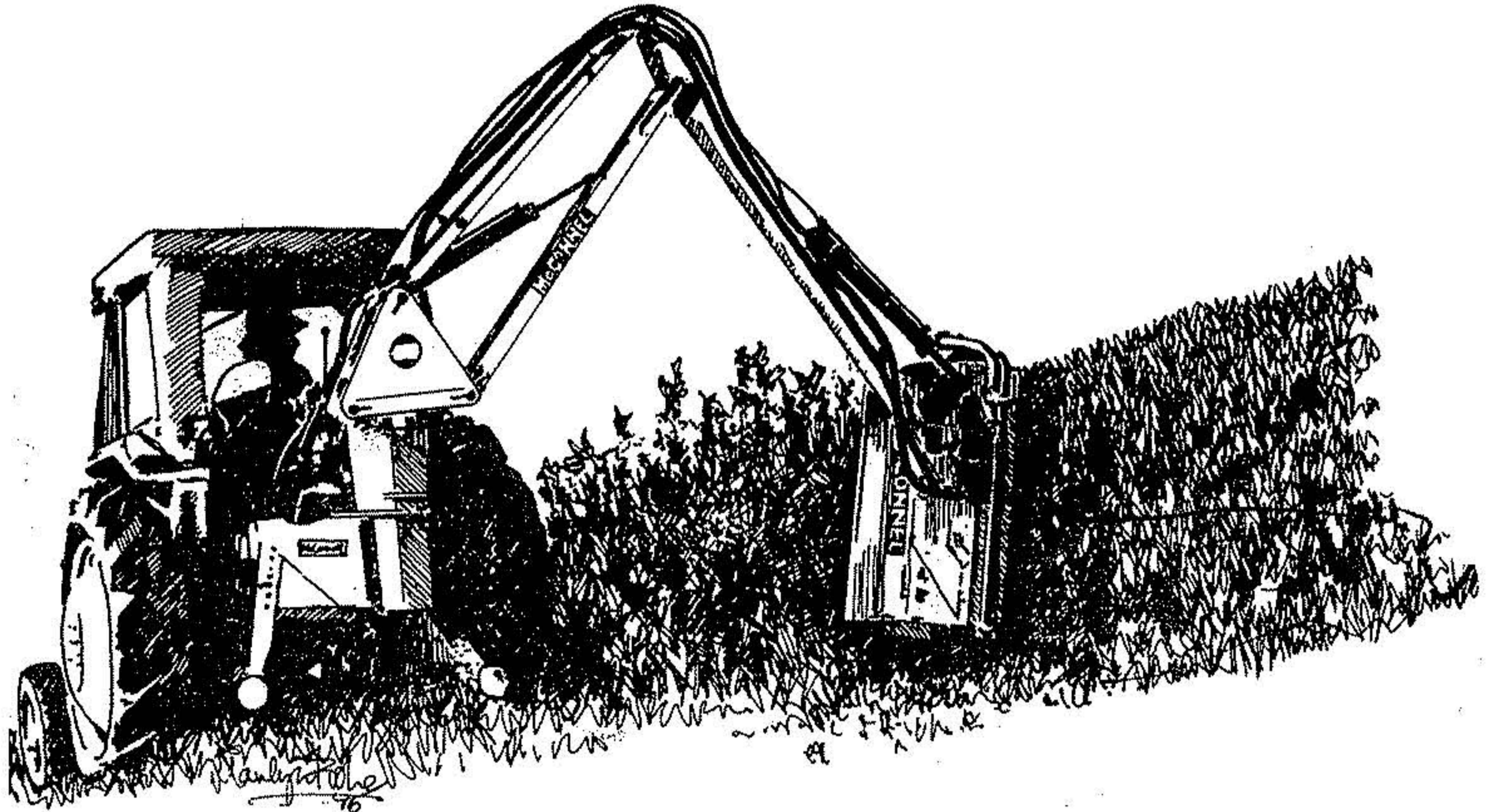


OPERATION AND SPARE PARTS MANUAL

HY-REACH.



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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.

SECTION 1 SAFETY PRECAUTIONS



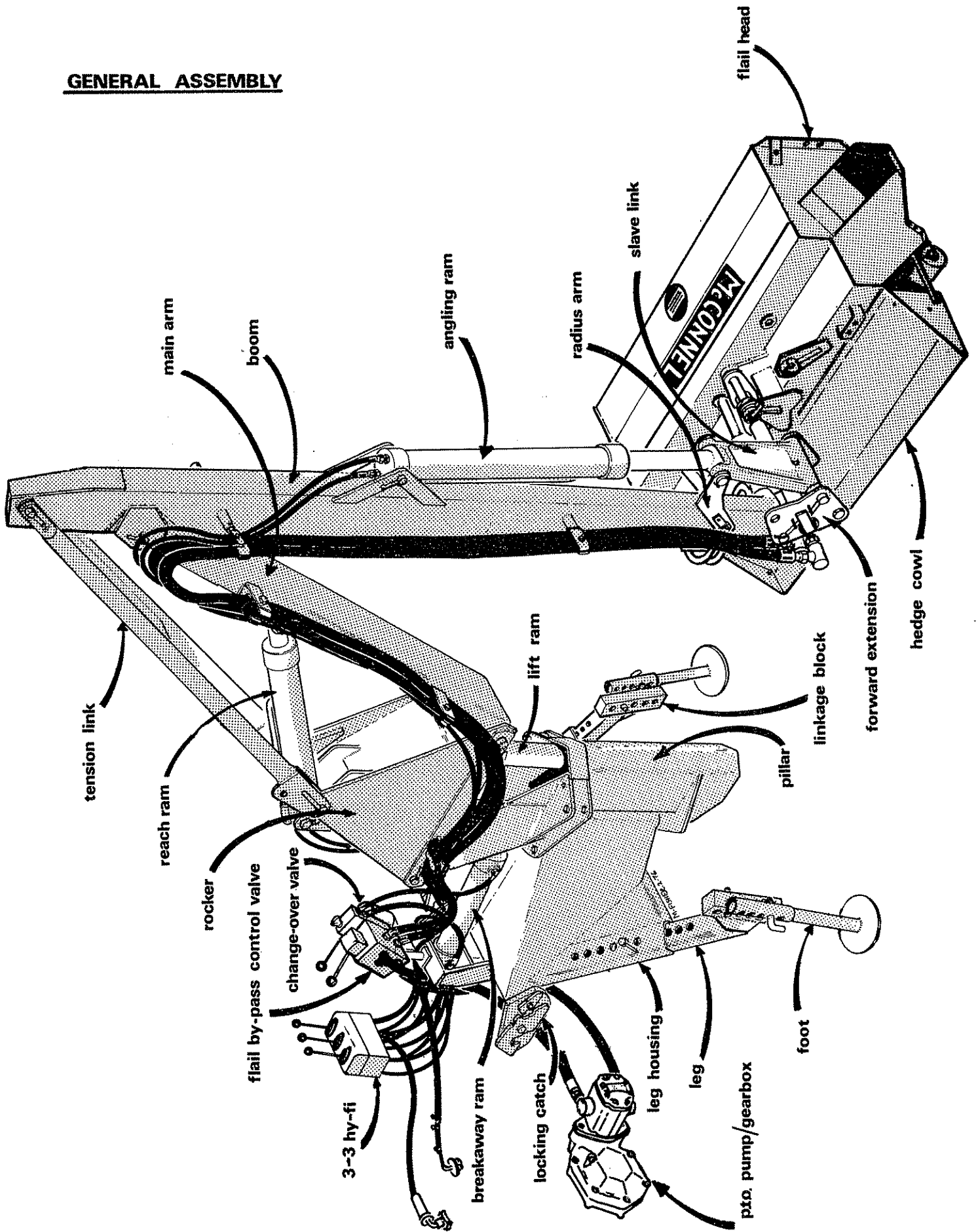
WARNING

- NEVER permit inexperienced personnel to operate the machine without supervision.
- stand under the raised flail head.
- 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 engine with the pto engaged.
- operate the machine without a safety guard.
- ALWAYS carefully inspect the work area or hedgerow for wire, steel posts, large stones, bottles and other dangerous materials and remove them (before starting work).
- ensure all bystanders are kept 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 damage to the machine.

CAUTION

One of the features of the Hy-Reach is the ability to cut close to the tractor in confined spaces. This means that in some instances the flail head casing can be made to foul the tractor if reasonable care is not observed.

GENERAL ASSEMBLY



SECTION 2 TRACTOR PREPARATION

1. Oil Supply

- a) Power for the movement of the armhead is obtained from the integral hydraulic tractor pump which should have a minimum relief valve setting of 2000 psi and minimum delivery of 1½galls per minute. (6.8 litres per minute at 140 bars).
- b) A PS/F pump bolted to a high ratio gearbox is mounted to the tractor pto shaft. This pump is used to drive the hydraulic motor for operation of the flail. The length of torque chain supplied with the gearbox should be adjusted to give an approximate angle of 90° on a line through the pto shaft. Note that the pump connections can be unbolted and rotated to suit individual requirements. It is essential that clearance is maintained between the Hy-Reach body and the pump/gearbox assembly.
- c) Some tractors have a high flow rate from their integral pumps. This results in violent movement of the armhead making precise control difficult. In these circumstances it is advisable to fit a flow control valve which limits the amount of oil passing to the control box.

- d) International Harvester. Flow metering valve necessary.

Kit number 81 04 032 required for: 614, 634.

81 04 033 required for: 2400, 2500; 454, 474, 574, 674.

- e) FORD Dual Power Certain models having a transmission pressure lubrication system require a flow by-pass valve McConnel part number 80 02 279 to prevent high return line pressures damaging the pump seals, filter etc. McConnel Service Bulletin HY/03 refers.

On Ford 600 and 700 Line tractors which are fitted with hydraulic cooler transmission pressure lubrication a maximum back pressure of 35/45 psi is maintained in the system. The return hose from the machine must be connected into the lubrication system at the cooler valve manifold cap nut. Use McConnel return kit part number 80 02 284. Alternatively use Ford kit, part numbers SF 670 191 S1 with SF 670 179 S1.

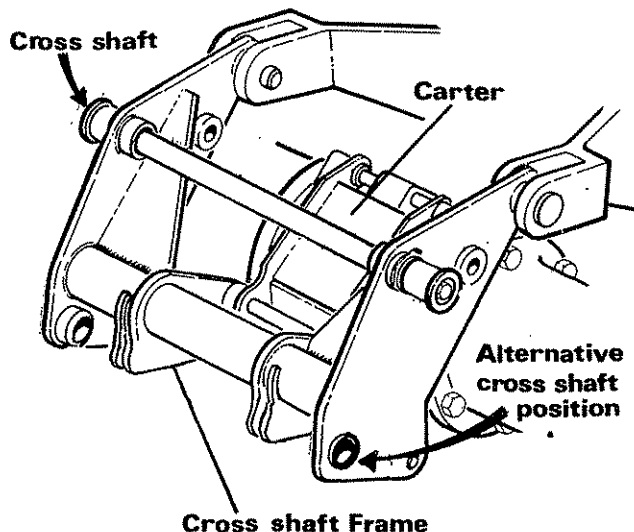
- f) John Deere tractors are equipped with 'closed centre' hydraulic systems. Refer to McConnel Service Bulletin HY/02 and the Appendix at the rear of this manual.

2. Hydraulic Fittings

- a) To protect the new machine, drain, flush and refill the hydraulic system on older tractors.
- b) A male half self-sealing coupling should be fitted to the auxiliary service port or trailer pipe connection.
- c) 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.
- d) In all cases, back pressure of the return oil flow must be kept to a minimum. The use of self-sealing couplings 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 the tractor auxiliary service is operated. This can lead to a burst filter housing and/or damaged pto pump shaft seal.
- e) All hoses should be carefully routed to avoid sharp bends and kinks and the hose lengths should be kept to a minimum.

Tractor fittings

Two new ranges of tractor fittings on which the Hy-Reach 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.



Whenever possible the higher cross shaft position should be selected for all flail work.

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 Hy-Reach.

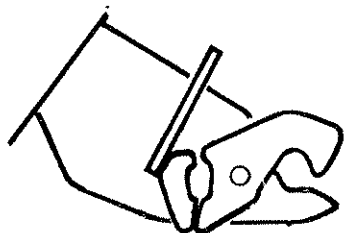
Series 45

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 Hy-Reach. 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.

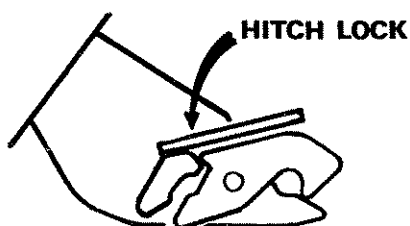
Use of any fitting set means the removal of tractor drop links and locking of the hydraulic lift arms by the cross shaft frame.

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.

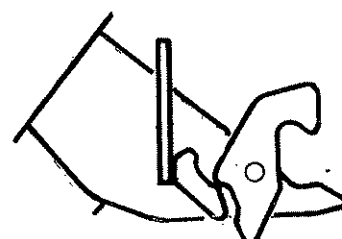
LOCKING-CATCH POSITIONS



HITCH



LOCK



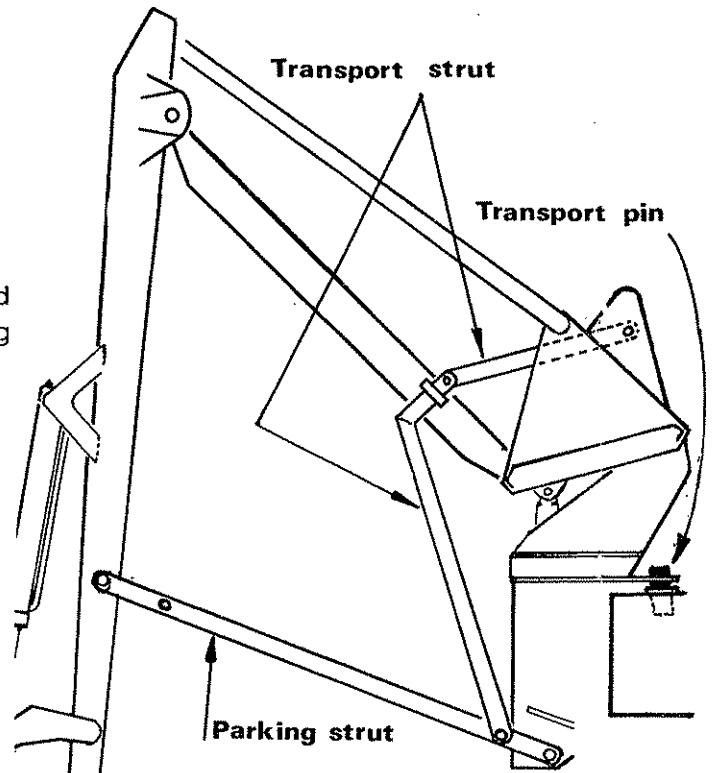
RELEASE

SECTION 3

ATTACHMENT TO TRACTOR

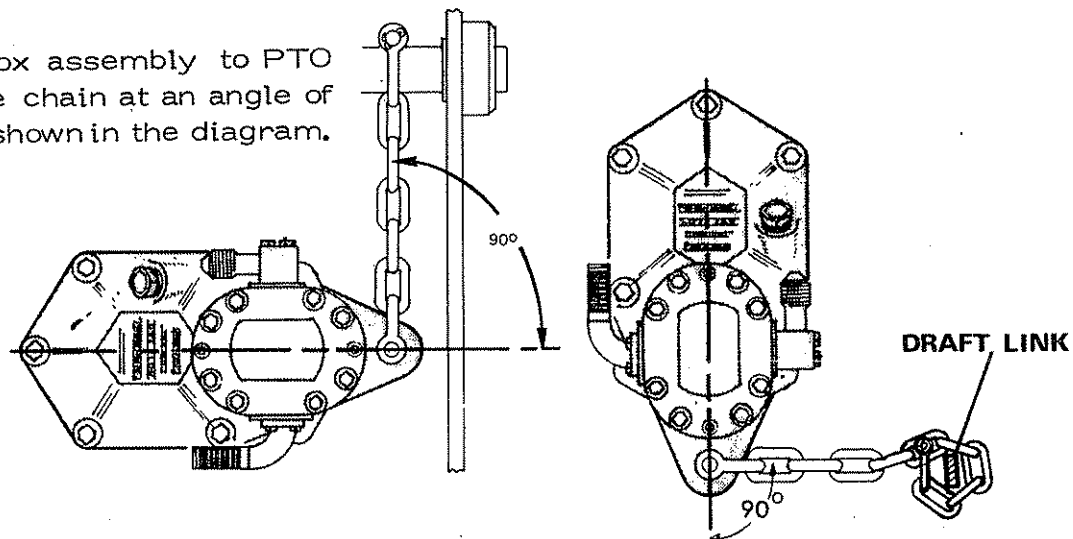
1. Attaching and removing from tractor must be carried out on firm, level ground with the machine in the 'park' position.
2. Remove flail hose end protective blanks and connect together with 1" BSP M-M union.
3. Fit tractor fittings onto the tractor as detailed in the sheet accompanying the fittings.

4. Remove and discard the transport pin and the two transport straps shown. The parking strap must be left in position.



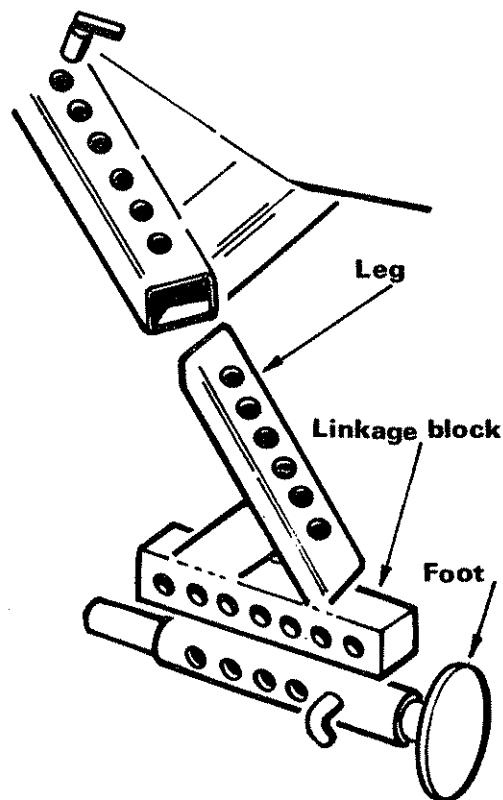
5. Set the locking catch on the main frame to HITCH position.
6. Reverse the tractor squarely and centrally to the machine until the cross shaft is approximately 18" from the locking catches.

7. Fit pump and gearbox assembly to PTO shaft. Fit the torque chain at an angle of 90° to the gearbox as shown in the diagram.

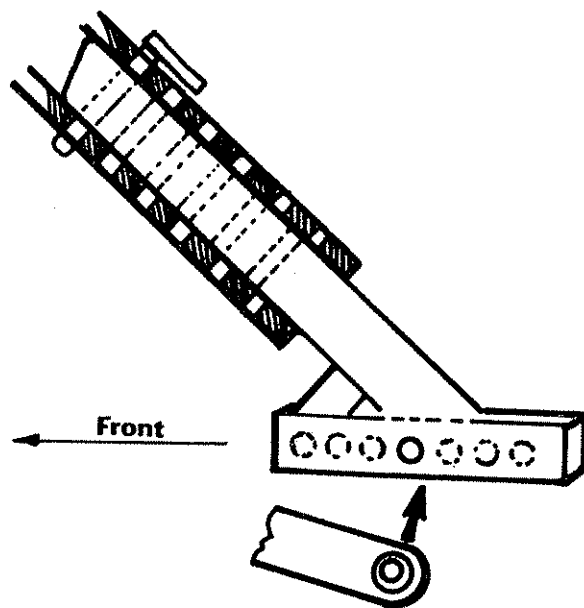


8. Remove the protective blanks from the return hose and fit to the return connection of the tractor using hose clips. Connect up the supply making sure the self-sealing coupling is fully engaged.
9. Isolate tractor linkage, select oil supply to machine and allow the oil to circulate for at least two minutes to prime the machine.

10. With the machine in 'park' position and by simultaneous use of the 'lift' and 'reach' levers on the Hy-Fi the machine can be tilted up or down to bring the locking catch level with the cross shaft.
11. Reverse the tractor and engage the locking catches on the outer ends of the cross shaft.
12. Using the reach and lift ram press down on the end of the boom to transfer the weight of the machine from the feet to the hitch locks. Raise the feet to their full height and replace the pin. Remove the leg pin, withdraw the leg from the frame, turn it through 180° and replace. Refit the leg pin in the top hole of both the frame and leg. The linkage block should now be horizontal.
13. Using the lift ram adjust the main body of the machine until it is just above the horizontal.



14. Fit the linkage pin in the nearest hole of the linkage block that is forward of the draught link ends. Hole alignment is achieved by removing the leg pin and extending the leg from the frame until the draught link can be fitted and the leg pin re-engaged.

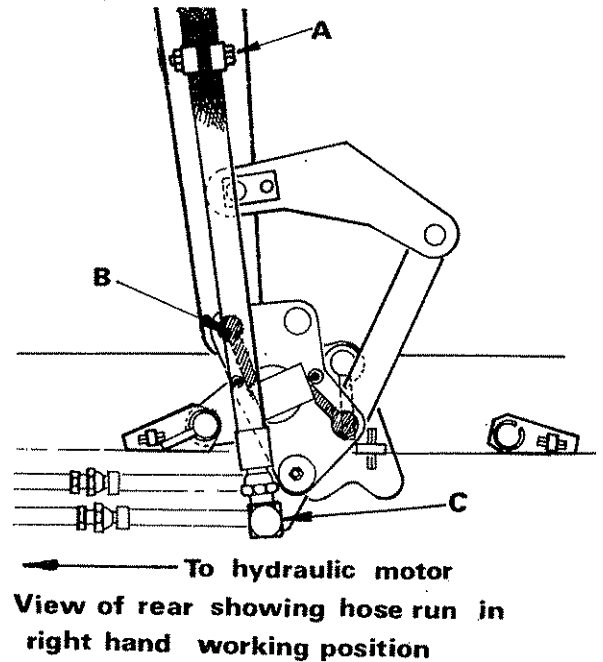


CAUTION

The leg needs the maximum amount of support within the frame when in the working position. Do not extend it further than 2" from the fully closed position. Use the next hole in the linkage block instead.

15. Remove the parking strap and stow in position on the side of the boom. Any tension on the strap can be relieved by use of the 'lift' and 'reach' levers on the Hy-Fi.
16. Reverse the machine up to the flail head and position flail mounting jaws on the forward extension between the central mounting lug and the secondary lug that is nearest the hydraulic motor.
17. Disconnect the slave link from the forward extension and fit the flail mounting pin through the main central lug and the mounting jaws on the forward extension. Reconnect the slave link. Fit the remaining mounting pin through the secondary lug. Lock the mounting pins in position with the roll pins.

