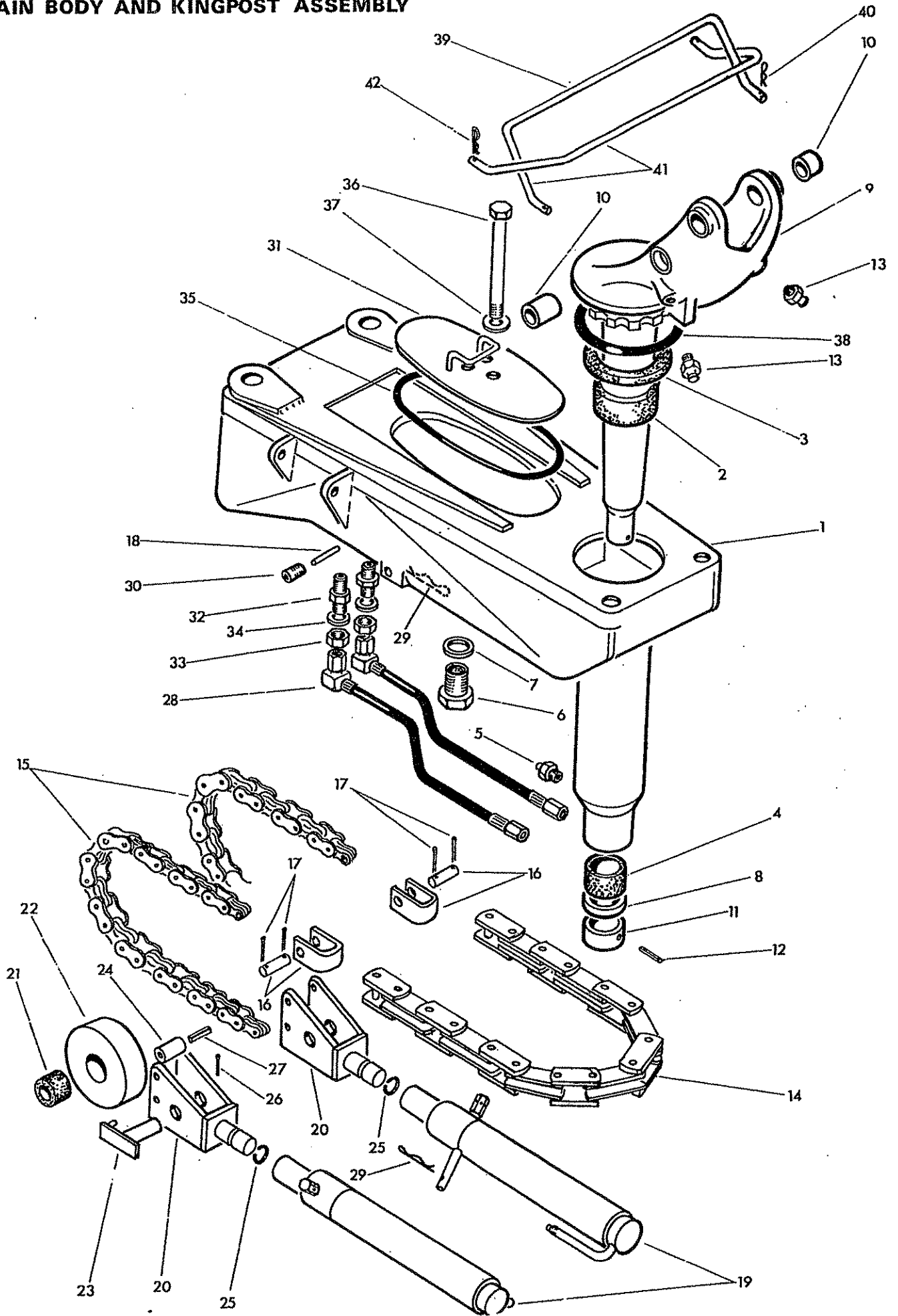
CRADLE AND LIFT FRAME ASSEMBLY



Ref	Part No	Qty	Description
	71 06 264	1	CRADLE c/w LIFT FRAME ASSEMBLY
1	71 06 265	1	. Cradle welded assembly
2	71 06 274	1	. Lift frame assembly c/w latch, pins etc.
3	71 06 063	2	.. Cross shaft locking latch c/w spring dowel
4	04 21 836	1	... Spring dowel 1/4" dia. x 2 1/4" long
5	09 01 121	1	... Greaser
6	71 06 064	1	.. Hand operated catch c/w sp.dowel plunger etc.
7	04 22 524	1	... Spring dowel 5/16" dia. x 1 1/2" long
8	81 11 009	1	... Spring
9	71 06 192	1	... Plunger
10	71 01 111	1	... Ring
11	71 06 066	1	.. Slave locking catch c/w spring dowel
12	04 22 524	1	... Spring dowel 5/16" dia. x 1 1/2" long
13	71 06 067	1	.. Locking rod
14	81 11 009	1	.. Spring
15	09 05 116	1	.. 1/2" dia. steel ball
16	60 12 032	2	.. Steel bush
17	71 06 061	2	. Locking latch pivot pin
* 18	71 06 276	1	. Leg - left hand
* 19	71 06 277	1	. Leg - right hand } Use 71 06 402
20	71 06 279	2	. Foot assembly
21	71 06 280	1	. Lift frame ram assembly
22	71 06 080	2	. Offset pin c/w linch pin
23	04 31 217	1	.. Linch pin
24	71 06 081	2	. Lift frame pivot pin c/w sp. dowel & greaser
25	04 22 728	1	.. Spring dowel 7/16" dia. x 1 3/4" long
26	09 01 121	1	.. Greaser
27	71 06 082	2	. Lift frame ram pin c/w sp. dowel & linch pin
28	04 31 217	1	.. Linch pin
29	04 22 632	2	.. Spring dowel 3/8" dia. x 2" long
30	68 03 012	2	. Linkage pin c/w split pin
31	05 03 205	1	. Split pin 3/16" dia. x 2 1/2" long
32	71 06 085	2	. Linkage pin
33	04 31 217	1	.. Linch pin
34	71 06 086	2	. Foot pin c/w spring cotter
35	04 31 105	1	.. Spring cotter
36	71 06 089	1	. Transport strut
37	71 06 048	1	. Hose guide c/w spring cotter
38	04 31 105	1	.. Spring cotter
39	71 06 083	2	. Leg pin c/w linch pin
40	04 31 217	1	.. Linch pin

* Note: Introduced Spring 1977.
71 06 402 replaces left and right hand leg
assemblies except for yard scraper mounting.

MAIN BODY AND KINGPOST ASSEMBLY

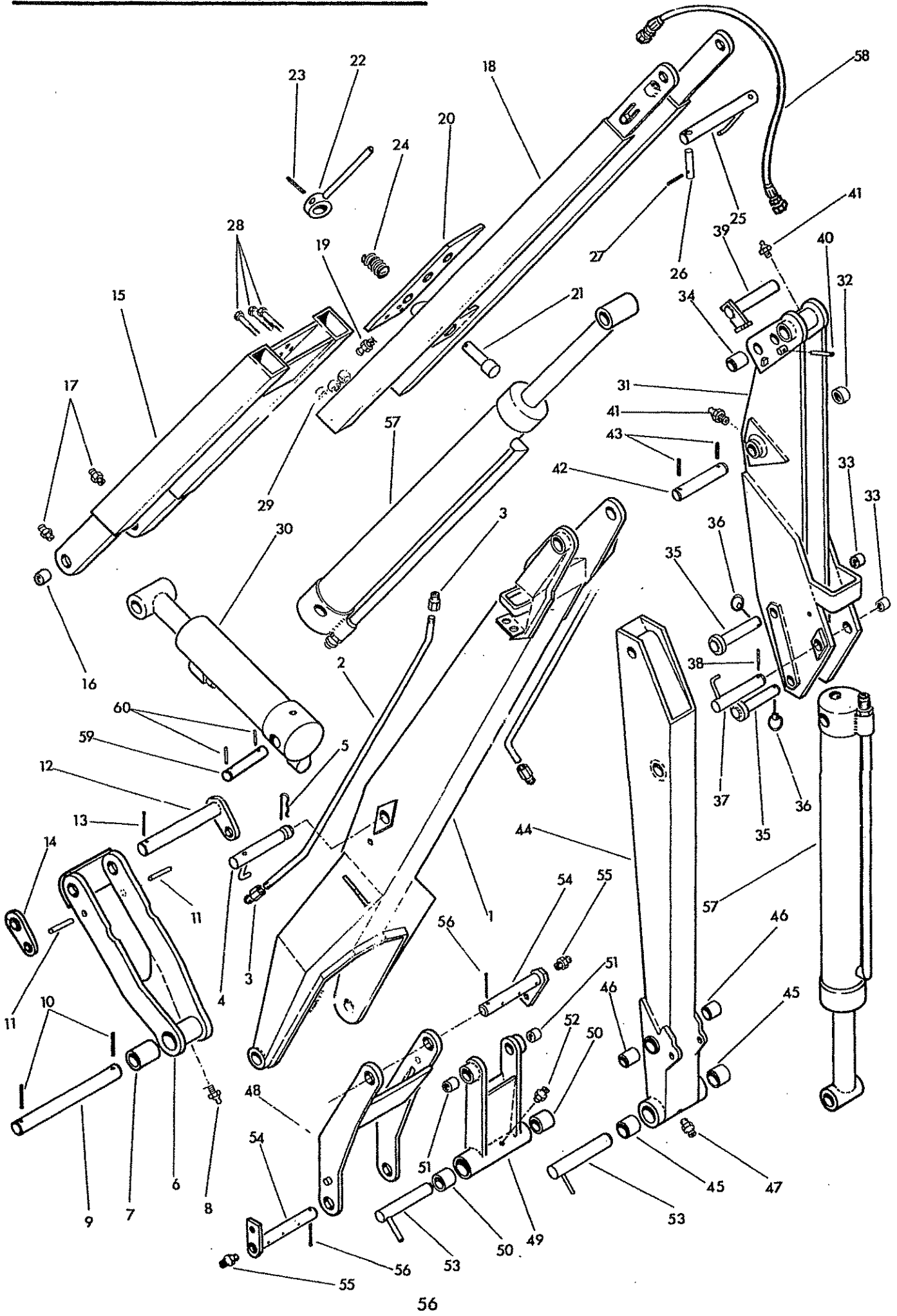


Ref	Part No	Qty	Description
	71 06 251		MAIN BODY AND KING POST ASSEMBLY
1	71 06 252	1	. Main body welded assembly
2	71 05 010	1	.. King post top bearing
3	71 05 015	1	.. Thrust washer
4	71 05 011	1	.. King post lower bearing
5	09 01 121	1	.. Greaser
6	71 06 023	1	.. Drain plug c/w bonded seal
7	86 50 104	1	... Bonded seal
8	86 29 105	1	.. Seal
9	71 05 257	1	. King post c/w collar, bush
10	71 06 024	2	.. Bush main arm pivot
11	71 06 025	1	.. Collar c/w spring dowel
12	04 22 740	1	... Spring dowel, 7/16" dia. x 2.1/2" long
13	09 01 121	3	.. Greaser
	71 05 259	1	. Slew chain assembly c/w pins and links
14	71 05 260	1	.. 3" pitch chain
15	71 05 016	2	.. 1.1/4" pitch chain
16	71 05 017	2	.. Joining link c/w pins and split pins
17	05 03 063	2	... Split pin 1/8" dia. x 3/4" long
18	71 05 018	2	.. Anchor pin
19	71 06 335	2	. Slew ram assembly
	71 06 036	2	. Roller frame assembly each comprising:-
20	71 06 037	1	.. Roller frame
21	60 00 160	1	.. Bush
22	71 06 038	1	.. Chain roller
23	71 06 039	1	.. Bearing shaft
24	71 06 040	1	.. Guide roller
25	68 03 009	1	.. Spring ring
26	05 03 203	1	.. Split pin 1/8" dia. x 2.1/2" long
27	04 22 732	1	.. Spring dowel 7/16" dia. x 2" long
28	85 35 012	2	. BSP hose x 18" long
29	04 31 105	4	. Spring cotter
30	85 82 042	2	. 1/4" BSP taper plug
31	71 06 337	1	. Inspection cover c/w unions, 'O' ring etc.
32	71 06 195	2	.. Union c/w locknut, seal
33	01 39 001	1	... Locknut
34	86 50 102	1	... Bonded seal
35	86 00 172	1	.. 'O' ring 8" inside diameter
36	71 06 042	1	. Inspection cover clamp screw c/w bonded seal
37	86 50 208	1	.. Bonded seal
38	86 00 172	1	. 'O' ring 8" inside diameter
39	71 06 047	1	. Hose guide top c/w spring cotter
40	04 31 105	2	.. Spring cotter
41	71 06 046	1	. Hose guide bottom c/w spring cotter
42	04 31 105	2	.. Spring cotter

Previous to Machine Serial Number 05PL51 JIC connections were fitted for items 19, 28, 32, 33, 34 - see below:-

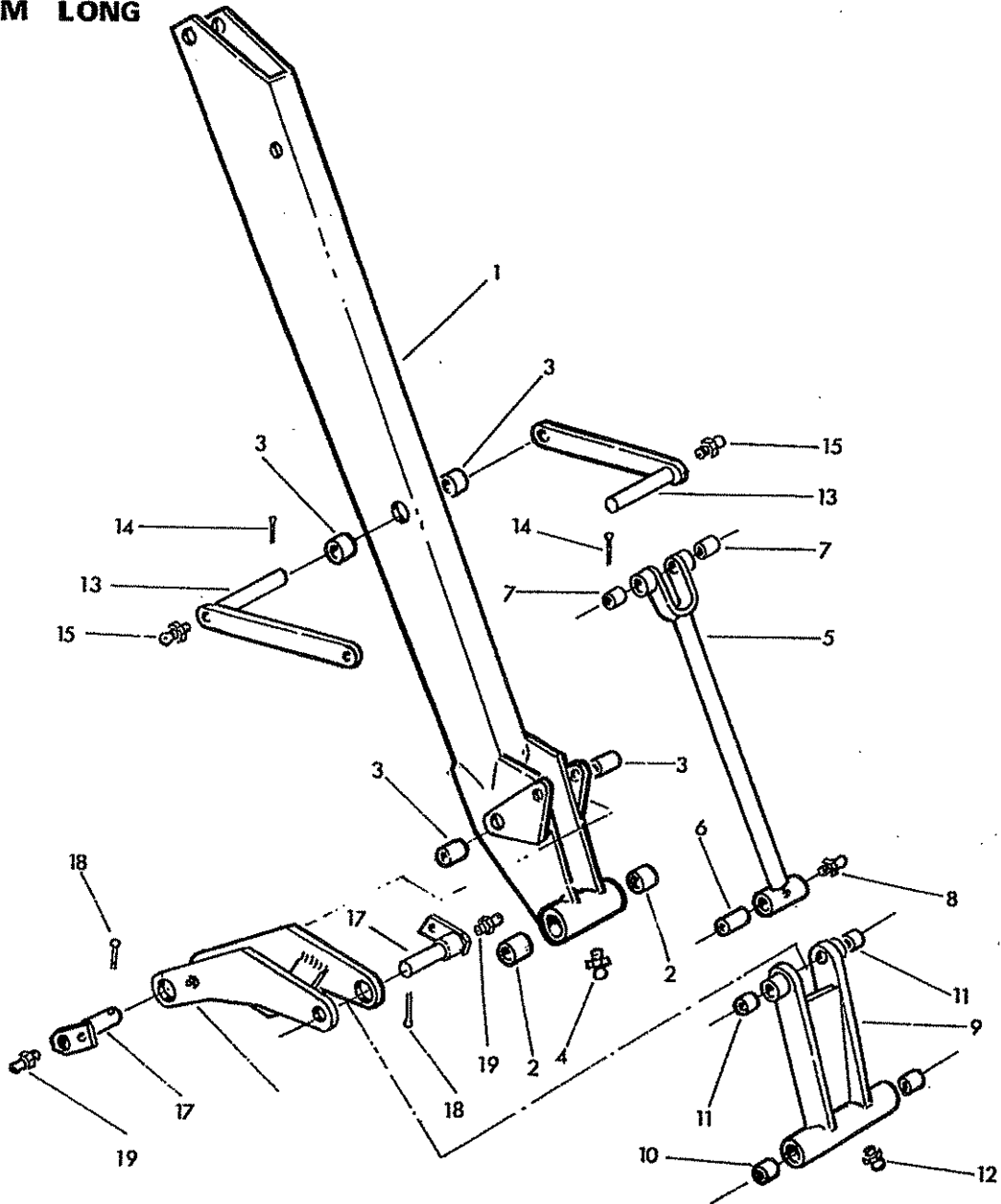
19	71 06 261	2	. Slew ram assembly
28	85 34 186	2	. JIC hose 18" long
32	71 06 041	2	.. Union, c/w locknut & seal
33	01 31 004	1	... Locknut
34	86 50 207	1	... Bonded seal

DIGGER-LOADER ARMHEAD ASSEMBLY



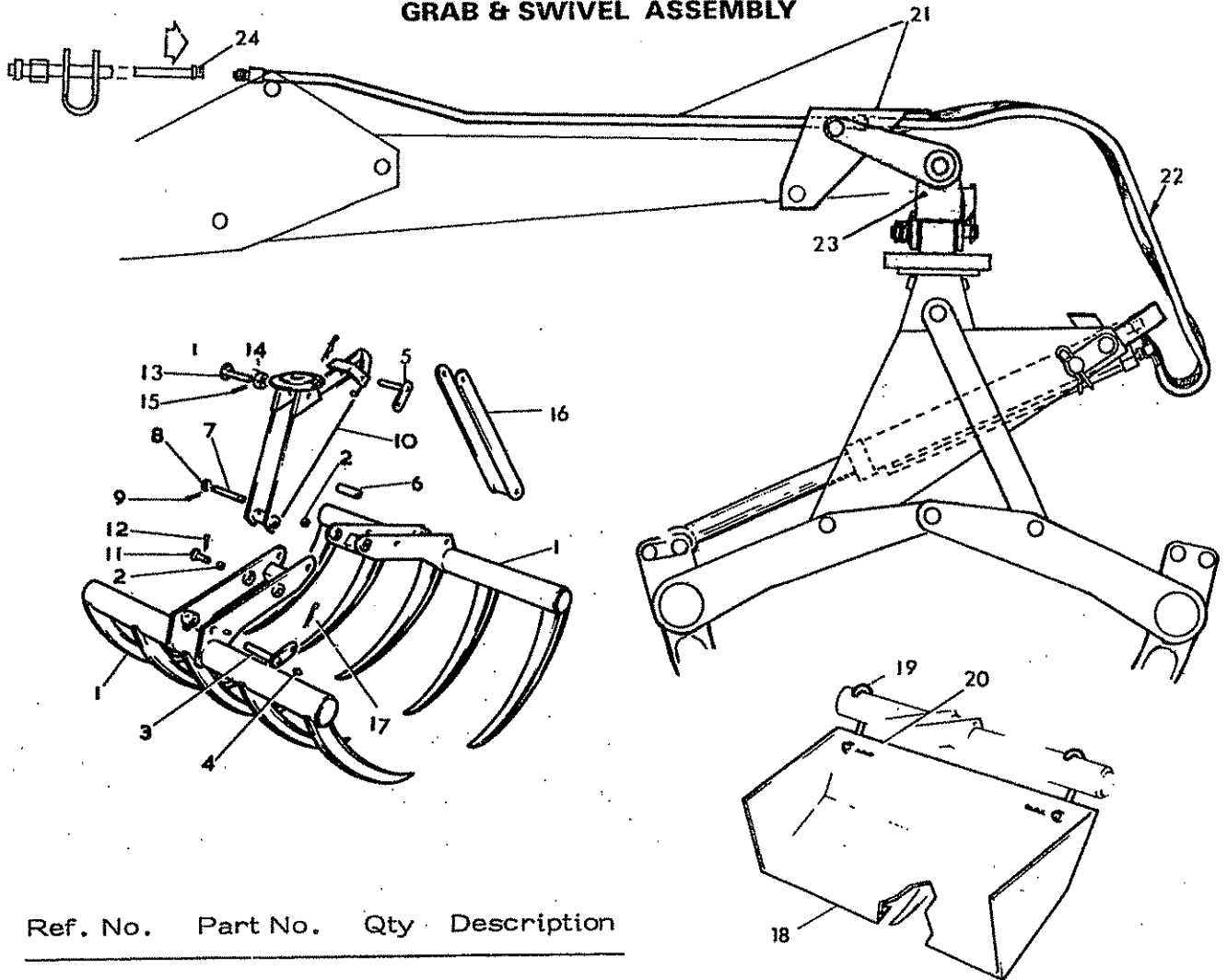
Ref	Part No	Qty	Description
	71 06 290	1	DIGGER LOADER ARMHEAD ASSEMBLY
1	71 06 291	1	. Main arm c/w pipes & ram pin
2	71 06 104	2	.. Rigid pipe
3	72 13 003	4	.. Union
4	71 06 111	1	.. Ram base end pin c/w spring cotter
5	04 31 105	1	... Spring cotter
6	71 06 296	1	. Rocker arm assembly c/w pins & bushes etc.
7	71 01 134	2	.. Bush
8	09 01 121	1	.. Greaser
9	71 06 112	1	.. Rocker pivot c/w spirol pin
10	04 42 632	2	.. Spirol pin 3/8" dia. x 2" long
11	04 23 532	2	.. Spring dowel 5/8 dia. x 2" long
12	71 06 113	1	.. Lift link pivot pin c/w split pin & tail plate
13	05 03 166	1	... Split pin
14	71 06 114	1	... Tail plate
	71 06 297	1	. Lift link assembly
15	71 06 298	1	.. Lift link outer c/w bush etc
16	71 05 037	2	... Bush
17	09 01 121	2	... Greaser
18	71 06 299	1	.. Lift link inner c/w greaser
19	09 01 121	1	... Greaser
20	71 06 124	1	.. Tongue
21	71 06 125	1	.. Plunger
22	71 06 126	1	.. Cam c/w spring dowel
23	04 22 632	1	... Spring dowel 3/8" dia. x 2" long
24	71 05 036	1	.. Spring
25	71 06 127	1	.. Pivot pin
26	71 06 128	1	.. Plunger c/w spring dowel
27	04 22 824	1	... Spring dowel 1/4" dia. x 1.1/2" long
28	02 11 146	3	.. 5/8" UNF bolt
29	01 51 006	3	.. 5/8" UNF thin aeronut
30	71 06 300	1	. Lift ram assembly
31	71 06 302	1	. Dipper arm upper c/w pins, bushes etc.
32	71 01 134	2	.. Bush
33	70 12 037	4	.. Bush
34	60 12 022	2	.. Bush
35	71 06 136	2	.. Joint pin c/w linch pin
36	04 31 217	1	... Linch pin
37	71 06 111	1	.. Ram base pin c/w spring cotter
38	04 31 105	1	... Spring cotter
39	71 05 104	1	.. Reach ram rod end pin
40	04 22 524	1	.. Spring dowel
41	09 01 121	2	.. Greaser
42	71 06 135	1	.. Reach arm pivot pin c/w spirol pin
43	04 42 632	2	... Spirol pin 3/8" dia. x 2" long
	71 06 307	1	. Dipper arm lower c/w slave link etc.
44	71 06 308	1	.. Dipper arm lower c/w bushes etc.
45	71 01 134	2	... Bucket pivot bush
46	71 01 083	2	... Radius arm pivot bush
47	09 01 121	1	... Greaser
48	71 06 367	1	.. Radius arm
49	71 06 312	1	.. Slave link c/w bushes etc.
50	71 01 134	2	... Bush
51	71 01 083	2	... Bush
52	09 01 121	1	... Greaser
53	71 06 138	2	.. Bucket pivot pin
54	71 05 090	2	.. Radius arm pin c/w pin & greaser
55	09 01 121	1	... Greaser
56	05 03 165	1	... Split pin 3/16" dia. x 2" long
57	71 03 301	2	. Reach and bucket ram assembly
58	85 11 328	2	. Hose J.I.C. 32" long
59	71 06 091	1	. Lift ram pin base end c/w spirol pin
60	04 42 632	2	.. Spirol pin 3/8" dia. x 2" long

