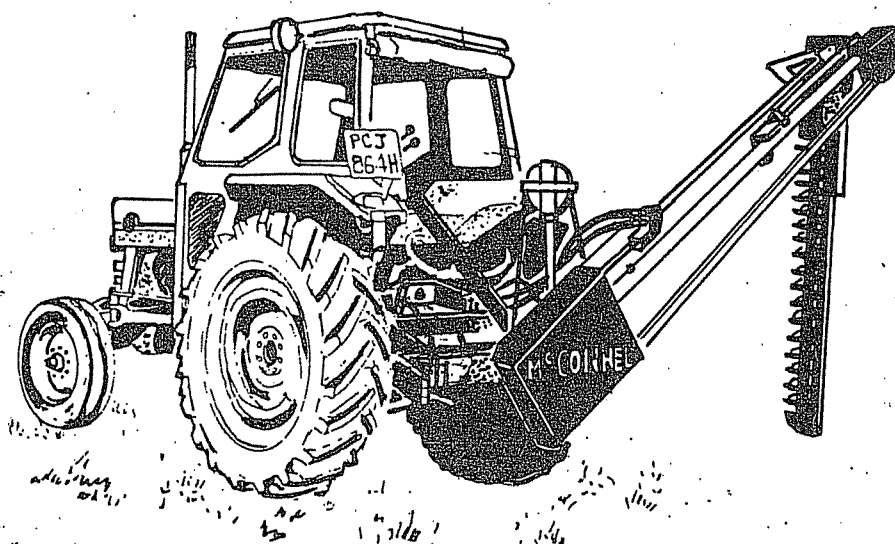


POWER ARM

UNIVERSAL



LIST OF CONTENTS

	SAFETY PRECAUTIONS	Page 2
<u>SECTION I</u>	INTRODUCTION	Page 3
	TRACTOR FITTING CHART	Page 4
SECTION II	FITTING INSTRUCTIONS	Page 5
SECTION III	PAU MAINTENANCE	Page 9
SECTION IV	ARMHEAD 1 Cutterbar	Page 10
SECTION V	FITTING INSTRUCTIONS	Page 11
	HY-FI CONTROL UNIT	Page 13
SECTION VI	REACH-OVER EXTENSION	Page 14
SECTION VII	ARMHEAD 1 MAINTENANCE	Page 16
SECTION VIII	SHAPESAW	Page 18
	SAWBLADE MAINTENANCE	Page 21
SECTION IX	12A DITCHER	Page 22
SECTION X	SPARE PARTS MANUAL	Page 24

INTRODUCTION

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

Use only McConnell spare parts on McConnell 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 will result in personal injury or loss of life if not observed carefully.

CAUTION:

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

NOTE:

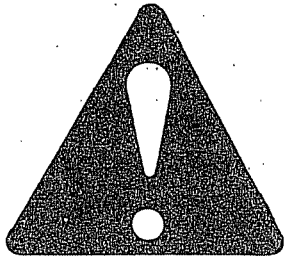
An operating procedure, technique etc., which is considered essential to emphasise.

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		



WARNING

SAFETY PRECAUTIONS

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

Do read McConnell publication 'Safety Bulletin' No. 3 for Rotary Hedgecutters.

NEVER

- ...Attempt to carry out any adjustment with the PTO in operation.
- ...Stop tractor engine with the PTO in gear.
- ...Operate a shapersaw or R.O.E. with the armhead in 'far reach' position.
- ...Exceed 420 RPM on the PTO when using a shapersaw.
- ...Use a cracked or distorted shapersaw blade.
- ...Use a tractor without 'live drive PTO' when operating a shapersaw.
- ...Use a shapersaw blade without the correct retaining bolts and nuts and spirolox safety ring fitted to sawshaft.
- ...Allow an assistant to work closely behind a shapersaw when in operation.

ALWAYS

- ...Keep all guards in place; they are for your protection.
- ...Use the correct shear bolts.
- ...Examine hedgerow first for dangerous material before starting work.
- ...Cut A shaped hedge tops to allow cuttings to fall to the ground and the blade to remain at a safe angle to the operator.
- ...Operate at a minimum tractor engine speed consistent with smooth operation and good cutting performance.
- ...Keep all nuts and bolts tight and check frequently.
- ...Keep the wire rope well greased - if it shows signs of fraying or corrosion it should be replaced.
- ...Park the machine in a safe position where a person or animal cannot walk into it - Cutter guard should be fitted in position for transport.
- ...Keep spectators well away.

SECTION 1

POWER ARM UNIVERSAL

INTRODUCTION

The P.A.U. as it is often called, is a rigidly mounted frame attached to a three point linkage of a tractor, which can accommodate a variety of armheads:

1. The Armhead Range

No. 1 M	Manual angling cutterbar hedge trimmer.
No. 1 H.A.	Hydraulic angling cutterbar hedge trimmer.
No. 1 H.A. ROE	As No. 1 H.A. but with a reach over extension.
No. 1 S.M.	Manual angling shapersaw.
No. 1 S.H.	Hydraulic angling shapersaw.
No. 12A	Ditch cleaner.

2. Basic Tractor Requirements

- Three point linkage.
- Linkage isolation.
- Centrally mounted PTO shaft.
- "Live" PTO.
- Trailer pipe connection.
- A minimum 2100 p.s.i. if using hydraulic angling equipment.
- All PTO driven armheads require a 540 RPM PTO shaft. Do not attempt to modify or adapt the coupling to run off a 1000 RPM shaft.