18. Raise the flail and angle the flail head until the hose clamp nearest the boom end 'A' the forward extension pivot pin 'B' and the 90° elbows 'C' are in line.

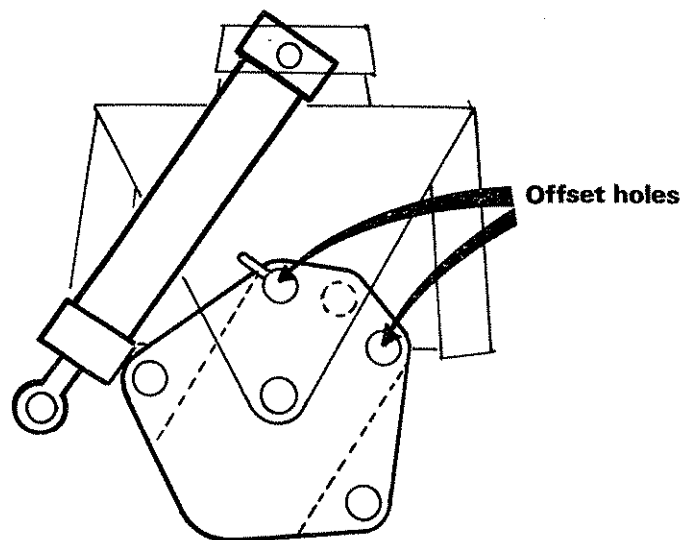


19. Separate the flail hose ends and connect to the 90° elbows.
20. Check rotation of rotor, if incorrect reverse the hose connections marked MR and MP on the flail control valve.
21. Operate machine carefully through its entire range of movement and check the hose runs for pinching, straining, chafing or kinking.

8

Transporting the Hy-Reach

The main boom can be offset to enable the flail head to be carried within the tractor wheel width for transport. Utilize the break-away ram rod end pin to position the pillar to the main frame in either of the offset holes in the pillar quadrant.



SECTION 4 OPERATION

1. Operating Speeds

It is not necessary to operate the flail at a speed of 540 rpm on the pto shaft. 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 means running the engine at about two thirds of the rated pto speed.

- ie. Where 2100 engine RPM = 540 PTO then run the engine at 1400 RPM
- Where 1900 engine RPM = 540 PTO then run the engine at 1270 RPM

Cutting downwards in heavy growth with excessive speed will result in shattering and splitting of the stems giving an untidy finish. The rotor and flails are also subject to unnecessarily rough treatment. The high ratio gearbox part number 18 13 290 is suitable for tractors that have a high forward speed in low gear as the flail speed can be maintained whilst reducing engine revolutions and therefore slowing the tractor ground speed.

Under no circumstances should a pto speed of 540 rpm ever be exceeded.

2. Operator Guard (see page 56)

An operators guard is supplied as standard equipment for all flails and attaches to the tractor cab with spacer and/or clip fittings. 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.

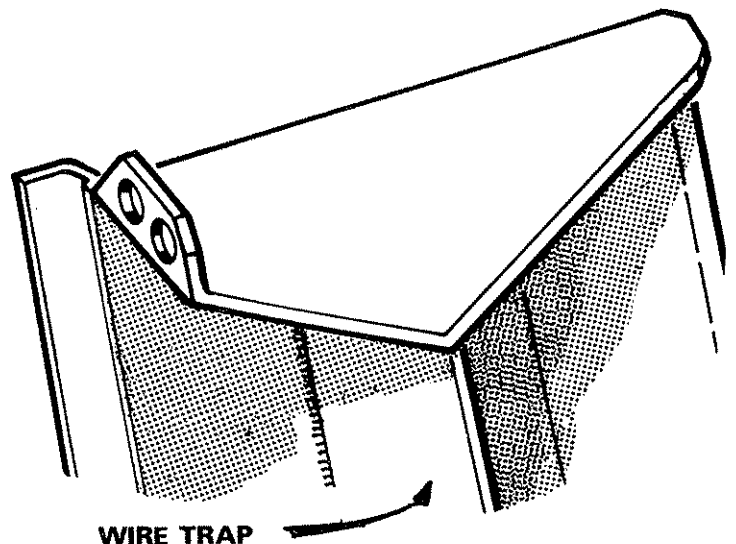
Tractors that have no cabs or that have canvas type weather cabs must have a frame built-up from the mud wing on which to attach the operator guard.

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

3. 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.



4. 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 required before moving the flail head into the work.

5. Machine Limitations

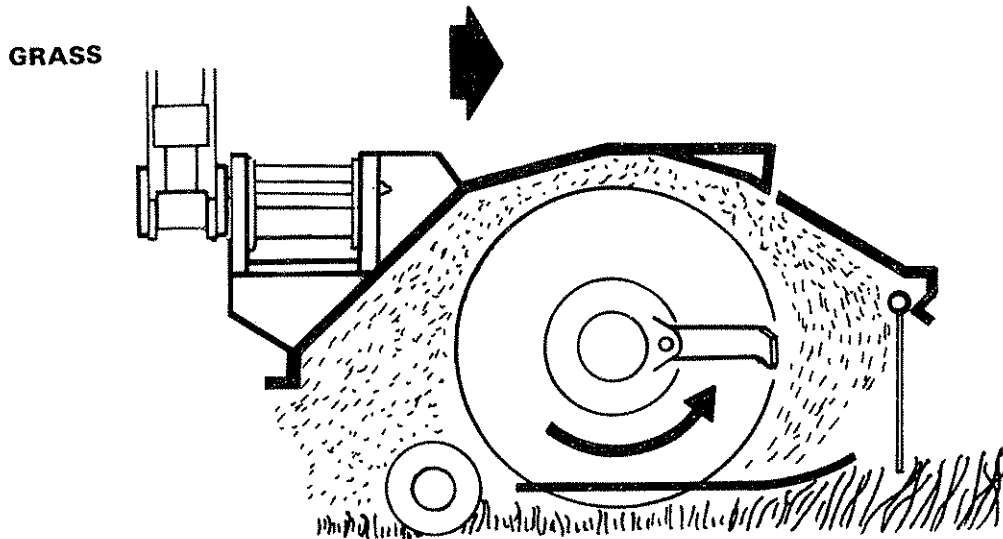
Bear in mind that the hedger flail is a maintenance tool designed to deal with one or two years growth. Badly neglected hedges should be tackled with a sawhead and really heavy timber should be felled with a chainsaw.

6. Flail Rotation

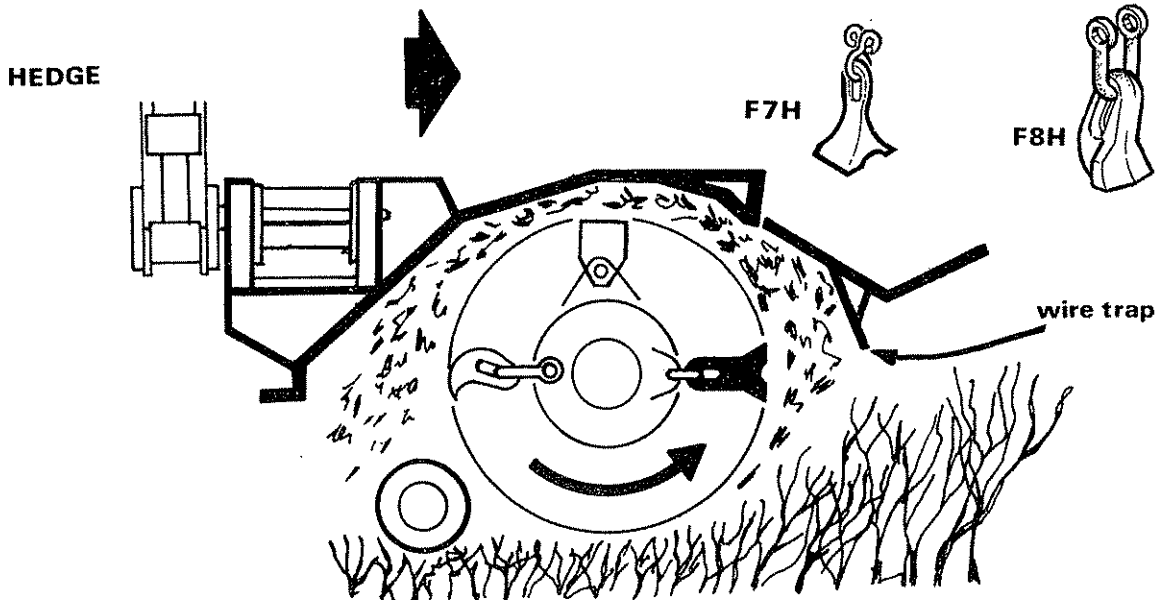
The flail head is normally assembled at the factory for the flails to cut upwards. This is the normal direction of rotation for grass cutting and average hedge cutting. For heavy hedge cutting, the direction of rotation should be changed to cut downwards in a chopping action. Rotation is reversed by interchanging the hoses to the hydraulic motor at the by-pass control valve connections. It will also be necessary to reverse the F 8H flails on the rotor.

Grass

When working in the vicinity of public highways, pedestrian and traffic safety is vital. The grass cutting cowl fitted at the front, completely shields the rotor. The flails move in an upward rotation sucking up the grass to provide a level finish.

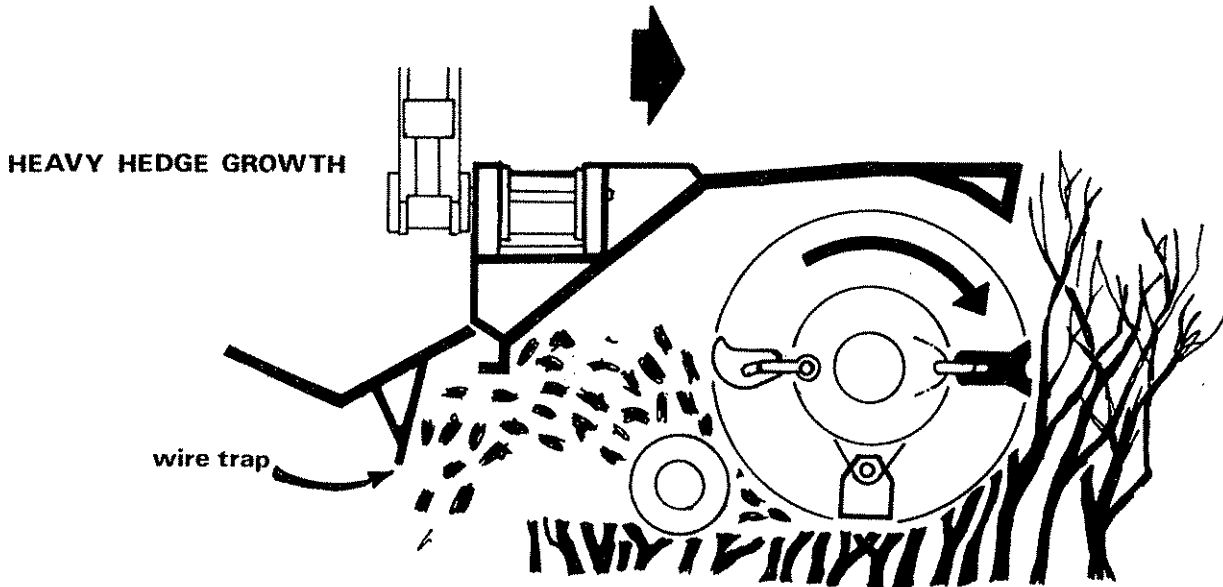


Hedger flails currently available are the F10/H for the multicut and the F9/T for the toughcut. Old flails to fit the triplecut rotors can still be ordered as spares - these are the F7/H and the F8/H.



For light hedge a clean cut is important as frost can enter split stems and cause die-back. The flails cut upwards and growth is sheared-off cleanly. A hedgecutting cowl fitted at the front leaves an opening allowing the hedgings to enter.

When cutting upwards in heavy growth, the depth of cut is controlled by the amount of material which can pass under the front of the hedging cowl. Cutting upwards generally gives a cleaner finish to the hedge and prolongs the life of the flails.



Where it is required to cut down heavy growth with a minimum number of passes, the rotation is reversed and the front of the flail head left open. The hedgecutting cowl is fitted to the rear and deflects the debris downwards. Where a considerable amount of heavy work is involved, the Toughcut flail should be used.

WARNING

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

7

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.

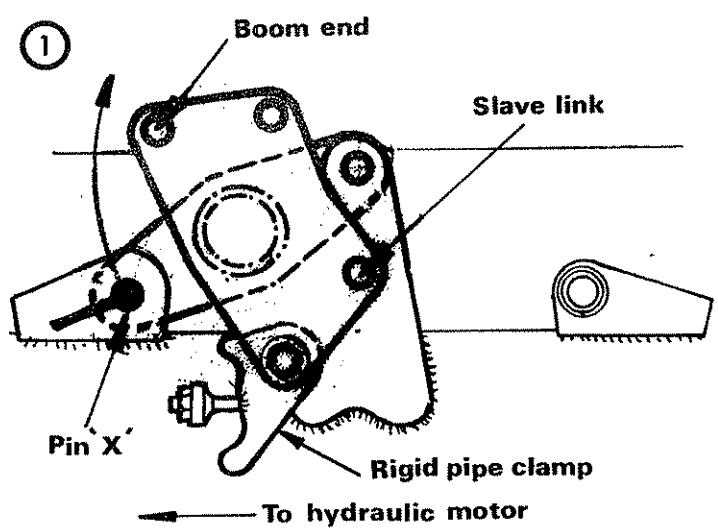
CONVERTING FROM RIGHT TO LEFT HAND WORKING

The Hy-Reach is normally despatched from the factory with the flail head positioned for right hand working i.e. the hydraulic motor mounted on the left of the rotor shaft nearest the operator.

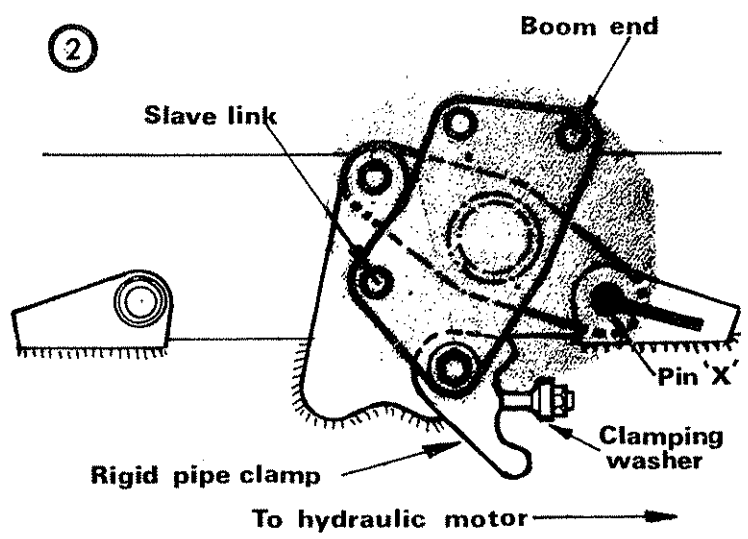
The flail head can be mounted for left hand working in which case it will be necessary to obtain supply and return rigid pipes for the hydraulic motor.

Work should be carried out on firm level ground with the machine in the 'park' position.

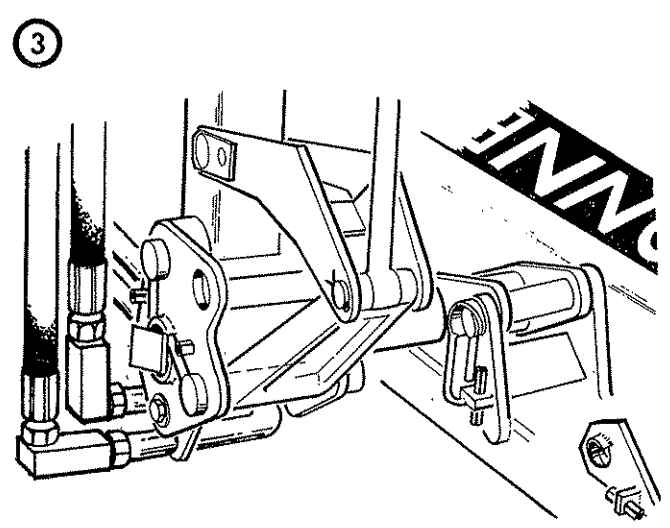
1. Disconnect the flail hoses at the 90° elbows ensuring that you have a suitable receptacle to catch the oil. Connect the hose ends with a 1" BSP M - M union.
2. Dismantle the rigid pipe clamp on the forward extension and uncouple the rigid pipes from the flail motor rigid pipe assemblies.
3. Remove the flail motor cover.
4. Remove and store existing flail motor rigid pipes.
5. Remove and reassemble the flail motor and drive coupling assembly on the other end of the flail head.
6. Fit new rigid pipes onto the flail motor and replace the flail motor cover.
7. Disconnect the boom and slave link from the forward extension and lower boom end to the ground.
8. Remove pin 'X', swing the forward extension over and secure in the opposite lug.
9. Remove hose clips and hoses from the main arm, boom and rocker and reassemble on the other side of the machine ensuring there is enough free hose at the pivots to allow the machine to operate through its entire range of movement without straining the hoses.
10. Remove breakaway ram rod end pin. Retract breakaway ram by selecting 'work' position on the change over valve. Select 'lift' on the Hy-Fi until the breakaway ram is fully closed. Swing the ram across behind the pillar. Extend the ram by selecting 'park' on the CHANGE OVER VALVE. Select lift on the Hy-Fi until ram is fully extended. Reconnect the ram rod end between the lugs.
11. Turn the entire flail head through 180° to face in the opposite direction.
12. Lower the boom boss end and slave link into the forward extension using the locations shown in Fig 2.
13. Connect the rigid pipes complete with elbows to the motor rigid pipes. The pipe with the elbow extending furthest rearward is fitted in the lower position.
14. Raise the flail, and angle until the hose clamp nearest the boss end 'A', the forward extension pivot pin 'B' and the 90° elbows 'C' are in line. See Fig 6.
15. Slacken the 90° elbows, separate the flail hose ends and connect to the 90° elbows ensuring the hose run passes over the forward extension pivot pin. Tighten the 90° elbows fully without disturbing the hose positions.
16. Refit the rigid pipe clamp by bolting through the hole shown with the washer on the outside and spacer on the inside of the forward extension plate, see Fig 2.
17. Using special clamping washer secure rigid pipes in position.
18. Check rotation of rotor, for upward cutting the hose/rigid pipe run from the connection marked MP on the FLAIL CONTROL VALVE should be connected to the lower connection on the hydraulic motor.
19. When work is completed operate machine carefully through its entire range of movement and re-check hoses for pinching, straining, kinking, or chafing.



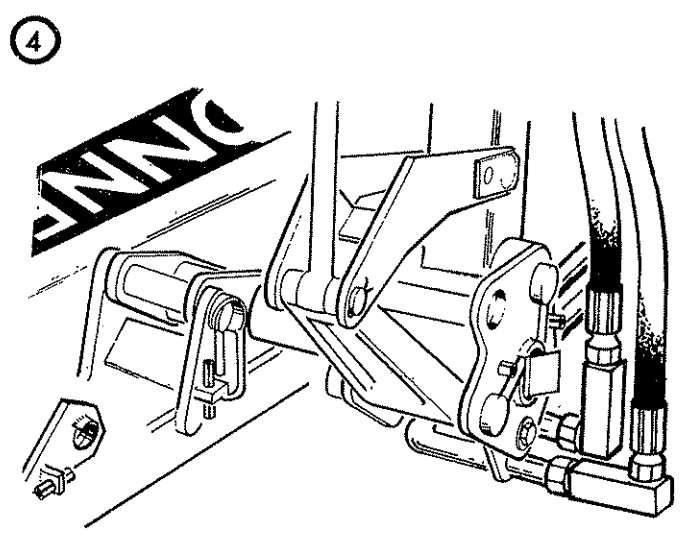
Rear of flail with forward extension in right hand working position



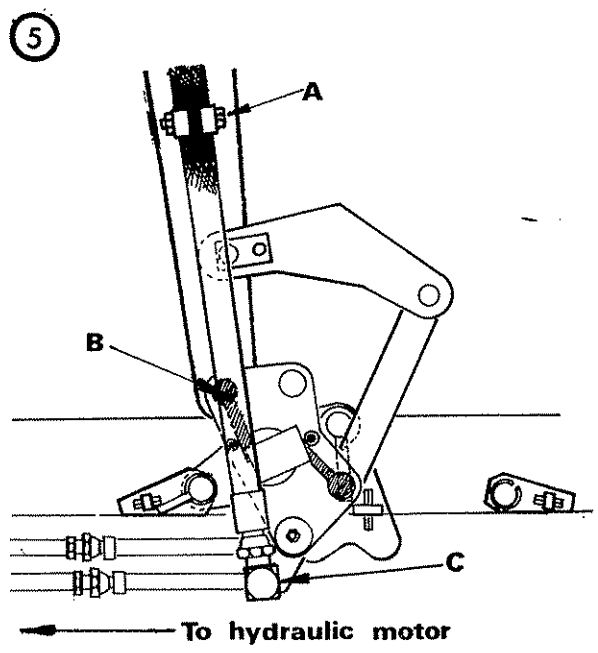
Rear of flail with forward extension in left hand working position



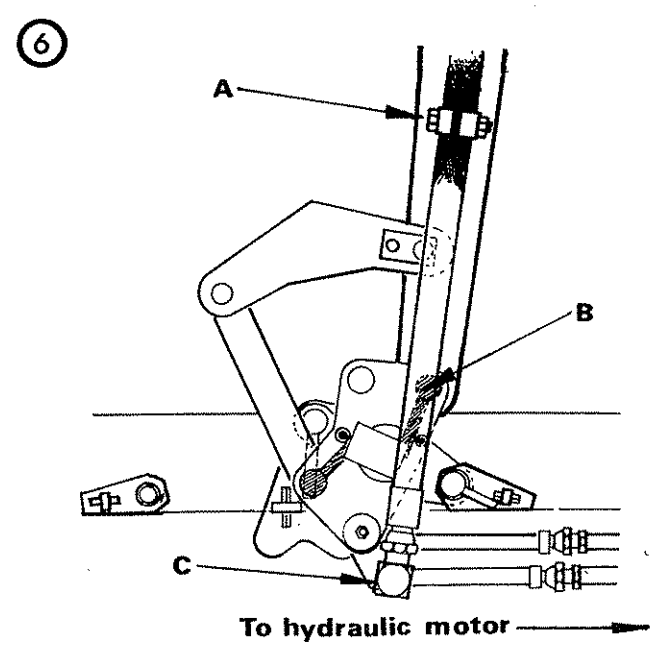
General view of flail attachment in R. Hand working position



General view of flail attachment in L. Hand working position



View of rear showing hose run in right hand working position

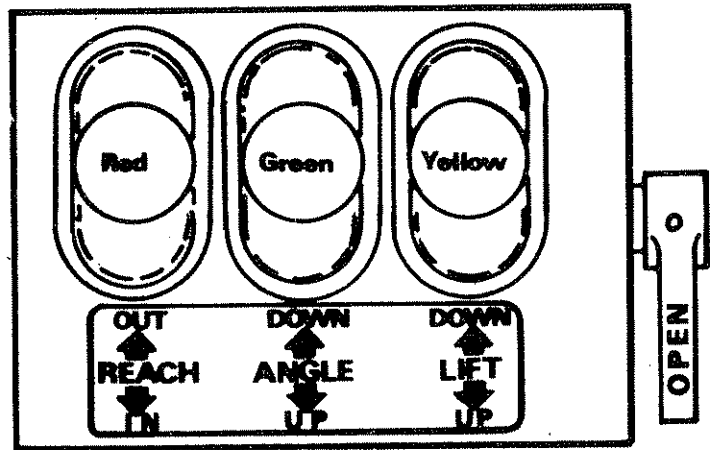


View of rear showing hose run in left hand working position

HYDRAULIC CONTROLS

3a) 3-3 Hy-fi

The 3 lever Hy-fi which is powered directly from the tractors integral hydraulic pump is used to control arm movements. The two double acting services control the angling and reach rams and the single acting service with its opposite port blanked off, controls the lift ram.