DIPPER ARM LONG



<u>Ref.No.</u>	<u>Part No.</u>	<u>Qty</u>	<u>Description</u>
	71 06 313	1	LONG DIPPER ARM ASSEMBLY c/w Links etc.
1	71 06 314	1	.Dipper Arm Welded Assy c/w Bushes etc.
2	71 01 134	2	..Steel Bush
3	71 01 083	4	..Radius Arm Pivot Bush
4	09 01 121	1	..Greaser
5	71 06 316	1	.Slave Link - Long c/w Bushes and Greaser
6	71 05 050	1	..Steel Bush
7	70 12 037	4	..Steel Bush
8	09 01 121	1	..Greaser
9	71 06 312	1	.Slave Link c/w Bushes and Greaser
10	71 01 134	2	..Steel Bush
11	71 01 083	2	..Bush
12	09 01 121	1	..Greaser
13	71 06 141	2	.Radius Arm c/w Split Pin and Greaser
14	05 03 165	2	..2" x 3/16" Split Pin
15	09 01 121	2	..Greaser
16	71 06 367	1	.Radius Arm (Cranked)
17	71 05 090	2	.Radius Arm Pin c/w Split Pin and Greaser
18	05 03 165	2	..2" x 3/16" Split Pin
19	09 01 121	2	..Greaser

GRAB & SWIVEL ASSEMBLY

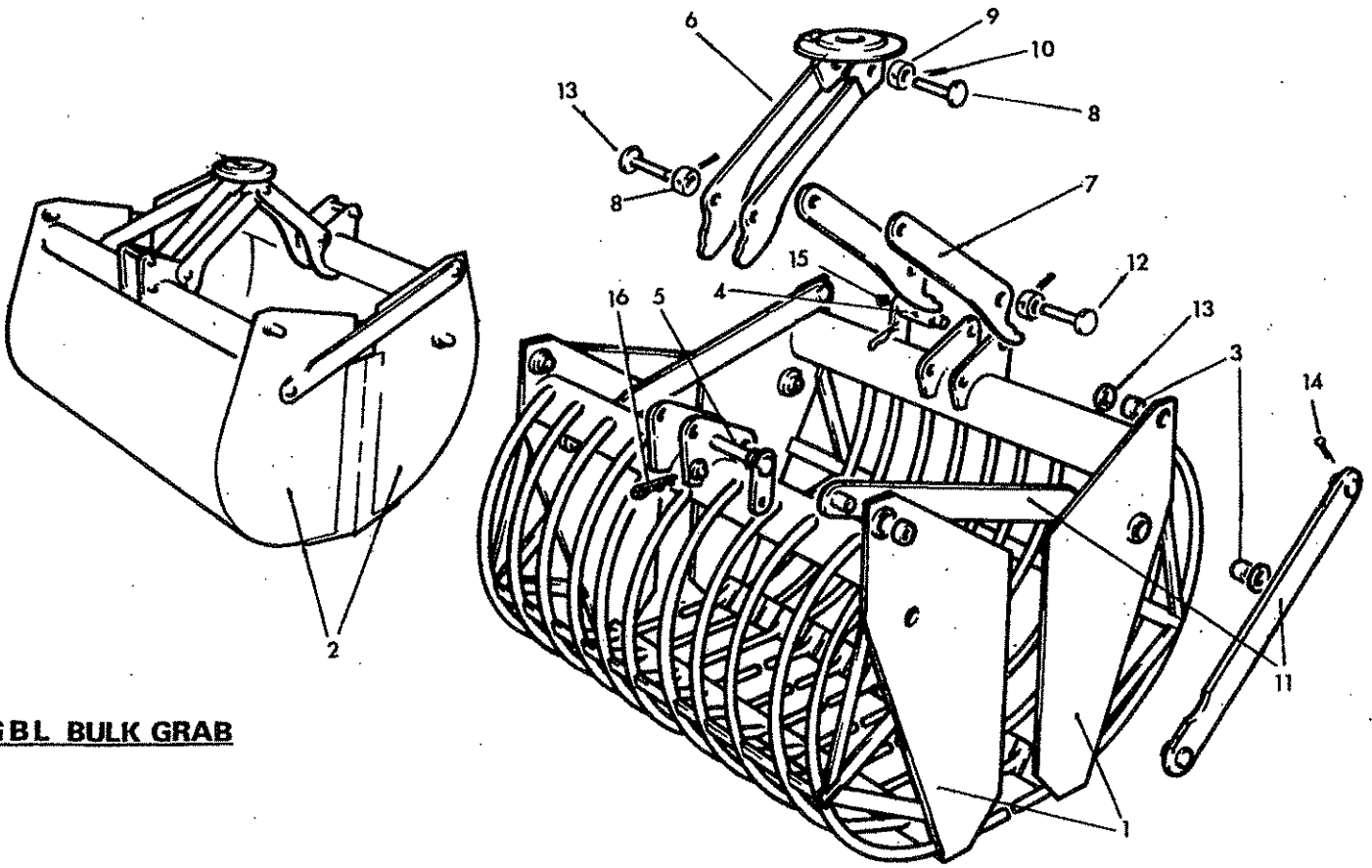


Ref. No.	Part No.	Qty	Description
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	73 12 290		GRAB & SWIVEL ASSEMBLY COMPLETE
	72 14 300		.Grab compact manure (GCM) assy.
1	72 14 301	2	..Tine bar c/w bushes
2	72 14 060	10	...Grab pivot bush
3	72 14 071	1	..Rod end pin
4	09 01 121	1	...Greaser
5	72 14 064	1	..Ram pivot pin c/w cotter
6	72 14 062	1	..Distance piece
7	72 14 063	1	..Joint pin c/w washers & split pin
P	70 14 048	2	...1" washer
9	05 03 125	2	...1½" x 3/16" split pin
10	72 14 302	1	..Suspension frame
11	72 14 066	4	..Pivot pin c/w split pin
12	05 03 165	4	...2" x 3/16" split pin
13	72 14 065	1	..Suspension link pin collar and dowel
14	72 14 068	1	...Collar
15	04 21 628	1	...Dowel 1 3/4" x 3/16"
16	72 14 061	1	..Suspension link
17	04 31 105	4	..Spring cotter
18	70 14 287	2	.Tine plate c/w hook & spring cotter (optional extra)
19	70 14 071	2	..Attachment hook
20	04 31 105	2	..Spring cotter
21	73 12 297	1	.Carrier bracket assy.
22	85 31 598	2	.Hose 59" S/90°
23	73 12 294	1	.K44 grab suspension swivel assy. see illustration on next page for detail
24	73 12 298	1	Extension pipe. Required when long drop arm fitted.

GRAB ASSEMBLIES
used with inclined
grab rams

GBR BEET GRAB



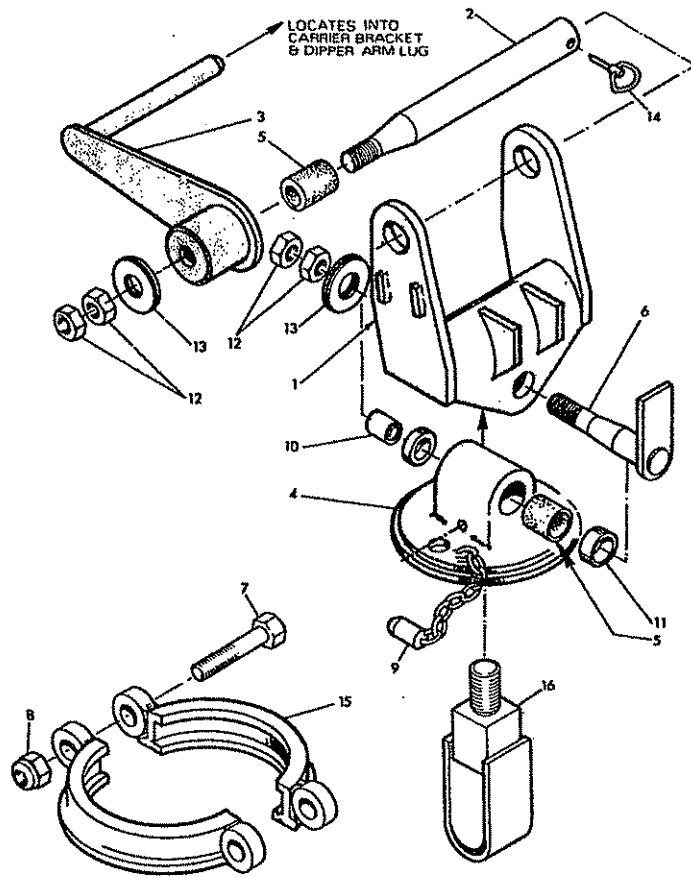
GBL BULK GRAB

	70 14 268	1	G.B.R. (Grab Beet Roots) GRAB comprising:-
1	71 04 269	2	.Beet grab halves c/w bushes
	72 14 305	1	G.B.L. (Grab Bulk Lime) GRAB comprising:-
2	72 14 306	2	.Bulk grab halves c/w bushes

The following parts are common to both grabs

3	71 01 083	8	..Bush
4	70 14 042	1	.Ram pin base end c/w spring cotter
5	71 04 043	1	.Ram pin rod end c/w greaser & spring cotter
6	70 14 315	1	.Suspension frame
7	70 14 316	1	.Suspension link
8	70 14 087	1	.Suspension link pin c/w collar & spring dowel
9	71 04 074	1	..Collar
10	04 21 624	1	..Spring dowel 1½" x 3/16"
11	72 14 069	4	.Cross link
12	70 14 088	2	.Suspension link pin (lower) c/w collar & spring dowel
13	70 14 048	8	.Special washer
14	05 03 125	8	.Split pin 1½" x 3/16"
15	09 01 121	1	.Greasee
16	04 31 105	2	.Spring cotter

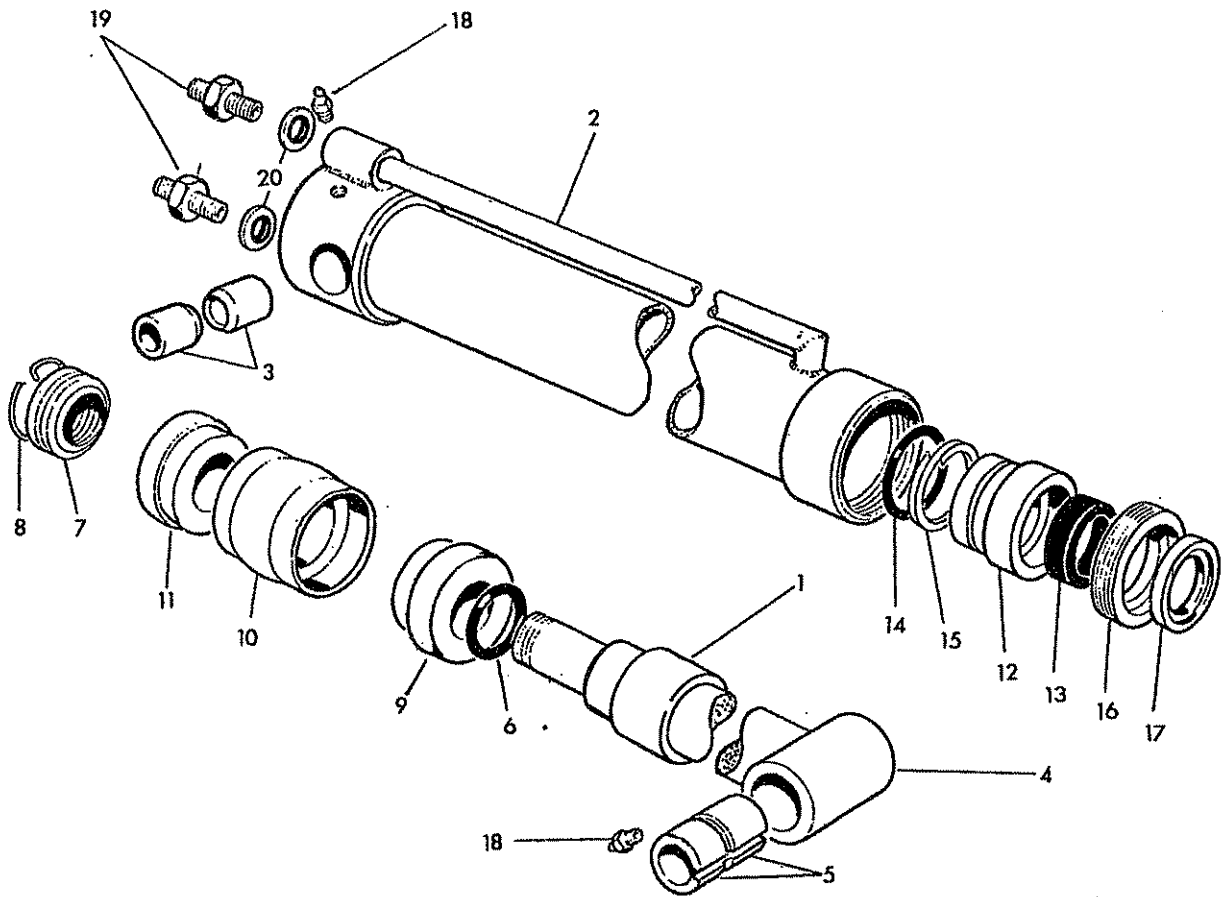
K 44 SUSPENSION SWIVEL



K44 SWIVEL ASSEMBLY

Ref. No.	Part Number	Qty	Description
	73-12-294	1	K44 GRAB SUSPENSION SWIVEL ASSEMBLY comprising:
1	73-12-295	1	.Universal Jaw
2	73-12-024	1	.Suspension swivel pin
3	73-12-296	1	.Torque arm
4	71-05-324	1	.Swivel plate c/w pins
5	71-05-071	2	.Friction sleeve
6	71-05-072	1	.Swivel pin
7	02-11-186	2	.5/8" UNF x 2 1/4" Hex bolt
8	01-51-006	2	.5/8" UNF thin aeronut
9	71-05-076	1	.Locating pin
10	73-12-072	1	.Steel bush
11	70-12-037	2	.Spring steel bush
12	01-31-006	4	.Locknut, 5/8" UNF
13	70-14-027	4	.Spring disc
14	04-31-217	1	.Linchpin
15	71-05-326	2	.Split clamp
16	73-12-073	1	Safety strap (for use with GCM grab only)

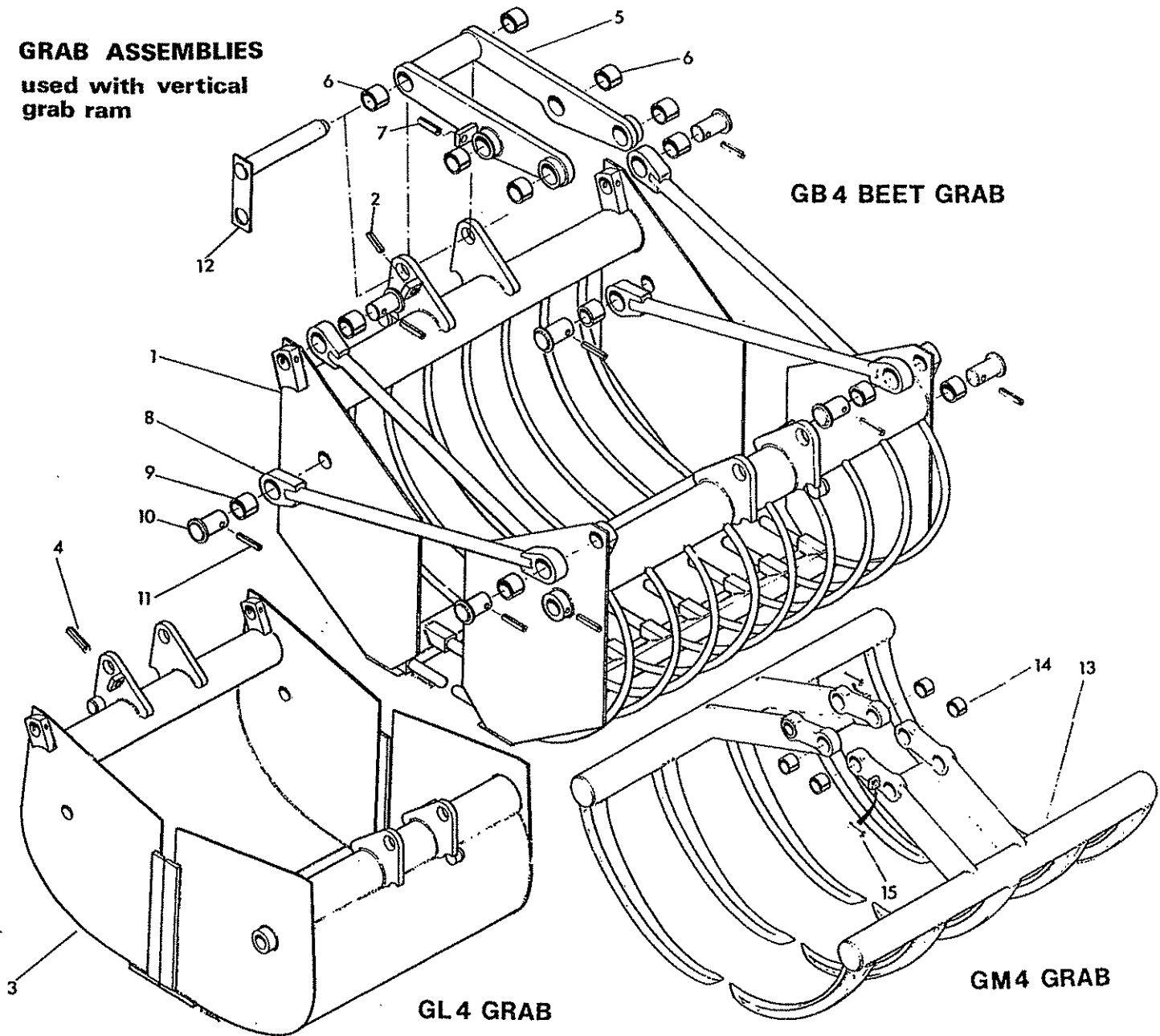
INCLINED GRAB RAMS



Ref	Part No.	Qty	Description
	71 03 302		GRAB RAM FOR GCM & GBL GRABS
	71 06 323		GRAB RAM FOR GBR GRAB
1	72 14 048	1	.Collar
	The following items are common to both grab rams.		
	72 12 271	1	.Ram comprising:-
2	72 12 272	1	..Ram cylinder c/w sleeve
3	71 01 158	2	...Sleeve
4	72 12 004	1	..Piston rod c/w bush
5	71 05 050	2	...Bush
6	86 00 119	1	..'O' ring
7	71 01 096	1	..Piston nut
8	71 01 152	1	..Piston nut locking ring
9	71 01 097	1	..Piston inner
10	86 35 131	1	..Piston seal
11	71 01 098	1	..Piston outer
12	71 01 099	1	..Gland housing
13	86 22 127	1	..Gland seal
14	86 00 304	1	..'O' ring
15	86 09 304	1	..Anti extrusion ring
16	71 01 100	1	..Gland nut
17	86 40 328	1	..Piston rod wiper
18	09 01 121	2	..Greaser 1/8" BSP straight
19	71 03 062	2	.Union 3/8" BSP - 3/4" JIC
20	86 50 103	2	.Bonded seal