3. Tractor Fittings

Tractor fittings are available to enable the P.A.U. to be fitted to a wide range of tractors - it is most important when ordering machine to state clearly to what make and model of tractor it is being fitted. For lesser known makes and some recent tractor models refer to Section 2 Paragraph 8.

(a) Top hitch bracket

These are identified by a number stamped or stencilled upon them and are sometimes painted with the colour of the tractor they are designed to fit. Some brackets are stamped with a number on either side in which case when bolting the bracket to the yoke, the required number is always on the top side. The bracket should not be attached to the tractor draft control or rocker arm mechanism unless it can be locked or isolated.

(b) Linkage pins

Two sizes of pin are available. Cat I 7/8" dia. and Cat II 1 1/8" dia.

(c) Drive shaft assembly Refer to tractor fitting chart

Alternative lengths of drive shaft assemblies are listed. For identification see table below: when in doubt specify the longer shaft and cut off surplus length.

<u>U/Joint Coupling</u>	<u>Drive Shaft</u>	<u>Guard</u>
Type A 11" long	Type A 21 7/8" long	Type A Short
Type B 13 3/4" long	Type B 26 7/8" long	Type B Long
	Type C 28 7/8" long	Type C Extra long

(d) Stabilizers

The PAU frame should always be rigidly held with the aid of the tractor stabilizer chains or arms. If none are fitted then a McConnel adjustable stabilizer bar should be obtained. Only Cat I size is available.

PAU tractor fitting chart.

TRACTOR MAKE and MODEL	TOP HITCH No.	YOKE Pos'n	LINK PINS		EXT. PLATES Req.	12A	DRIVE SHAFT ASSY			ADDITIONAL REQUIREMENTS and REMARKS
			Cat	Pos'n			Coupling	Shaft	Guard	
<u>David Brown</u> 850 880 950 990 Imp. } 770 Sel 780 Sel 880 Sel 885 Sel 990S 995S 996S 990S 995S 996S 1200S	34 45 56 48 62 49 49 35	5c 3a 3a 2a 5c 4b 4b 5c	II I I I I I I II	X X X X Y Y X X			A A A A A B B B	A A A A A B B B	A A A A A B B C	3/8" offset PTO Special top yoke Pt. No. 68 01 274 Mounting bracket & pin Mounting bracket & pin Mounting bracket & pin Draft link-hole centres 35½" Draft link hole centres 38½"
<u>Nuffield/Leyland</u> Universal 4 Universal 4 & 3 342 460 1060 1042 1065 345 465 344 384 270 253 245 255 154 Mini	5 17 32 54 47	2a 2a 3a 3a 3a	II II II II I	X X X X X			A A A A A	A A A A A	A A A A A	Mid mounted drawbar model Rear mounted drawbar Mounting bracket L & R hand stabilizers
<u>Ford</u> Major P/Major Super Major Old Fordson Dexta New Dexta S/Dexta 2000 3000 4000 5000	3A 26 19 19 40 41 42 43	5c 5c 5b 5b 5b 5b 5c 2a	II II I I I I II II	X X X X Y Y X X			A B A A B B B B	A A A A A A A A	A B A A B B B B	For auto clutch release use Bracket 3E and yoke holes 5c Top hitch pin Top hitch pin Top hitch pin Rocker locking pin Mounting bracket & pin
<u>Massey Ferguson</u> T.E.20 35 135 65 165 std 65 165 non/std 65 165 HC 65 165 175 178 185 25 130	1 14 20 39 36 37	5b 5b 5b 5b 5b 5b 3a	I I I I II I	X X X X X Y			A A B B B B B	A A A C C C A	A A B C C C A	Splined adaptor sleeve On 11 x 32 tyres - 34" links (Cat.I) On 11.36 rear and 600 x 16" front-tyres 35" or 38" rear and 19" front wheels 37.5" links (Cat.II) * See footnote
<u>International H.</u> 253 245 B250 275 414 276(w/out VTH) 414 434 444 354 344 276 with VTH 450 523 B275 Hi/clearance 614 634 674 474 574 454 single PTO 454 twin PTO	10 31 25 57 33 46 59 60 61	3a 5c 4b 2a 5c 4b 3a 3a 3a	II I II II II II II II II	X Y X X X X X X X			A B B A B B A A A	A C A A A A A A A	A C B B B B B B B	Clip for hydraulic lever Mounting bracket & pin Quadrant stop Clip for hydraulic lever Clip/also offset linkage pin Mounting bkt. & Quadrant stop 2 spd shaft Draft lock req. Draft lock Draft lock
<u>Zetor</u> 3011 3045 351 3545 4011 4511 5511 5545	53 52 51	5c 5c 3a	II II II	Y Y X			B B A	C C B	C C B	Self seal coupling Self seal coupling Self seal coupling
<u>John Deere</u> 1020 2020	58	3a	II	X			A	A	A	S/S adaptor LH offset linkage pin