- i) 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.

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

b) Change-over Valve

Oil from the low pressure return port of the Hy-fi is delivered into the change-over valve and passes through a low pressure filter before entering the flail by-pass control valve. The change-over valve has a two position lever for controlling operation of the breakaway ram and to enable the arm to be swung round into the transport position.

i) Breakaway action

With the change-over lever in 'WORK' position the base end of the lift ram is connected to the gland end of the breakaway ram. On meeting an obstruction, the breakaway movement of the arm displaces oil from the breakaway ram to the lift ram, causing the arm to rise and help clear the obstruction. When clear, the arm can drop back displacing oil from the lift ram back to the breakaway until the original position, rod fully closed, is reached. A one-way restrictor limits the speed of the oil flowing back into the breakaway ram so that the arm does not return forward violently.

ii) Transport position

The armhead is positioned to the rear of the tractor for travelling or when parking the machine before tractor removal. With the change-over lever in 'PARK' position both the gland and base ends of the breakaway ram are connected to the base end of the lift ram. To operate, raise the arm with the lift ram. The weight of the arm pressurizes the oil and the breakaway ram will extend thus swinging the machine into 'PARK' position. The armhead will drop as this operation is carried out and it may be necessary to operate the lift control lever on the Hy-fi to give the arm sufficient height to allow the movement to be completed.

- iii) The adjustable tap in the top of the change-over valve controls the lowering speed of the lift ram only.

c) Flail By-pass Control Valve

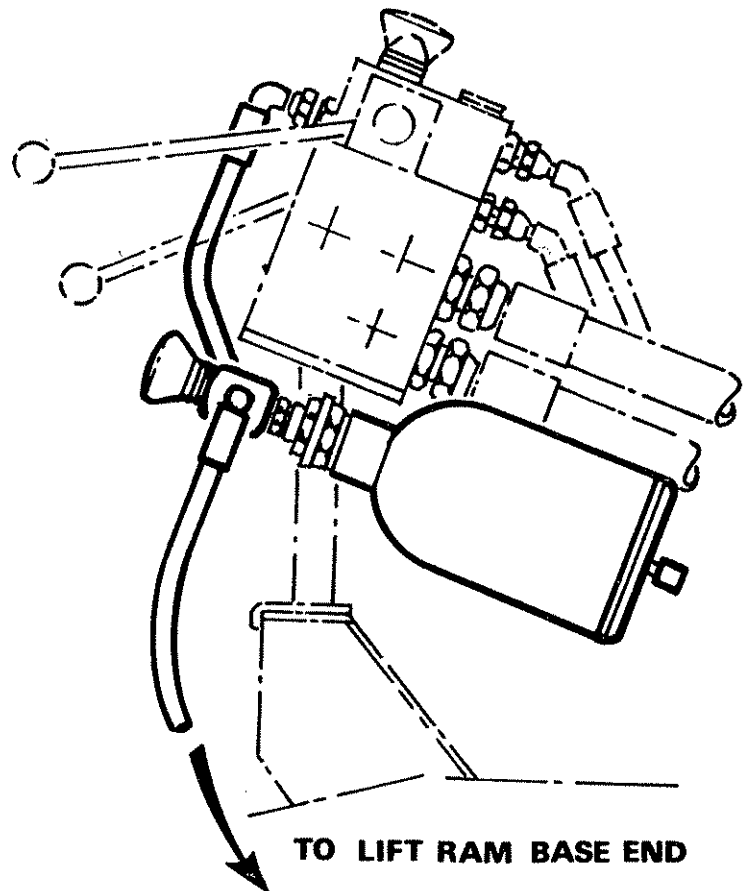
This valve controls the STOP/START action of the flail head thus making it unnecessary to disengage the PTO pump to bring the flail head to a stop. When engaging the drive, the engine speed should be reduced, the control lever should be pushed up slowly until the drive is fully engaged and then the engine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

i) Pressure relief valve

Situated in the top of the By-pass control valve and pre-set at 2500 psi (170 bar); the valve protects the PTO pump against over-load. The valve is non-adjustable.

d) Hydraulic Float Kit

The hydraulic float kit which is mounted on a lug immediately beneath the by-pass control valve is supplied as an optional extra for use with the grass flail. In operation, it allows the flail head to ride over undulating ground, any shock loads are absorbed by an accumulator which is pre-charged with 500 psi of Nitrogen and sealed. The accumulator can be isolated for hedge cutting by closing the stop tap.



e) Accumulator Test

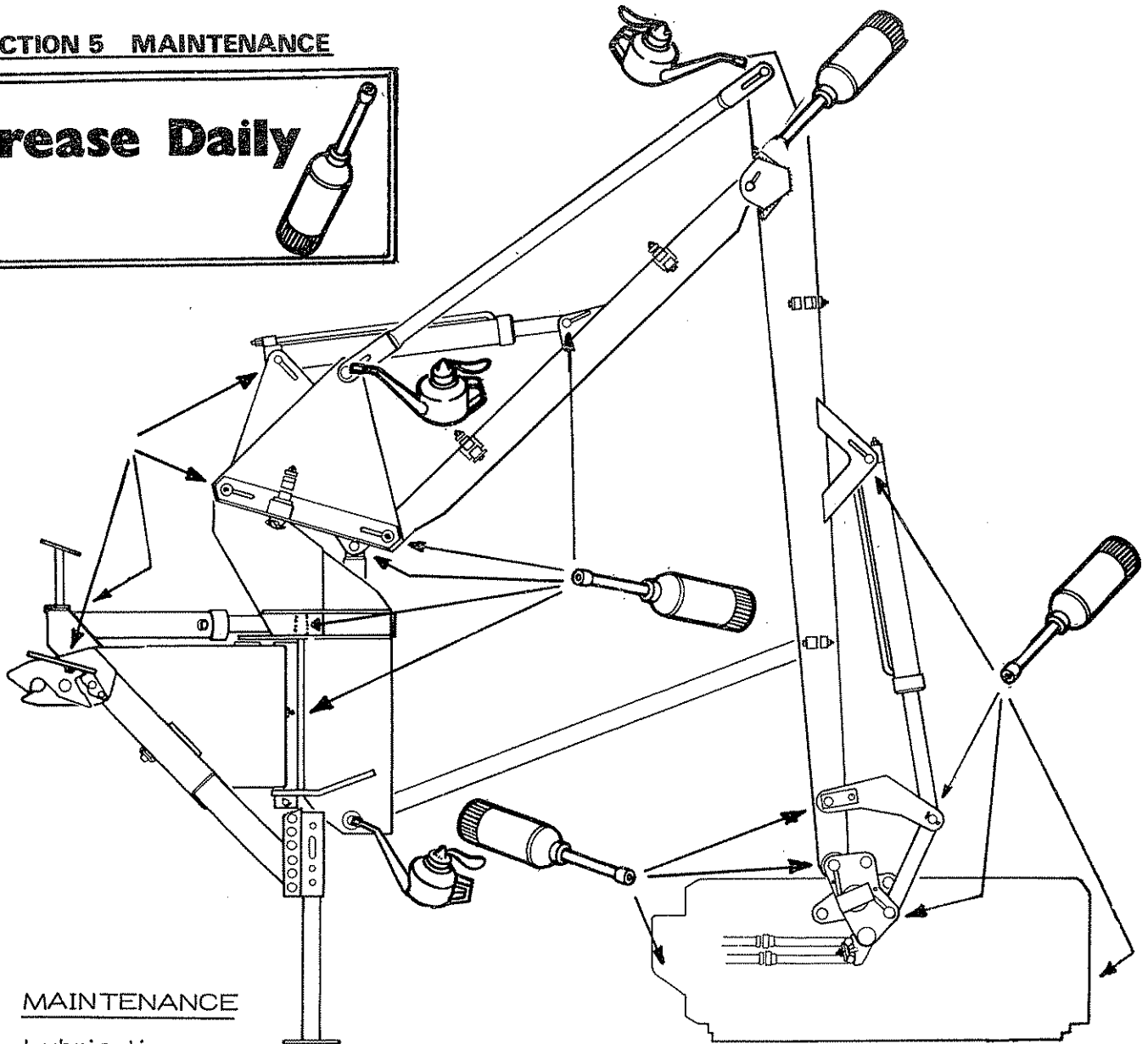
If a leak of Nitrogen is suspected a test with soapy water around the valve thread and core area should be carried out.

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.

SECTION 5 MAINTENANCE



MAINTENANCE

1. Lubrication

Refer to the lubrication diagram above and grease daily all points shown. Pay particular attention to the rotor shaft bearings; in arduous conditions these should be greased more often.

Apply oil weekly to the reach link pivot points.

2. Flail Head

Frequently inspect the rotor assembly for damaged or missing flails and check that all locking pins are securely in position.

Do not run the rotor with flails missing. Inbalance will cause severe vibration and rapidly damage rotor bearings and 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.

Always replace flails in pairs and never match up a new flail with a resharpened one. Ensure that opposite fitting flails are balanced for weight.

Blunt flails absorb a lot of power and leave an untidy finish to the work, they should be removed and sharpened on a grindstone periodically.

Ensure the bearing housing and motor nuts and bolts are kept tight. They should be checked during routine servicing.

3. Hydraulic 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.

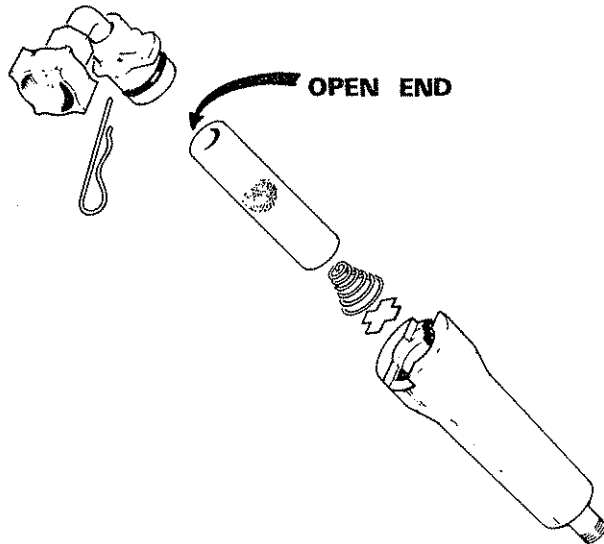
Reduce contamination by:-

- a) Carrying out all hydraulic maintenance & 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.

4. Oil Filters

Two filters are fitted to the machine.

- a) High pressure filter situated in the pressure line from the tractor. During the first week clean filter daily by removing spring cotter and rotating bayonet end fitting 90°. Wash out element in a small quantity of diesel fuel, drain and replace. Make sure that the spring and 'iron cross' are in position against the closed end of the element. Clean at weekly intervals thereafter.



- b) Low pressure filter. A full flow low pressure filter is situated on the side of the By-pass 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.

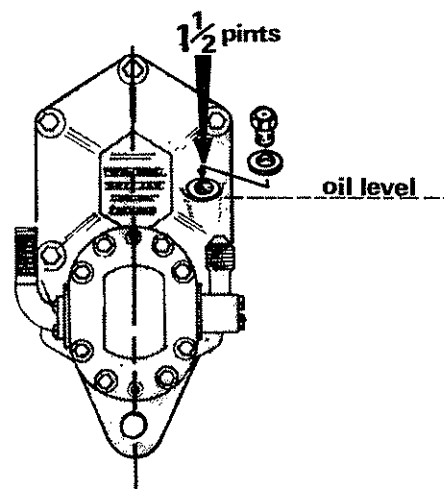
5. PTO Gearbox and Pump Assembly

The gearbox holds approx. 1½ pints (.75 litre) of E.P.90 grade gear oil. It should be checked 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.



6. 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.

7. 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, Reach and Breakaway Rams

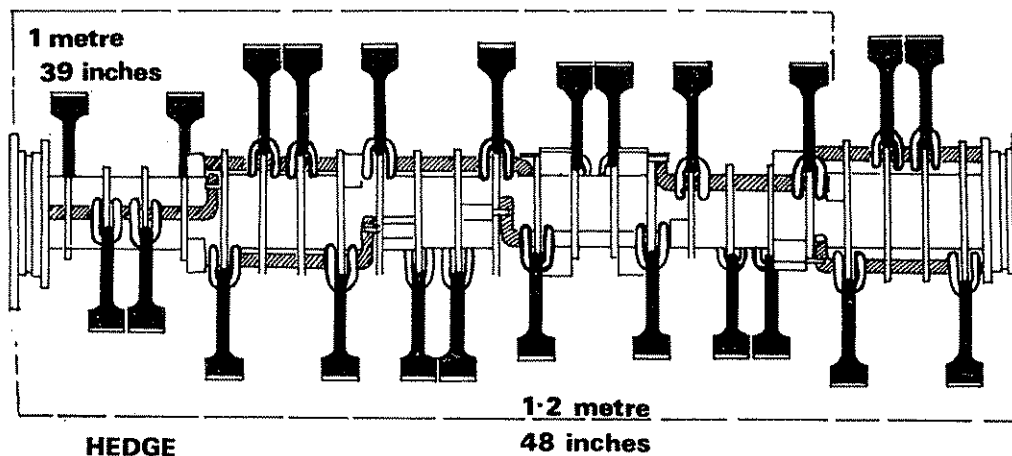
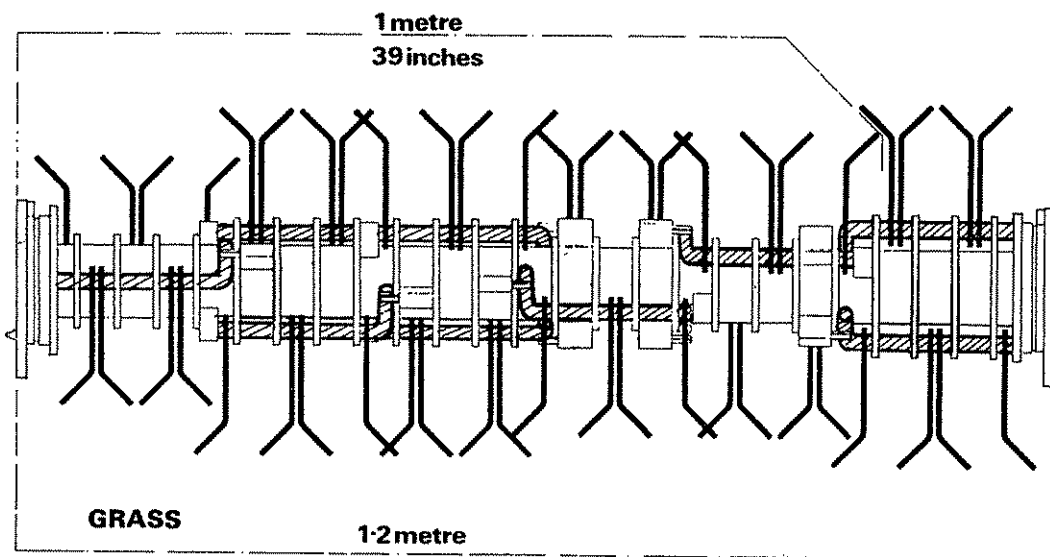
Unscrew gland nut and withdraw the complete rod assembly.
Remove locking wire from groove of ram nut and unscrew nut.
Remove piston, piston seals and gland housing assembly from rod.
Renew all seals including the 'O' ring behind piston.
Lubricate all seals on assembly and do not overtighten ram nut.
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

This is a single-acting displacement type 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).

FLAIL ARRANGEMENT OF TRIPLECUT ROTOR



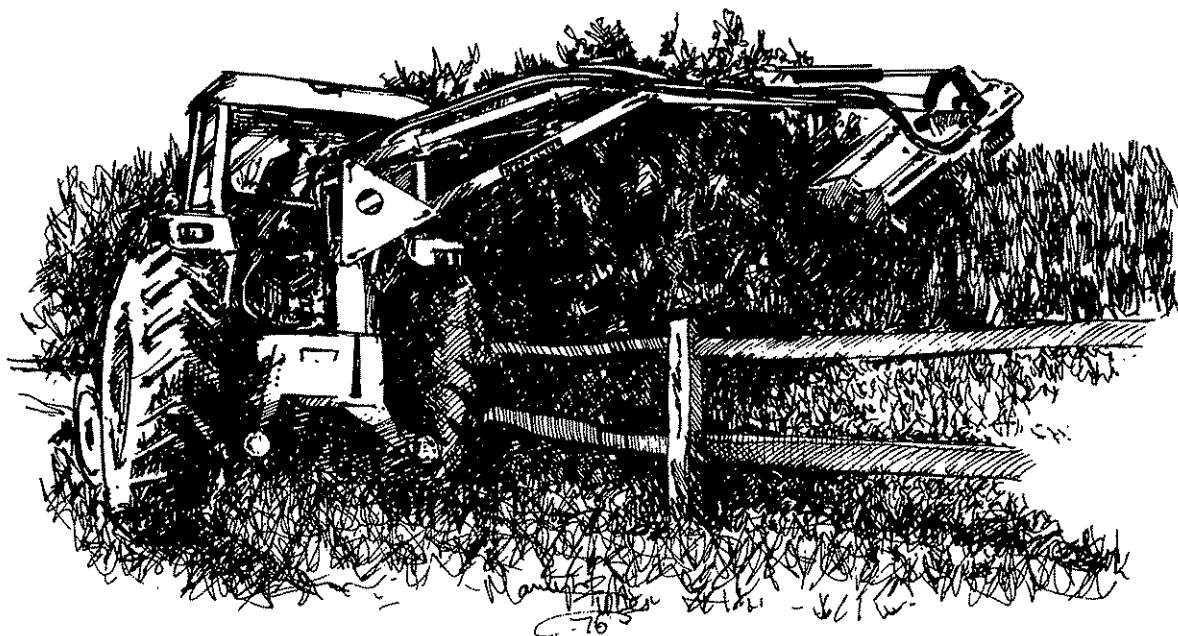
Splined drive flail head

The metric flail head is fitted to both McConnel Power Arm 44 and Hy-Reach machines.

All Hy-Reach flail heads up to the introduction of the Multicut in December 1977 have a two piece 13 splined coupling between the hydraulic motor and the rotor shaft.

Early Hy-Reach flail heads had a circlip within the female coupling which was discontinued and replaced by a distance piece part no 80 13 051 from approximately 07FR58 (1 metre), 06FM67 (1.2 metre), 01FT24 (Toughcut) in September 1976.

SPARE PARTS MANUAL for HY-REACH FLAIL



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.

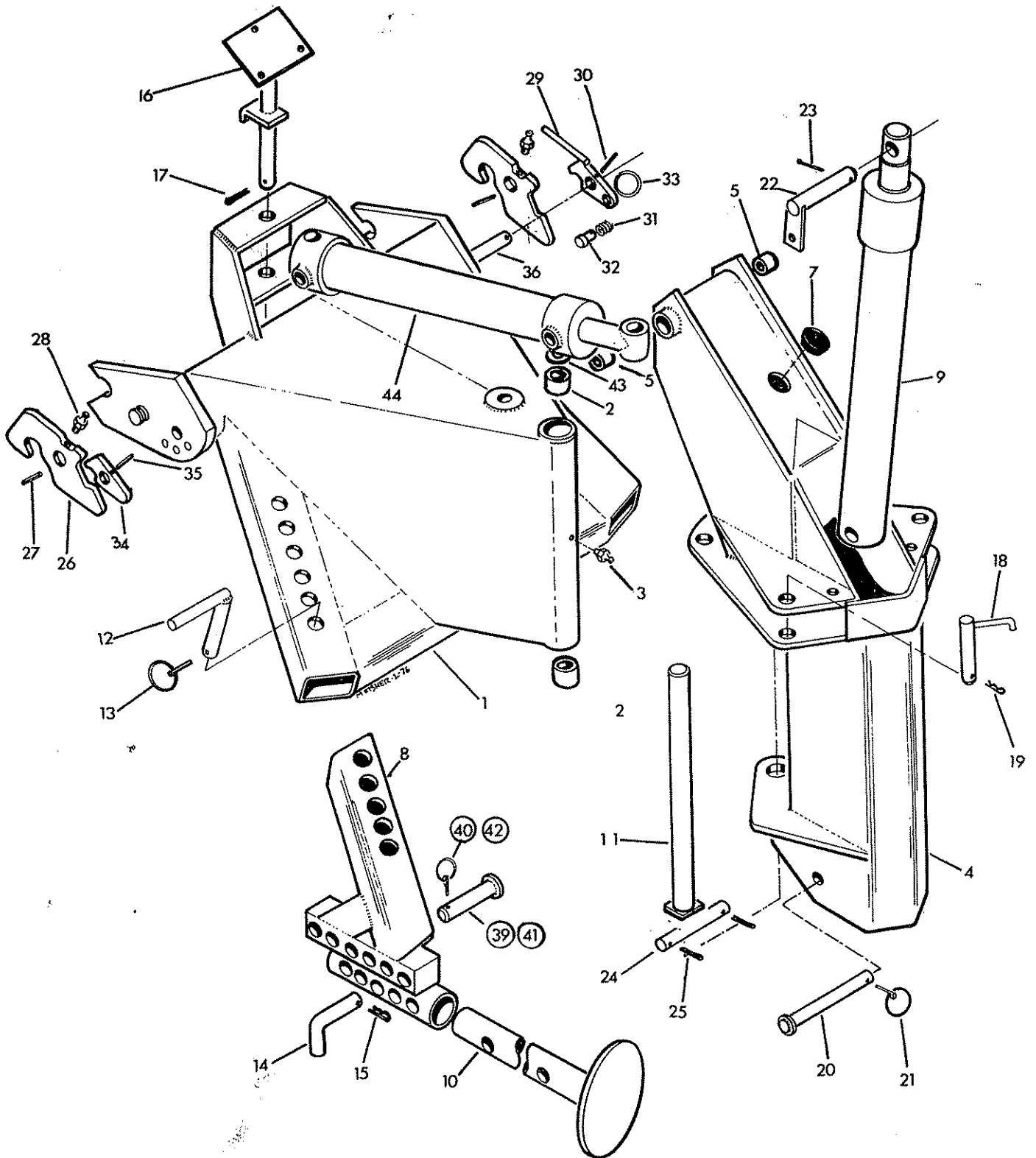
Always quote machine type and serial number as well as the part number.