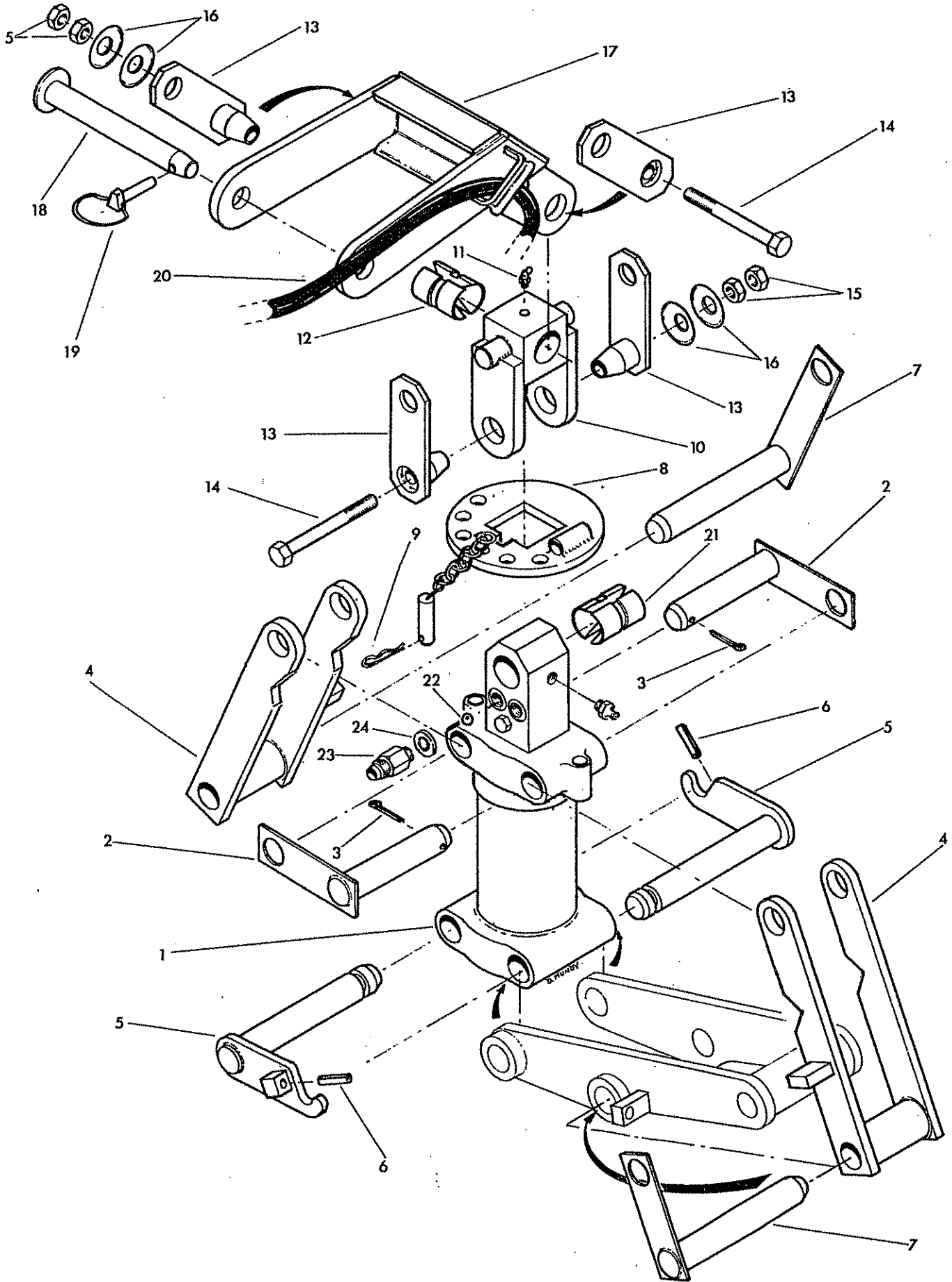
GRAB ASSEMBLIES

used with vertical grab ram



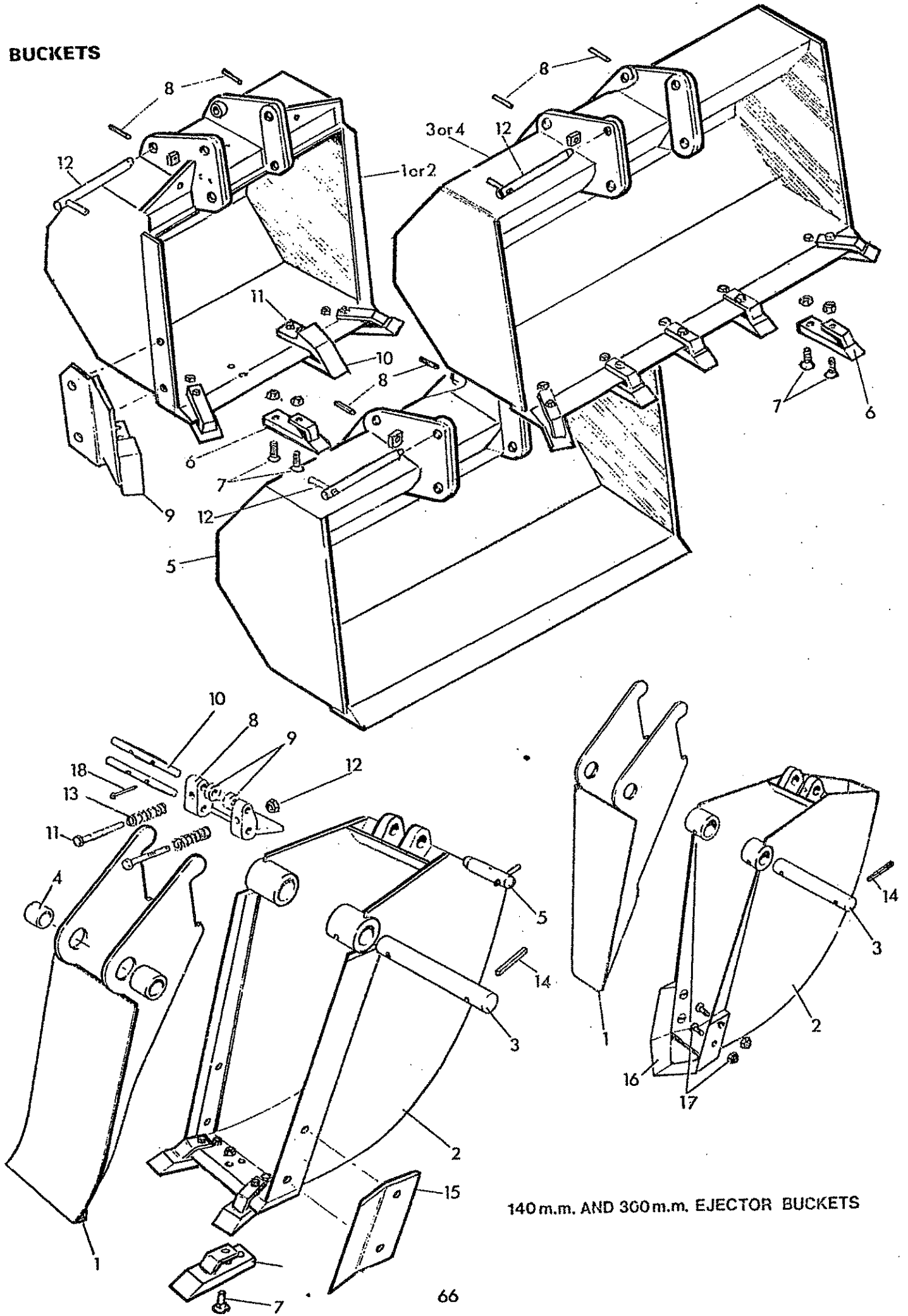
Ref	Part No	Qty	Description
	73 12 335	1	GB4, BEET GRAB ASSEMBLY, comprising:-
1	73 12 336	2	. Grab half, c/w spring dowel
2	04 22 728	1	.. Spring dowel, 1 3/4" x 7/16" dia.
	73 12 340	1	GL4 GRAB ASSEMBLY comprising:-
3	73 12 341	2	. Grab half, c/w spring dowel
4	04 22 728	1	.. Spring dowel
The following items 5 - 12 (incl) are common to GB4 & GL4 Grab Assemblies:-			
5	73 12 343	2	. Suspension link c/w bushes & spring dowel
6	60 12 032	6	.. Bush
7	04 22 728	1	.. Spring dowel, 1 3/4" x 7/16" dia.
8	73 12 067	4	. Cross link c/w bushes
9	60 12 032	2	.. Bush
10	73 12 068	8	. Cross link pin c/w spring dowel
11	04 22 632	1	.. Spring dowel, 2" x 3/8" diameter
12	73 12 063	2	. Grab linkage pin
13	73 12 330	2	GM4 GRAB HALF c/w bushes and spring dowel
14	60 12 032	4	. Bush
15	04 22 728	1	. Spring dowel, 1 3/4" x 7/16" dia.

**GRAB RAM KNUCKLE & LINKAGE ASSEMBLY—
GM 4, GB 4 & GL 4 GRABS**



Ref	Part No	Qty	Description
	73 12 325	1	GRAB RAM KNUCKLE & LINKAGE ASSY comp:-
1	73 12 344	1	. 4" bore grab ram assembly
2	73 12 064	2	. Suspension link pin, c/w split pin
3	05 03 145	2	.. Split pin, 1 $\frac{3}{4}$ " x 3/16" dia.
4	73 12 061	2	. Grab ram suspension link
5	73 12 078	2	. Ram linkage pin c/w spring dowel
6	04 22 728	2	.. Spring dowel, 1 $\frac{3}{4}$ " x 7/16" dia.
7	73 12 063	2	. Grab linkage pin
8	73 12 054	1	. Indexing plate assembly c/w spring cotter
9	04 31 105	1	.. Spring cotter
10	73 12 329	1	. Knuckle c/w angled greaser
11	09 01 124	1	.. Angled greaser, 1/8" BSP
12	73 12 055	1	. Taper bush
13	73 12 056	1	. Damper pivot
14	02 11 446	2	. Bolt 5 $\frac{1}{2}$ " x 5/8" UNF
15	01 31 006	4	. Thin nut, 5/8" UNF
16	70 14 027	4	. Disc spring
17	73 12 328	1	. Knuckle bracket c/w pin and linch pin
18	73 12 071	1	.. Pin c/w linch pin
19	04 31 217	1	... Linch pin
20	85 51 648	2	. Hose 3/8" bore JIC
21	73 12 055	1	. Steel bush
22	09 05 116	1	. Steel ball
23	73 12 070	2	. Union 3/8" BSP
24	86 50 103	2	. Bonded seal
	86 99 140	1	Seal kit 4" ram

BUCKETS



140m.m. AND 300m.m. EJECTOR BUCKETS

BUCKETS

Ref	Part No	Qty	Description
1	73 12 250	1	400 mm Trenching Bucket c/w tines etc.
2	73 12 251	1	600 mm Trenching Bucket c/w tines etc.
3	73 12 261	1	800 mm Digging Bucket c/w tines etc.
4	73 12 262	1	1 metre Digging Bucket c/w tines etc.
5	73 12 263	1	1.5 metre Ditch Cleaning Bucket
	73 12 320	1	1.2 metre Ditch Cleaning Bucket

The following parts are common to all but the Ditch Cleaning Buckets:-

			400 mm	600 mm	800 mm	1 metre	
6	73 12 005	Qty	4	5	6	7	Bucket tine c/w nuts & bolts
7	60 12 074	Qty	8	10	12	14	Tine bolt & nut complete
8	04 22 732	Qty	2	2	2	2	2" x 7/16" Spring dowel

Heavy duty bucket tine assembly for 400mm & 600mm trenching buckets.

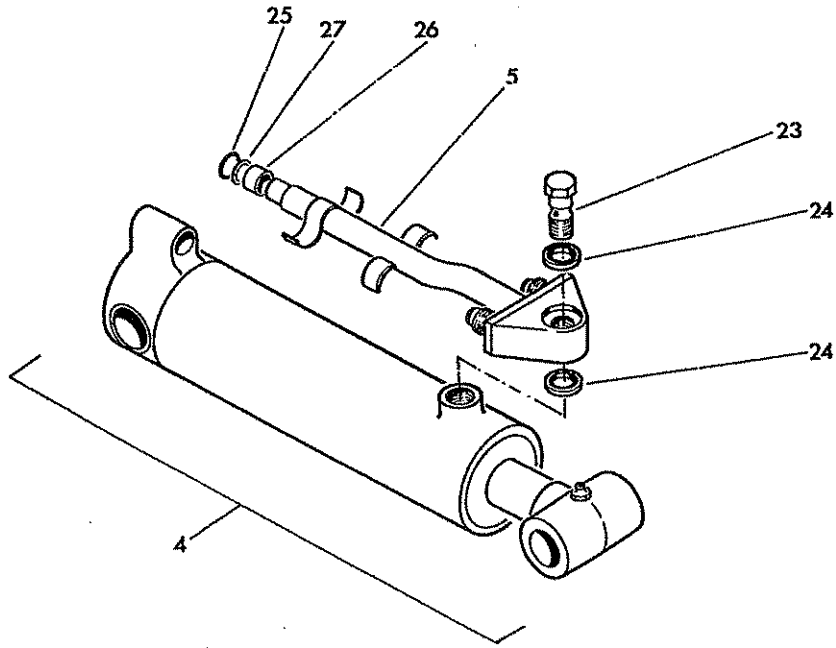
	73 12 321	Set	400mm Heavy Duty Tine Assembly 4 tine. Converts bucket to 450mm.			
	73 12 322	Set	600mm Heavy Duty Tine Assembly 5 tine. Converts bucket to 650mm.			
9	73 12 307	1	End tine assembly R.H. c/w nuts, bolts and washers			
	73 12 308	1	End tine assembly L.H. c/w nuts, bolts and washers			
10	73 12 306		Heavy duty tine c/w bolts, nuts and washers			
11	92 13 085		.Tine bolt			
	91 13 005		.Nut M10			
12	71 06 138	2	Bucket pivot pin (not supplied with bucket)			

EJECTOR BUCKETS

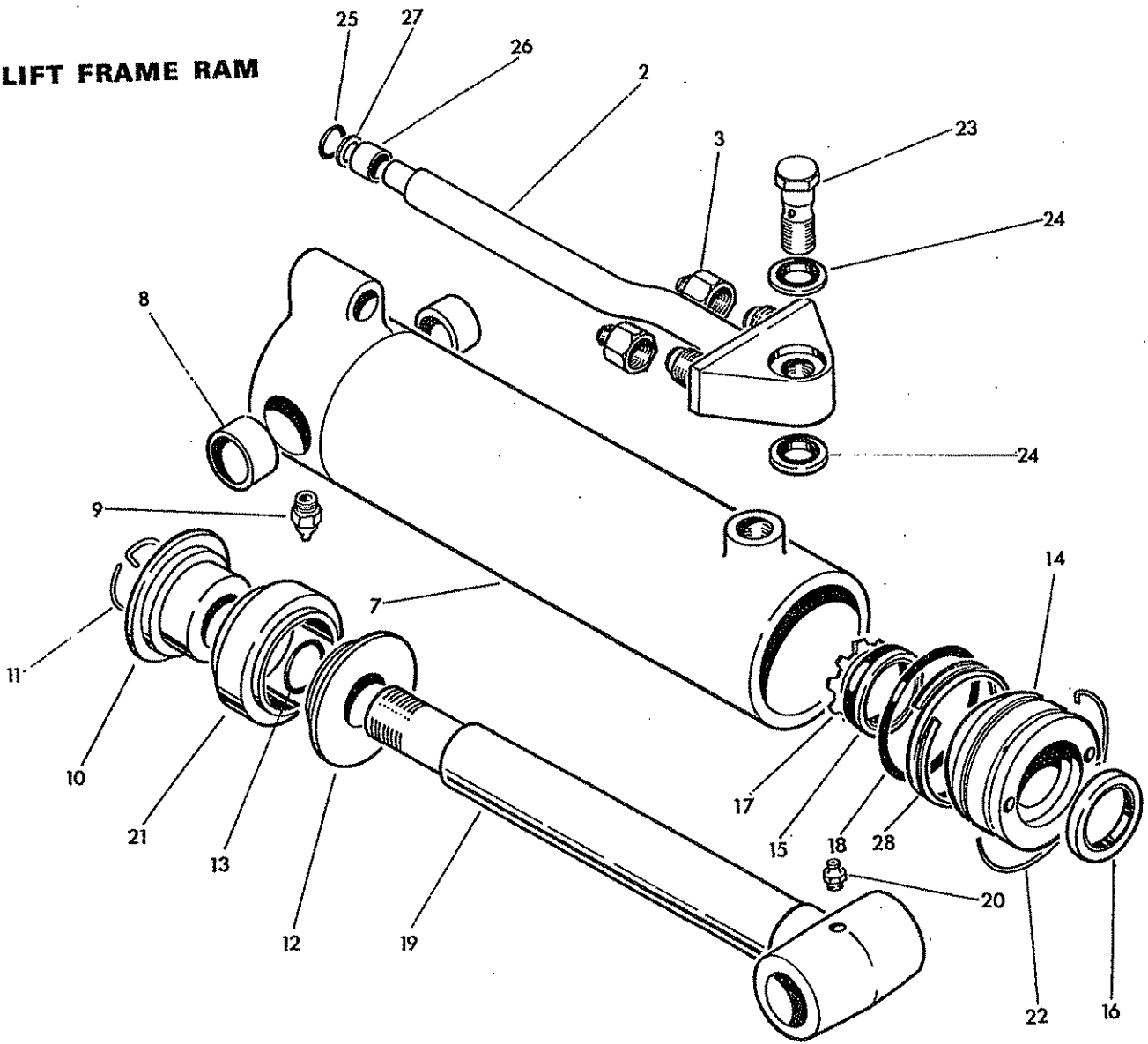
<u>Ref. No.</u>	<u>Part No.</u>	<u>Qty.</u>	<u>Description</u>
	73 12 300	1	300 mm ejector bucket assembly
	73 12 277	1	140 mm ejector bucket assembly
1	73 12 304	1	300 mm ejector plate
	73 12 280	1	140 mm ejector plate
2	73 12 301	1	300 mm welded bucket assembly
	73 12 278	1	140 mm welded bucket assembly
3	73 12 033	1	300 mm bucket pivot pin
	73 12 020	1	140 mm bucket pivot pin
4	73 12 021	2	Bucket pivot bush (140 mm)
	60 12 032	2	Bucket pivot bush (300 mm)
5	73 12 022	1	Ram pivot pin
6	73 12 005	3	Bucket tine c/w bolts & nuts
7	60 12 074	6	Tine bolts & nuts
8	70 12 040	1	Ejector latch
9	72 12 016	2	Ejector Roller
10	70 12 041	2	Ejector pivot pin
11	02 11 183	2	2¼" x 3/8" UNF bolt
12	01 61 003	2	3/8" UNF Aeronut
13	60 00 110	2	Spring
14	04 42 632	2	Spiral pin
15	70 12 072	2	Cheek plate optional extra c/w bolts & nuts
16	70 12 263	1	V shoe c/w bolts & nuts
17	70 12 030	4	Shoe bolts & nuts
18	05 03 085	4	Split Pin, 1" x 3/16"

HYDRAULIC RAMS

LIFT RAM



LIFT FRAME RAM



REL	PART NO	Qty	DESCRIPTION
1	71 06 280	1	3" BORE LIFT FRAME RAM ASSEMBLY
2	71 06 283	1	. Oil pipe assembly
3	71 06 079	2	. Reducing connection
4	71 06 300	1	3" BORE LIFT RAM ASSEMBLY
5	71 06 301	1	. Oil pipe assembly

The following parts are common to the above Rams:-

	71 06 281	1	. Basic 3" bore ram assembly
7	71 06 282	1	.. Cylinder c/w bushes and greaser
8	71 01 134	2	... Bush
9	09 01 121	1	... Grease nipple
10	71 06 072	1	.. Piston - inner, c/w lock ring
11	71 01 152	1	... Ram nut locking ring
12	71 06 073	1	.. Piston - outer, c/w 'O' ring
13	86 00 123	1	... 'O' ring
14	71 05 044	1	.. Gland housing c/w seals etc.
15	86 22 127	1	... Gland seal
16	86 40 328	1	... Piston rod wiper
*17	04 17 132	1	... Fastener
18	86 00 310	1	... 'O' ring
19	71 06 074	1	.. Piston rod c/w greaser
20	09 01 121	1	... Greaser
21	86 33 137	1	.. Piston seal
22	71 06 075	1	.. Locking wire
23	71 06 077	1	. Banjo bolt
24	86 50 104	2	. 1/2" BSP bonded seal
25	86 00 111	1	. 'O' ring
26	71 06 078	1	. Collar
27	86 09 111	1	. Extrusion ring
28	86 09 310	1	. Extrusion ring

86 99 118

RAM SEAL KIT

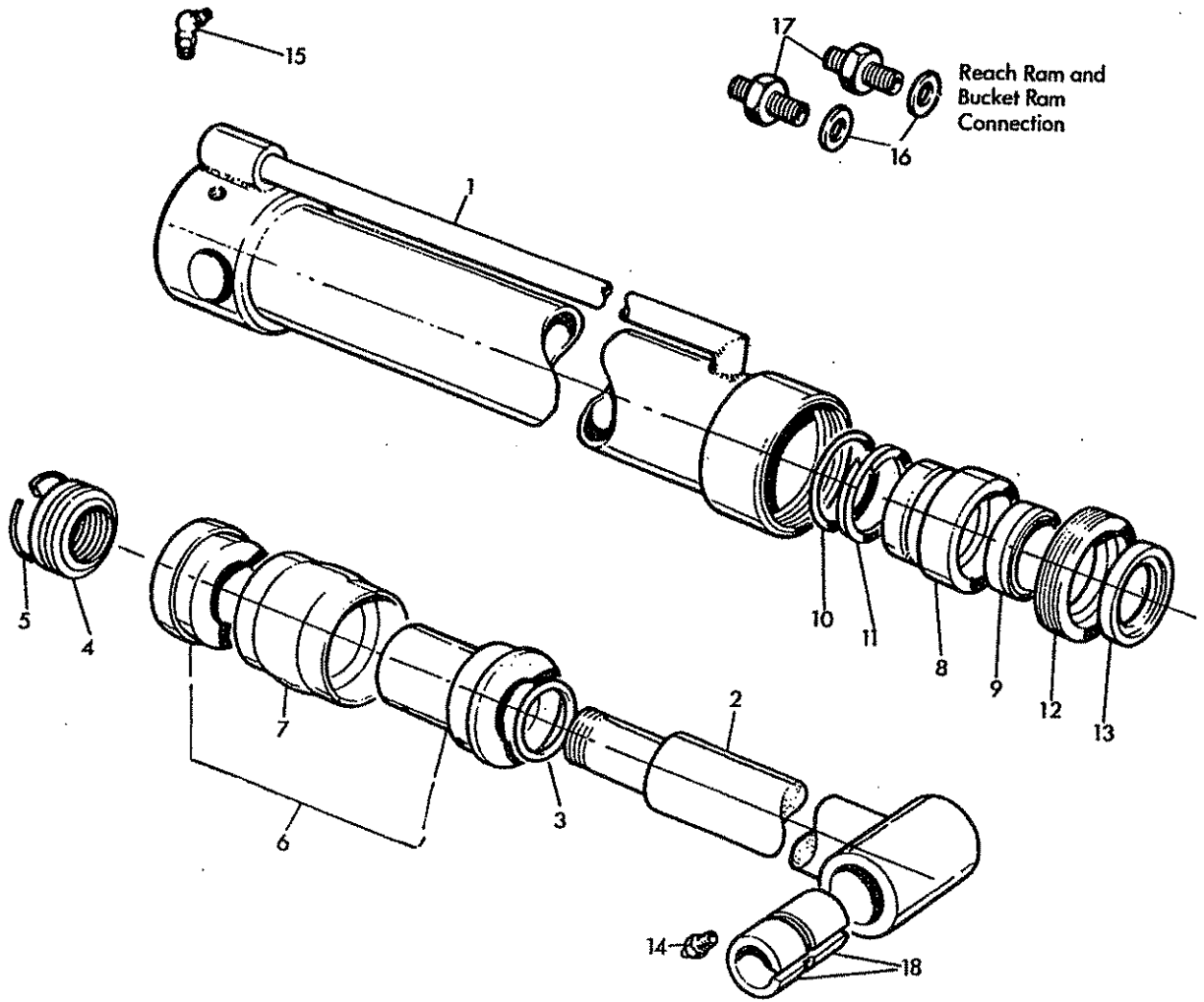
*Note:- 04 17 132 is a star washer type fastener
04 12 132 is a circlip type fastener for which a circlip groove
is machined in the gland housing.