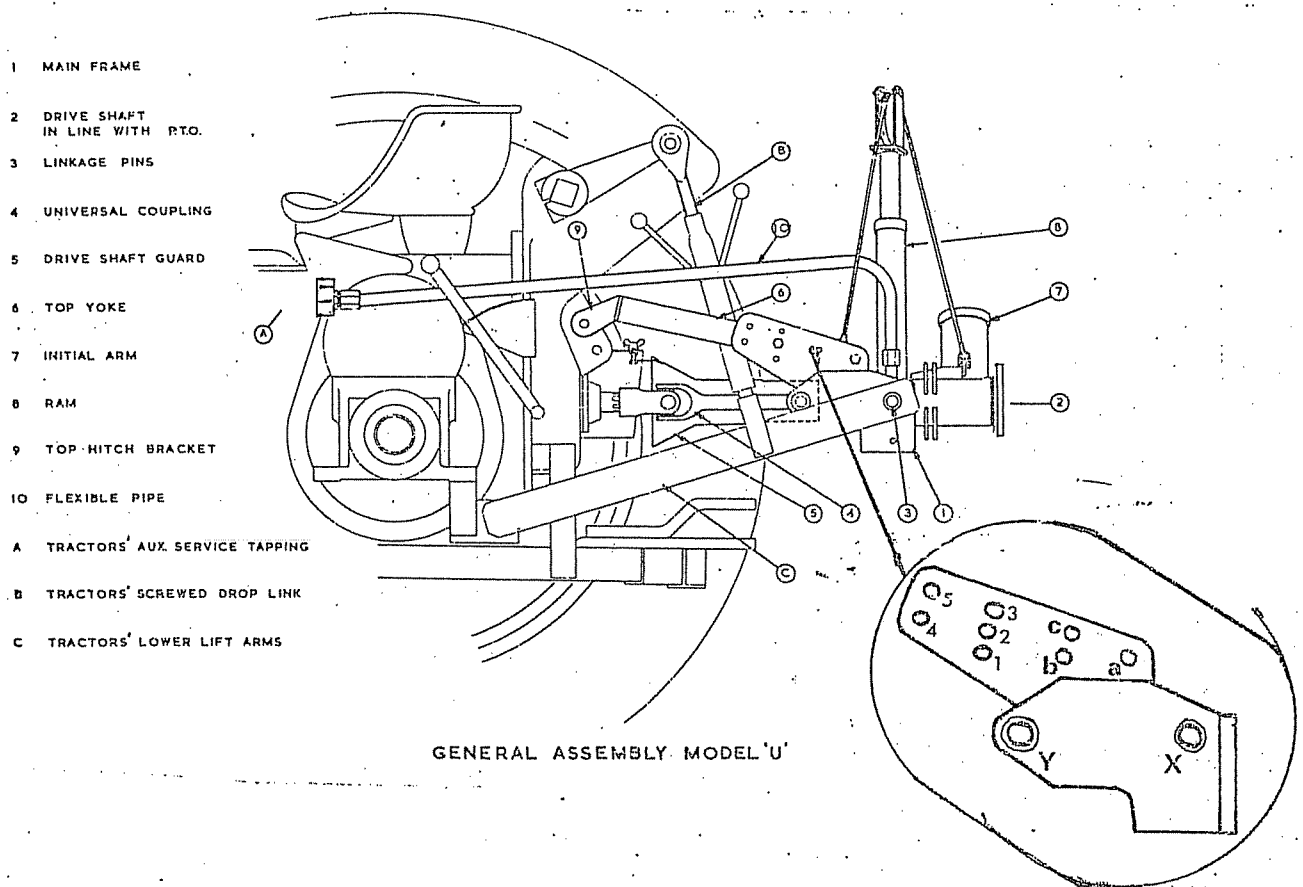
* When ordering fittings for MF65/165 please state the length of lower links measured between hole centres.

SECTION 2

FITTING INSTRUCTIONS

1. Preparing Power Arm

- (a) Check that you have the correct set of fittings for your particular tractor.
- (b) Bolt the Top Yoke to the Main Frame using the holes as detailed in the tractor fittings chart. If Yoke Extension Plates are required, fit these between the Yoke and the Main Frame Quadrant Plates as shown in Fig. 2, using the same holes in the Main Frame.
- (c) Bolt the correct Top Hitch Bracket securely to the Top Yoke, ensuring that the number stamped on the bracket is uppermost.
- (d) Fit and secure the Linkage Pins in their correct positions.
- (e) Ensure that all bolts and nuts are secure.



2. Fitting of Power Arm

- (a) Slide the Drive Shaft guard over the Universal Coupling, leaving it fully telescoped. Slide the Universal Coupling fully home on to the Power Arm rectangular Drive Shaft.
- (b) Lower the tractor's lift arms and fit the near side Power Arm Linkage Pin. Insert the tractor's linch pin. Adjust the tractor's off-side lift arm with the levelling handle until it is in line with the off-side linkage pin. Fit the linkage pin and insert the tractor's linch pin.
- (c) Raise the Power Arm from the ground using the tractor's hydraulics, at the same time swinging it forward until the top hitch bracket mates with the fixed point on the tractor. Secure the tractor's top link pin.
- (d) Couple the Universal Joint to the tractor's P.T.O. shaft. On certain tractors (c) and (d) may need to be carried out in reverse order.

3. Levelling & Stabilising

(a) Levelling - Centre the power arm by adjusting the tractor's levelling control handle on the off-side drop link. **THIS IS ESSENTIAL.** The power arm rectangular drive shaft must be centralised in the hole in front of the box section main frame and the power arm **MUST** be level both fore and aft and laterally when it is supporting an Armhead. Levelling as above also alters the alignment of the central driving pulley with the driven pulley on the Armhead so that after an Armhead with flat belt drive has been fitted it is necessary to check that when the lift ram is under load the belt is running centrally on the drive pulley, and if not, to adjust the tractor's levelling control handle until it does so.