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

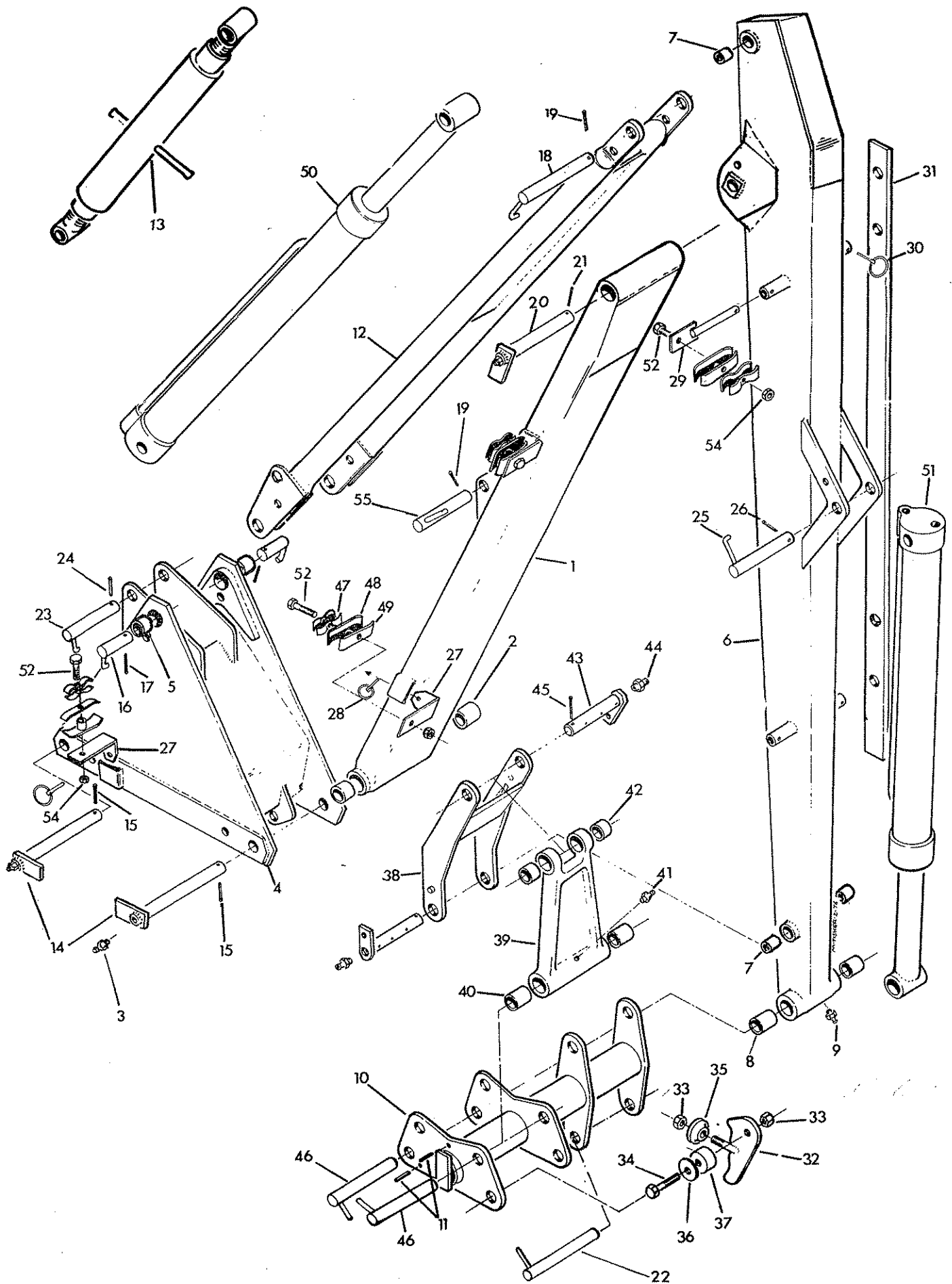
Many spares are supplied as Assemblies or as Sub-assemblies and, to help the customer determine the composition of an Assembly, the Dot System is used. The Main Assembly will not show a dot preceding its description and is printed in BLOCK CAPITALS. Subsequent listed parts are preceded by one or more 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.

MAIN FRAME ASSEMBLY



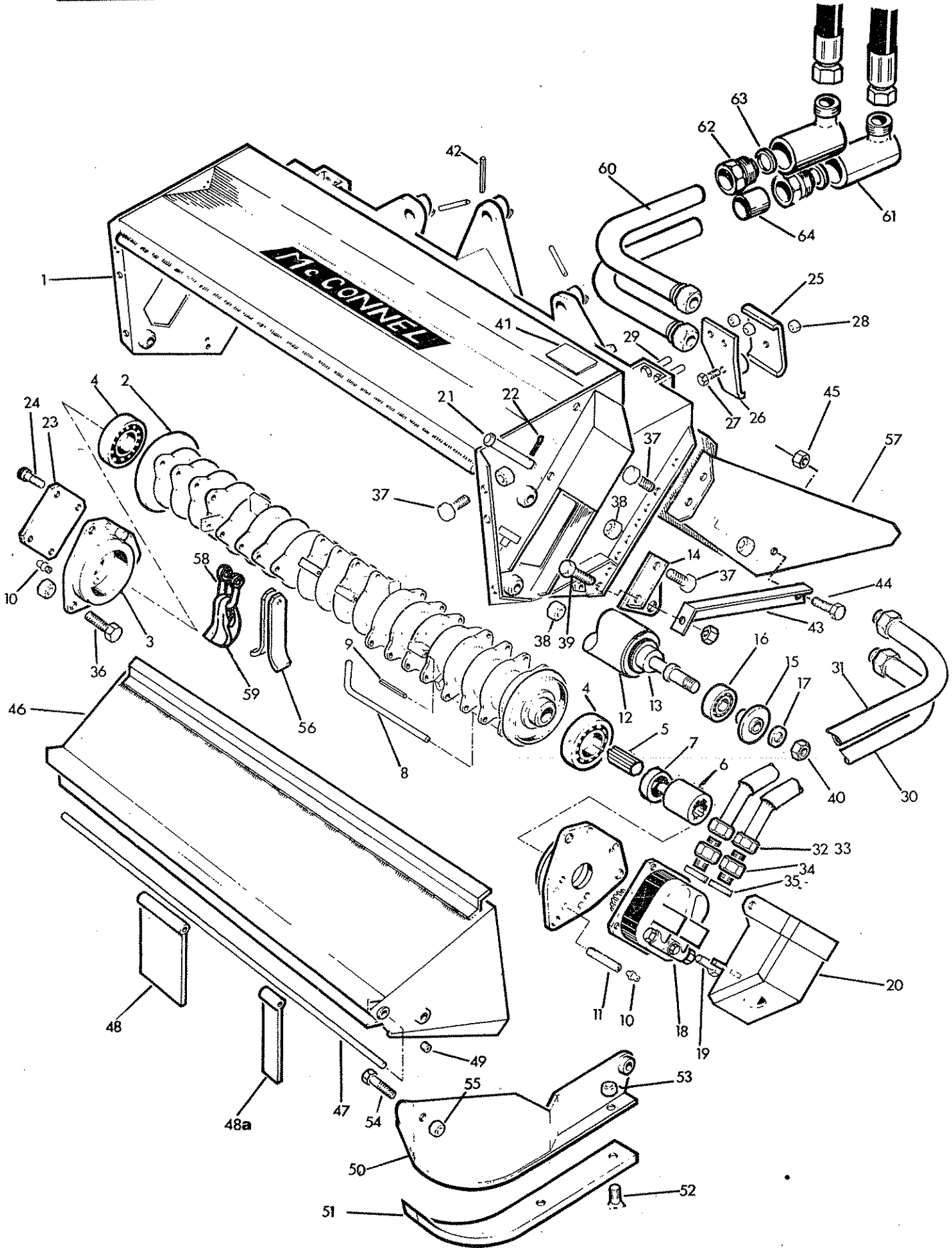
Ref	Part No	Qty	Description
1	71 09 255	1	.Main Frame c/w bushes
2	60 01 003	2	..Bush
3	09 01 121	1	..1/8" BSP Greaser
4	71 09 257	1	.Pillar c/w bushes
5	71 01 134	2	..Bush
7	71 09 090	1	..Bung
8	71 09 261	1	.Welded Leg Assembly left hand
	71 09 262	1	.Welded Leg Assembly right hand
9	71 09 263	1	.Lift Ram
10	71 09 030	2	.Stand leg
11	71 09 031	1	.King post
12	71 09 059	2	.Leg pin
13	04 31 217	1	..Linch pin
14	71 09 060	2	.Stand pin c/w Spring Cotter
15	04 31 105	1	..Spring Cotter
16	71 09 061	1	.Ram base pin c/w split pin
17	05 03 126	1	..Split pin
18	71 09 062	1	.Rod end pin c/w spring cotter
19	04 31 105	1	..Spring cotter
20	71 09 063	1	.Lift ram base pin
21	04 31 217	1	..Linch pin
22	71 09 064	1	.Lift ram rod end pin
23	05 03 126	1	..Split pin
24	71 09 065	1	.King post retainer pin c/w split pins
25	05 03 095	2	..Split pin
26	71 06 063	2	. Cross shaft locking latch c/w spring dowel
27	04 21 836	1	..Spring dowel 1/4" x 2 1/4"
28	09 01 121	1	..1/8" BSP Greaser
29	71 06 064	1	.Hand operated catch c/w spring dowel
30	04 22 524	1	..Spring dowel 5/16" x 1 1/2"
31	81 11 009	1	..Spring
32	71 06 192	1	..Plunger
33	71 01 111	1	..Ring
34	71 06 066	1	.Slave locking catch c/w spring dowel
35	04 21 836	1	..Spring dowel 1/4" x 2 1/4"
36	71 06 067	1	.Locking rod
39	71 06 085	2	.Linkage pin category I
40	04 31 217	1	..Linch pin
41	68 03 012	2	.Linkage pin category II
42	04 31 217	1	..Linch pin
43	60 01 136	1	.Thrust washer
44	71 09 274	1	.Breakaway ram assembly

MAIN ARM ASSEMBLY



Ref	Part No	Qty	Description
1	71 09 277	1	.Main arm c/w bushes
2	71 01 134	2	..Bush
3	09 01 121	3	. Greaser 1/8" BSP
4	71 09 267	1	.Rocker welded assembly
5	71 01 083	2	..Bush
6	71 09 281	1	.Boom welded assembly c/w bushes etc.
7	71 01 083	4	..Bush
8	71 01 134	2	..Bush
9	09 01 121	1	..Greaser 1/8" BSP
10	71 09 270	1	.Forward extension
11	04 22 620	2	..Spring dowel 3/8" x 1¼"
12	71 09 279	1	.Tension link welded assembly
13	71 09 273	1	.Manual reach strut
14	71 09 066	2	.Pivot pin rocker c/w split pin
15	05 03 166	1	..Split pin
16	71 09 067	2	.Tension link pin c/w split pin
17	05 03 126	1	..Split pin
18	71 09 095	1	.Tension link pin outer c/w split pin
19	05 03 126	1	..Split pin
20	71 09 066	1	.Boom pivot pin c/w split pin
21	05 03 166	1	..Split pin
22	71 09 070	1	.Special flail mounting pin
23	71 09 071	1	.Reach ram base pin c/w split pin
24	05 03 126	1	..Split pin
25	71 09 071	1	.Angling ram base pin
26	05 03 126	1	..Split pin
27	71 09 073	3	.Hose bracket c/w linch pin
28	04 31 217	1	..Linch pin
29	71 09 074	2	.Hose support pins
30	04 31 217	1	..Linch pin
31	71 09 102	1	.Stand strap
32	71 09 079	1	.Pipe clamp bracket assembly
33	91 00 002	2	..M10 'Conelok' nut
34	92 13 135	1	..M10 x 65 hex. bolt
35	71 09 080	1	..Clamp washer
36	71 09 081	1	..Special washer
37	71 09 083	1	..Distance piece
38	71 06 367	1	.Radius arm
39	71 06 312	1	.Slave link c/w bushes
40	71 01 134	2	..Bush
41	09 01 121	1	..1/8" BSP Greaser
42	71 01 083	2	..Bush
43	71 05 090	2	.Radius arm pin c/w split pin and greaser
44	09 01 121	1	..1/8" BSP greaser
45	05 03 165	1	..Split pin
46	71 06 138	3	.Pivot pin'
47	60 12 026	8	.Pipe clamp
48	73 13 130	5	.Hose clip
49	71 09 084	5	.Hose clip lower
50	71 09 275	1	.Reach ram assembly
51	71 09 276	1	.Angling ram assembly
52	92 13 185	4	.M10 x 90 bolt
53	92 13 145	1	.M10 x 70 bolt
54	91 00 002	5	.'Conelok' nut M10
55	71 09 062	1	.Reach ram rod pin c/w split pin

ONE METRE FLAIL HEAD. (Triplecut)

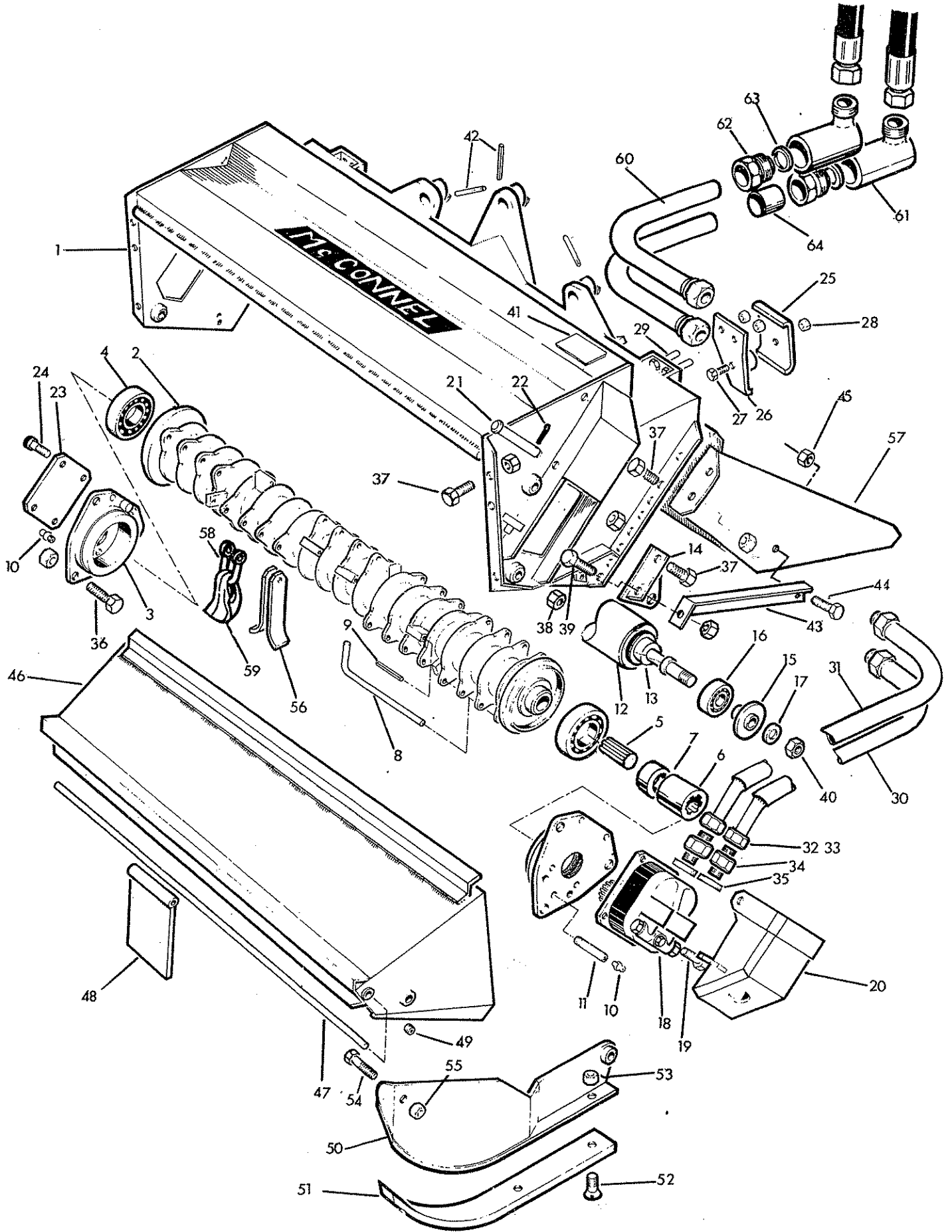


Ref	Part No.	Qty	Description
	73 14 335	1	1 METRE (39") HEDGE FLAIL
	73 14 336	1	1 METRE (39") GRASS FLAIL
The following items are common to both flails:-			
1	73 14 338	1	.Main casing welded assembly
	73 14 348	1	.Rotor shaft bare
2	73 14 345	1	.Rotor assembly c/w bearing and adaptor
3	73 14 313	2	.Bearing 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 14 191	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
	73 14 355	1	.Rigid pipe lower
	73 14 356	1	.Rigid 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 1f2	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	71 09 077	2	Rigid pipe assembly
61	71 09 078	2	Swivel union
62	85 81 144	2	Hydro-stud coupling
63	71 09 089	2	.Nylon seal
64	71 09 082	1	Swivel pipe spacer

Required for use with grass flail only.

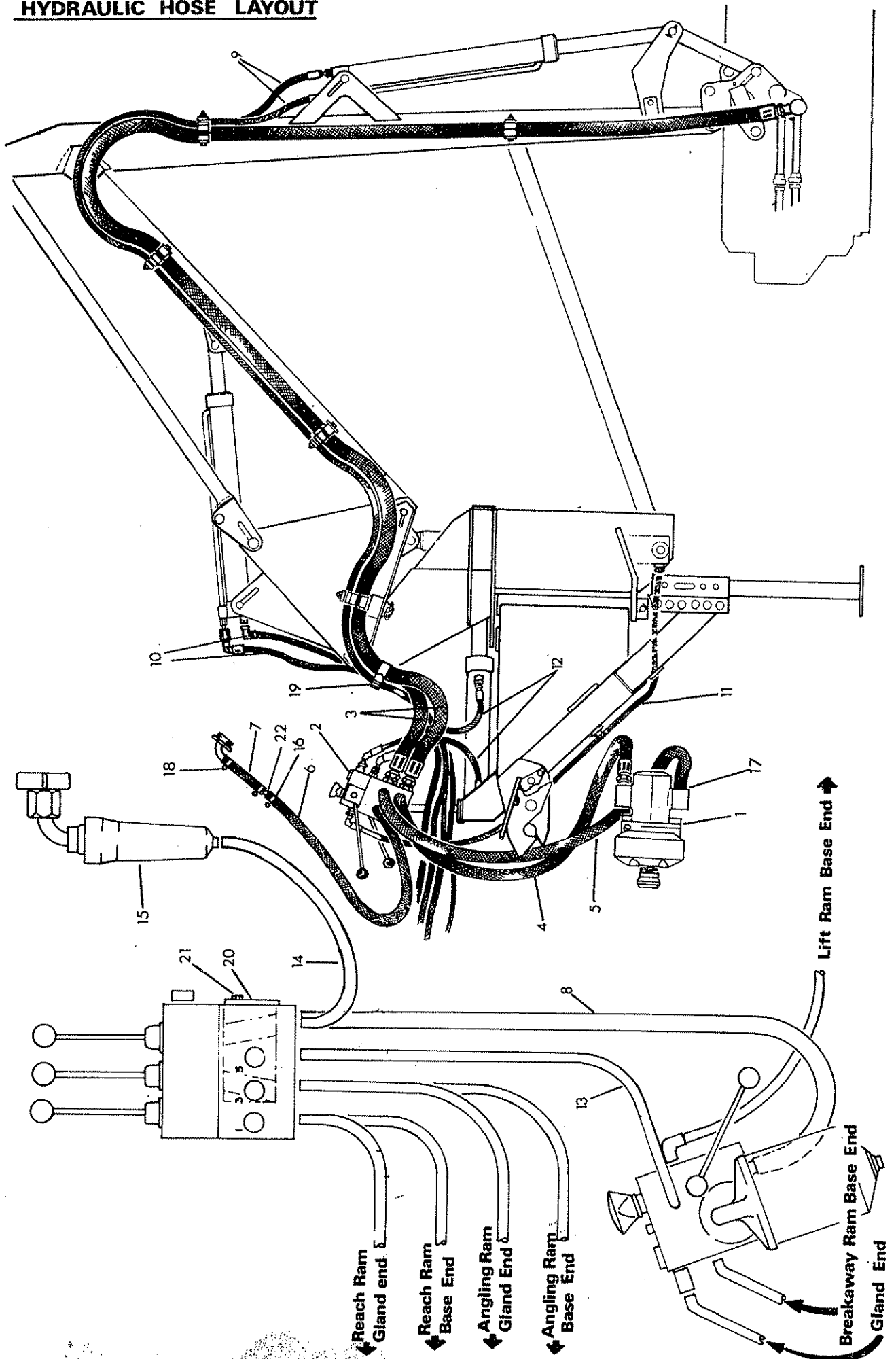
Required for use with hedge flail only.