Important note added February 1979

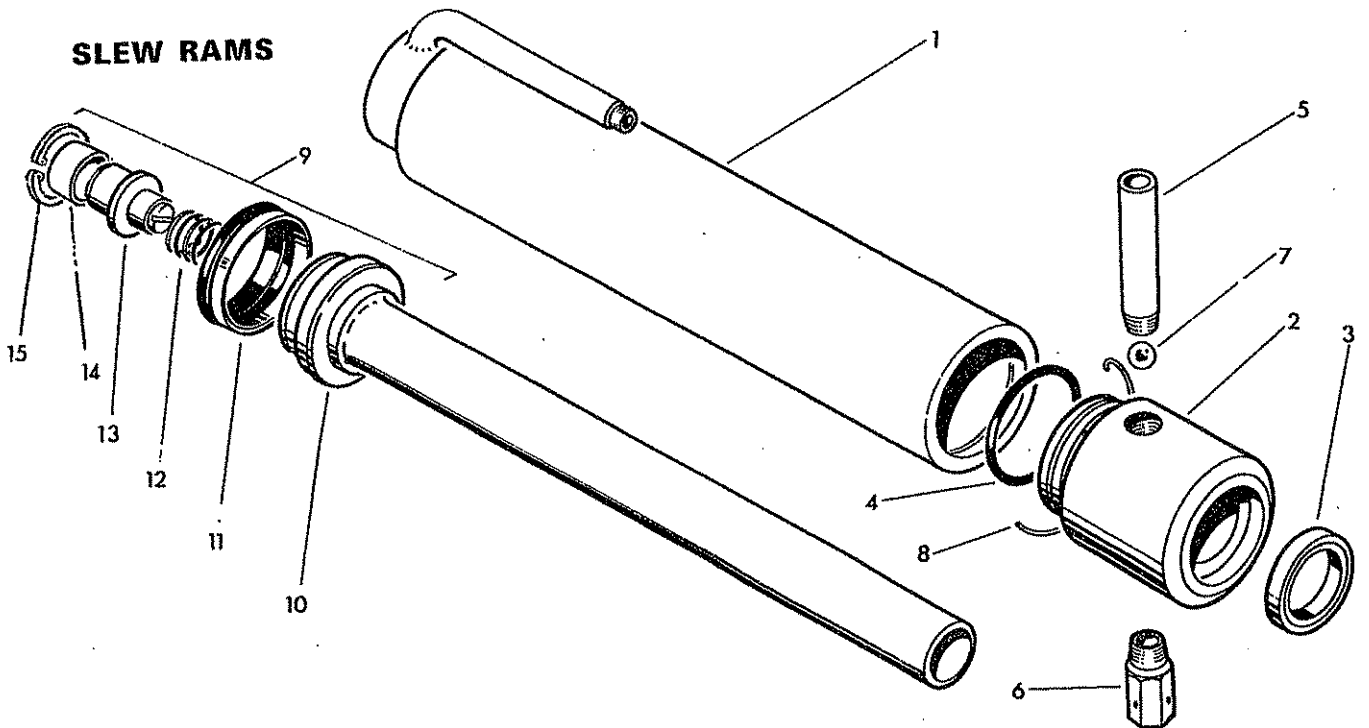
From early Spring 1979 the 3" bore lift ram will be superseded by one of 80 mm bore. This is an increase of 3.8 mm in bore diameter. For identification purposes the figure '80' will be stamped on the base of the ram. Subsequently the 3" lift frame ram will also be changed to 80 mm diameter.

71 05 292	80 mm lift ram assembly replaces 71 06 300
71 05 293	80 mm lift frame ram assembly replaces 71 06 280
71 05 290	80 mm basic ram replaces 71 06 281
86 99 165	SEAL KIT for 80 mm ram.

**HYDRAULIC RAMS —
REACH & BUCKET RAMS**



SLEW RAMS



REACH & BUCKET RAMS

Ref No	Part No	Qty	Description
	71 03 301	1	LONG STROKE RAM COMPLETE COMPRISING:
	71 03 303	1	. Ram assembly comprising:
1	71 03 304	1	.. Ram cylinder
2	71 01 095	1	.. Ram rod c/w bush 'O' ring, nut & greaser
3	86 00 119	1	... 'O' ring for piston rod
4	71 01 096	1	.. Piston nut c/w locking ring
5	71 01 152	1	... Locking ring
6	71 01 097	1	.. Piston assembly c/w seal
7	86 35 131	1	... Piston seal
8	71 01 099	1	.. Gland housing c/w seal and 'O' ring
9	86 22 127	1	... Gland seal
10	86 00 304	1	... 'O' ring
11	86 09 304	1	... Anti-extrusion ring
12	71 01 100	1	.. Gland nut c/w wiper
13	86 40 328	1	... Piston rod wiper
14	09 01 121	1	.. Greaser (straight)
15	09 01 124	1	.. Greaser (angular)
16	86 50 103	2	. Bonded Seal, 3/8" BSP
17	71 03 062	2	. JIC Union
18	71 05 050	2	. Bush Rod End
	86 99 102		RAM SEAL KIT

The above spares list is identical for both reach and bucket rams.

SLEW RAMS

	71 06 335	2	SLEW RAM COMPLETE (after 05 PL 51)
1	71 06 336	1	. Ram barrel (BSP connection)
	71 06 261	2	SLEW RAM COMPLETE
1	71 06 262	1	. Ram barrel (JIC connection before 05 PL 51)

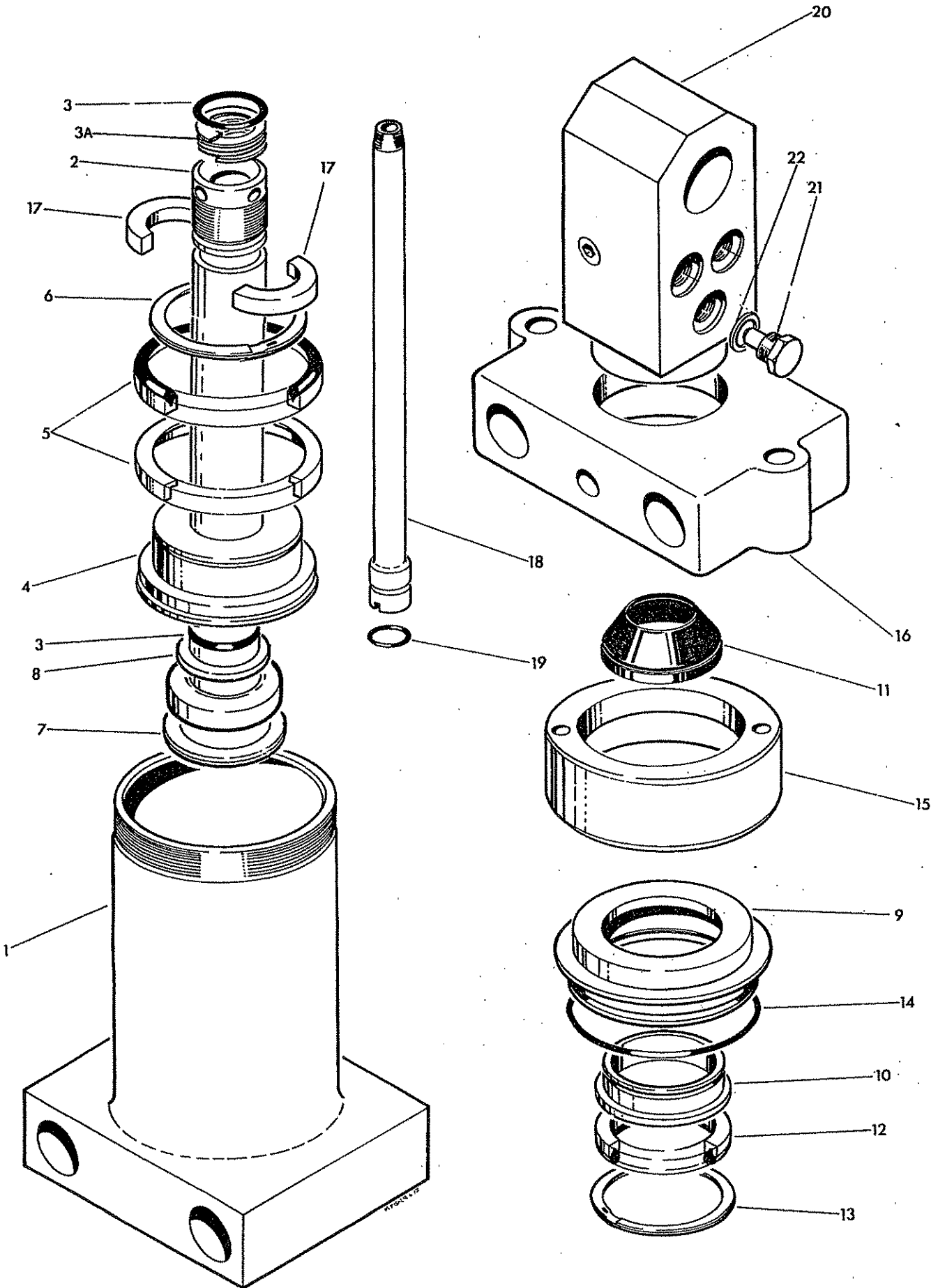
The following parts are common to both ram types:

2	71 06 028	1	. Head bush c/w seals
3	86 40 328	1	.. Wiper seal
4	86 00 306	1	.. 'O' Ring
5	71 06 029	1	. Suction pipe
6	71 06 030	1	. Chain oiler assembly
7	09 05 116	1	. 1/2" steel ball
8	71 01 030	1	. Locking wire
9	71 06 033	1	. Piston assembly complete
10	71 06 034	1	.. Piston rod
11	86 34 133	1	.. Piston seal
12	71 03 078	1	.. Cushion external spring
13	71 03 095	1	.. Cushion valve assembly
* 14	71 06 142	1	.. Sleeve
15	04 12 119	1	.. Locking ring

86 99 119 RAM SEAL KIT

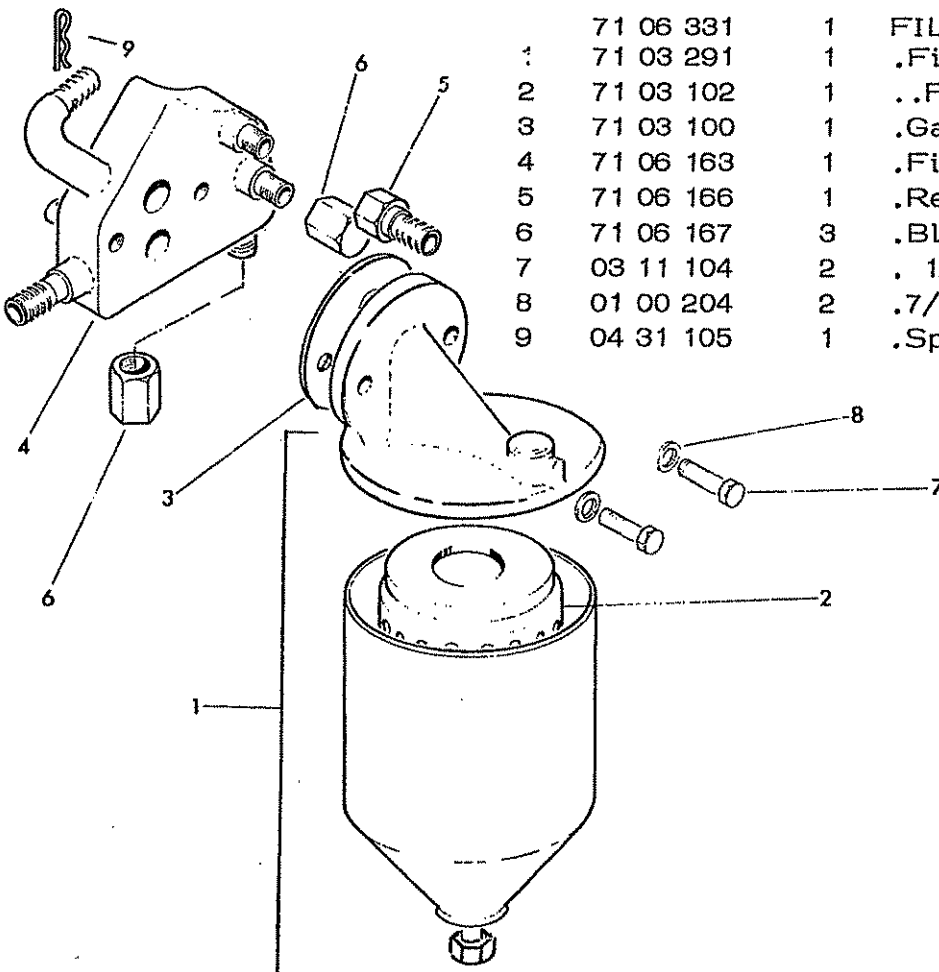
*Note: Item 14 deleted after February 1975.

4" BORE GRAB RAM ASSEMBLY



Ref	Part No	Qty	Description
	73 12 344	1	4" BORE GRAB RAM
1	73 12 348	1	.Ram barrel
2	73 12 355	1	.Piston rod c/w 'O' rings & anti extrusion ring
3	86 00 127	2	.. 'O' ring
3a	86 09 127	1	.. Anti extrusion ring
4	73 12 099	1	.Piston c/w seals & spirolox
5	86 12 145	1	.. Seal
6	04 02 152	1	.. External spirolox 3 1/4" dia
7	04 12 142	1	.. Internal spirolox 2 5/8" dia
8	73 12 100	1	.Thrust washer
	73 12 088	1	.Gland housing c/w seals
9	73 12 080	1	.. Gland housing
10	73 12 050	1	.. Gland bush
11	86 29 118	1	.. Rod wiper
12	86 12 132	1	.. Gland seal
13	04 12 138	1	.. Internal spirolox 2 3/8" dia
14	86 00 318	1	.. 'O' ring
15	73 12 084	1	.Gland nut
16	73 12 347	1	.Swivel
17	73 12 085	1	.Split collar
18	73 12 083	1	.Transfer tube c/w 'O' ring
19	86 00 114	1	.. 'O' ring
20	73 12 346	1	.Rod end
21	73 12 082	1	.Lock screw
22	86 50 103	1	.Bonded seal
	86 99 140	1	.RAM SEAL KIT

Ref	Part No	Qty	Description
	71 06 331	1	FILTER ASSY COMPLETE
1	71 03 291	1	.Filter assembly
2	71 03 102	1	.. Filter element
3	71 03 100	1	.Gasket
4	71 06 163	1	.Filter manifold
5	71 06 166	1	.Return adaptor
6	71 06 167	3	.Blanking plug
7	03 11 104	2	. 1/4" x 7/16" UNF setscrew
8	01 00 204	2	. 7/16" spring washer
9	04 31 105	1	.Spring cotter

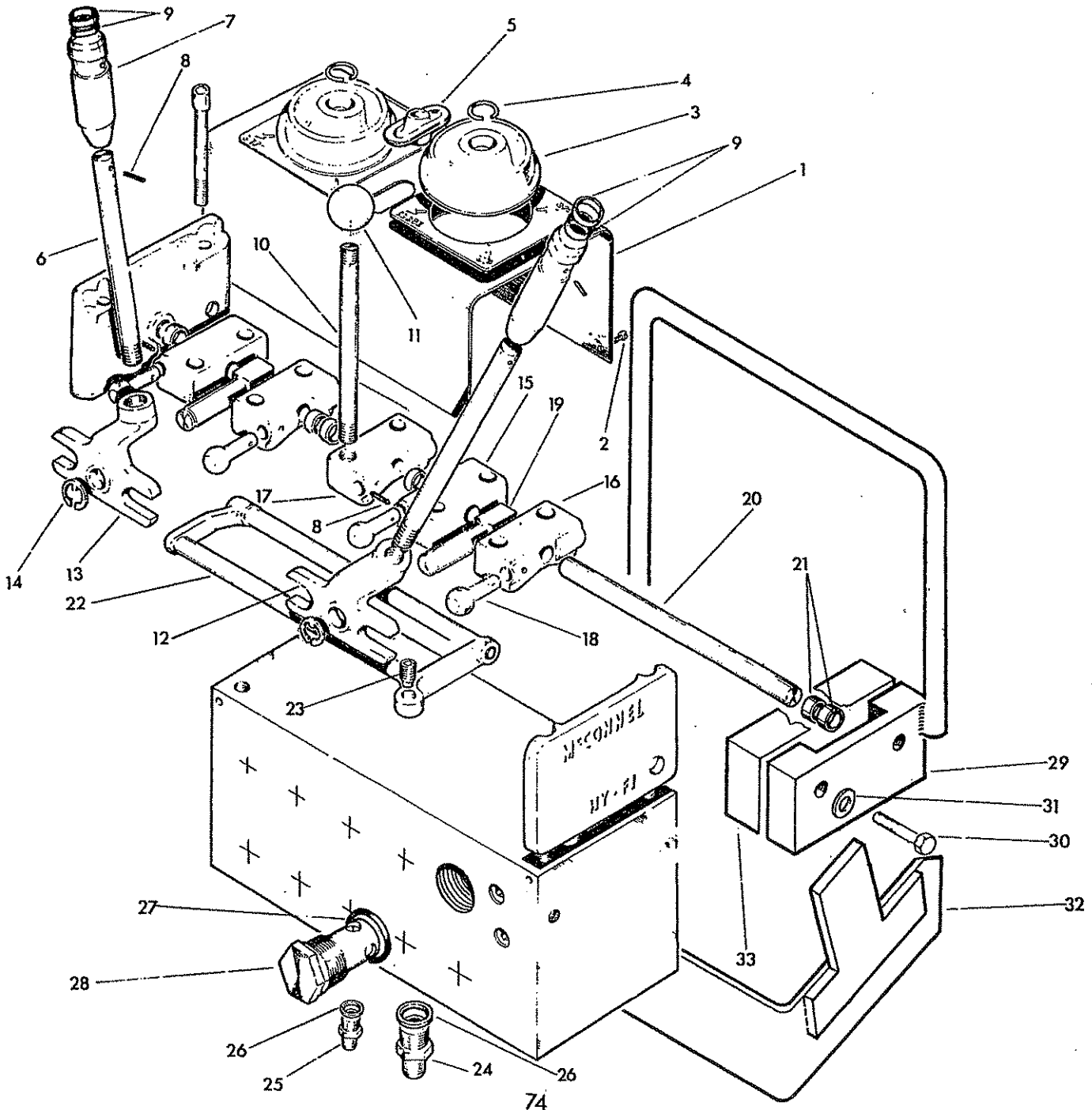


HY-FI CONTROL VALVE

The 3/5S model control valve as used on the P. A. 44 is a precision instrument and as such should only be stripped by qualified technicians. However, a certain amount of servicing can be carried out by the owner/operator. The Hy-Fi consists of an aluminium block into which is fitted two rows of capsules on each side. The block is sectioned and stamped with a series of numbers. The top row of capsules are check valves each of which is identified with a code letter stamped on its face. Although all these check valves may look alike, each has a different operation to perform, so on no account whatever should one be transposed with another of different coding. The lower rows of capsules contain locked line relief valves and these too should not be interchanged. Refer to the diagram for the correct layout.

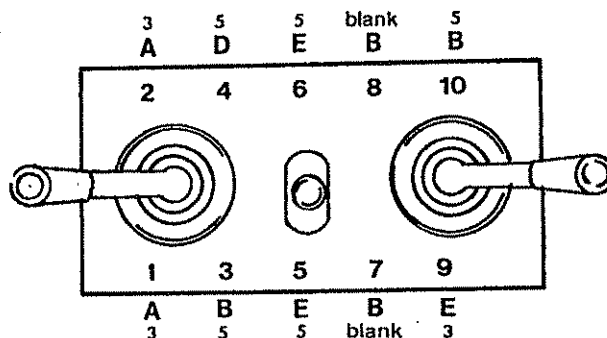
Nylon Rockers

In extreme cases these can become so badly worn as to limit spindle movement. To renew rockers the four allen headed cap screws beneath the tin shroud should be removed. The whole rocker assembly can then be lifted off. Do not start tractor or engage pump at this time or the cut off needle will be ejected. Liberally coat the underside of the rockers with grease on reassembly and re-adjust the tappet clearance between the allen headed grub screw and the cut off needle to 1/32" when the bar is raised by hand.