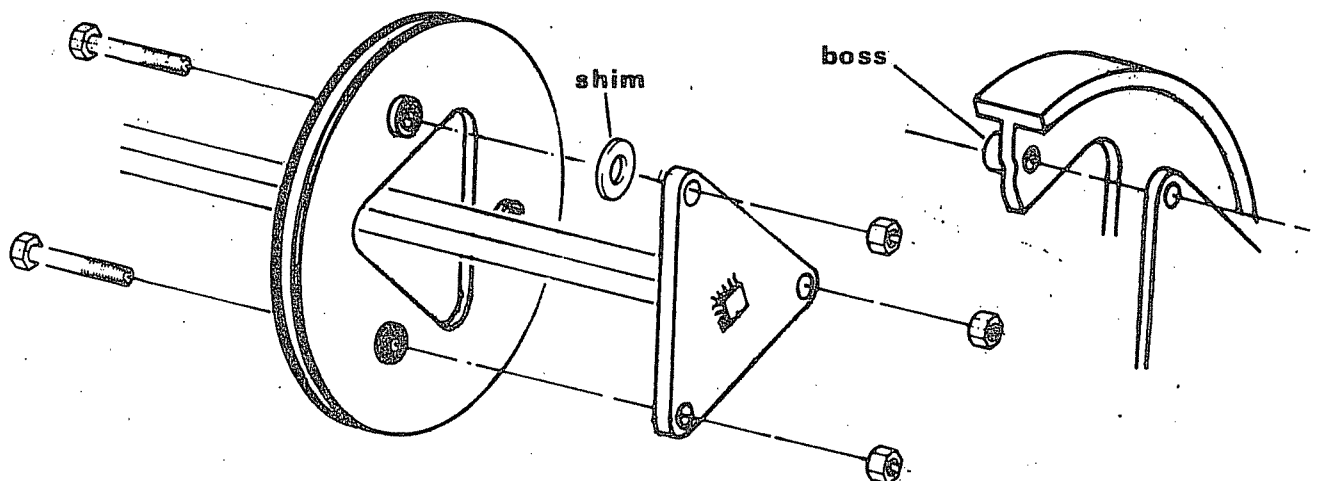
(b) Stabilising - The Power Arm must be held rigidly on the tractor without sideways. Stabilisers or check chains must be used.

CAUTION

Do not use a drive shaft length that can 'bottom out' against the centre of the universal coupling.

4. Pulley

This should be bolted to the inner face of the triangular plate. Any tendency for the pulley to wobble can be corrected by fitting shims between pulley and plate. Note the cast boss on one bolt hole to prevent incorrect fitting.



5. Hydraulic Connections

Connect the self seal coupling to the tractor trailer pipe connection. Ensure that the hose neither passes between the ram and ram cable nor in any other position in which it is liable to damage by chafing or rubbing. (Remember that a hose under pressure will take up a different position to that when it is slack).

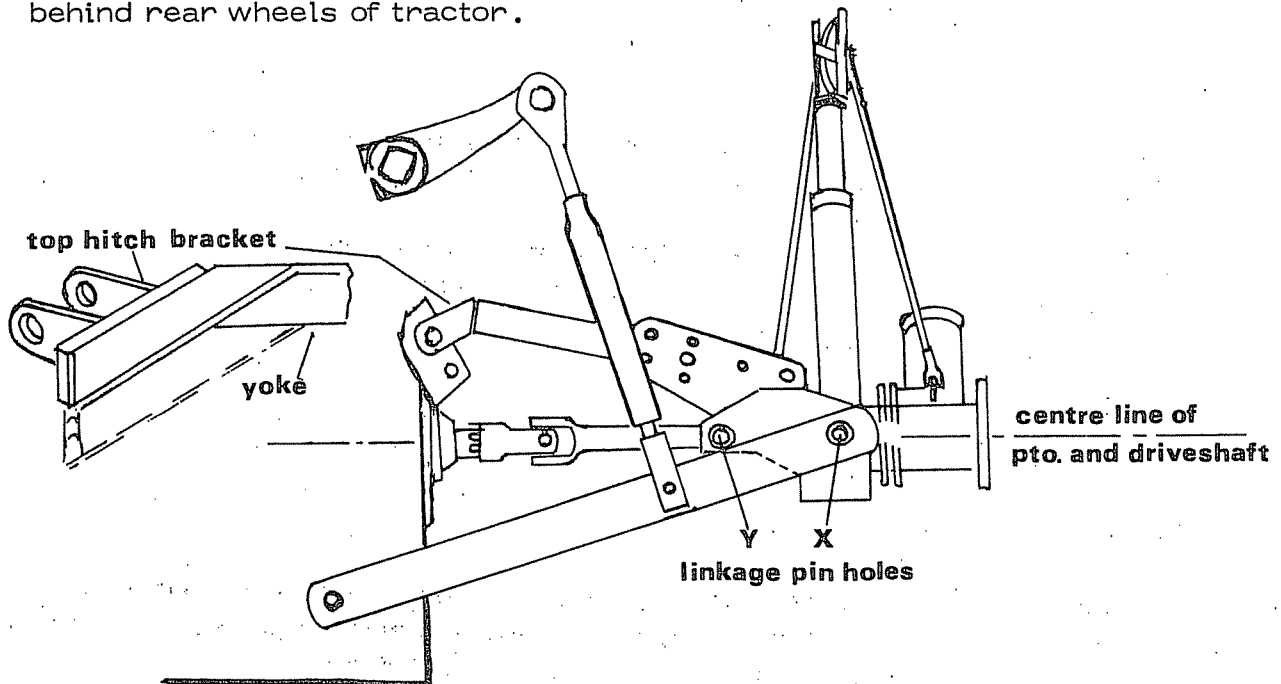
After connection, bleed the hose by slackening the joint to the ram cylinder, opening the tap and lightly applying pressure to the ram. Tighten the joint when oil begins to seep out.