1-2 METRE FLAIL HEAD (Triplecut)



Ref	Part No	Qty	Description
	73 14 380		1.2 METRE 48" HEDGE FLAIL (MULTICUT)
	73 14 381		1.2 METRE 48" GRASS FLAIL (MULTICUT)
1	73 14 305	1	.Main casing
2	73 14 372	1	.Rotor
	73 14 206	1	.Coupling assembly
3	73 14 204	1	..Coupling motor half
4	73 14 203	1	..Coupling rotor half
5	73 14 205	1	..Coupling sleeve
6	06 00 032	2	.Ball bearing 6311 - 2Z
7	73 14 368	2	.Bearing housing
8	73 14 369	1	.Spacer block c/w greaser
9	09 01 125	1	..Greaser 1/8" BSP 35°
10	73 14 214	1	.Coupling spacer
11	73 14 211	1	.Clamp washer
12	73 14 370	1	.Rotor end cover c/w greaser
13	09 01 121	1	..Greaser 1/8" BSP Straight
14	73 14 382	1	.Motor Assy. c/w key, nut, washer & coupling half
15	73 14 374	1	.Motor cover
16	73 14 114	1	.Roller
17	73 14 195	1	.Roller bracket LH c/w spring dowel
	73 14 196	1	.Roller bracket RH c/w spring dowel (not illustrated)
18	04 21 810	1	..Spring dowel 1/4" dia. x 5/8" long
19	73 14 192	2	.Bearing spigot
20	73 14 191	1	.Roller tie rod
21	06 00 002	2	.Ball bearing DN 2125
22	73 14 145	1	.Motor guard pin c/w split pin
23	C5 03 104	1	..Split pin 5/32" dia. x 1 1/4" long
24	73 14 376	1	.Rigid pipe upper Standard build for
25	73 14 376	1	.Rigid pipe lower left hand flails.
	73 14 377	1	.Rigid pipe upper For right hand flails
	73 14 377	1	.Rigid pipe lower not illustrated.
26	73 14 158	1	.Motor pipe clamp upper
27	73 14 159	1	.Motor pipe clamp lower
28	85 81 112	2	.Ermeto union
29	86 50 106	2	.Bonded seal 3/8" BSP
30	73 14 194	1	.Special washer
31	91 00 005	2	.Hexagon nut M20
32	93 13 067	2	.Setscrew M16 x 30
33	91 00 001	8	.Hexagon nut self-locking M16
34	92 13 105	1	.Bolt M10 x 50
35	93 13 055	5	.Setscrew M10 x 25
36	93 00 104	7	.Capscrew M10 x 40
37	93 00 105	2	.Capscrew M12 x 50
38	91 00 002	3	.Hexagon nut self-locking M10
39	04 22 648	3	.Spring dowel 3/8" dia. x 3" long
40	73 14 088	1	.Flail speed sticker
41	73 14 087	1	.Serial plate
42	28 00 020	4	.Pop rivet 1/8" dia.
43	73 14 209	24	.Flail pivot bush
44	73 14 201	24	.Special flail bolt
45	01 00 206	48	.Spring washer 5/8" dia.
46	10 79 091	24	.Hexagon nut self-locking 5/8" UNF
47	73 14 146	6	.Bolt M16 x 50
	Items 48 to 55 (inclusive) are for Hedge Flails only:-		
48	72 14 325	1	.Hedge hood
	73 14 361	1	.Strut right hand c/w bolts and nuts (not illustrated)
49	73 14 362	1	.Strut left hand c/w bolts and nuts
50	93 13 067	1	..Setscrew M16 x 30
51	93 13 087	1	..Setscrew M16 x 40
52	91 00 001	2	..Nut self-locking M16
53	93 13 067	4	.Setscrew M16 x 30
54	91 00 001	4	.Nut self-locking M16
55	73 14 366	24	.F10H Hedger flail
	Items 56 - 67 (inclusive) are for Grass Flails only:-		
56	73 14 315	1	.Grass hood
57	73 14 143	1	.Flap bar
58	85 82 041	2	.1/8" BSP hexagon plug
59	73 14 125	7	.Flap
	73 14 320	1	.Skid right hand (not illustrated)
60	73 14 319	1	.Skid left hand
61	73 14 323	2	.Replaceable skid
62	93 33 065	6	.Setscrew countersunk M10 x 30
63	91 00 002	6	.Nut self-locking M10
64	92 13 107	4	.Bolt M16 x 50
65	92 13 067	6	.Setscrew M16 x 30
66	91 00 001	10	.Nut self-locking M16
67	73 14 390	48	.F10G Grass flail
68	71 09 127	2	.Rigid pipe assembly
69	71 09 126	2	.Elbow

HYDRAULIC HOSE LAYOUT



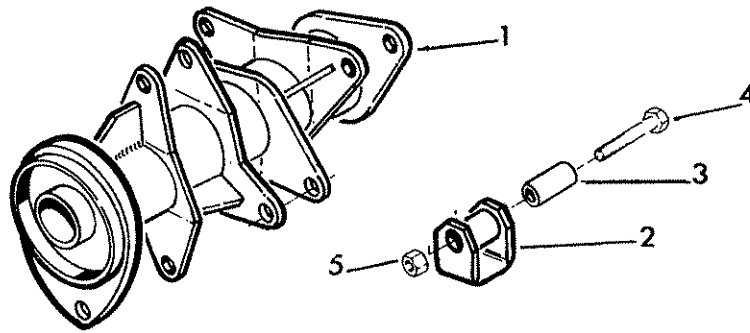
Ref	Part No	Qty	Description
	73 14 380		1.2 METRE MULTICUT HEDGE FLAIL ASSEMBLY
	73 14 381		1.2 METRE MULTICUT GRASS FLAIL ASSEMBLY
	73 14 384		1 METRE MULTICUT HEDGE FLAIL ASSEMBLY
	73 14 385		1 METRE MULTICUT GRASS FLAIL ASSEMBLY
	73 14 302		1.2 METRE TRIPLECUT HEDGE FLAIL ASSEMBLY
	73 14 303		1.2 METRE TRIPLECUT GRASS FLAIL ASSEMBLY
	73 14 335		1 METRE TRIPLECUT HEDGE FLAIL ASSEMBLY
	73 14 336		1 METRE TRIPLECUT GRASS FLAIL ASSEMBLY
	73 14 337		1 METRE TOUGH CUT FLAIL ASSEMBLY

The following parts are common with all above flail assemblies.

1	80 13 295	1	.Gearbox and PS/F pump assembly
2	81 29 250	1	.Changeover bypass valve assembly
3	85 01 072	2	.1" BSP S/F - S/F hose 198" long
4	85 01 059	1	.1" BSP S/F - S/F hose 78" long
5	85 01 039	1	.1¼" bore rubber suction hose 78" long
6	85 00 859	1	.1" bore rubber hose 59" long
7	85 01 083	1	.5/8" bore return hose 6" long
8	85 01 053	1	.5/8" bore single braided hose 60" long
9	85 16 012	2	.¼" BSP S/F - S/F hose 207" long
10	85 36 012	2	.¼" BSP S/F - 90°/F hose 105" long
11	85 36 022	1	.¼" BPP S/F - 90°/F hose 70" long
12	85 46 012	2	.¼" BSP S/F - 45°/F hose 18" long
13	85 36 032	1	.¼" BSP S/F - 90°/F hose 64" long
14	85 31 223	1	.3/8" BSP S/F - 90°/F hose 59" long
15	84 01 250	1	.Pressure filter assembly
16	09 04 106	2	.Hose clip (1" bore hose)
17	09 04 108	4	.Hose clip (1¼" bore hose)
18	09 04 204	4	.Hose clip (5/8" bore hose)
19	71 06 187	3	.Hose strap
20	80 17 001	1	.Hy-Fi mounting bracket
21	03 12 063	2	.3/8" UNC Hex set screw 3/4" long
22	81 21 063	1	.Return adaptor

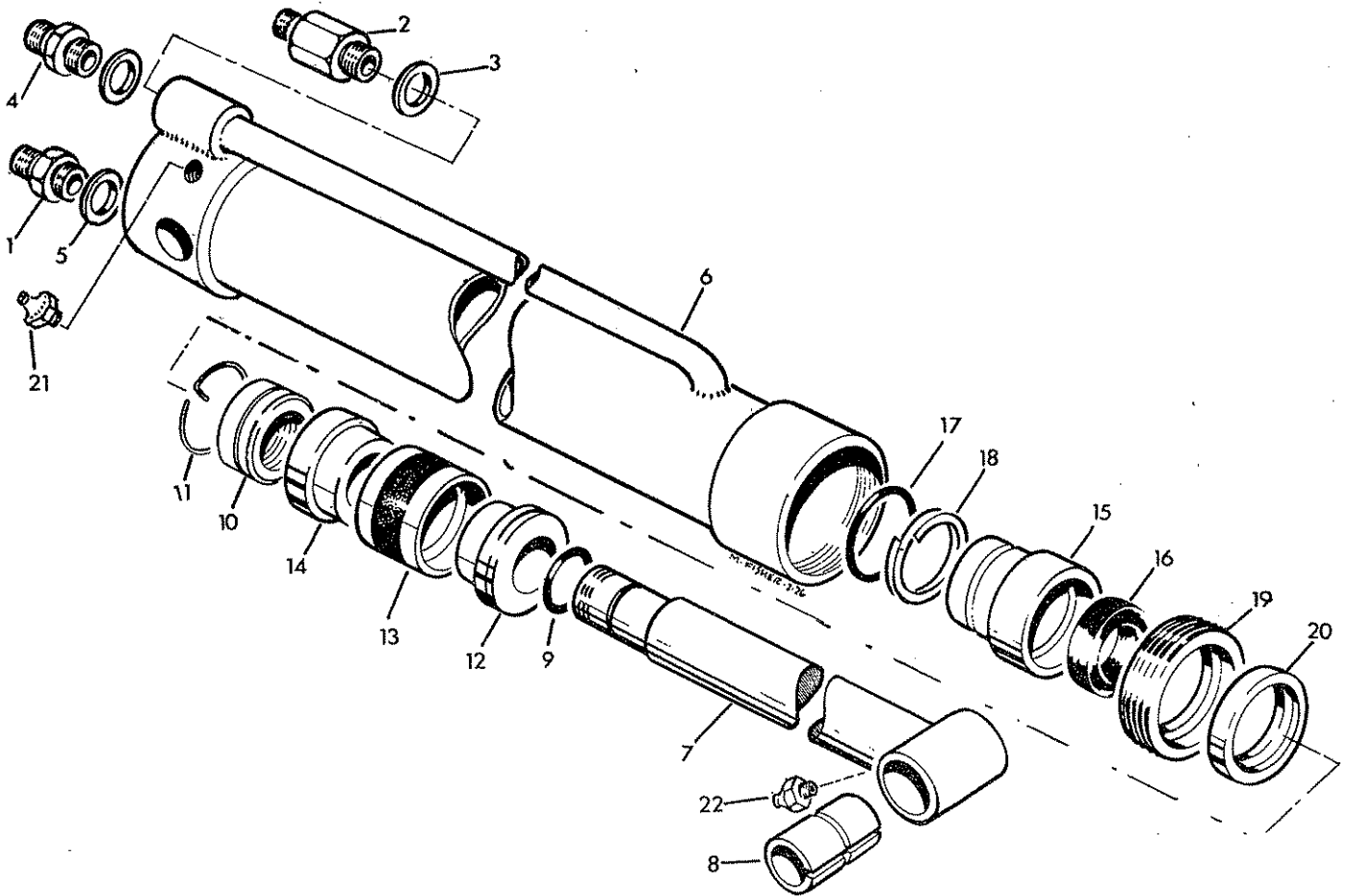
TOUGCUT ROTOR

The spare parts list for the 1 metre Toughcut flail is identical to its triplecut counterpart with the exception of the following:-



	73 14 337	1	TOUGCUT FLAIL ASSEMBLY - 1 METRE
	73 14 339	1	.Toughcut rotor c/w bearing & bearing housing
1	73 14 349	1	..Rotorshaft bare
2	73 14 119	12	.Toughcut flail
3	73 14 120	12	.Flail bush
4	73 14 200	12	.Special bolt
5	10 79 091	12	.5/8" UNF Cone Lok nut

REACH RAM and ANGLING RAM ASSEMBLIES

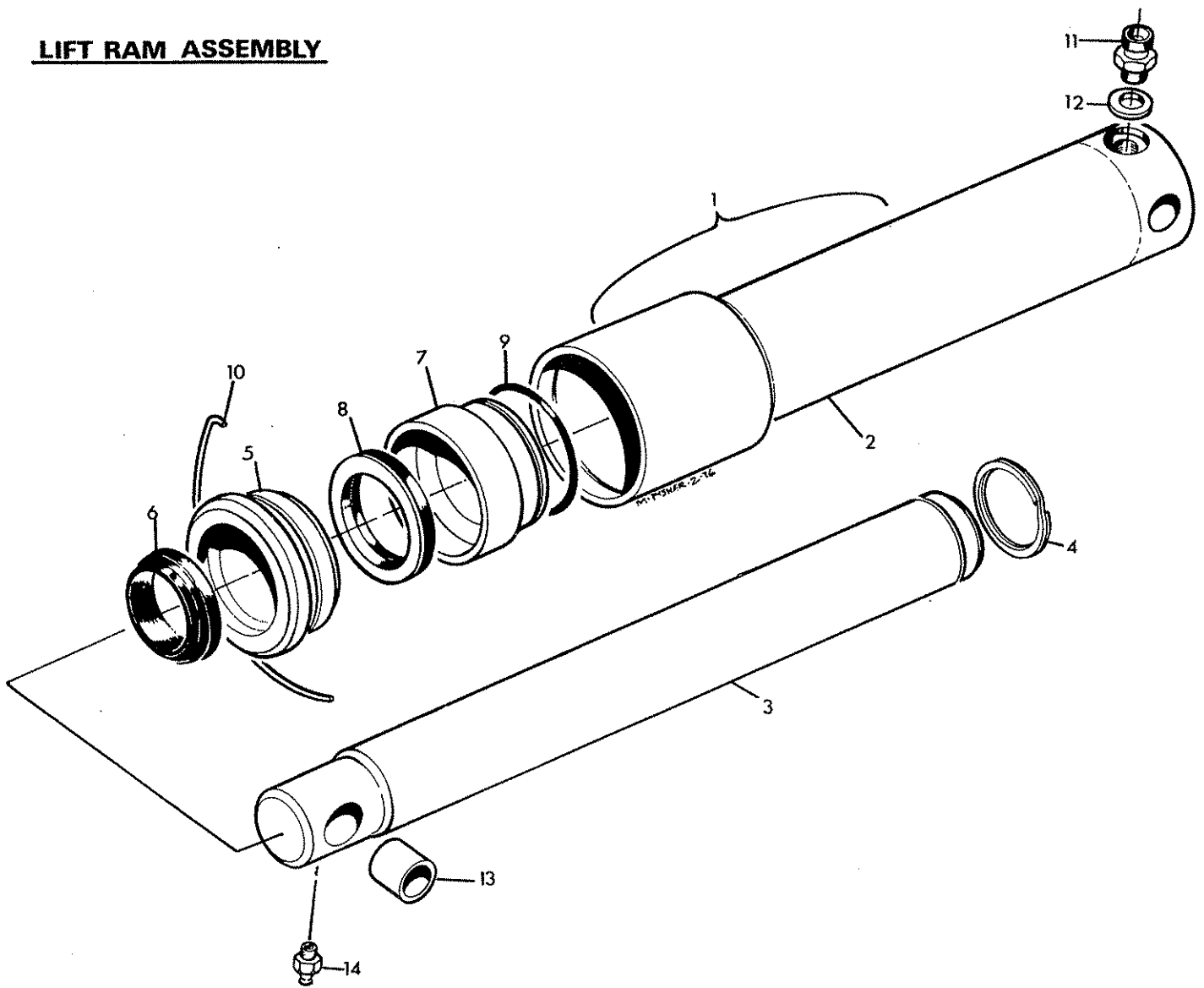


Ref	Part No	Qty	Description
	71 09 275	1	REACH RAM ASSEMBLY
1	85 81 145	1	.3/8" BSP - 1/4" Union
2	85 81 146	1	.3/8" BSP - 1/4" BSP long union
3	86 50 103	2	.3/8" BSP bonded seal
	71 09 276	1	ANGLING RAM ASSEMBLY
4	85 81 145	2	.3/8" BSP - 1/4" BSP union
5	86 50 103	2	.3/8" BSP bonded seal

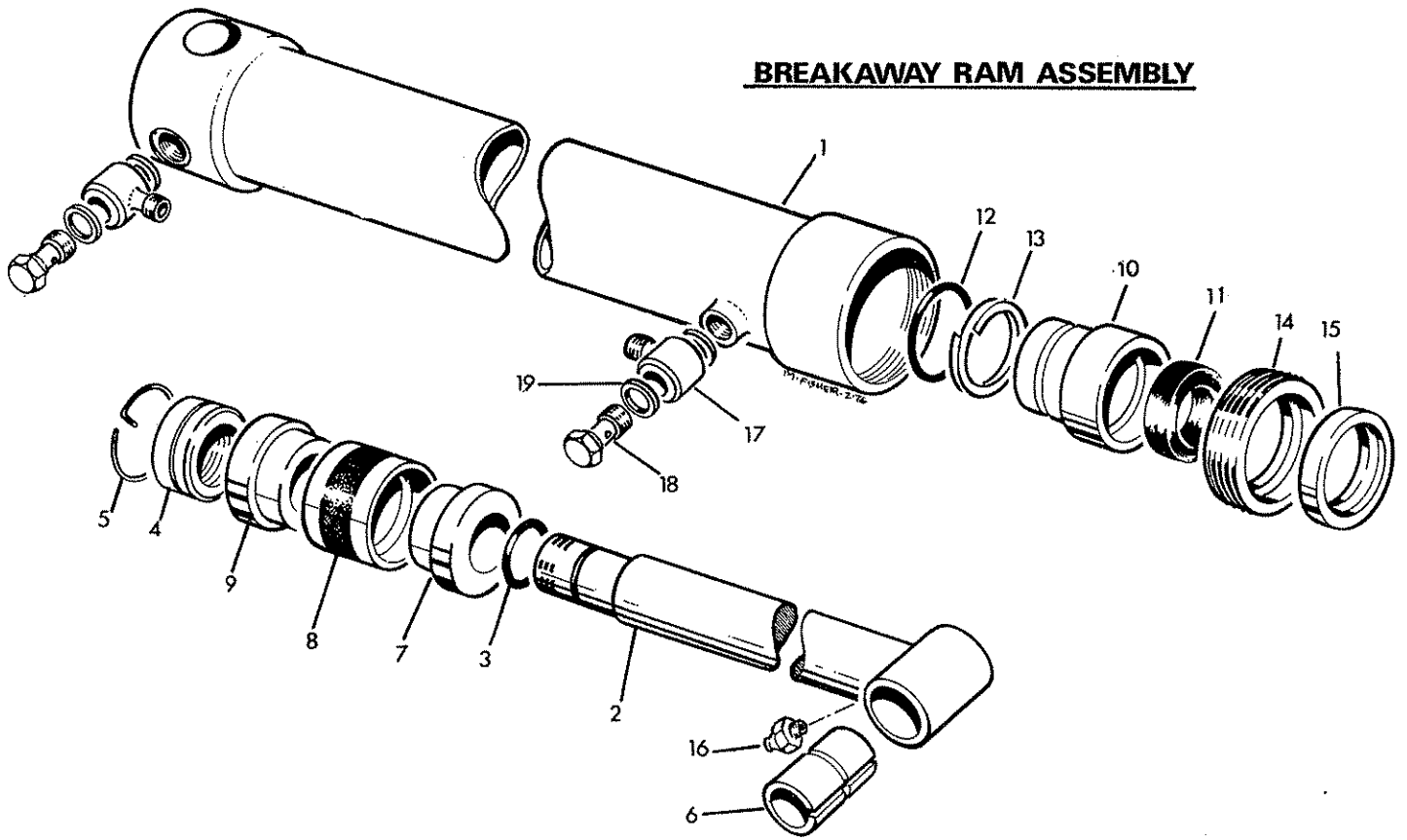
The following parts are common to both ram assemblies:-

	71 09 292	1	.Long stroke ram assembly
6	71 03 304	1	..Long stroke ram cylinder
7	71 01 095	1	..Piston rod assembly
8	71 05 050	1	...Bush rod end
9	86 00 119	1	...Piston rod 'O' ring
10	71 01 096	1	..Piston nut
11	71 01 152	1	...Ram nut locking ring
12	71 01 097	1	..Piston inner assembly
13	86 35 131	1	...Piston seal
14	71.01 098	1	...Piston outer
15	71 01 099	1	..Gland housing assembly
16	86 22 127	1	...Gland seal
17	86 00 304	1	...Gland 'O' ring
18	86 09 304	1	...Anti-extrusion ring
19	71.01 100	1	..Gland nut assembly
20	86 40 328	1	...Piston rod wiper
21	09 01 121	1	..1/8" BSP straight greaser
22	09 01 123	1	..1/8" BSP 90° greaser
	86 99 102		SEAL KIT

LIFT RAM ASSEMBLY



BREAKAWAY RAM ASSEMBLY

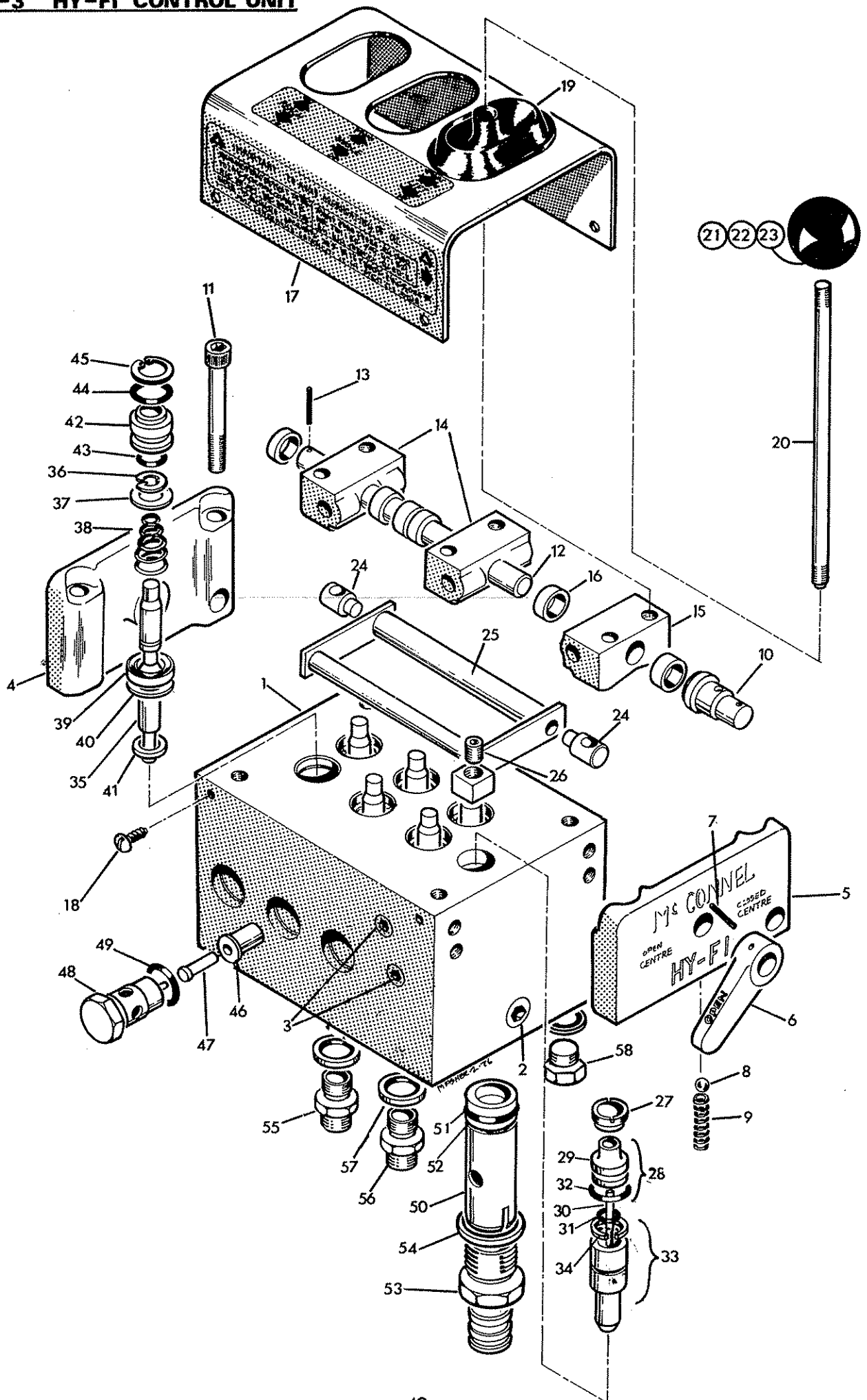


Ref	Part No	Qty	Description
	71 09 263	1	LIFT RAM ASSEMBLY complete
1	71 09 264	1	.Lift ram comprising
2	71 09 265	1	..Ram barrel
3	71 09 266	1	..Ram rod c/w spirolox
4	04 03 260	1	...Spirolox ring
5	71 09 032	1	..Gland retainer c/w wiper
6	86 29 130	1	...Wiper ring
7	71 09 033	1	..Gland housing c/w seals
8	86 15 001	1	...Seal
9	86 00 312	1	...'O' ring
10	71 09 034	1	..Locking wire
11	85 81 145	1	.3/8" BSP-1/4 BSP Union
12	86 50 103	1	.3/8" BSP Bonded seal
13	71 05 050	1	.Bush
14	09 01 121	1	.1/8" BSP Greaser

Seal Kit 86 99 154 comprising ref. nos. 6, 8, 9.