Ref. No.	Part No.	Qty.	Description
	81 17 405	1	P.A.44 HY-FI assembly complete
1	81 17 252	1	Cover c/w Labels
2	81 14 057	4	Self Tapping screw
3	81 14 028	2	Boot, large
4	04 05 108	2	Wire ring clip
5	81 17 001	1	Boot, small
6	81 14 075	2	Lever
7	81 14 053	2	Handle
8	04 20 812	2	Roll pin
9	81 14 063	1	Black ring
	81 14 062	1	Red ring
	81 14 060	1	Yellow ring
	81 14 061	1	Green ring
10	81 17 009	1	Lever
11	09 03 114	1	Yellow knob
12	81 14 073	1	Lever bracket R. Hand
13	81 14 074	1	Lever bracket L. Hand
14	81 14 058	2	Circlip
15	81 14 055		Rocker L. Hand c/w ball & Pin
16	81 14 054		Rocker R. Hand c/w ball & pin
	81 14 033	4	Rocker only
17	81 17 006	1	Centre rocker
18	81 14 034	4	Ball end
19	81 14 030	2	Lever pivot
20	81 17 003	1	Rocker shaft
21	81 14 031	6	Spacer
22	81 17 004	1	Cut off lever
23	81 14 056	1	Socket screw (cut off adjustment)
24	71 03 062		Union 3/8" BSP x 3/4" JIC
25	81 17 010		Union 3/8" BSP x 7/16" JIC
26	86 50 103		Bonded seal 3/8" BSP
27	86 00 402		'O' ring
28	81 14 150		A type
	81 14 149		B type
	81 14 153		D type
	81 14 154		E type
			Check valve assembly
29	71 06 347		Hy-Fi mounting handle
30	02 12 163		3/8" UNC x 2" bolt
31	01 00 203		3/8" Spring washer
32	71 06 345		Hy-Fi mounting bracket
33	71 06 183	2	Packing Piece

Layout of check valves and line relief valves



Ref	Part No	Qty	Description
	80 13 296		GEARBOX HIGH RATIO PDL PUMP
1	82 01 480	1	. Hydraulic pump Dowty 1P3044/C/SSFB
2	80 05 021	1	. Pressure connection c/w '0' ring set screws
3	86 00 405	1	.. '0' ring
4	03 12 082	4	.. 5/16" UNC x 1" long set screw
5	03 12 084	2	. 7/16" UNC x 1" long set screw
6	01 00 204	2	. 7/16" dia. spring washer
7	80 05 022	1	. Suction connection c/w '0' ring set screws
8	86 00 405	1	.. '0' ring
9	03 12 082	4	.. 5/16" UNC x 1" long set screw
10	80 13 043	1	. Splined coupling
	80 13 295		GEARBOX HIGH RATIO PSF PUMP
	82 01 478	1	. Dowty pump c/w connections comprising:-
11	82 01 475	1	.. Dowty pump 2P3146 CSSFB
12	80 13 022	1	.. Inlet connection c/w screw
13	02 42 202	2	... 5/16" UNC socket cap screw
14	80 13 023	1	.. Inlet gasket
15	80 13 038	1	.. Outlet connection c/w screw and '0' ring
16	86 00 121	1	... '0' ring
17	02 42 162	4	... 5/16" UNC socket cap screw
18	86 00 436	1	. '0' ring
19	80 13 025	1	. Adaptor flange, c/w bolts & nuts etc.
20	02 11 205	2	.. 1/2" UNF x 2.1/2" long bolt
21	01 00 005	2	.. 1/2" UNF nut
22	01 00 205	2	.. Spring washer
23	80 13 028	1	. Splined coupling

The following items are common to both gearbox pump combinations:-

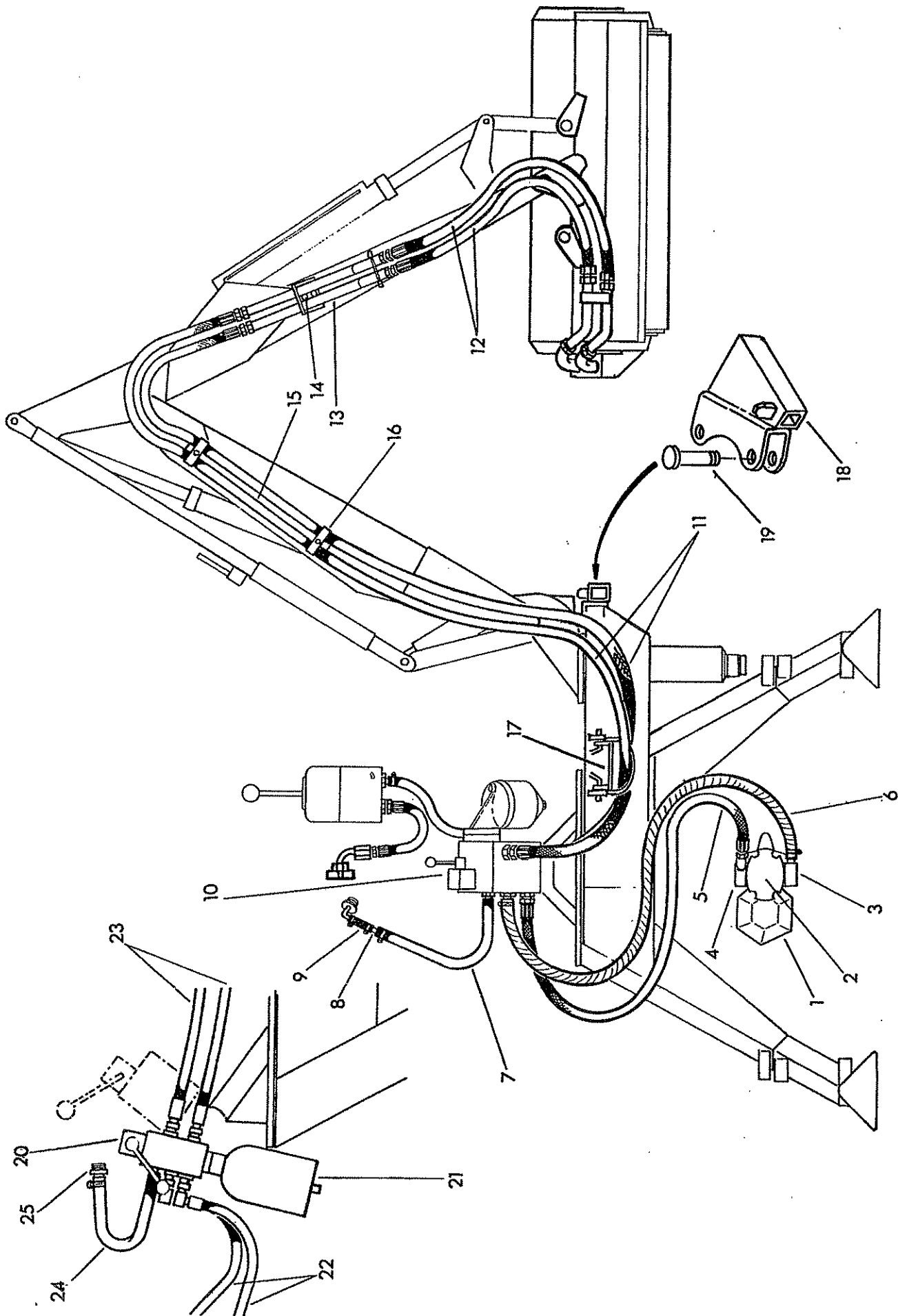
	80 13 290	1	. High Ratio Gearbox comprising:-
24	80 13 291	1	.. Case Input Side
25	80 13 292	1	.. Case Out Put Side
26	80 13 263	1	.. Take off Shaft
27	80 13 294	1	.. Gear, 77 teeth
28	80 13 293	1	.. Gear, 18 teeth
29	80 13 030	1	.. Ball Retainer
30	80 13 031	1	.. Bung
31	09 05 116	3	.. 1/2" dia. Ball
32	86 29 116	1	.. Oil Seal
33	86 00 409	1	.. '0' ring
34	86 00 435	1	.. '0' ring
35	04 16 112	1	.. Circlip 3/4" Internal
36	04 16 124	1	.. Circlip 1.1/2" Internal
37	04 06 250	1	.. M50 External Circlip
38	02 11 242	7	.. 5/16" UNF Hexagon Bolt
39	01 11 002	7	.. 5/16" UNF Hexagon Nut
40	01 00 202	7	.. Spring Washer
41	80 13 033	1	.. Breather Valve
42	01 00 903	1	.. Fibre Washer
43	80 13 032	1	.. Ball Retaining Spring
44	06 03 650	2	.. Bearing
45	06 04 640	2	.. Bearing
46	09 02 330	1	. Chain
	60 00 087	2	. Shackle assembly each comprising:-
47	60 00 089	1	.. Shackle pin
48	60 00 088	1	.. Shackle
49	04 31 105	1	.. Spring cotter

Ref	Part No	Qty	Description
	80 13 265		GEARBOX LOW RATIO PDL PUMP
1	82 01 480	1	. Hydraulic pump Dowty 1P3 044/C/SSFB
2	80 05 021	1	. Pressure connection c/w '0' ring set screws
3	86 00 405	1	.. '0' ring
4	03 12 082	4	.. 5/16" UNC x 1" long set screw
5	03 12 084	2	. 7/16" UNC x 1" long set screw
6	01 00 204	2	. 7/16" dia. spring washer
7	80 05 022	1	. Suction connection c/w '0' ring setscrews
8	86 00 405	1	.. '0' ring
9	03 12 082	4	.. 5/16" UNC x 1" long set screw
10	80 13 001	1	. Splined coupling
	82 01 489		GEARBOX LOW RATIO PSF PUMP
	82 01 478	1	. Dowty pump c/w connections comprising:-
11	82 01 475	1	.. Dowty pump 2P3146CSSFB
12	80 13 022	1	.. Inlet connection c/w screw
13	02 42 202	2	... 5/16" UNC socket cap screw
14	80 13 023	1	.. Inlet gasket
15	80 13 038	1	.. Outlet connection c/w screw and '0' ring
16	86 00 121	1	... '0' ring
17	02 42 162	4	... 5/16" UNC socket cap screw
18	86 00 436	1	. '0' ring
19	80 13 025	1	. Adaptor flange, c/w bolts & nuts etc.
20	02 11 205	2	.. 1/2" UNF x 2.1/2" long bolt
21	01 00 005	2	.. 1/2" UNF nut
22	01 00 205	2	.. Spring washer
23	80 13 002	1	. Splined coupling

The following items are common to both gearbox pump combinations:-

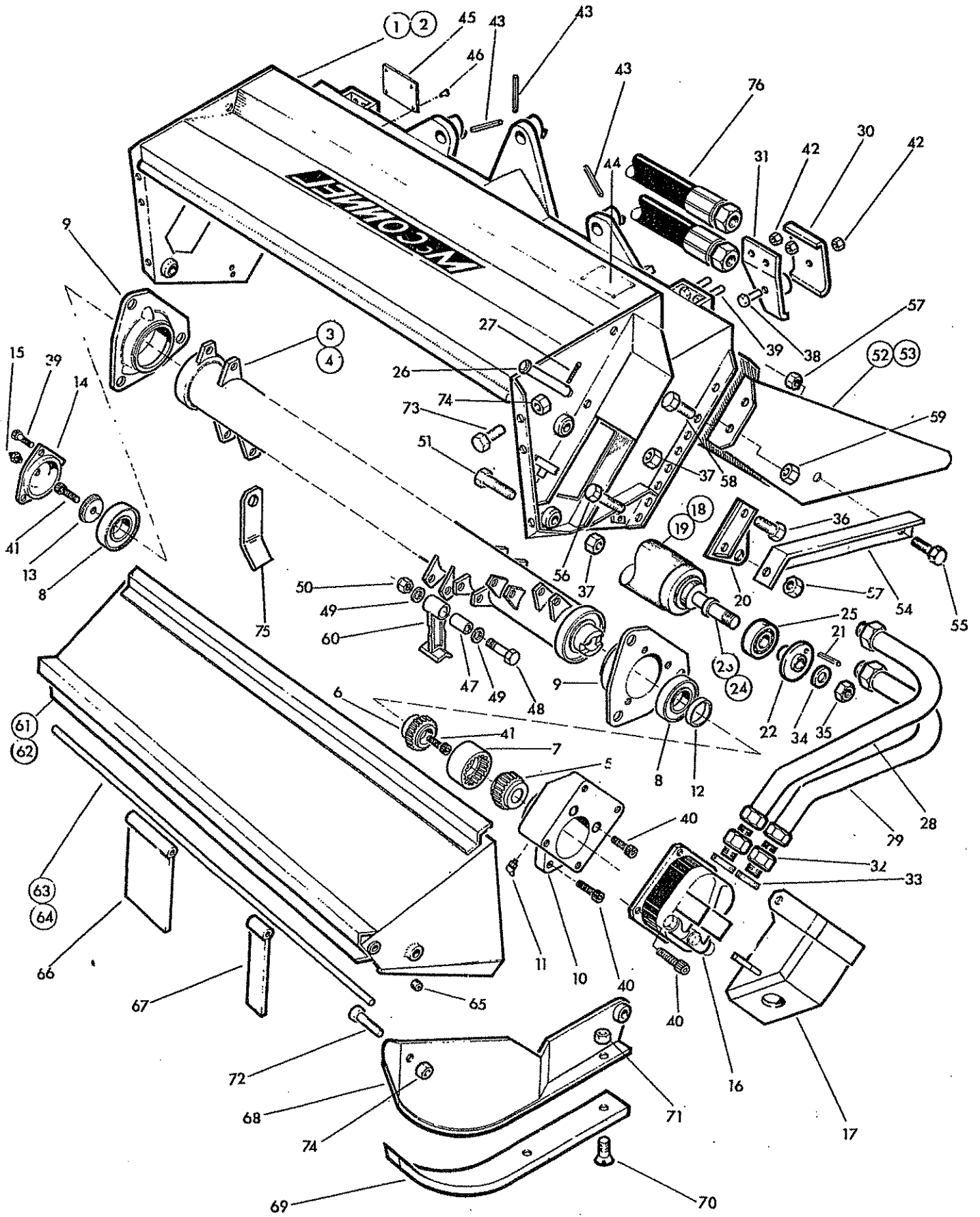
24	80 13 260	1	. Low ratio gearbox comprising:-
25	80 13 261	1	.. Case input
26	80 13 262	1	.. Case output
27	80 13 263	1	.. Take-off shaft
28	80 13 264	1	.. Gear 51 teeth
29	80 13 029	1	.. Gear 16 teeth
30	80 13 030	1	.. Ball retainer
31	80 13 031	1	.. Bung
32	09 05 116	3	.. 1/2" dia. steel ball
33	86 29 116	1	.. Oil seal
34	86 00 409	1	.. '0' ring
35	86 00 435	1	.. '0' ring
36	04 16 110	1	.. Circlip 3/4" internal
37	04 16 124	1	.. Circlip 1.1/2" internal
38	04 06 250	1	.. M50 external circlip
39	02 11 242	7	.. 5/16" UNF hexagon bolt
40	01 11 002	7	.. 5/16" UNF hexagon nut
41	01 00 202	7	.. Spring washer
42	80 13 033	1	.. Breather valve
43	01 00 903	1	.. Fibre washer
44	80 13 032	1	.. Ball retaining spring
45	06 03 650	4	.. Bearing
46	09 02 330	1	. Chain
	60 00 087	2	. Shackle assembly each comprising:-
47	60 00 089	1	.. Shackle pin
48	60 00 088	1	.. Shackle
49	04 31 105	1	.. Spring cotter

FLAIL ASSEMBLY



Ref.	Part No.	Qty.	Description.
	73 14 333		1 metre GRASS FLAIL ASSEMBLY
	73 14 332		1 metre HEDGE FLAIL ASSEMBLY
	73 14 330		1.2 metre GRASS FLAIL ASSEMBLY
	73 14 329		1.2 metre HEDGE FLAIL ASSEMBLY
	The following parts are common to all the above flail assemblies:-		
	80 13 295	1	.Gearbox and PSF pump assembly
1	80 13 290	1	..Gearbox (B2100)
	82 01 490	1	..Conversion set (from PDL)
	80 13 025	1	...Adaptor flange c/w bolts & nuts
	80 13 028	1	...Splined adaptor 11m 13F
	86 00 436	1	... 'O' Ring 4" I.D.
	82 01 478	1	...Dowty pump c/w 1" BSP connections
2	82 01 475	1Dowty pump 7505/3146
3	80 13 038	1Inlet connection c/w screws
	02 42 202	2Skt capscrew 2½" x 5/16" UNC
	80 13 023	1Gasket, inlet
4	80 13 038	1Pressure connection c/w screws & 'O' Ring
	02 42 162	4Skt Capscrew 2" x 5/16" UNC
	86 00 121	1 'O' Ring
5	85 01 059	1	.Hydraulic hose 1" BSP 78" long
6	85 01 039	1	.Suction hose 1¼" bore 78" long
7	85 00 859	1	.Return hose 1" bore 59" long
8	81 21 063	1	.Return adaptor
9	85 01 083	1	.Braided hose 5/8" bore 6" long
	09 04 204	4	.Hose clip 5/8" bore
	09 04 106	2	.Hose clip 1" bore
	09 04 108	4	.Hose clip 1¼" bore
10	81 25 300	1	.Flail by-pass control valve complete
11	85 01 058	2	.Hydraulic hose 1" BSP 132" long
12	85 01 060	2	.Hydraulic hose 1" BSP 43" long
13	73 14 327	1	.Twin rigid pipe assy. c/w extra long joint pin
14	73 14 164	1	..Extra long joint pin
15	73 13 316	1	.Hose bracket
16	73 13 130	2	..Hose clamp
	01 41 003	2	..3/8" UNF Aeronut
	04 31 105	1	..Spring cotter
17	73 14 367	1	.Hose guide
18	73 13 322	1	.Stop bracket
19	73 13 026	2	..Bracket pin
	The following parts are common to grass flail assemblies only:-		
20	81 26 250	1	.Float valve assembly
21	81 26 251	1	.Hydraulic accumulator
	81 26 015	1	..Charge valve assembly c/w 'O' ring
	81 26 016	1	..Charge valve core
	86 00 103	1	.. 'O' ring
22	85 31 458	2	.Hydraulic hose ¾" JIC 45" long
23	85 11 678	2	.Hydraulic hose ¾" JIC 67" long
24	85 95 024	1	.Rubber hose 5/8" bore 24" long
25	81 25 008	1	.Return connection
	<u>HY-FI HOSE EXTENSION SET 73 14 187</u>		
	85 11 328	6	Hydraulic hose ¾" JIC 32" long
	72 13 004	6	Adaptor union ¾" x ¾" JIC M/M
	85 14 336	4	Hydraulic hose 7/16" JIC 33" long
	71 06 041	4	Adaptor union 7/16" x 7/16" JIC M/M
	85 01 063	2	Extension hose 24" long when fitting 1 metre flail head to long dipper arm. (Optional extra).

MULTICUT FLAIL
1 Metre & 1-2 Metre Grass & Hedge



Ref	Part No.	Quan	Quan	Description
		1.2m	1m	
	73 14 380			1.2 METRE 48" HEDGE FLAIL
	73 14 381			1,2 METRE 48" GRASS FLAIL
	73 14 384			1 METRE 39" HEDGE FLAIL
	73 14 385			1 METRE 39" GRASS FLAIL
1	73 14 305	1		.Main casing
2	73 14 338		1	.Main casing
3	73 14 372	1		.Rotor
4	73 14 373		1	.Rotor
	73 14 206	1	1	.Coupling Assembly
5	73 14 204	1	1	..Coupling motor half
6	73 14 203	1	1	..Coupling rotor half
7	73 14 205	1	1	..Coupling sleeve
8	06 00 018	2	2	.Ball bearing
9	73 14 368	2	2	.Bearing housing
10	73 14 369	1	1	.Spacer block c/w greaser
11	09 01 125	1	1	..Greaser 1/8" BSP 35°
12	73 14 214	1	1	.Coupling spacer
13	73 14 211	1	1	.Clamp washer
14	73 14 370	1	1	.Rotor end cover c/w greaser
15	09 01 121	1	1	..Greaser 1/8" BSP Straight
16	73 14 382	1	1	Motor assembly c/w key, nut, washer & coupling half.
17	73 14 374	1	1	.Motor cover
18	73 14 114	1		.Roller
19	73 14 165		1	.Roller
20	73 14 195	1	1	.Roller bracket LH c/w spring dowel
	73 14 196	1	1	.Roller bracket RH c/w spring dowel (not illustrated)
21	04 21 810	1	1	..Spring dowel ¼" dia. x 5/8" long
22	73 14 192	2	2	.Bearing spigot
23	73 14 191	1		.Roller tie rod
24	73 14 190		1	.Roller tie rod
25	06 00 002	2	2	.Ball bearing DN 2125
26	73 14 145	1	1	.Motor guard pin c/w split pin
27	05 03 104	1	1	..Split pin 5/32 dia. x 1½" long
28	73 14 376	1	1	.Rigid pipe Standard build for
29	73 14 376	1	1	.Rigid pipe left hand flails.
	73 14 377	2	2	.Rigid pipe For right hand flails.
30	73 14 158	1	1	.Motor pipe clamp upper
31	73 14 159	1	1	.Motor pipe clamp lower
32	85 81 112	2	2	.Ermeto union
33	86 50 106	2	2	.Bonded seal ¾" BSP
34	73 14 194	1	1	.Special washer
35	91 00 005	2	2	.Hexagon nut M20
36	93 13 067	2	2	.Setscrew M16 x 30
37	91 00 001	8	8	.Hexagon nut self-locking M16
38	92 13 105	1	1	.Bolt M10 x 50
39	93 13 055	5	5	.Setscrew M10 x 25
40	93 00 104	7	7	.Capscrew M10 x 40
41	93 00 105	2	2	.Capscrew M12 x 50
42	91 00 002	3	3	.Hexagon nut self-locking M10
43	04 22 648	3	3	.Spring dowel 3/8" dia. x 3" long
44	73 14 088	1	1	.Flail speed sticker
45	73 14 087	1	1	.Serial plate
46	28 00 020	4	4	.Pop rivet 1/8" dia.
47	73 14 209	24	20	.Flail pivot bush
48	73 14 201	24	20	.Special flail bolt
49	01 00 206	48	40	.Spring washer 5/8" dia.
50	10 79 091	24	20	.Hexagon nut self-locking 5/8" UNF
51	73 14 146	6	6	.Bolt M16 x 50

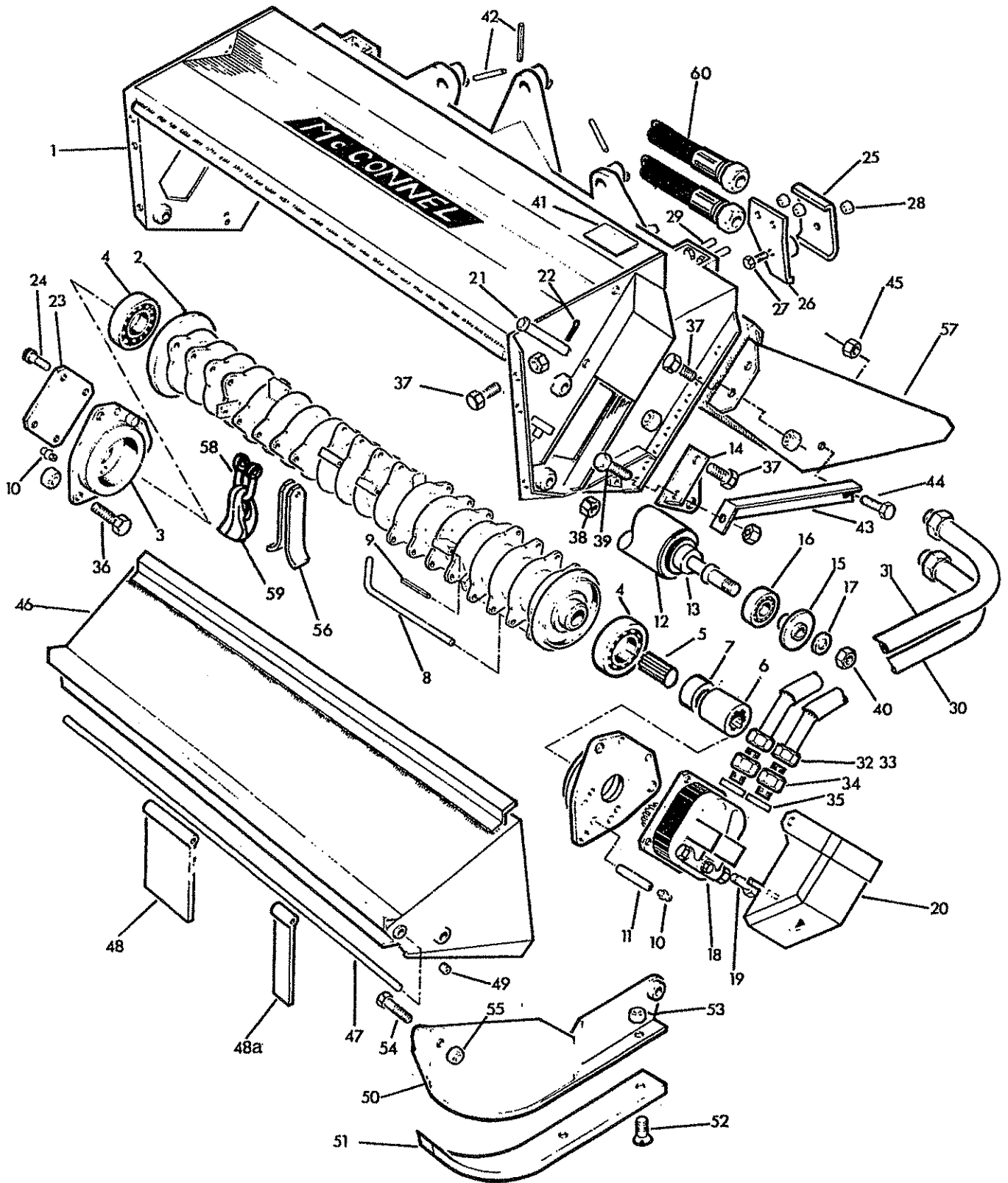
Items 52 to 60 (inclusive) are for Hedge Flails only:-