6. Recent Tractor Models

The P.A.U. has been in production since 1952 and over fifty different top hitch brackets are available for various tractor models. Since 1972 no further brackets have been designed at our works, but it is comparatively easy to fabricate a required bracket by following the instructions.

- (a) Ensure that all available fittings are to hand including Cat I or II linkage pins. Different lengths of PTO drive shaft are available - if in doubt order the longest assembly and cut down to requirements.

Extension plates are sometimes needed to ensure adequate clearance behind rear wheels of tractor.



(b) Fitting & Alignment

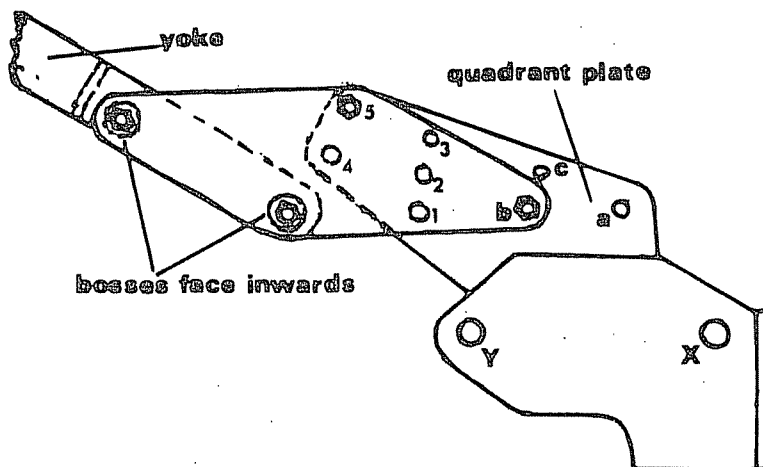
- i Refer to drawing and fit linkage pins in hole marked X.
- ii Fit the Power Arm frame to the tractor draft links and raise until the linkage pins are exactly the same height as the tractor p.t.o. shaft. Use axle stands or blocks and set the frame so that the rectangular Drive Shaft is central and dead in line with the tractor p.t.o. shaft. Use a spirit level to check this.
- iii Bolt the top yoke to a suitable combination of holes in the main frame so that the end of the yoke is suitably close to the tractor's top hitch point. There is an alternative position - holes Y - for the linkage pins if the Power Arm is too close to the tractor. If it is not possible to fit the yoke sufficiently close to the tractor top hitch point, use extension plates 68 01 269 and 68 01 270 which extend the yoke forwards approximately 7½ inches.
- iv Cut a cardboard or sheet metal template to determine the profile of the top link attachment plates. Then - either modify an existing top hitch bracket, or cut out and drill two steel plates not less than ½" thick, using the template and securely weld to the back plate of a top hitch bracket.

7. Draft Sensing Units

Whenever possible attach the Power Arm to a "dead" top hitch point. The loads imposed by the Power Arm model "U" are not normally high enough to activate the sensing unit, but it is advisable to lock the unit to prevent it from being compressed, should the operator forget to isolate the hydraulics.

8. Extension Plates

These are sometimes required when the tractor is fitted with extra long draft arms, or when there is a risk of damaging the rear tractor tyres with the bucket teeth when using a 12A armhead. The yoke must be bolted between the bosses on the extension plates which should be bolted to the outside of the quadrant plates using holes 5 & b as shown in the diagram.



9. Hydraulic control valve

Where difficulty is experienced in obtaining a positive 'hold' position with the tractor quadrant lever, a single spool control valve can be fitted. If a hydraulic angled armhead is used then a twin spool Hy-Fi valve is necessary in place of the single spool type.

10. B.M.C. Top Hitch Mounting Bracket

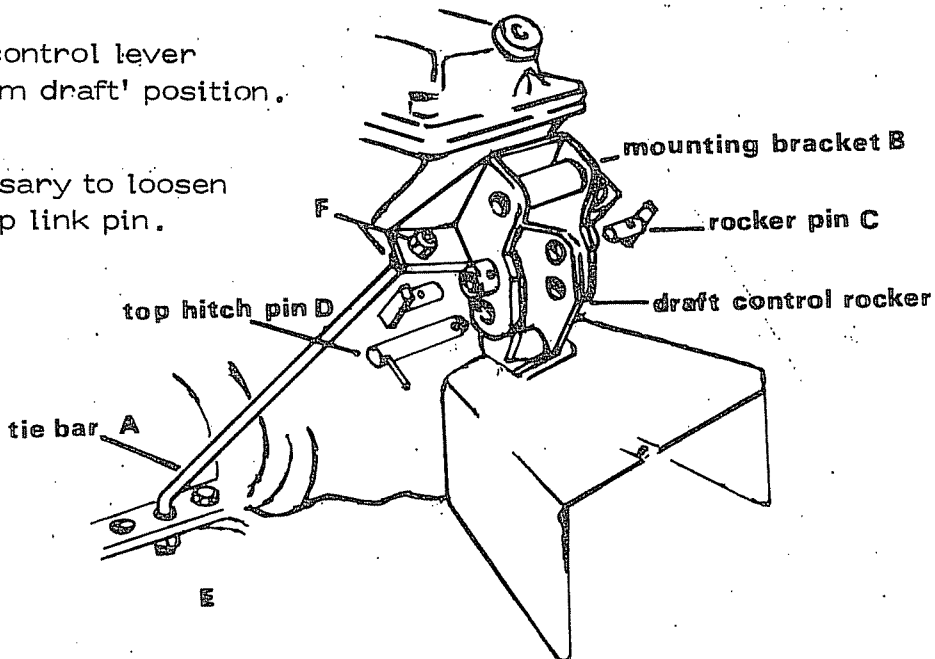
Purpose: for locking the draft control mechanism

Follow the letter sequence when assembling bracket to tractor paying particular attention to the following.