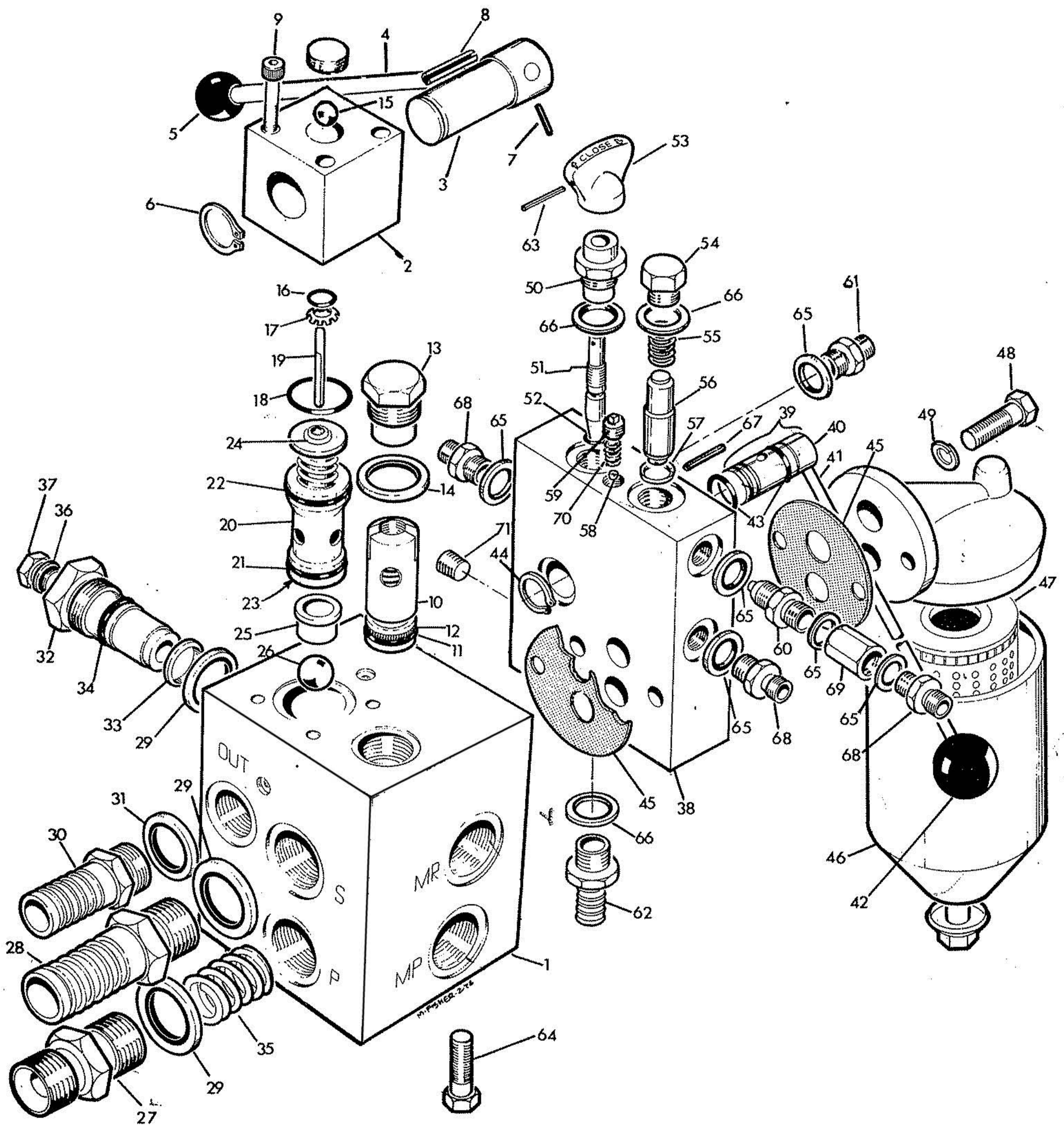
Ref	Part No	Qty	Description
	71 09 274	1	BREAKAWAY RAM ASSEMBLY complete
	71 09 272	1	.Breakaway ram comprising:-
1	13 35 379	1	..Ram cylinder
2	72 12 004	1	..Piston rod assembly
3	86 00 119	1	...'O' ring
4	71 01 096	1	...Piston nut
5	71 01 152	1	...Ram nut locking ring
6	71 05 050	1	...Bush
7	71 01 097	1	..Piston inner assembly
8	86 35 131	1	...Piston seal
9	71 01 098	1	...Piston outer
10	71 01 099	1	..Gland housing assembly
11	86 22 127	1	...Gland seal
12	86 00 304	1	...Gland 'O' ring
13	86 09 304	1	...Anti-extrusion ring
14	71 01 100	1	..Gland nut assembly
15	86 40 328	1	...Piston rod wiper
16	09 01 121	1	.1/8" BSP greaser
17	85 81 147	2	.Banjo union
18	60 01 127	2	.Banjo bolt
19	86 50 103	4	.3/8" BSP bonded seal
	86 99 102		SEAL KIT

3-3 HY-FI CONTROL UNIT



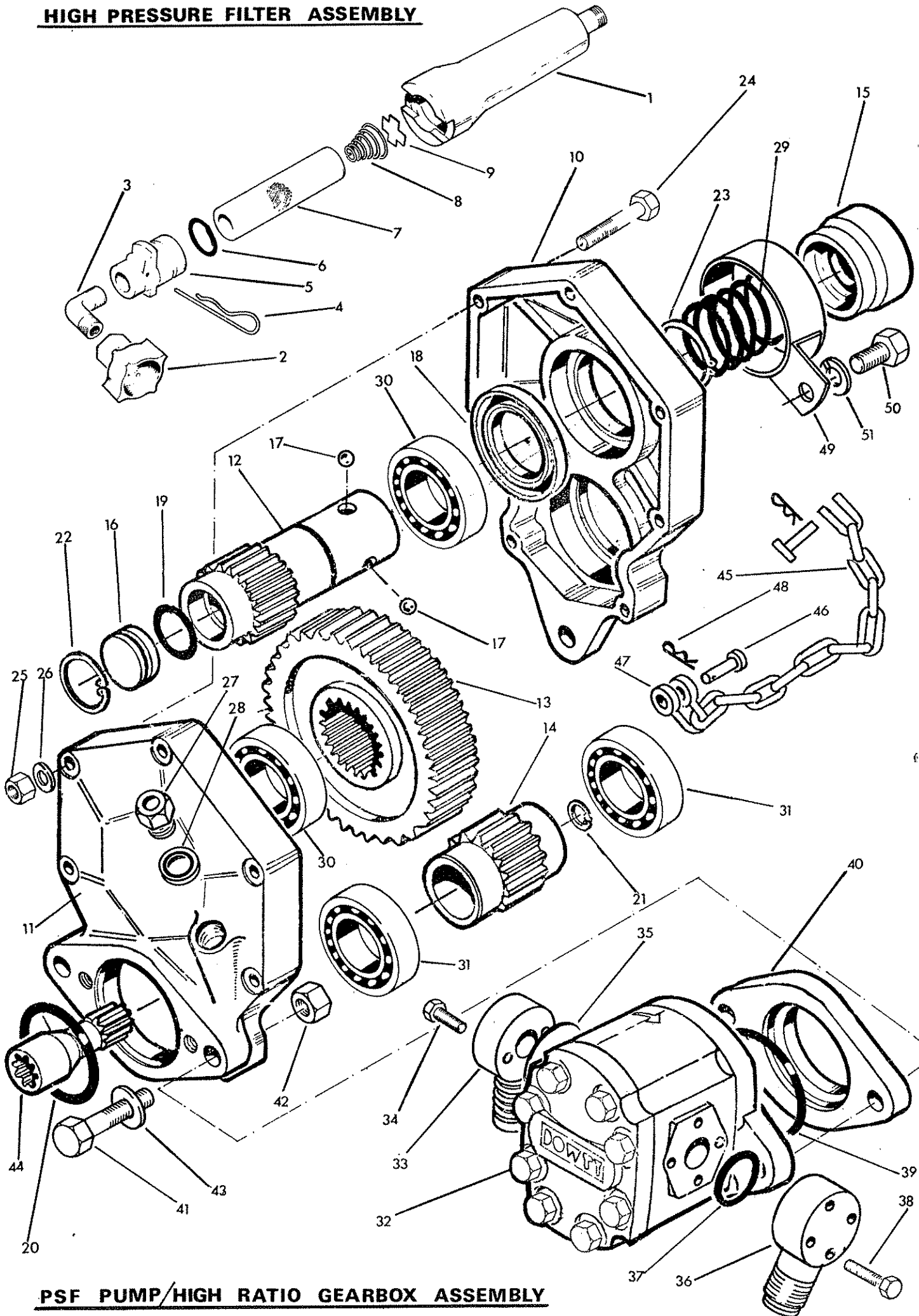
Ref	Part No	Qty	Description
	81 19 405	1	3 - 3 HY-FI complete
1	81 19 301	1	.Body
2	81 14 016	1	.Taper plug 5/8" BSP
3	85 82 042	4	.Taper Plug 1/4" BSP
4	81 14 252	1	.Bracket (left hand)
5	81 18 251	1	.Bracket (right hand)
6	81 02 010	1	.Flip lever
7	04 21 516	1	.Spring dowel 5/32" x 1"
8	09 05 108	1	.Steel ball 1/4"
9	81 14 009	1	.Spring
10	81 18 002	1	.Cam sleeve
11	02 42 203	4	.Capscrew Hex. socket 3/8" UNC x 2 1/2"
12	81 19 014	1	.Rocker shaft
13	04 20 816	1	.Spring dowel 1/8" x 1"
14	81 19 016	2	.Rocker
15	81 17 006	1	.Rocker
16	81 14 031	6	.Spacer
17	81 19 012	1	.Cover
18	81 14 057	4	.Cover screw
19	81 17 001	3	.Dust boot
20	81 19 015	3	.Lever
21	09 03 112	1	.Red knob
22	09 03 113	1	.Green knob
23	09 03 114	1	.Yellow knob
24	81 14 036	2	.Fulcrum pin
25	81 19 013	1	.Cut -off lever
26	81 14 056	1	.Cut-off setscrew 3/8" UNF x 5/8" *
27	81 14 069	1	.Ring nut
28	81 14 032	1	.Cut-off insert assembly c/w needle etc.
29	81 14 012	1	..Cut-off bobbin
30	81 14 013	1	..Cut-off needle
31	86 00 103	1	..'0' ring
32	86 00 111	1	..'0' ring
33	81 14 006	1	.Cut-off piston assembly
34	81 14 078	1	..Piston ring
35	81 14 001	6	.Spindle
36	81 14 058	6	.Circlip
37	81 14 081	6	.Flat washer
38	81 14 003	6	.Conical spring
39	81 06 022	6	.Cup seal
40	81 14 004	6	.Back-up ring
41	81 14 005	6	.Lower seal
42	81 14 002	6	.Insert bobbin c/w circlip and '0' rings
43	86 00 110	1	..'0' ring
44	86 00 401	1	..'0' ring
45	81 14 077	1	..Circlip
46	81 14 047	6	.Actuator (large)
47	81 14 050	6	.Actuator (small)
48	81 14 083	6	.Check valve Type 'H'
49	86 00 402	6	.'0' ring
50	81 09 103	1	.Main relief valve assembly
51	86 00 113	1	..'0' ring
52	81 14 079	1	..Back-up ring
53	81 14 015	1	.Return connection
54	86 50 218	1	.Bonded seal 1.1/8"
55	60 00 113	1	.3/8" BSP / 3/8" BSP union
56	85 81 145	6	.3/8"BSP / 1/4" BSP union
57	86 50 103	2	.Bonded seal 3/8" BSP
58	80 03 001	1	.Plug 3/8" BSP
	86 99 156		SEAL KIT complete

CHANGE-OVER/BYPASS VALVE



Ref	Part No.	Qty	Description
	81 29 250	1	CHANGE-OVER/BYPASS VALVE comprising
	81 25 302	1	..Bypass valve assembly comprising
1	81 21 301	1	..Block
2	81 21 048	1	..Lever block
3	81 21 049	1	..Operating cam
4	81 21 047	1	..Operating lever
5	09 03 112	1	..Red lever knob
6	04 01 114	1	..External circlip
7	04 21 516	1	..Spring dowel
8	04 21 824	1	..Spring dowel
9	92 43 123	4	..M6 x 60 Skt cap bolt
10	81 09 103	1	..Relief valve assembly
11	86 00 113	1	... 'O' Ring
12	81 14 079	1	... Backing ring
13	81 21 050	1	..Relief valve cap
14	86 50 218	1	..Bonded seal
15	09 05 118	1	..Steel ball .562" Dia.
16	86 00 103	1	.. 'O' ring 5/16" O/D. Use 87 00 631 after March 1977
17	04 17 107	1	..Star washer
18	86 00 405	1	.. 'O' Ring 1 1/4" O/D
19	81 21 045	1	..Actuator needle
20	81 25 022	1	..Bypass cartridge assembly comprising
21	86 00 401	1	... 'O' Ring 1" O/D
22	86 00 403	1	... 'O' Ring 1 1/8" O/D
23	86 00 109	1	... 'O' Ring 5/8" O/D
24	04 01 107	1	... Ext circlip
25	81 25 021	1	..Seat
26	09 05 124	1	..Steel ball .750" Dia.
27	81 21 052	3	..Male, Male connector
28	81 21 051	1	..Return connection
29	86 50 108	5	..Bonded seal
30	81 21 062	1	..Return connection
31	86 50 106	1	..Bonded seal
32	81 25 020	1	..Plug
33	81 21 061	1	..Seal
34	86 00 403	1	.. 'O' Ring 1 1/8" O/D
35	81 25 026	1	..Ball stop spring
36	86 50 103	1	..Bonded seal
37	80 03 001	1	..3/8" BSP Hex Plug
38	81 29 251	1	..Valve body
39	81 29 002	1	..Spindle assembly
40	81 29 003	1	... Spindle
41	11 51 758	1	... Lever
42	11 51 762	1	... Black knob
43	86 00 113	2	... 'O' Ring 7/8" O/D
44	04 01 114	1	... 7/8" Dia. Ext circlip
45	71 03 100	2	..Gasket
46	71 03 291	1	..Filter assembly
47	71 03 102	1	... Filter element
48	92 13 146	2	..M12 x 70 Bolt
49	91 00 206	2	..Spring Washer
50	81 06 043	1	..Gland nut
51	81 06 044	1	..Tap spindle c/w 'O' ring
52	81 06 045	1	... 'O' Ring 7/16" O/D
53	81 08 006	1	..Knob
54	81 29 001	1	..Plug
55	81 14 024	1	..Spring
56	81 14 103	1	..Locked line relief valve cartridge
57	81 14 014	1	..Seat
58	09 05 110	1	..Steel ball 5/16" Dia.
59	81 29 006	2	..1/4" BSP Taper plug
60	81 07 010	1	..Adjustable one way restrictor
61	85 81 145	1	..3/8" BSP Union
62	80 02 059	1	..Return connection
63	04 20 820	1	..1/8" Dia. Spring dowel
64	93 13 044	3	..M8 x 20 Set screw
65	86 50 103	6	..3/8" BSP Bonded seal
66	86 50 104	3	..1/2" BSP Bonded seal
67	04 21 820	2	..1/4" Dia Spring dowel
68	85 81 145	3	..1/4" BSP - 3/8" BSP Union
69	81 06 013	1	..3/8" BSP Socket
70	81 14 045	1	..1" Spring
71	85 82 042	1	..Taper Plug BSP Hex Socket
	86 99 157		SEAL KIT

HIGH PRESSURE FILTER ASSEMBLY



PSF PUMP/HIGH RATIO GEARBOX ASSEMBLY

Ref	Part No	Qty	Description
	84 01 250	1	PRESSURE FILTER ASSEMBLY comprising:-
1	84 01 001	1	. Filter Body
2	85 90 023	1	. Female Half Self Seal Coupling
3	85 81 033	1	. 3/8" BSP Bend
4	04 31 105	1	. Spring Cotter
5	84 01 002	1	. Bayonet End Plug
6	86 00 121	1	. 'O' Ring
7	84 01 004	1	. Filter Element
8	84 01 003	1	. Compression Spring
9	84 01 005	1	. Filter Stop
	80 13 295	1	PSF PUMP/HIGH RATIO GEARBOX ASSEMBLY
	80 13 290	1	. High Ratio Gearbox comprising:-
10	80 13 291	1	.. Case Input Side
11	80 13 292	1	.. Case Out Put Side
12	80 13 263	1	.. Take off Shaft
13	80 13 294	1	.. Gear, 77 teeth
14	80 13 293	1	.. Gear 18 teeth
15	80 13 030	1	.. Ball Retainer
16	80 13 031	1	.. Bung
17	09 05 116	3	.. 1/2" dia. Ball
18	86 29 116	1	.. Oil Seal
19	86 00 409	1	.. 'O' Ring
20	86 00 435	1	.. 'O' Ring
21	04 16 112	1	.. Circlip 3/4" Internal
22	04 16 124	1	.. Circlip 1.1/2" Internal
23	04 06 250	1	.. M50 External Circlip
24	02 11 242	7	.. 5/16 UNF Hexagon Nut
25	01 11 002	7	.. 5/16 UNF Hexagon Nut
26	01 00 002	7	.. Spring Washer
27	80 13 033	1	.. Breather Valve
28	01 00 903	1	.. Fibre Washer
29	80 13 032	1	.. Ball Retaining Spring
30	06 03 650	2	.. Bearing
31	06 04 640	2	.. Bearing
	82 01 478	1	. Dowty Pump c/w connections comprising:-
32	82 01 475	1	.. Dowty Pump
33	80 13 022	1	.. Inlet Connection c/w Screw
34	02 42 202	2	... Screw (5/16" UNC Socket Cap)
35	80 13 023	1	.. Inlet Gasket
36	80 13 038	1	.. Outlet Connection c/w Screw & 'O' Ring
37	86 00 121	1	... 'O' Ring
38	02 42 162	4	... Screw (5/16 UNC Socket Cap)
39	86 00 436	1	. 'O' Ring
40	80 13 025	1	. Adaptor Flange c/w Bolts & Nuts etc.
41	02 11 225	2	.. 1/2" UNF x 2 3/4" Long Hex. Bolt
42	01 11 005	2	.. 1/2" UNF Nut
43	01 00 205	2	.. Spring Washer
44	80 13 028	1	. Splined Adaptor
45	09 02 330	1	. Chain
	60 00 087	2	. Shackle Assembly each comp:-
46	60 00 089	1	.. Shackle Pin
47	60 00 088	1	.. Shackle
48	04 31 105	1	.. Spring Cotter
49	80 13 266	1	. P.T.O. GUARD
50	03 11 066	1	.. Screw 5/8" UNF x 3/4" long
51	01 00 206	1	.. Spring washer 5/8" diameter

SECTION 7 APPENDIX

Optional Extra

Hy-Reach Forward Extension Kit

For 1 metre and 1.2 metre heads.

Extends the flail head forward for improved operator vision by 1 metre. Kit consists of the extension arm and two rigid pipes and is assembled in the same way as the standard extension.