Ref	Part No	Quan	Quan	Description
		1.2m	1m	
52	72 14 325	1		.Hedge hood
53	73 14 326		1	.Hedge hodd
	73 14 361	1	1	.Strut RH c/w bolts & nuts (not illustrated)
54	73 14 362	1	1	.Strut LH c/w bolts & nuts
55	93 13 067	1	1	..Setscrew M16 x 30
56	93 13 087	1	1	..Setscrew M16 x 40
57	91 00 001	2	2	..Nut self-locking M16
58	93 13 067	4	4	.Setscrew M16 x 30
59	91 00 001	4	4	.Nut self-locking M16
60	73 14 366		0	.F10H Hedger flail

Items 61 to 75 (inclusive) are for Grass Flails only:-

Ref	Part No	Quan	Quan	Description
		1.2m	1m	
61	73 14 315	1		.Grass hood
62	73 14 341		1	.Grass hood
63	73 14 143	1		.Flap bar
64	73 14 166		1	.Flap bar
65	85 82 041	2	2	.1/8" BSP hexagon plug
66	73 14 125	7	5	.Flap
67	73 14 167		2	.Flap narrow
	73 14 320	1	1	.Skid right hand (not illustrated)
68	73 14 319	1	1	.Skid left hand
69	73 14 323	2	2	.Replaceable skid
70	93 33 065	6	6	.Setscrew c/sunk M10 x 30
71	91 00 002	6	6	.Nut self-locking M10
72	92 13 107	4	4	.Bolt M16 x 50
73	92 13 067	6	6	.Setscrew M16 x 30
74	91 00 001	10	10	.Nut self-locking M16
75	73 14 390	48	40	.F10G grass flail
76	85 01 060	2	2	Hydraulic hose 1" BSP 43" long

ONE METRE FLAIL HEAD

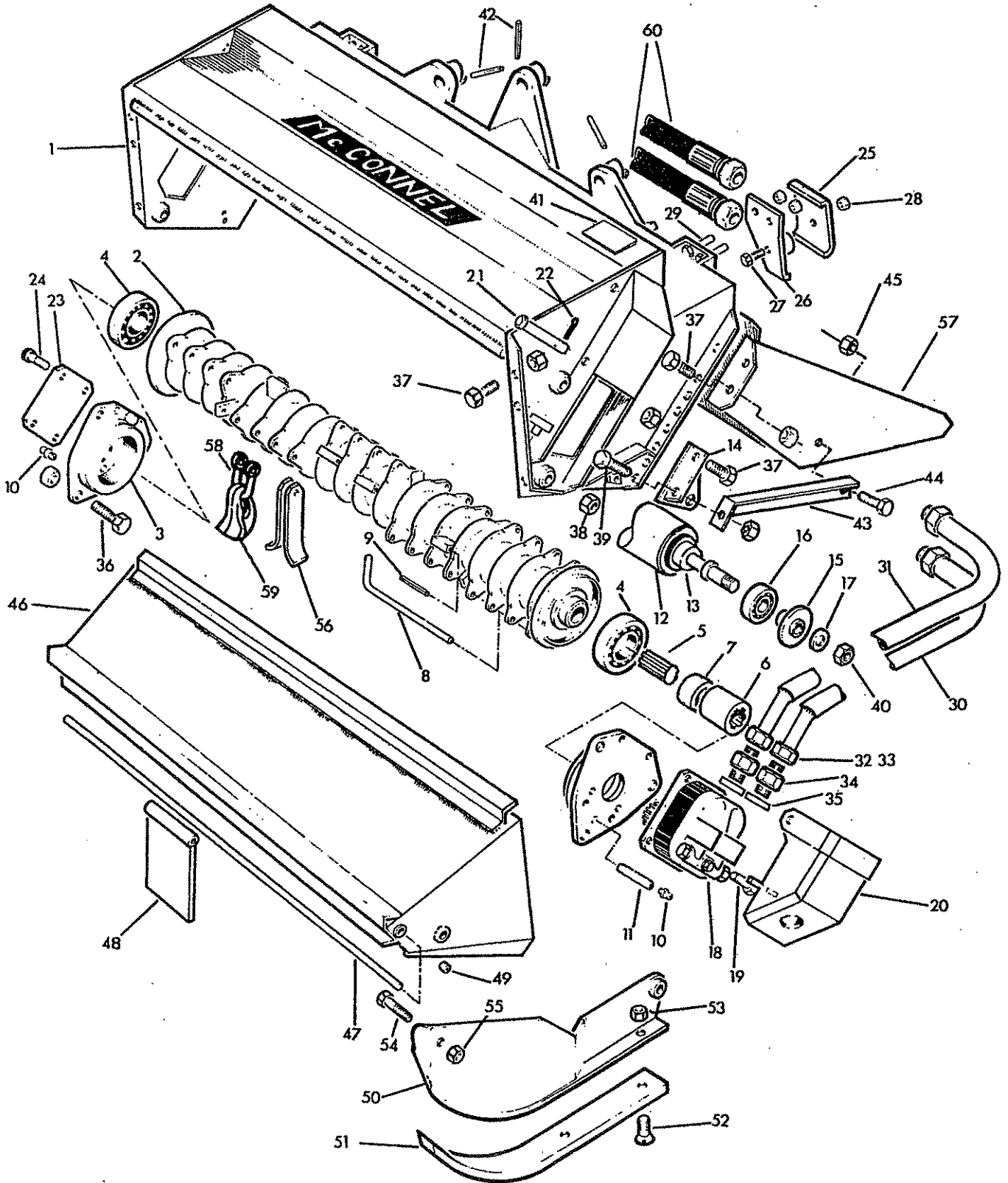


Ref	Part No.	Qty	Description
	73 14 335	1	1 METRE (39") HEDGE FLAIL
	73 14 336	1	1 METRE (39") GRASS FLAIL
The following items are common to both flails:-			
1	73 14 338	1	.Main casing welded assembly
	73 14 348	1	.Rotor shaft bare
2	73 14 345	1	.Rotor assembly c/w bearing and adaptor
3	73 14 313	2	..Bearing housing
4	06 00 018	2	..Ball bearing assembly
5	80 13 048	1	..Male spline shaft
6	80 13 049	1	..Female spline coupling
7	80 13 051	1	..Distance piece
8	73 14 134	10	..Flail pin
9	04 22 640	10	..Roll pin 3/8" x 2 1/2" long
10	09 01 121	2	.Greaser 1/8" BSP
11	73 14 177	1	.Greaser extension
12	73 14 165	1	.Roller
13	73 14 190	1	.Roller tie rod
14	73 14 195	1	.Roller bracket left hand
	73 14 196	1	.Roller bracket right hand
			c/w spring dowel part no. 04 21 810
15	73 14 192	2	.Bearing spigot
16	06 00 002	2	.Ball bearing assembly
17	73 14 194	2	.Special washer
18	83 01 014	1	.Hydraulic motor (splined shaft)
19	93 00 100	4	.Socket head 'wedgelok' capscrew M8 x 40
20	73 14 308	1	.Motor cover
21	73 14 145	1	.Motor cover pin c/w split pin
22	05 03 104	1	..Split pin
23	73 14 126	1	.Bearing plate
24	93 13 034	4	.Setscrew M8 x 16
25	73 14 158	1	.Pipe clamp upper
26	73 14 159	1	.Pipe clamp lower
27	92 13 105	1	.Bolt M10 x 50
28	91 00 002	3	.Locknut M10
29	93 13 055	2	.Set screw M10
30	73 14 359	1	.Motor pipe lower
31	73 14 360	1	.Motor pipe upper
			Motor assembly left hand side of flail head.
	73 14 355	1	.Rigid pipe lower
	73 14 356	1	.Rigid pipe upper
			Motor assembly right hand side of flail head.
32	85 81 113	2	.Ermeto nut
33	85 81 114	2	.Ermeto ring
34	85 81 112	2	.Ermeto union
35	86 50 106	2	.Bonded seal 3/4"
36	73 14 146	6	.Special bolt M16 x 50
37	92 13 067	6	.Bolt M16 x 30
38	91 00 001	14	.Locknut M16
39	93 13 087	2	.M16 x 40 hexagon coarse setscrew
40	91 00 005	2	.Nut M20 coarse 'conelok'
41	73 14 088	1	.Flail speed warning sticker
42	04 22 648	3	.Spring dowel 3/8" x 3" long
	73 14 361	1	.Right hand strut c/w nut and bolt
43	73 14 362	1	.Left hand strut c/w nut and bolt
44	93 13 067	1	..Setscrew M16 x 30
45	91 00 001	1	..M16 'conelok' nut
46	73 14 341	1	.Grass hood
47	73 14 166	1	.Flap bar
48	73 14 167	5	.Flap
48a	73 14 125	2	.Flap, narrow
49	85 82 041	2	.Socket plug 1/8" BSP
50	73 14 319	1	.Skid left hand
	73 14 320	1	.Skid right hand
51	73 14 323	2	.Replaceable runner
52	93 33 065	6	.Countersunk screw M10 x 30
53	91 00 002	6	.Locknut M10
54	92 13 107	4	.Bolt M16 x 50
55	91 00 001	4	.Locknut M16
56	73 14 054	40	.F7G grass flail
57	73 14 326	1	.Hedge hood
58	73 14 183	20	.Shackle
59	73 14 184	20	.F8H hedge flail
60	85 01 060	2	Hydraulic hose 1" BSP 43" long

Required for use with grass flail only.

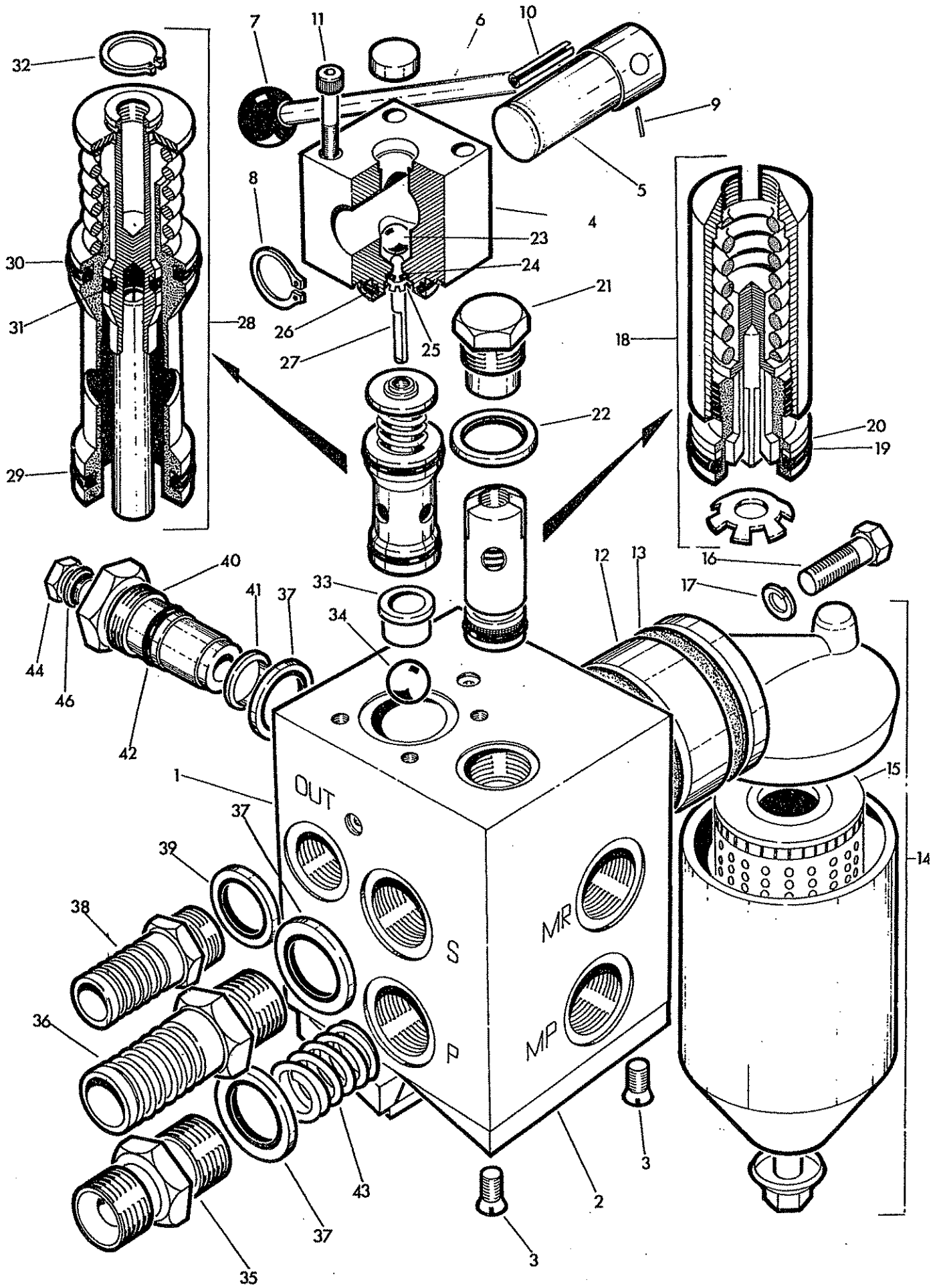
Required for use with hedge flail only.

1-2 METRE FLAIL HEAD



Ref	Part No	Qty	Description
	73 14 302	1	1.2 METRE (48") HEDGE FLAIL
	73 14 303	1	1.2 METRE (48") GRASS FLAIL
The following items are common to both Flaills:-			
1	73 14 305	1	.Main casing welded assembly
	73 14 352	1	.Rotor shaft bare
2	73 14 346	1	.Rotor assembly c/w bearings & adaptor
3	73 14 313	2	..Bearing housing
4	06 00 018	2	..Ball bearing assembly
5	80 13 048	1	..Male spline shaft
6	80 13 049	1	..Female spline coupling
7	80 13 051	1	...Distance piece
8	73 14 134	12	..Flail pin
9	04 22 640	12	..Roll pin 3/8" x 2 1/2" long
10	09 01 121	2	.Greaser 1/8" BSP
11	73 14 177	1	.Greaser extension
12	73 14 114	1	.Roller
13	73 14 191	1	.Roller tie rod
14	73 14 195	1	.Roller bracket left hand
	73 14 196	1	.Roller bracket right hand
			c/w spring dowel Part No. 04 21 810
15	73 14 192	2	.Bearing spigot
16	06 00 002	2	.Ball bearing
17	73 14 194	2	.Special washer
18	83 01 014	1	.Hydraulic motor (splined shaft)
19	93 00 100	4	.Capscrew M8 x 40 socket head 'wedgelok'
20	73 14 308	1	.Motor cover
21	73 14 145	1	.Motor cover pin c/w split pin
22	05 03 104	1	..Split pin
23	73 14 126	1	.Bearing plate
24	93 13 054	4	.Setscrew M8 x 25
25	73 14 158	1	.Pipe clamp upper
26	73 14 159	1	.Pipe clamp lower
27	92 13 105	1	.Bolt M10 x 50
28	91 00 002	3	.Locknut M10
29	93 13 055	2	.Setscrew M10
30	73 14 359	1	.Motor pipe lower
31	73 14 360	1	.Motor pipe upper
	73 14 355	1	.Motor pipe lower
	73 14 356	1	.Motor pipe upper
			Motor assembly left hand side of flail head Motor assembly right hand side of flail head
32	85 81 113	2	.Ermeto nut
33	85 81 114	2	.Ermeto ring
34	85 81 112	2	.Ermeto union
35	86 50 106	2	.3/4" bonded seal
36	73 14 146	6	.Special bolt M16 x 50
37	92 13 067	6	.Bolt M16 x 30
38	91 00 001	14	.Locknut M16
39	93 13 087	2	.Setscrew M16 x 40 hexagon coarse
40	91 00 005	2	.Locknut M20 'conelok'
41	73 14 088	1	.Flail speed warning sticker
42	04 22 648	3	.Spring dowel 3/8" x 3" long
	73 14 361	1	.Right hand strut c/w nut and bolt
43	73 14 362	1	.Left hand strut c/w nut and bolt
44	93 13 067	1	..Setscrew M16 x 30
45	91 00 001	1	..M16 'conelok' nut
46	73 14 315	1	.Grass hood
47	73 14 143	1	.Flap bar
48	73 14 125	7	.Flap
49	85 82 041	2	.Socket plug 1/8" BSP
50	73 14 319	1	.Skid left hand
	73 14 320	1	.Skid right hand
51	73 14 323	2	.Replaceable runner
52	93 33 065	6	.Screw M10 x 30 countersunk
53	91 00 002	6	.Locknut M10
54	92 13 107	4	.Bolt M16 x 50
55	91 00 001	4	.Locknut M16
56	73 14 054	48	.F7G grass flail
57	73 14 325	1	.Hedge hood
58	73 14 183	24	.Shackle
59	73 14 184	24	.F8H Hedge flail
60	85 01 060	2	Hydraulic hose 1" BSP 43" long

FLAIL CONTROL VALVE



Ref	Part No	Qty	Description
	81 25 300		FLAIL CONTROL VALVE ASSEMBLY
1	81 21 301	1	.Block
2	81 21 303	1	.Mounting bracket
3	93 53 054	3	.M8 x 25 socket countersunk screw
4	81 21 048	1	.Lever block
5	81 21 049	1	.Operating cam
6	81 21 047	1	.Operating lever
7	09 03 112	1	.Lever knob
8	04 01 114	1	.External circlip
9	04 21 516	1	.Spring dowel
10	04 21 824	1	.Spring dowel
11	92 43 123	4	.M6 x 60 skt cap bolt (Nov '77 superceded by:-
	92 13 143	4	M6 x 70 Hexagon bolt).
12	81 21 064	1	.Filter block
13	71 03 100	2	.Gasket
14	71 03 291	1	.Filter assembly
15	71 03 102	1	..Filter element
16	93 13 126	2	.M12 x 60 hex. screw
17	01 00 205	2	.Spring washer
18	81 09 103	1	.Relief valve assembly
19	86 00 113	1	..'O' ring
20	81 14 079	1	..Backing ring
* 21	81 21 074	1	.Cap relief valve
* 22	86 50 108	1	.Bonded seal
23	09 05 118	1	.562" dia. steel ball
□ 24	87 00 631	1	..'O' ring 5/16" o/d
25	04 17 107	1	.Star washer
26	86 00 405	1	..'O' ring 1¼" o/d
27	81 21 045	1	.Actuator needle
28	81 25 022	1	.By-pass cartridge assembly
29	86 00 401	1	..'O' ring 1" o/d
30	86 00 403	1	..'O' ring 1.1/8" o/d
31	86 00 109	1	..'O' ring 5/8" o/d
32	04 01 107	1	..External circlip
33	81 25 021	1	.Seat
34	09 05 124	1	.Steel ball .750" dia.
35	81 21 052	3	.Male male connector
36	81 21 051	1	.Return connection
37	86 50 108	5	.Bonded seal
38	81 21 062	1	.Return connection
39	86 50 106	1	.Bonded seal
40	81 25 020	1	.Plug
41	81 21 061	1	.Seal
42	86 00 403	1	..'O' ring 1.1/8" o/d
43	81 25 026	1	.Ball stop spring
			FOR FLAILS USED FOR HEDGING
44	80 03 001	1	.3/8" BSP hexagon plug
			FOR FLAILS USED FOR GRASS
45	81 25 008	1	.Return connection (not illustrated)
			COMMON TO BOTH
46	86 50 103	1	.3/8" Bonded seal

*Before June 1978 item 21 was 81 21 050 and item 22 was 86 50 218.
□Before March 1977 - item 24 was 86 00 103

Interchangeability of Rotors and Splined Adaptors.

A 13 splined rotor and a 13 splined male-female adaptor was introduced for the toughcut flail and also incorporated into the triplecut flail, commencing from serial numbers 02 FM 88 (1.2 metre) and 02 FR 63 (1 metre).

When ordering spare parts for machines previous to these numbers study the following:-

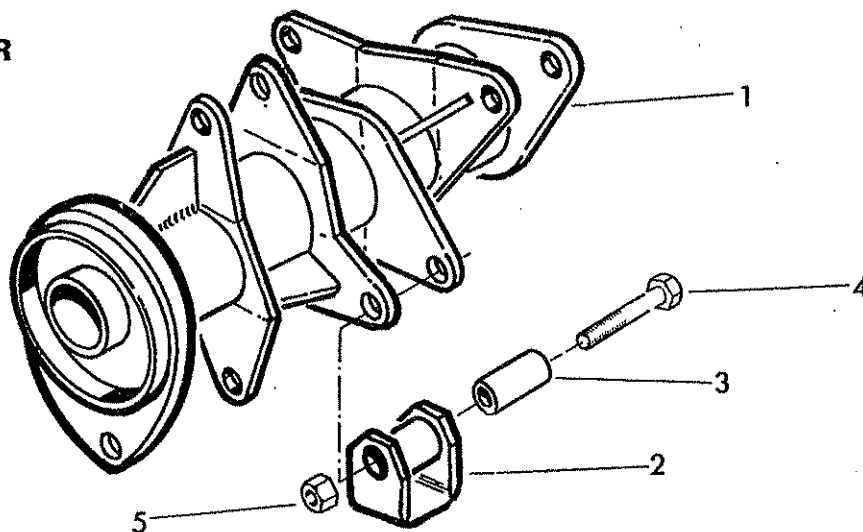
All rotors will be supplied with the thirteen tooth splines.