- 1/ The nuts 'E' at the cranked ends of the tie bars should have full depth of engagement.
- 2/ Fit the top link and pin 'D' before tightening nuts 'F'.
- 3/ Nuts 'F' should be tightened equally to apply pre-load to the mounting bracket which should then come into contact with the tractor hydraulic housing.

For operation the draft control lever should be set in 'minimum draft' position.

Note that it will be necessary to loosen the tie bars to remove top link pin.

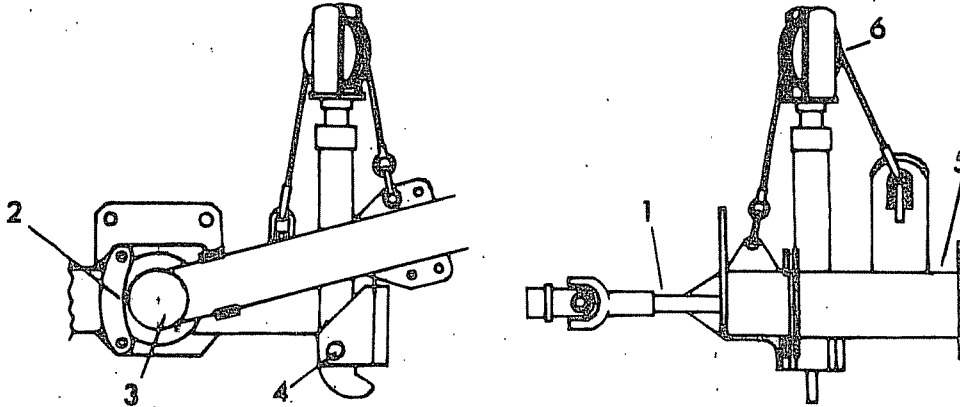


SECTION 3

MAINTENANCE

General - Self locking nuts are fitted throughout, but a certain amount of bedding down is bound to occur. All nuts must be tightened after the first few hours working. Pay particular attention to the nuts securing the Linkage Pins.

Lubrication



- | | | |
|----------------------------|---|--|
| 1. Universal Joint) | - | (Oil once daily when working. |
| 2. Arm Retaining Clip) | | (Recommended lubricant - |
| | | (Agricastrol Gear Oil Medium. |
| 3. Central Pulley Bearing) | - | (Grease once daily when working. |
| 4. Ram Pivot Bearing) | | (Recommended lubricant - |
| 5. Arm Pivot Bearing) | | (Agricastrol Grease Medium. |
| 6. Wire Rope. | | This should be frequently inspected for corrosion and damaged strands which could lead to sudden failure, - regular greasing of the rope is essential. |

Hydraulic Ram

Check occasionally for leakage of oil past the pressure cup by working the ram to its full stroke three or four times. Persistent leakage (caused by a worn pressure cup) will be denoted by oil being ejected from the breather hole at the end of every stroke. Strip for inspection as follows:-

- Unscrew the Gland Nut and withdraw the Piston Rod complete with Pressure Cup from the Cylinder.
- Grip the Piston Rod between SOFT METAL JAWS and unscrew the seal retaining nut. Remove the Spacer Collar and Pressure Cup and inspect for signs of damage or wear.
- A Pressure Cup badly worn over only part of its circumference could mean that the Cylinder Barrel has been damaged by dirt in the hydraulic system, or that there has been excessive side loading of the piston. Check that the Ram cable has been correctly assembled, and that no obstructions, such as stones etc., have become lodged between the Ram and the Power Arm Frame.
- Re-fit the Pressure Cup and then the Spacer Collar, making sure that the radiused edge of the Collar abuts the Cup. Fit the Seal Retaining Nut and tighten securely.

Note:- There have been variations in the type of Pressure Cup used in the Ram and care should be taken to ensure that a replacement Cup is of the same type as that fitted.

- Inspect the Piston Rod Wiper housed in the Gland Nut and renew if necessary.
- Insert the Piston into the Cylinder taking care not to damage the lip of the Pressure Cup when entering the bore, and screw home the Gland Nut.

SECTION 4

ARMHEAD No. 1

INTRODUCTION

Five types of armhead I are available.