Kit No. 71 09 301 for 1.2 metre flail head comprising:-

71 09 300 .Forward extension arm
71 09 129 2 off .Rigid pipe

Kit No. 71 09 302 for 1 metre flail head comprising:-

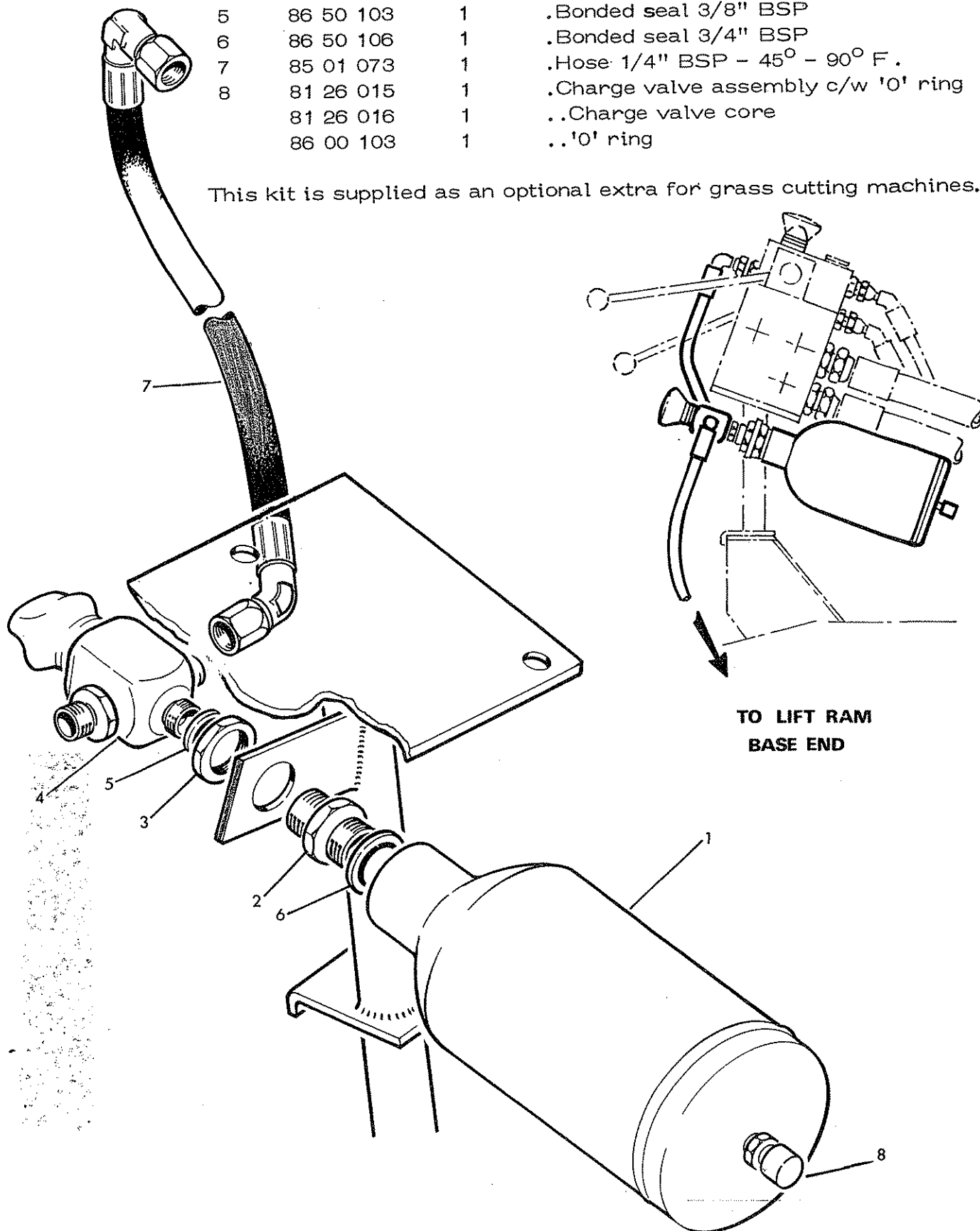
71 09 300 .Forward extension arm
71 09 130 2 off .Rigid pipe

For Triplecut flails additional elbows are required to replace the existing hydrostuds.

2 off 71 09 126 90° elbow hose connections

Ref	Part No	Qty	Description
	81 26 255	1	HYDRAULIC FLOAT KIT comprising:-
1	81 26 254	1	.Accumulator 500 psi precharge
2	85 81 150	1	.Adaptor
3	85 81 151	1	.Backnut
4	81 26 010	1	.Tap assembly
5	86 50 103	1	.Bonded seal 3/8" BSP
6	86 50 106	1	.Bonded seal 3/4" BSP
7	85 01 073	1	.Hose 1/4" BSP - 45° - 90° F.
8	81 26 015	1	.Charge valve assembly c/w 'O' ring
	81 26 016	1	..Charge valve core
	86 00 103	1	..'O' ring

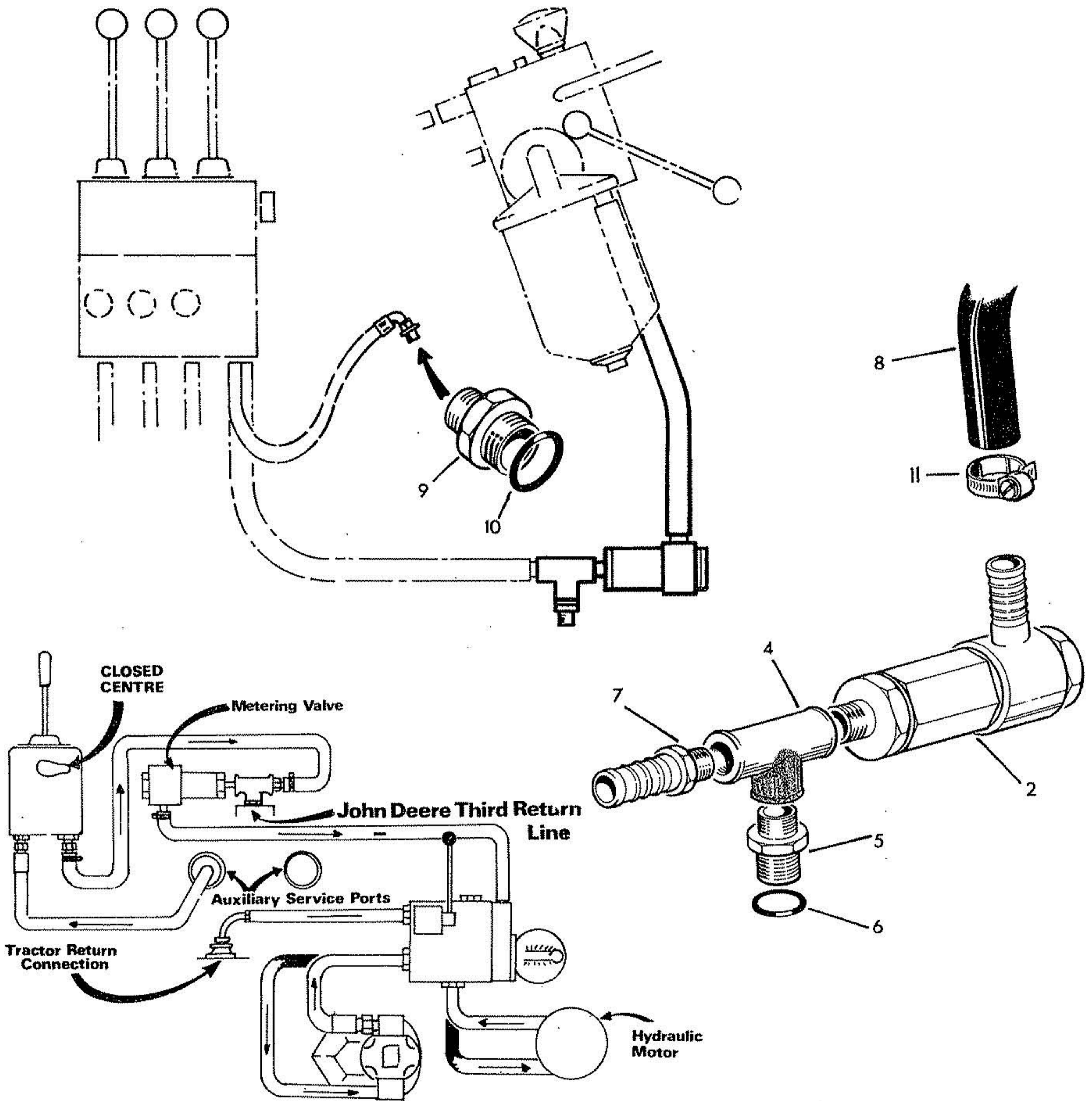
This kit is supplied as an optional extra for grass cutting machines.



HYDRAULIC FLOAT KIT

JOHN DEERE METERING VALVE KIT

See McConnel Service Bulletin HY/02

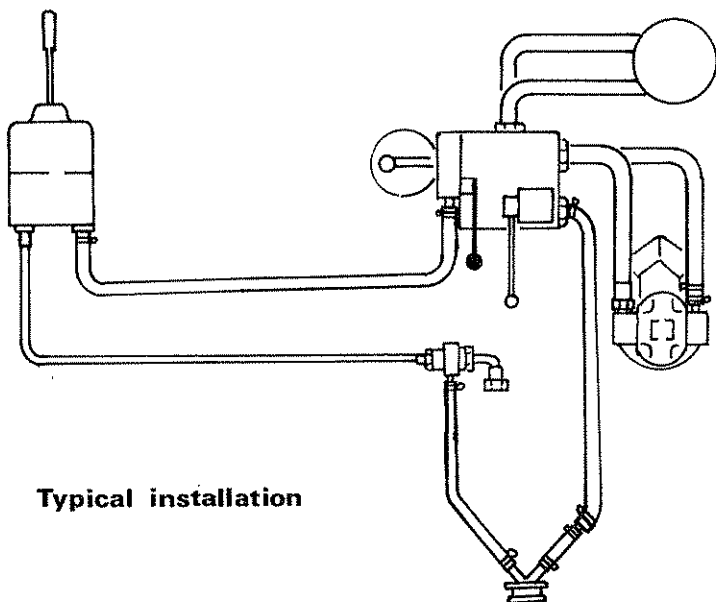


Ref	Part No	Qty	Description
	81 04 031	1	JOHN DEERE METERING VALVE KIT
	81 04 030	1	.Metering valve assembly c/w adaptors
2	81 04 010	1	..John Deere metering valve
	81 04 029	1	..Adaptor assembly
4	85 81 073	1	...3/8" BSP female tee junction
5	81 04 016	1	...3/8" BSP - 3/4" SAE union c/w 'O' ring
6	86 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 02 146	1	.Adaptor 3/4" SAE - 3/8" BSP c/w 'O' ring
10	86 00 112		..'O' ring
11	09 04 204		.Hoseclip (5/8" bore hose)

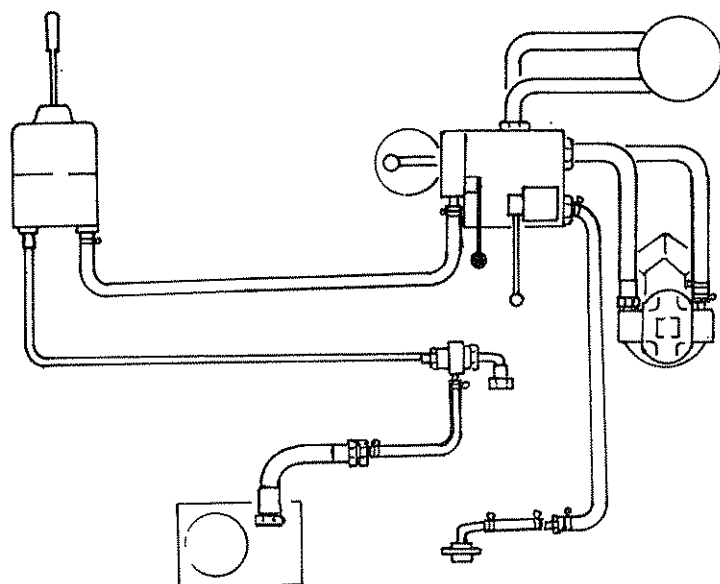
HYDRAULIC FLOW CONTROL VALVE

On certain makes of tractor, difficulty can sometimes be experienced in maintaining precise control of the flail head because of high flow rates. Reducing tractor engine speed and thus reducing the power output from the PTO driven pump is an unsatisfactory solution. A flow control valve is now available which is calibrated to pass approx. 3 gpm to the Hy-fi control box, the remainder of the tractor's output being passed at low pressure directly back to the tractor's hydraulic reservoir.

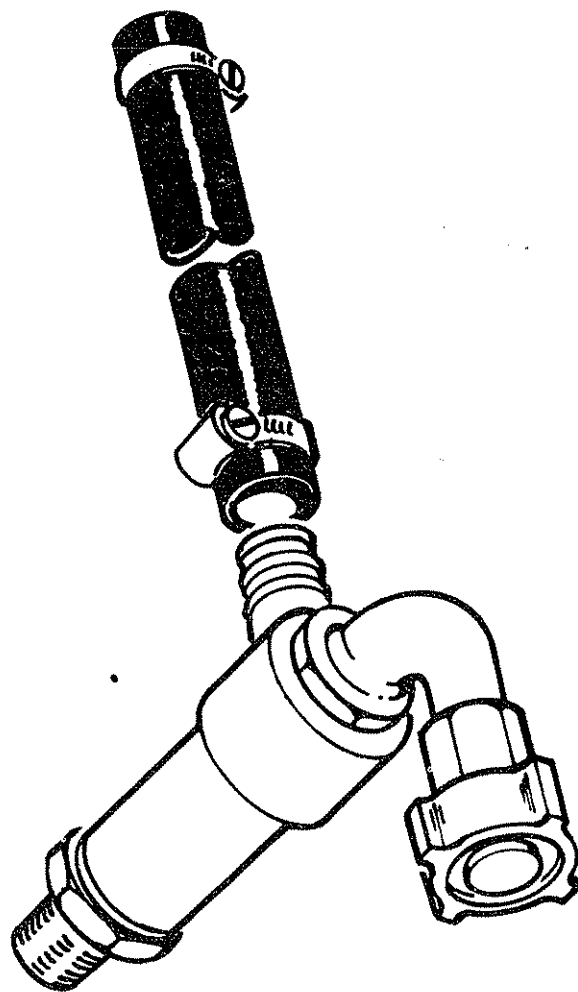
On some tractors i.e. the later Ford range and Dual Power models, return line pressure is necessary for lubrication of transmission and operation of the dual clutch packs. This pressure can be sufficiently high to damage auxiliary pump and hydraulic motor seals. A flow control valve should be installed to the requirements of McConel Service Bulletin HY/03. Where any doubt exists, Ford tractor owners are strongly recommended to consult their Dealers who should refer to the Ford Service Bulletin No. 15 (1977) Item No.6 for further information.