Description	11 tooth Rotorshaft Assy c/w bearings & quillshaft Part No.	Replaced by Assy Part No.	'Bare Rotor-shaft 13 tooth Part No.
1 metre	73 14 340	73 14 345	73 14 348
1.2 metre	73 14 314	73 14 346	73 14 352
Adaptor quillshaft	80 13 002 (11 male/13 female spline)	80 13 028 (13 male/13 female spline)	

Where a 'bare' rotor shaft is ordered to replace an existing 11 tooth spline shaft then a quillshaft 80 13 028 is also required.

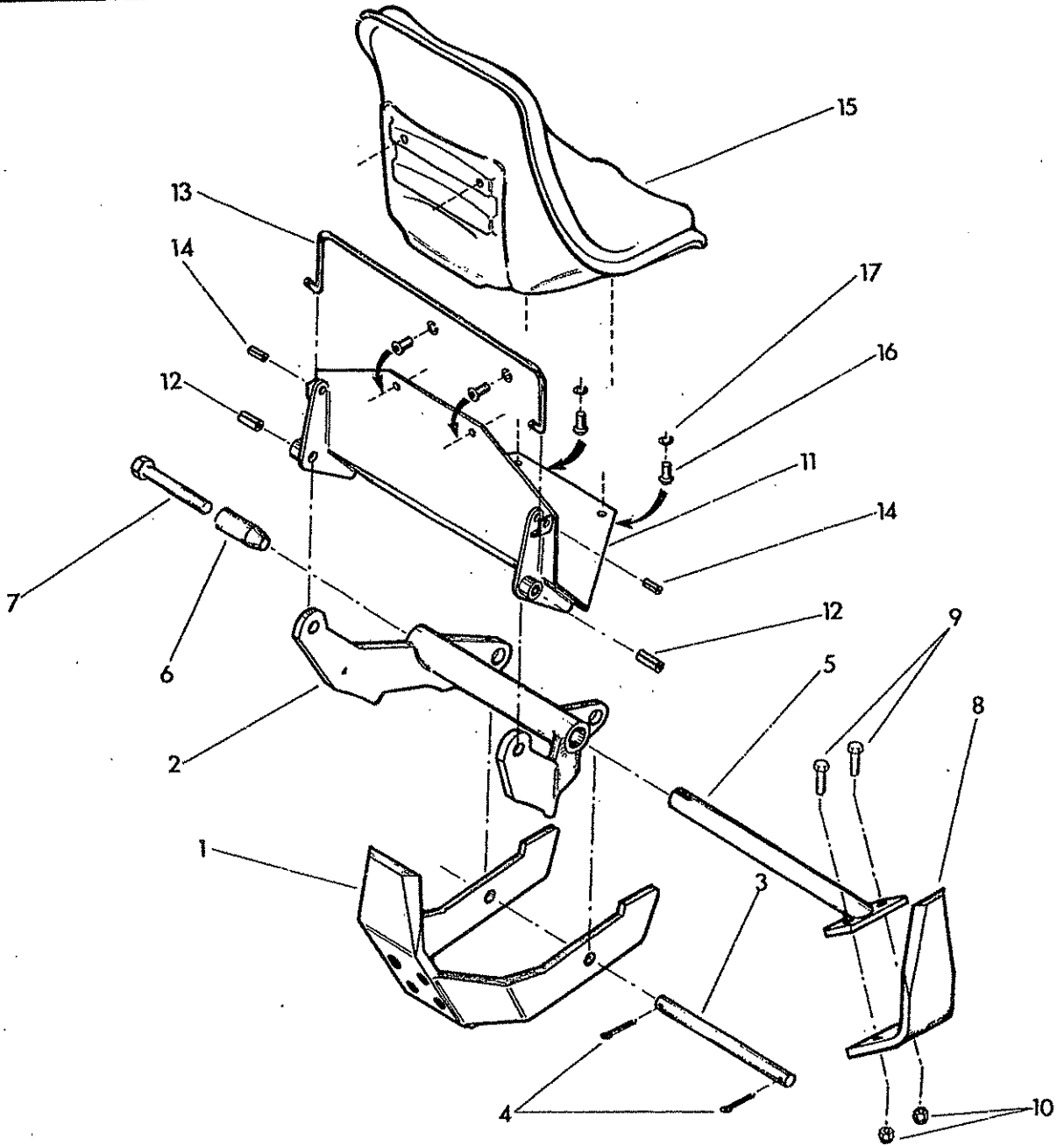
The spare parts list for the 1 metre and 1.2 metre toughcut flails is identical to its triplecut counterpart with the exception of the following:-

TOUGHCUT ROTOR



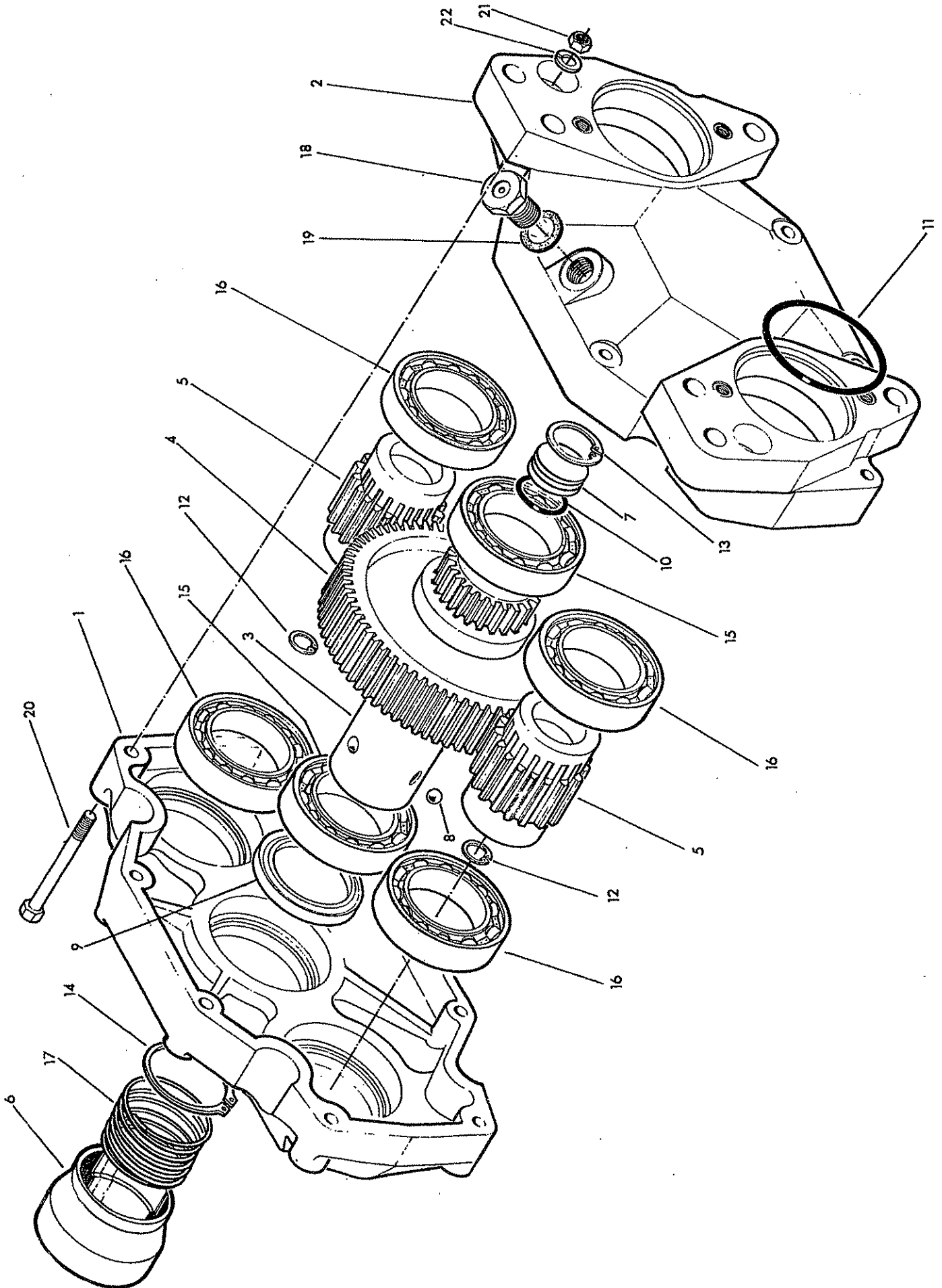
		TOUGHCUT FLAIL ASSEMBLY - 1 METRE	
	73 14 337	1	. Toughcut rotor c/w bearing & bearing housing.
	73 14 339	1	.. Rotorshaft bare
1	73 14 349	1	. Toughcut flail
2	73 14 119	12	. Flail bush
3	73 14 120	12	. Special bolt
4	73 14 200	12	. M16 'Conelok' locknut
5	10 79 091	12	

TIP UP SEAT ASSEMBLY



	71 06 340	1	TIP-UP SEAT ASSEMBLY
1	71 06 341	1	.Pivot Body
2	71 06 343	1	.Swinging Link
3	71 06 182	1	.Pivot Pin
4	05 03 125	2	.1¼" x 3/16" split pin
5	71 06 176	1	.Control unit swivel
6	71 06 177	1	.Taper wedge
7	02 11 325	1	.4" x ½" UNF bolt
8	71 06 178	1	.Side pillar
9	02 11 103	2	.1¼" x 3/8" UNF bolt
10	01 41 003	2	.3/8" UNF locknut
11	71 06 353	1	.Seat adaptor plate
12	04 22 816	2	.1" x ½" Spring dowel
13	71 06 180	1	.Latch
14	04 21 812	2	.¾" x ¼" Spring dowel
15	71 06 352	1	.Bostram Seat c/w screws & washers
16	71 06 181	4	..½" x 5/16" UNC setscrew
17	01 00 102	4	..5/16" washer

HIGH RATIO DOUBLE GEARBOX (OPTIONAL EXTRA)

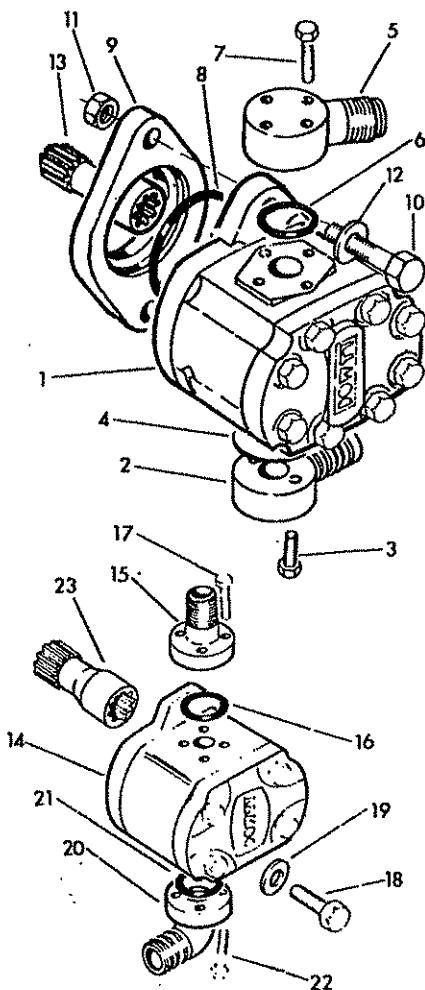


Ref	Part No.	Qty	Description
	80 13 284		HIGH RATIO DOUBLE GEARBOX
1	80 13 285	1	.Case-input
2	80 13 286	1	.Case-output
3	80 13 263	1	.Take-off shaft
4	80 13 294	1	.77 tooth gear
5	80 13 293	2	.18 tooth gear
6	80 13 030	1	.Ball retainer
7	80 13 031	1	.Bung
8	09 05 116	3	.Ball
9	86 29 116	1	.Oilseal
10	86 00 409	1	.. 'O' ring
11	86 00 435	2	.. 'O' ring
12	04 16 110	2	.Circlip - internal
13	04 16 124	1	.Circlip - internal
14	04 06 250	1	.Circlip - external
15	06 03 650	2	.Bearing 6210
16	06 04 640	4	.Bearing 6308
17	80 13 032	1	.Ball retaining spring
18	85 82 023	1	.Oil filler plug
19	01 00 903	1	.Fibre washer
20	02 11 242	8	.Bolt 5/16" UNF x 3" long
21	01 00 002	8	.Hexagon nut 5/16" UNF
22	01 00 202	8	.Spring washer 5/16" diameter
23	80 13 266	1	.P. T. O. guard
24	03 11 066	1	.. Screw 5/8" UNF x 3/4" long
25	01 00 206	1	.. Spring washer 5/8" diameter

not
illustrated

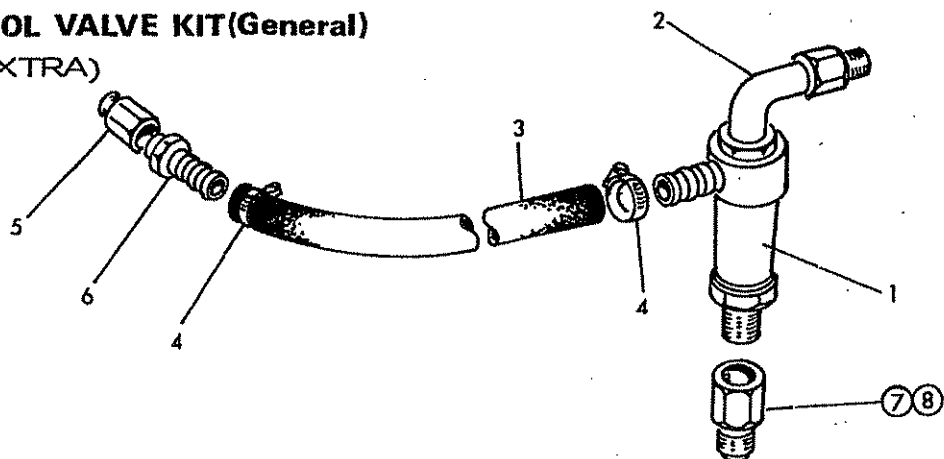
PUMPS

(OPTIONAL EXTRAS used when Double Gearbox is supplied)



Ref	Part No.	Qty	Description
	82 01 478	1	H. RATIO D/GEARBOX & PSF PUMP
1	82 01 475	1	.. Dowty pump
2	80 13 022	1	.. Inlet connection c/w screw
3	02 42 202	2	... Screw 5/16" UNC socket cap
4	80 13 023	1	.. Inlet gasket
5	80 13 038	1	.. Outlet connection c/w screw & 'O' ring
6	86 00 121	1	... 'O' ring
7	02 42 162	4	... Screw 5/16" UNC socket cap
8	86 00 436	1	.. 'O' ring
9	80 13 025	1	.. Adaptor flange c/w bolts & nuts etc.
10	02 11 225	2	.. Bolt 1/2" UNF 2 3/4" long
11	01 11 005	2	.. Hexagon nut 1/2" UNF
12	01 00 205	2	.. Spring washer
13	80 13 021	1	. Splined adaptor
	82 01 480	1	H. RATIO D/GEARBOX & PDL PUMP
14	82 01 480	1	. Hydraulic pump
15	80 05 021	1	. Inlet connection c/w 'O' ring & set screws
16	86 00 405	1	.. 'O' ring
17	03 12 082	4	.. Setscrew 5/16" UNC x 1" long
18	03 12 084	2	. Setscrew 7/16" UNC x 1" long
19	01 00 204	2	. Spring washer 7/16" dia.
20	80 05 022	1	. Suction connection c/w 'O' ring & setscrews
21	86 00 405	1	. 'O' ring
22	03 12 082	4	.. Setscrew 5/16" UNC x 1" long
23	80 13 043	1	. Splined coupling

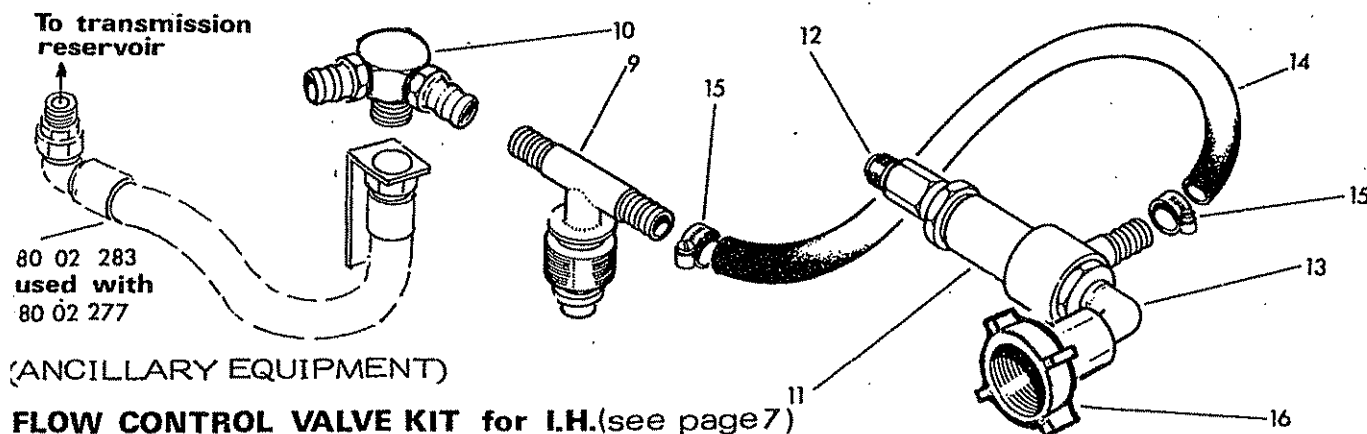
FLOW CONTROL VALVE KIT(General)
(OPTIONAL EXTRA)



Ref	Part No	Qty	Description
	80 02 291		FLOW CONTROL VALVE KIT
1	81 04 011	1	.Flow control valve
□2	85 81 043	1	.Elbow 3/8" BSP M - F
3	85 01 085	1	.Hose 5/8" bore x 30"long
4	09 04 204	2	.Hose clip
5	85 81 142	2	.Union 3/8" BSP - 1/2" BSP M - F
6	81 08 022	1	.Return union
*7	72 13 003	1	.JIC end fitting
8	70 14 020	1	.BSP end fitting

□ Elbow assembled onto flow control valve using jointing tape.

*J.I.C. end fitting for PA44



(ANCILLARY EQUIPMENT)

FLOW CONTROL VALVE KIT for L.H.(see page 7)

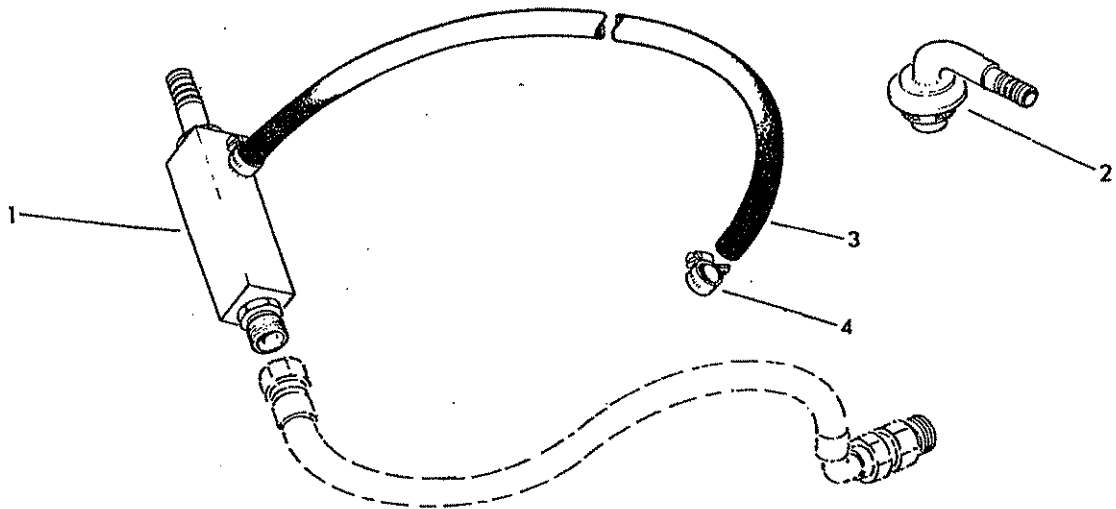
	80 02 276		FLOW CONTROL VALVE KIT
9	80 02 041	1	.Tractor return connection
	80 02 277		FLOW CONTROL VALVE KIT
10	80 02 088	1	.Tractor return connection

The following items are common to both 80 02 276 and 80 02 277.

11	81 04 011	1	.Flow control valve
12	72 13 003	1	.J.I.C. End fitting
*13	85 81 043	1	Elbow 3/8" BSP M - F
14	85 95 020	1	.Hose 5/8" bore x 20" long
15	09 04 204	2	.Hose clip
16	85 90 023	1	.Female half s/s coupling

*Elbow assembled onto Flow control valve using jointing tape.