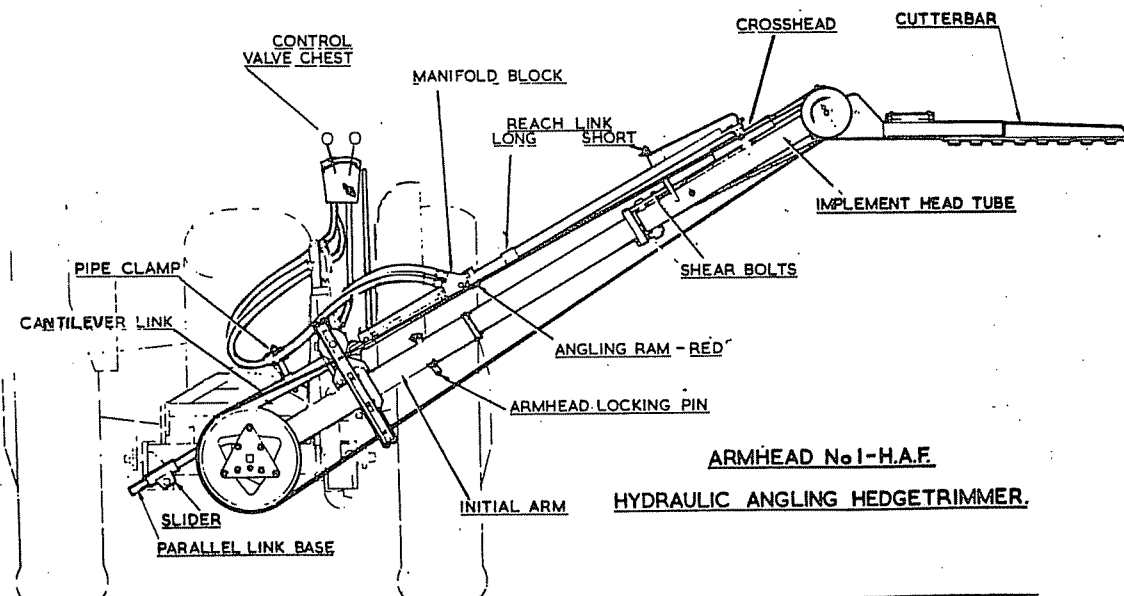
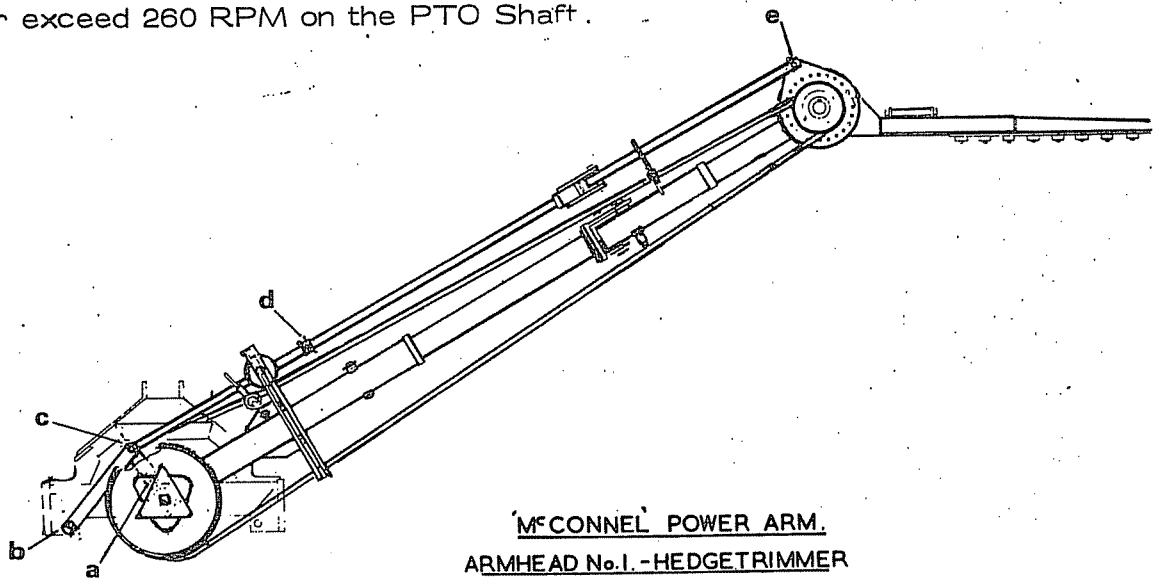
- | | | |
|---|------------------|---|
| 1 | No. 1 M | Cutterbar manual angling |
| 2 | No. 1 HA | Cutterbar hydraulic angling |
| 3 | No. 1 HA. R.O.E. | Cutterbar hydraulic angling: Reach over extension |
| 4 | No. 1 SM | Shapesaw manual angling |
| 5 | No. 1 SH | Shapesaw hydraulic angling |

The Armhead I cutterbar is a hedge trimmer designed for hedge maintenance and cutting from one to three years growth. For heavier growths and for badly overgrown hedges a shapesaw should be used.

Tractor P.T.O. Speed

For best results the crankshaft should be run at about 625 RPM. This is equivalent to about 215-235 RPM on the PTO Shaft.

Never exceed 260 RPM on the PTO Shaft.



SECTION 5

Fitting Instructions

Refer to the general arrangement drawing concerned and fit as illustrated in the following order.

1/ Armhead

Plug in and secure with the tube locking pin. Note that the lug for the guide through which the compensating link passes should be on the top.

Two positions for the armhead securing pin are provided.

A V belt is normally supplied to allow the armhead to be used in the 'long reach' position, however a short V belt is available and has to be used when the machine is operated in 'close reach' position such as in narrow lanes.