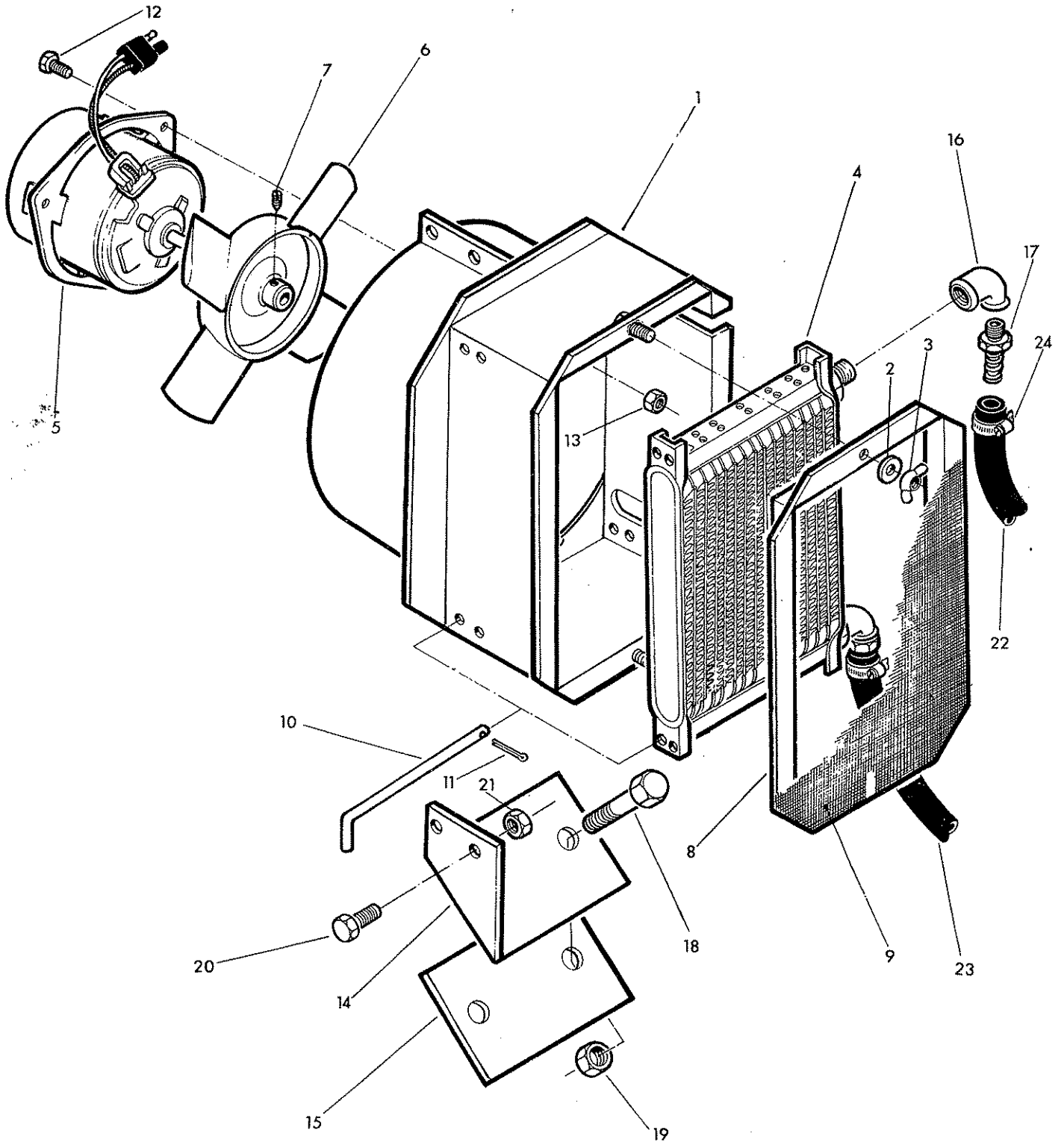
Typical installation



Ford installation 600 & 700 Series

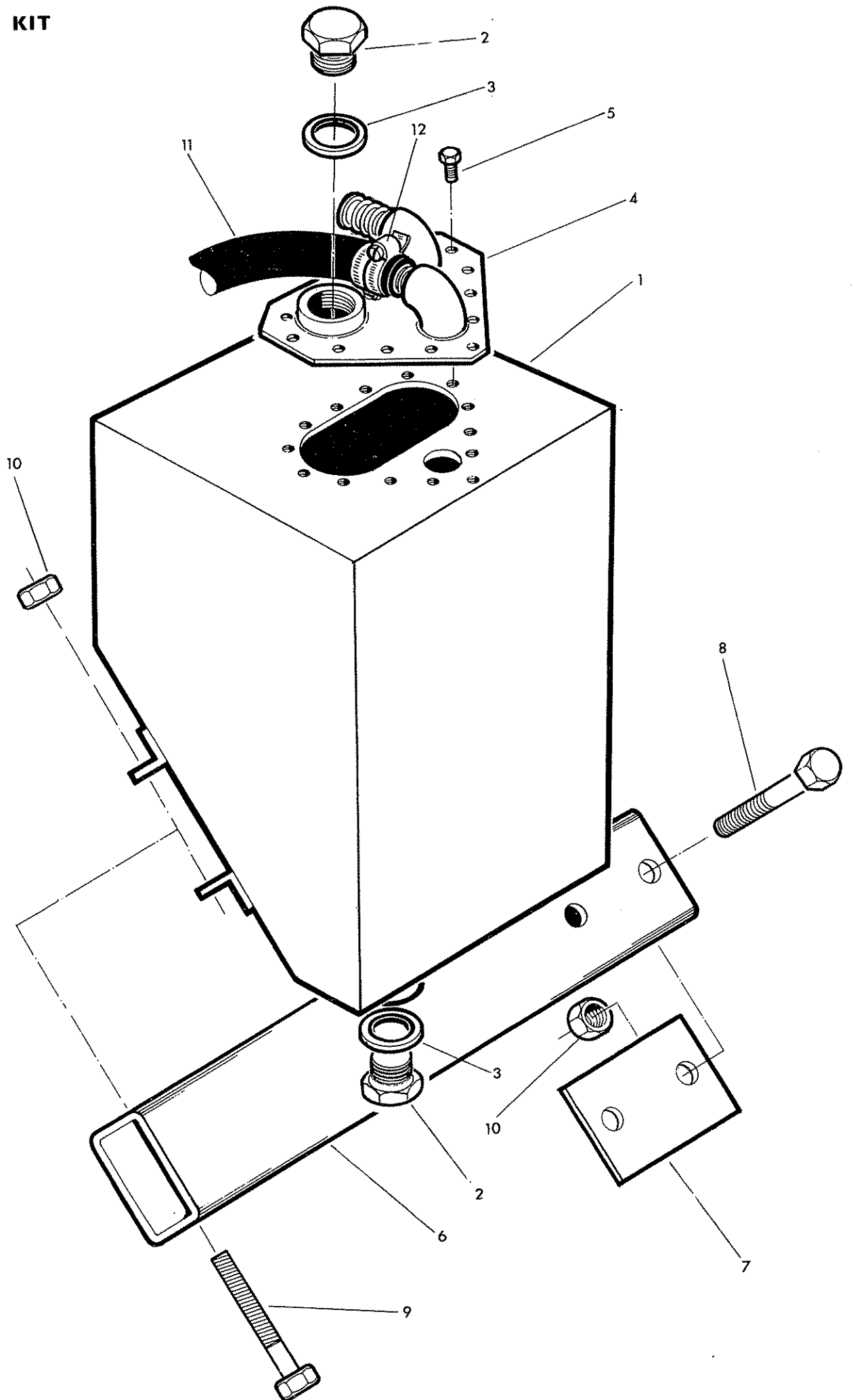


COOLER KIT



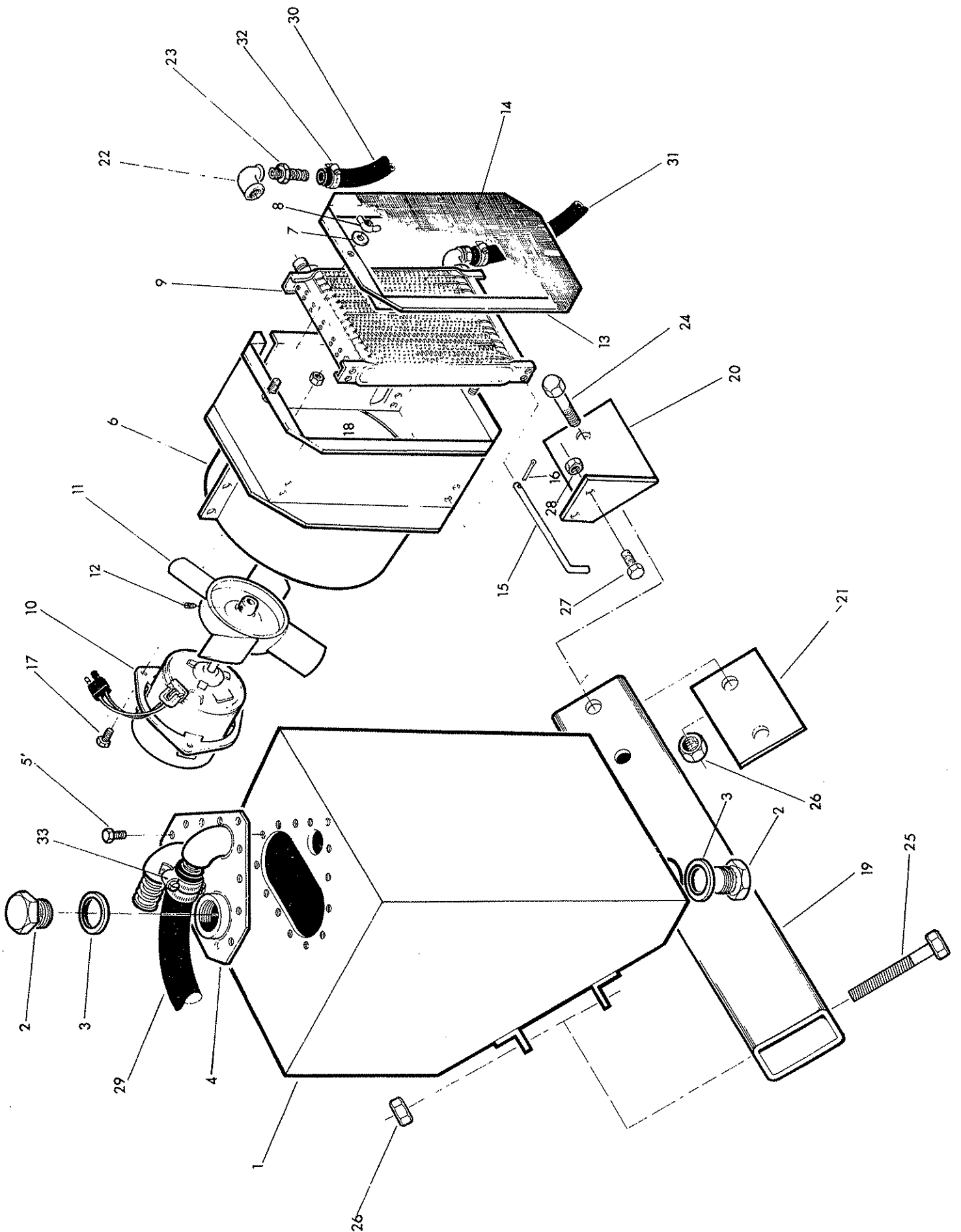
Ref	Part No.	Qty	Description
	71 09 306		COOLER KIT
	71 09 305	1	.Cooler unit
1	71 09 288	1	..Cooler frame c/w wing nuts
2	01 91 003	2	...Wing nut 3/8" UNF
3	01 00 103	2	...Plain washer
4	84 02 001	1	..Cooler matrix
5	84 02 002	1	..Electric motor
6	84 02 003	1	..4 blade fan complete with grub screw
7	03 60 062	1	...Grub screw 2BA x 3/8" long
8	71 09 289	1	..Filter frame c/w gauge
9	71 09 115	1	...Filter gauge
10	71 09 124	2	..Retainer pin c/w split pin
11	05 03 063	1	...Split pin
12	03 11 041	3	..Set screw 1/4" UNF x 1/2" long
13	01 41 001	3	..Aeronut 1/4" UNF
14	71 09 113	1	.Cooler mounting bracket
15	71 09 125	1	.Clamp plate
16	85 81 101	2	.90° elbow 1/2" BSP. F. 3/8" BSP .F.
17	81 25 008	2	.Return connection
18	02 11 366	2	.Bolt 5/8" UNF x 4 1/2" long
19	01 51 006	2	.Thin aeronut 5/8" UNF
20	93 13 055	2	.Set screw M10 x 25
21	91 00 002	2	.Conelok nut M10
22	85 95 060	1	.Hose 5/8" bore x 60" long
23	85 95 096	1	.Hose 5/8" bore x 96" long
24	09 04 204	4	.Hose clip

OIL TANK KIT

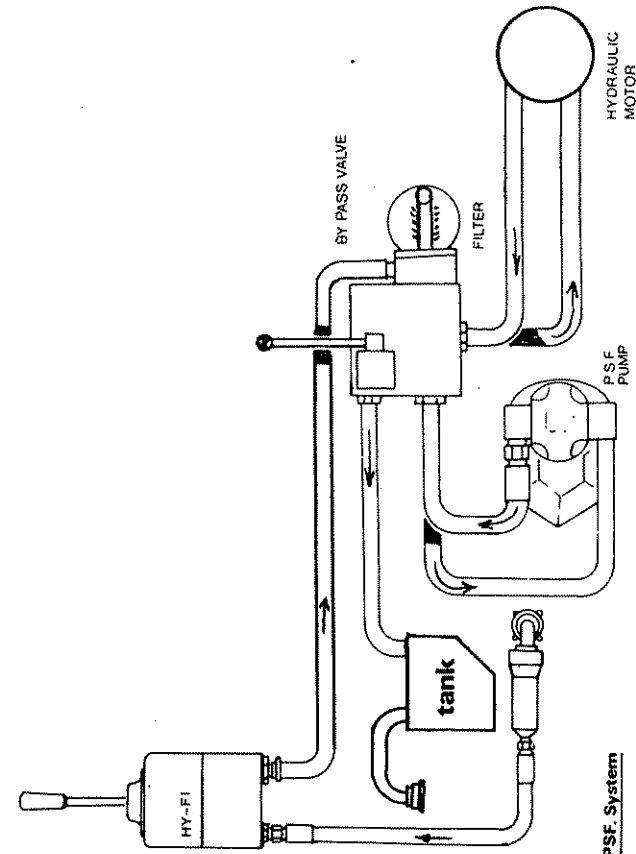


Ref	Part No.	Qty	Description
	71 09 307		OIL TANK KIT
1	71 09 309	1	.Oil Tank
2	85 81 159	2	..Blank plug 1" BSP
3	86 50 108	2	..Bonded seal 1" BSP
4	71 09 310	1	..Tank cover plate
5	93 13 023	14	..Setscrew M6 x 12
6	71 09 293	1	.Tank mounting bracket
7	71 09 125	1	.Clamp plate
8	02 11 566	2	.Bolt 5/8" UNF x 7" long
9	02 11 446	2	.Bolt 5/8" UNF x 5½" long
10	01 51 006	4	.Aeronut 5/8" UNF
11	85 00 836	1	.Hose 1" bore x 36" long
12	09 04 106	4	.Hose clip (1" bore hose)

OIL TANK & COOLER KIT

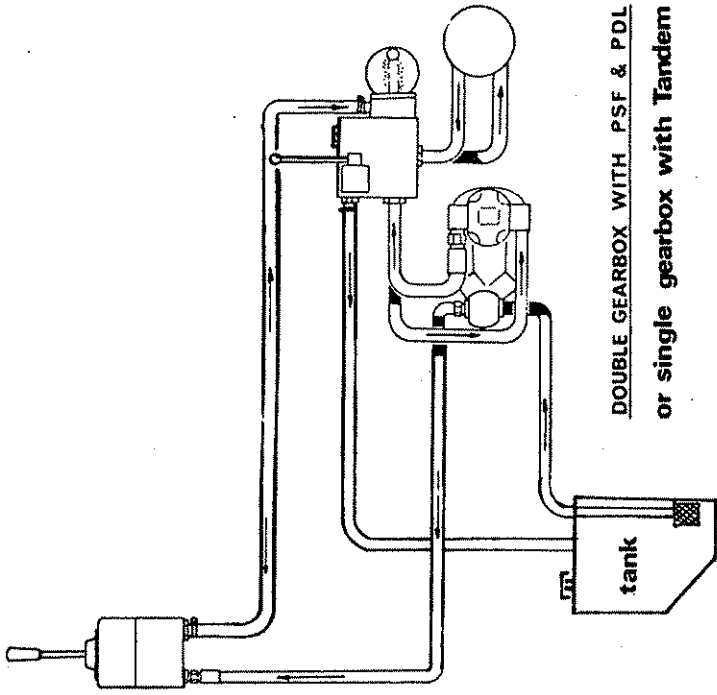


Ref	Part No	Qty	Description
	71 09 308		OIL TANK AND COOLER KIT
1	71 09 309	1	.Oil tank
2	85 81 159	2	..Blank plug 1" BSP
3	86 50 108	2	..Bonded seal
4	71 09 310	1	..Tank cover plate
5	93 13 023	14	..Set screw M6 x 12
	71 09 305	1	.Cooler unit
6	71 09 288	1	..Cooler frame c/w wing nuts and washers
7	01 01 003	2	...Wing nut 3/8" UNF
8	01 00 103	2	...Plain washer
9	84 02 001	1	..Cooler matrix
10	84 02 002	1	..Electric motor
11	84 02 003	1	..4 blade fan c/w grub screw
12	03 60 062	1	... Grub screw 2BA x 3/8" long
13	71 09 289	1	..Filter frame c/w gauge
14	71 09 115	1	...Filter gauge
15	71 09 124	2	..Retainer pin c/w split pin
16	05 03 063	1	...Split pin
17	03 11 041	3	..Set screw 1/4 UNF x 1/2" long
18	01 41 001	3	..Aeronut 1/4 UNF
19	71 09 293	1	.Tank mounting bracket
20	71 09 113	1	.Cooler mounting bracket
21	71 09 125	1	.Clamp plate
22	85 81 101	2	.90° elbow 1/2 BSP.F - 3/8 BSP - F
23	81 25 008	2	.Return connection
24	02 11 566	2	.Bolt 5/8" UNF x 7" long
25	02 11 446	2	.Bolt 5/8" UNF x 5 1/2" long
26	01 51 006	4	.Aeronut 5/8" UNF
27	93 13 055	2	.Set screw M10 x 25
28	91 00 002	2	.Conelok nut M10
29	85 00 836	1	.Hose 1" bore 36" long
30	85 95 060	1	.Hose 5/8" bore 60" long
31	85 95 096	1	.Hose 5/8" bore 96" long
32	09 04 204	4	.Hose clip (5/8" bore hose)
33	09 04 106	4	.Hose clip (1" bore hose)



PSF System

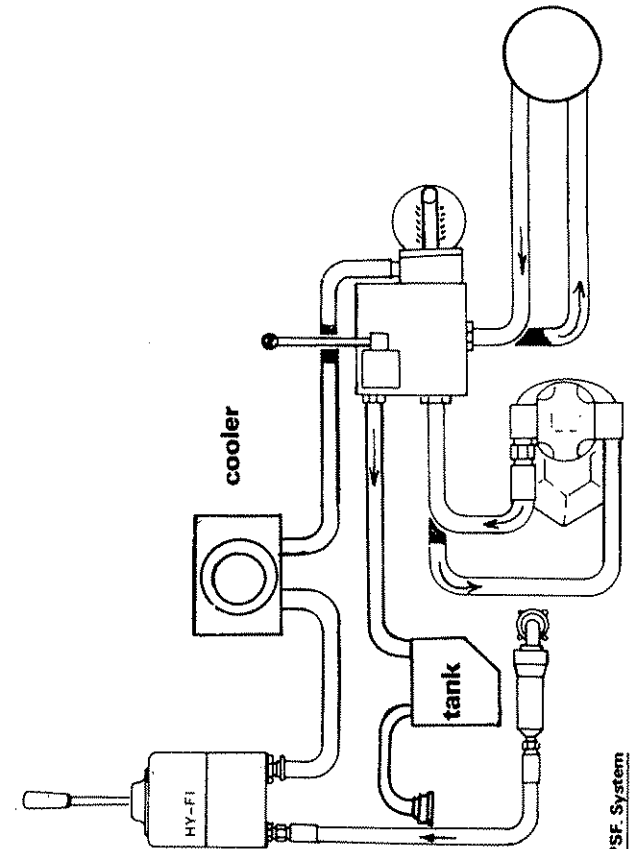
PSF system used when operating flail with auxiliary tank



DOUBLE GEARBOX WITH PSF & PDL

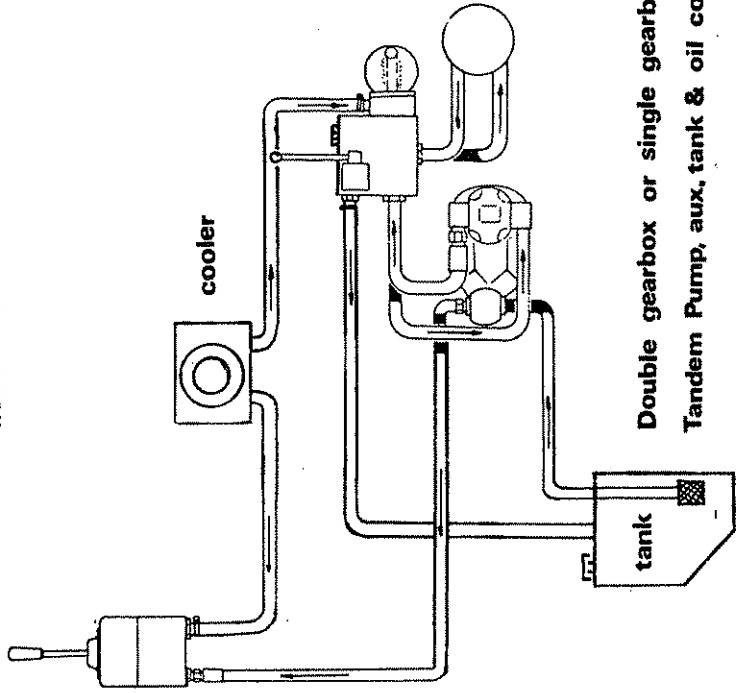
or single gearbox with Tandem Pump

INDEPENDENT HYDRAULIC SUPPLY -



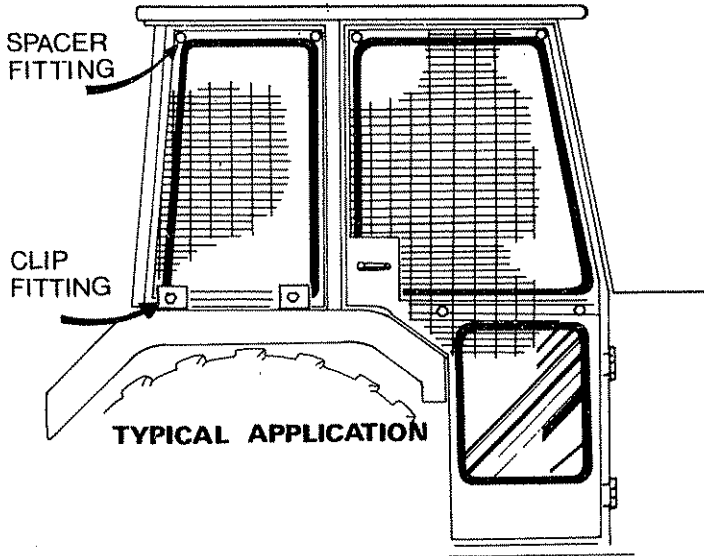
PSF System

PSF system used when operating flail with aux. tank & oil cooler



Double gearbox or single gearbox with Tandem Pump, aux. tank & oil cooler

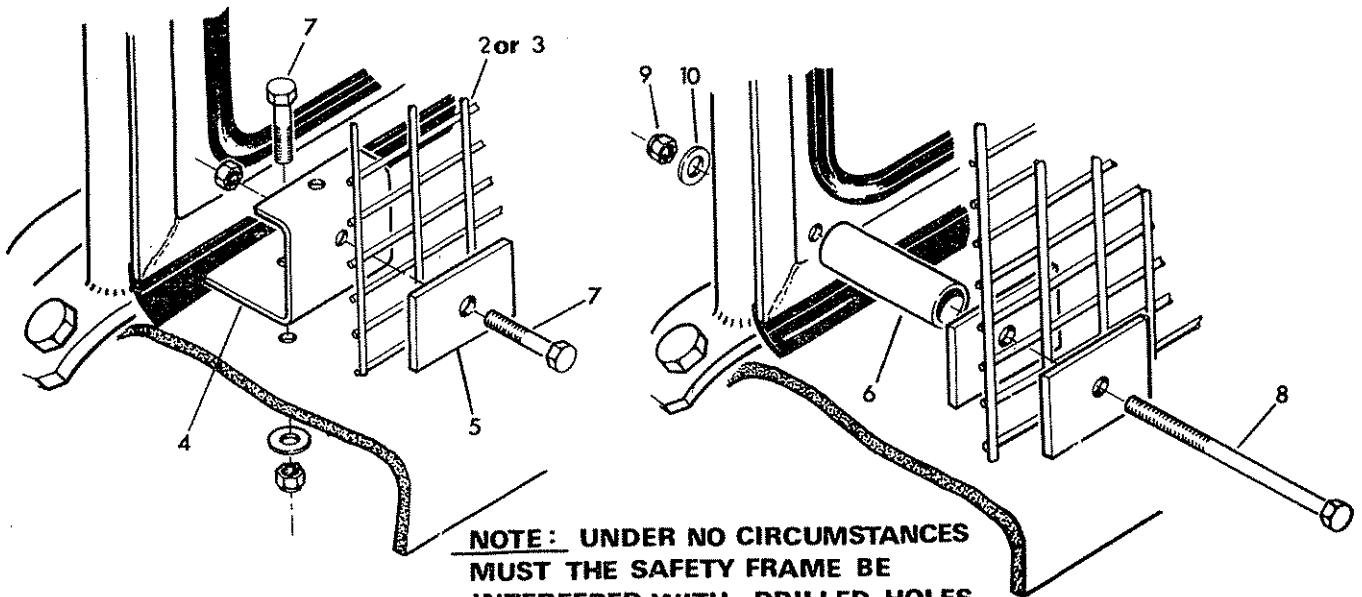
CAB GUARD



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.



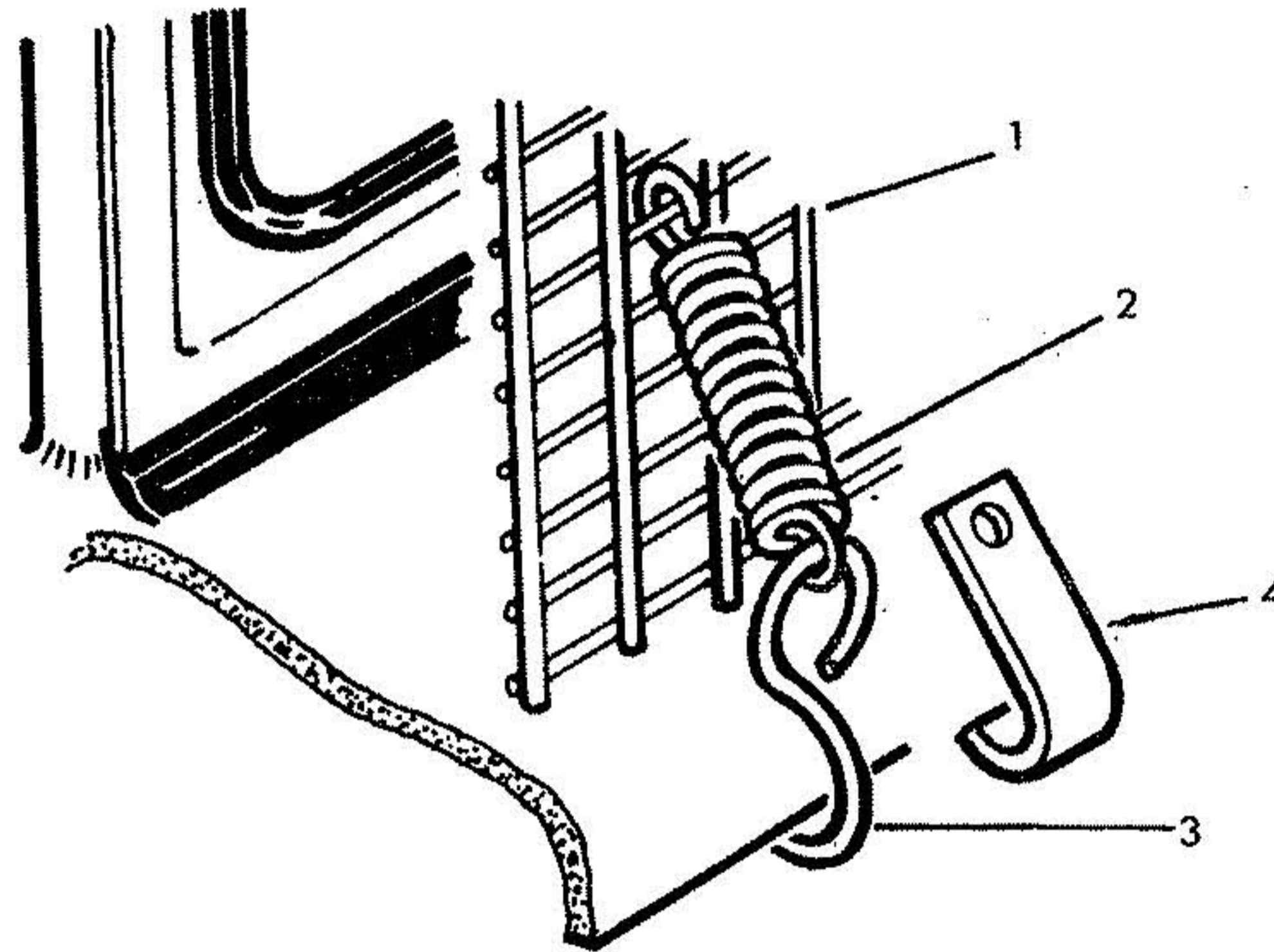
NOTE: UNDER NO CIRCUMSTANCES MUST THE SAFETY FRAME BE INTERFERED WITH. DRILLED HOLES MUST BE THROUGH CLADDING

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

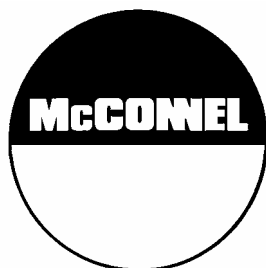
Operator Guard Kit

From March 1977 the guard kit assembly part no 73 13 320 will be superseded by kit no. 73 13 324 which allows the guard to be fitted where it is not possible to drill the cladding ie. on some 'Q' cabs.

Spring loaded hooks are used to secure the guards against the window area by hooking around the cab gutter. The lower edge of the mesh guard being held by hooks on the mudwing - because of the great range of cabs it may be necessary to adapt or make brackets to secure the mesh.



<u>Ref</u>	<u>Part No</u>	<u>Qty</u>	<u>Description</u>
	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



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