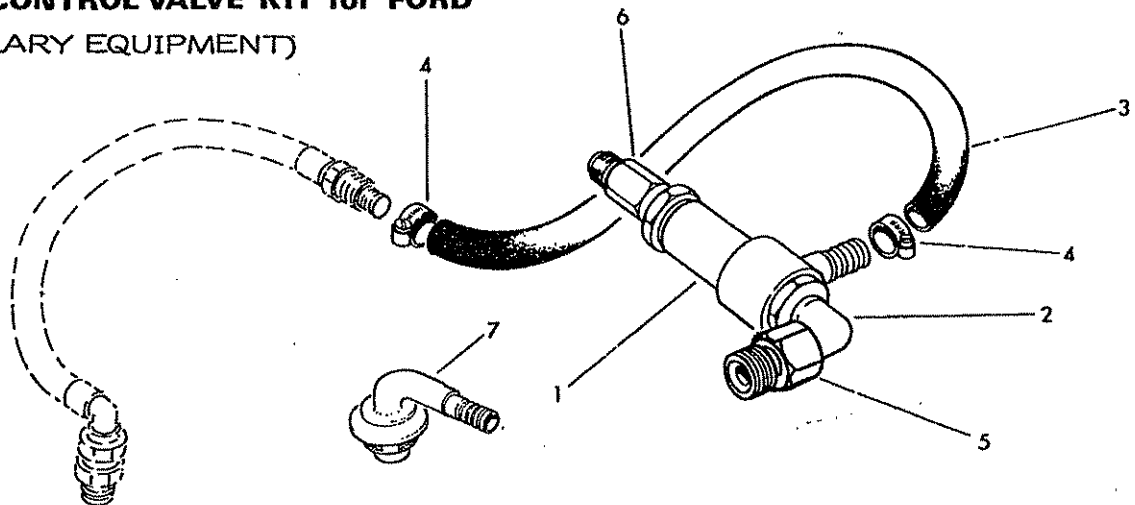
RETURN BY-PASS VALVE KIT for FORD (ANCILLARY EQUIPMENT)



Return oil by-pass valve kit for selected Ford tractors. (see page 4)

Ref	Part No.	Qty	Description
	80 02 279		By-pass valve kit
1	81 04 025	1	.Return flow by-pass valve
2	80 02 080	1	.Return connection
3	85 95 032	1	.Hose 5/8 bore x 32" long
4	09 04 204	2	.Hose clip

FLOW CONTROL VALVE KIT for FORD (ANCILLARY EQUIPMENT)



Flow control valve kit for selected Ford tractors (see page 5)

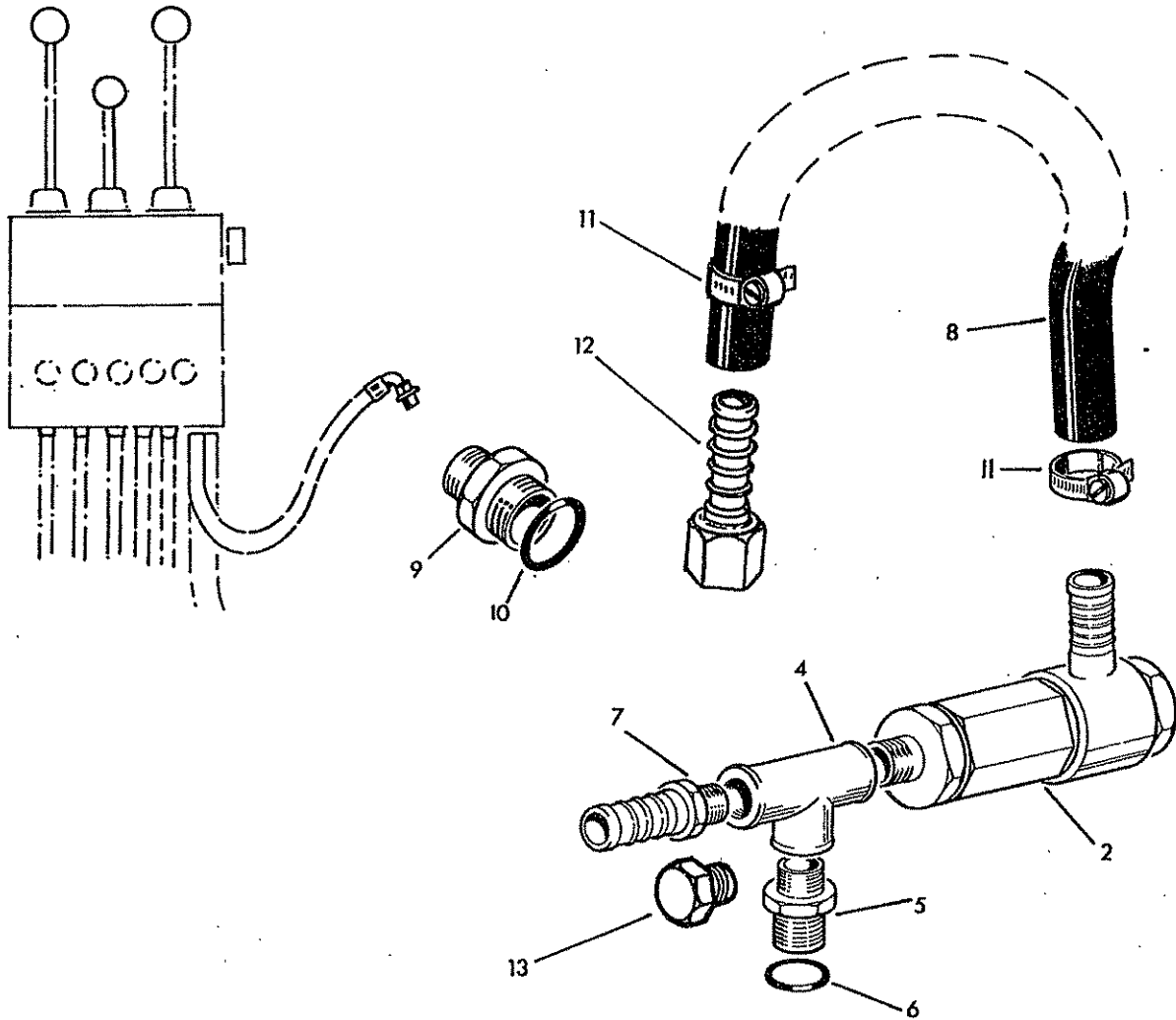
Ref	Part No.	Qty	Description
	80 02 289		FLOW CONTROL VALVE KIT
1	81 04 011	1	.Flow control valve
*2	85 81 043	1	.Elbow 3/8 BSP M - F
3	85 95 020	1	.Hose 5/8" bore x 20" long
4	09 04 204	2	.Hose clip
5	85 81 142	2	.Union 3/8" BSP - 1/2" BSP M - F
6	72 13 003	1	.J.I.C. End fitting
7	80 02 083	1	.Return connection

* Elbow assembled onto flow control valve using jointing tape.

JOHN DEERE METERING VALVE KIT

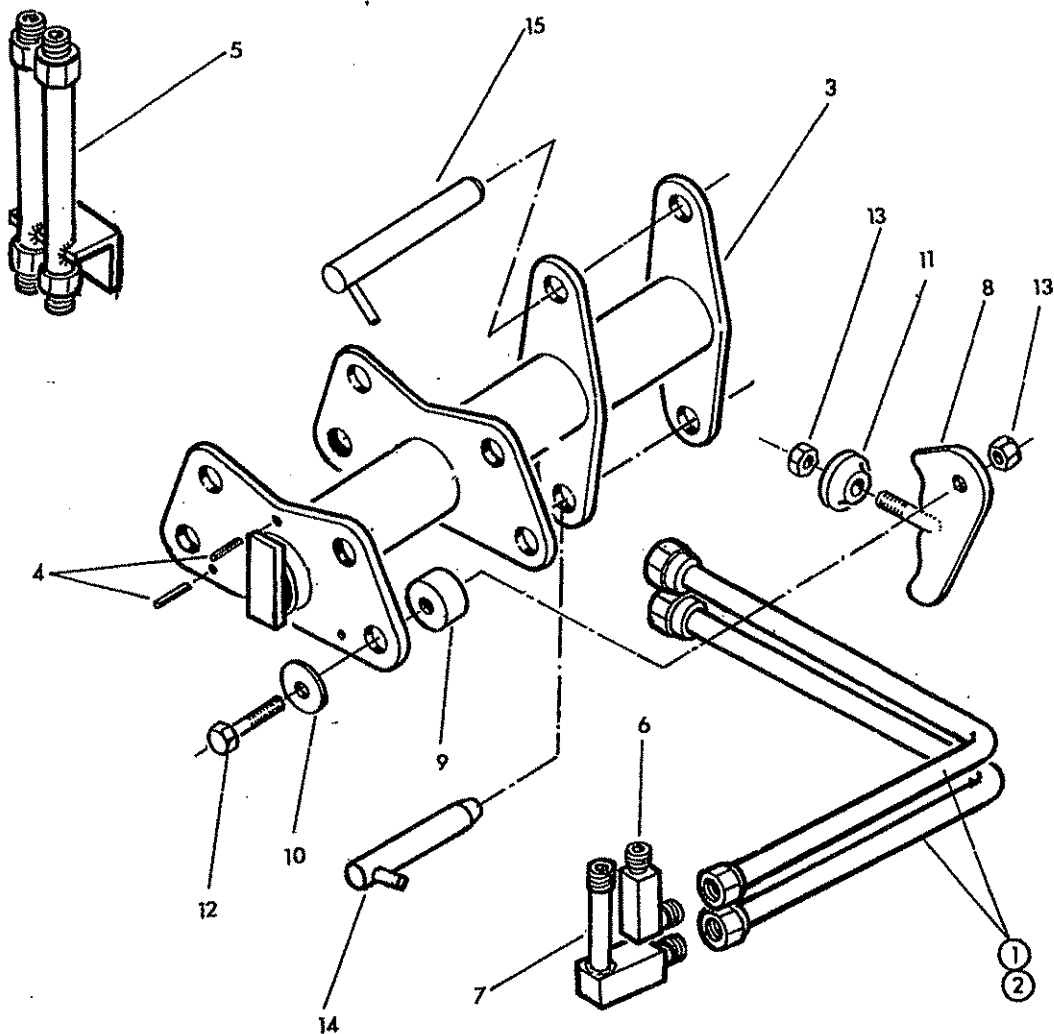
(ANCILLARY EQUIPMENT)

See McConel Service Bulletin HY/02



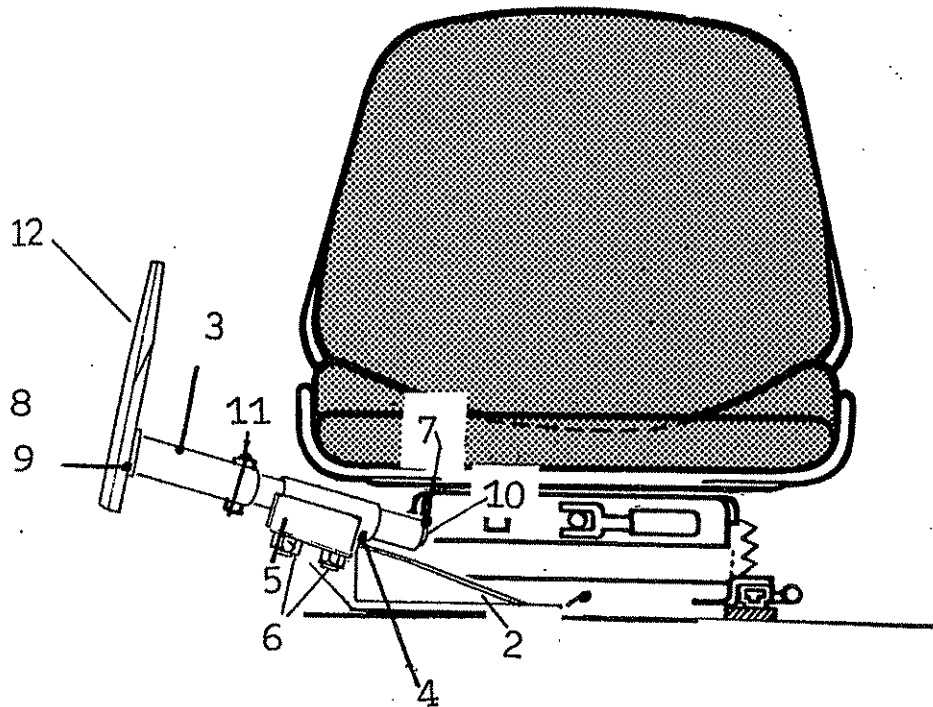
Ref	Part No	Qty	Description
	71 05 114	1	JOHN DEERE METERING VALVE KIT
	81 04 030	1	.Metering valve assembly c/w adaptors
2	81 04 010	1	..John Deere metering valve
	81 04 029	1	..Adaptor assembly
4	85 81 073	1	...3/8" BSP female tee junction
5	81 04 016	1	...3/8" BSP - 3/4" SAE union c/w 'O' ring
6	86 00 112	1'O' ring
7	81 25 008	1	...Return connection
8	85 95 030	1	.Rubber hose 5/8" bore x 30" long
9	80 02 149	1	.Adaptor 3/4" JIC c/w 'O' ring
10	86 00 112	1	..'O' ring
11	09 04 204	2	.Hoseclip (5/8" bore hose)
12	71 06 166	1	.Adaptor
13	80 03 001	1	.3/8" BSP plug

FORWARD EXTENSION SET



Ref	Part No.	Qty	Description
	73 14 365		FORWARD EXTENSION KIT FOR 1.2 METRE FLAIL
1	71 09 127	2	.Rigid pipe
	73 14 364		FORWARD EXTENSION KIT FOR 1METRE FLAIL
2	71 09 128	2	.Rigid pipe
	The following items are common to both forward extension kits.		
3	71 09 270	1	.Forward extension arm c/w spring dowel
4	04 22 620	2	..Spring dowel
5	73 14 363	1	.Hose bracket
6	71 09 126	1	.Elbow
7	73 14 215	1	.Elbow
8	71 09 079	1	.Pipe clamp bracket assy
9	71 09 083	1	..Distance piece
10	71 09 081	1	..Special washer
11	71 09 080	1	..Clamp washer
12	92 13 135	1	..Bolt M10 x 65
13	91 00 002	2	..Conelok nut M10
14	71 09 070	1	.Flail mounting pin
15	71 06 138	1	.Bucket pivot pin

H.C.U. SANDWICH MOUNTING STALK
(OPTIONAL EXTRA)

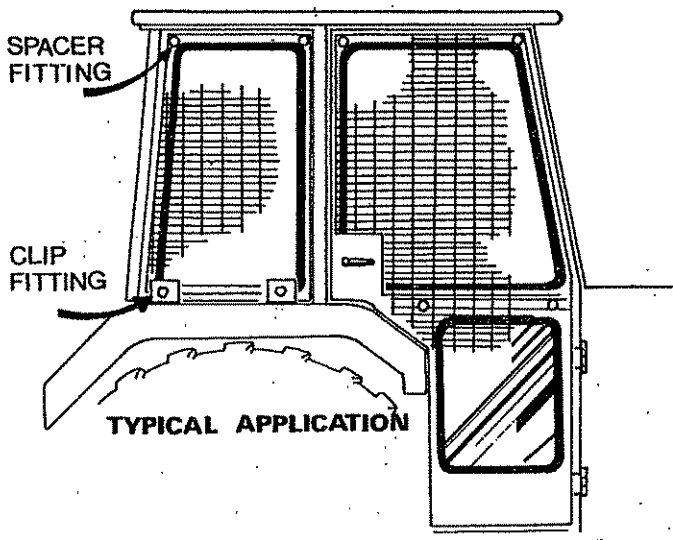


Ref	Part No.	Qty	Description
1	80 01 267		HCU MOUNTING ASSEMBLY R.HAND
2	80 01 268	1	.Base plate R.Hand
	80 01 271		HCU MOUNTING ASSEMBLY L.HAND
	80 01 269	1	.Base plate L.Hand (not illustrated)

The following items are common to both H.C.U. Mounting Assemblies:-

3	80 01 109	1	.Swivel tube
4	80 01 110	1	.Locking tube
5	80 01 112	1	.Location tube
6	01 41 003	2	..3/8" UNF nut
7	71 06 177	1	.Taper wedge
8	01 11 003	2	.3/8" UNF nut
9	03 11 103	2	.3/8" UNF screw 1¼" long
10	02 11 325	1	.½" UNF Bolt 4" long
11	04 22 524	1	.5/16" dia. spring dowel 1½" long
12	81 01 111	1	.Wedge plate

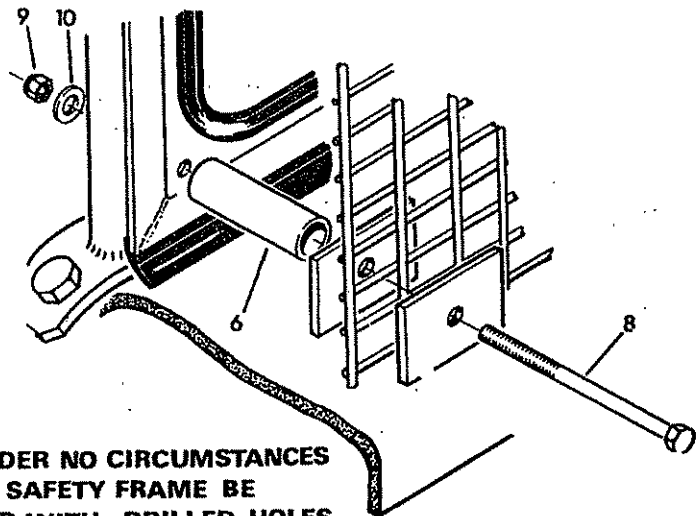
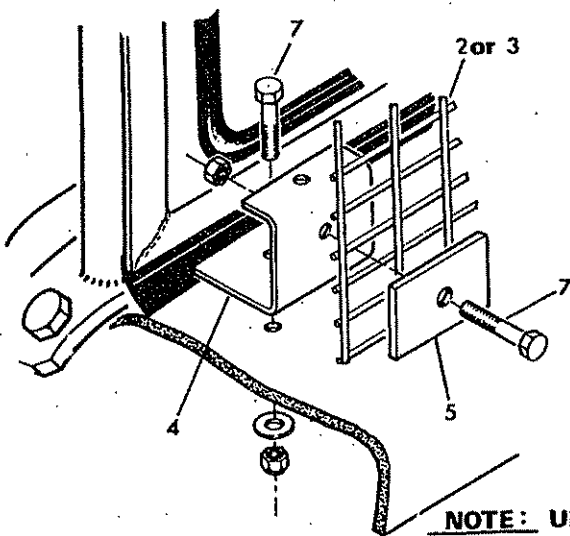
CAB GUARD



CUT THE MESH TO SHAPE AS REQUIRED TO CLEAR THE DOOR HANDLE AND ALLOW FULL OPENING OF THE DOOR.

FITTINGS SUPPLIED CAN BE USED IN ANY COMBINATION TO SUIT INDIVIDUAL TRACTORS.

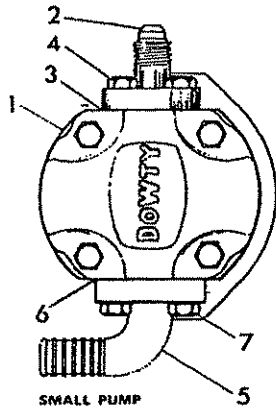
A MINIMUM OF FOUR FITTINGS PER MESH IS REQUIRED.



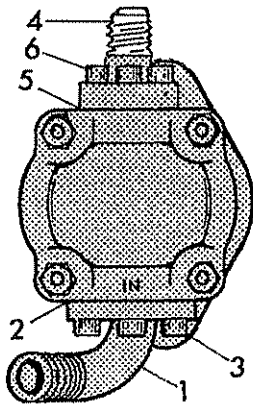
NOTE: UNDER NO CIRCUMSTANCES MUST THE SAFETY FRAME BE INTERFERED WITH. DRILLED HOLES MUST BE THROUGH CLADDING

Ref.	Part No.	Qty	Description	Ref.	Part No.	Qty	Description
1	73 13 320	1	GUARD KIT ASSEMBLY	6	73 13 137	8	.Tube Spacer
2	73 13 133	1	.Guard Panel Large	7	03 11 082	8	.5/16" UNF Hex S/Screw 1" lg
3	73 13 134	1	.Guard Panel Small	8	02 11 242	8	.5/16" UNF Hex Bolt 3" lg
4	73 13 135	4	.Guard Clip	9	01 41 002	8	.5/16" UNF Hex 'Aero' nut
5	73 13 136	16	.Clamp Plate	10	01 00 102	8	.5/16" Dia Plain Washer

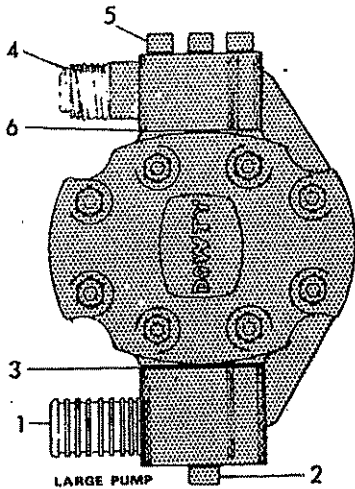
HYDRAULIC PUMPS



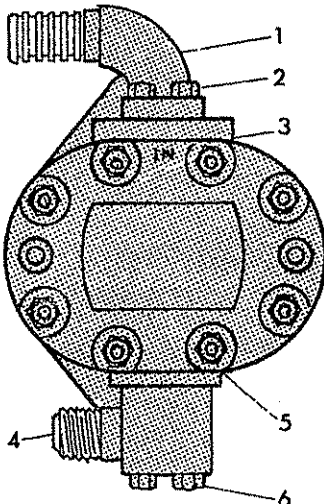
Ref.	Pt.No.	Qty	Description
	82-01-481	1	P.D/L DOWTY PUMP ASSEMBLY comprising:
1	82-01-480	1	. Dowty pump 1P3044
2	80-05-021	1	. Pressure connection c/w
3	86-00-405	1	.. 'O' Ring
4	03-12-082	4	.. Setscrew 1" x 5/16" UNC.
5	80-05-022	1	. Suction connection c/w
6	86-00-405	1	.. 'O' Ring
7	03-12-082	4	.. Setscrew 1" x 5/16" UNC.
	86-99-137	1	SEAL KIT (optional extra)



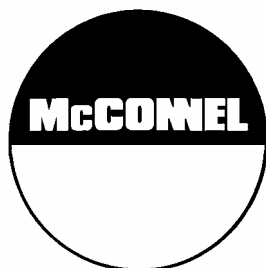
Ref.	Pt.No.	Qty	Description
	82-01-350	1	P.D/L PLESSEY BETA 33 PUMP comprising:
1	80-05-024	1	. Suction connection c/w
2	86-00-401	1	.. 'O' Ring
3	03-42-062	4	.. 3/4" x 5/16" UNC. capscrew
4	80-13-013	1	. Pressure connection c/w
5	86-00-112	1	.. 'O' Ring
6	03-42-061	4	.. 3/4" x 1/4" UNC. caphead screw
	82-01-107	1	SEAL KIT (optional extra)



Ref.	Pt.No.	Qty	Description
	82-01-476		P.S/F DOWTY PUMP ASSEMBLY comprising:
	82-01-475	1	. Dowty pump 7505/3146
1	80-13-022	1	. Suction connection c/w
2	02-42-202	2	.. 2 1/2" x 5/16" UNC. capscrew
3	80-13-023	1	. Gasket
4	80-13-024	1	. Pressure connection c/w
5	02-42-162	4	.. 2" x 5/16" UNC. capscrew
6	86-00-121	1	.. 'O' Ring
	86-99-138	1	SEAL KIT (optional extra)



Ref.	Pt.No.	Qty	Description
	82-01-452	1	P.S/F PLESSEY GAMMA 95 PUMP comprising:
1	80-13-018	1	. Suction connection c/w
2	03-12-104	4	.. 1 1/2" x 7/16" UNC set screws
3	80-13-019	1	. Gasket
4	80-13-026	1	. Pressure connection c/w
5	86-00-121	1	.. 'O' Ring
6	02-12-203	4	.. 2.1/2" x 3/8" UNC bolts
	86-99-123	1	SEAL KIT (optional extra)



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