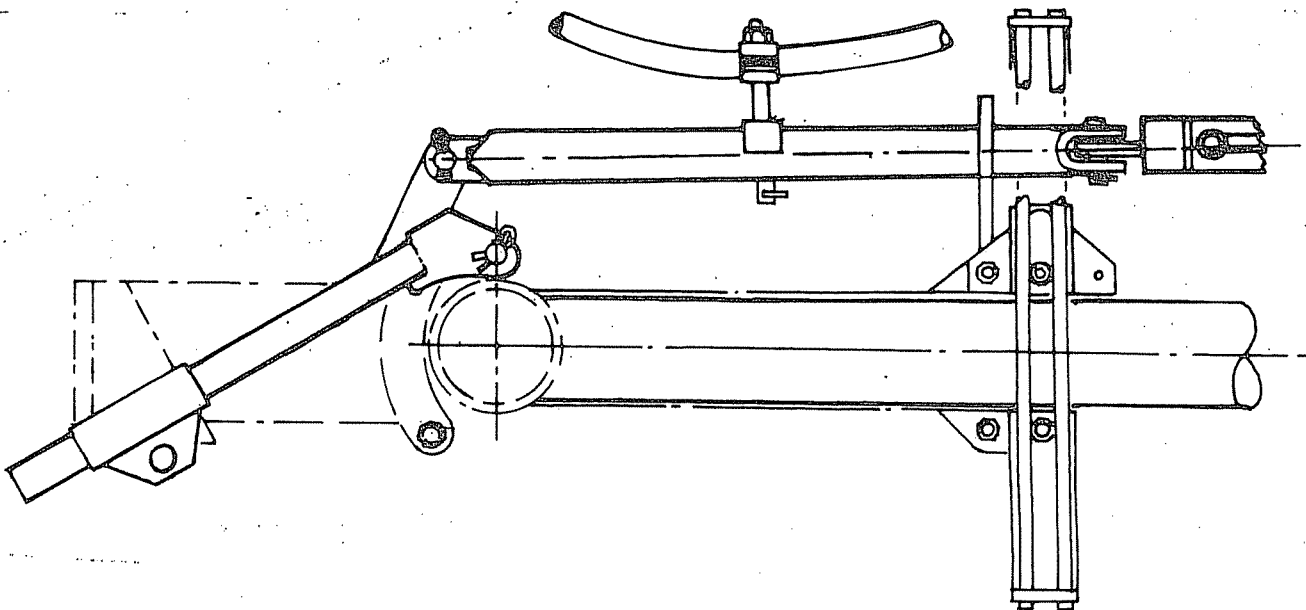
The Reach over extension (ROE) is always operated in the 'close reach' position.

2/ Compensating link gear (Manual)

Raise armhead to shoulder height and allow cutterbar to hang down. Fit links as shown, securing the pins A to E with the shorter end passing through the hole in the lug on the middle tube. Bolt the loose portion of the guide (on the outer end of the link) to the lug on the middle tube.

3/ Parallel motion lever and slider (Hydraulic)

Assemble to the Power Arm main frame with the spindle of the slider inserted through the unused P. A. Ram pivot pin holes and the fork end straddling the rearmost of the upper pair of the lugs on the initial arm. Secure with special pin and spring cotter.



4/ Cantilever Link

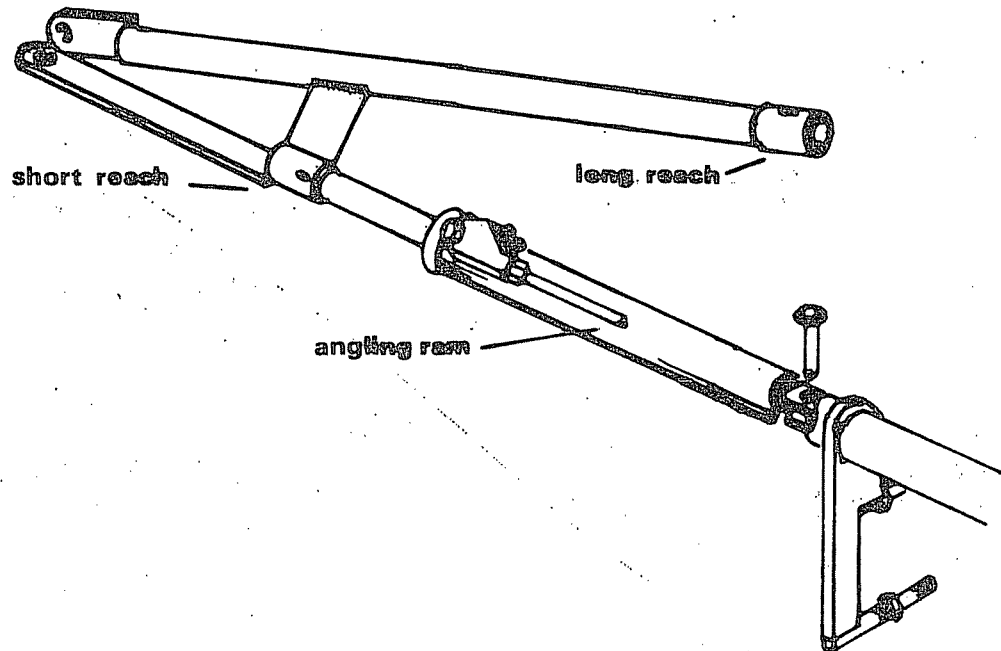
This slides through the hole in the top of the guide plate and is anchored to the top lug of the parallel motion lever with the 5/8" diameter hole mid-way along in the vertical position. The pipe clamp for the Double Acting Ram is attached through this hole.

5/ Angling Ram

The lug on the base end of the ram is pivoted in the outer end of the Cantilever Link. The Manifold Block, to which the Hydraulic Hoses are connected, should face towards the rear of the machine.

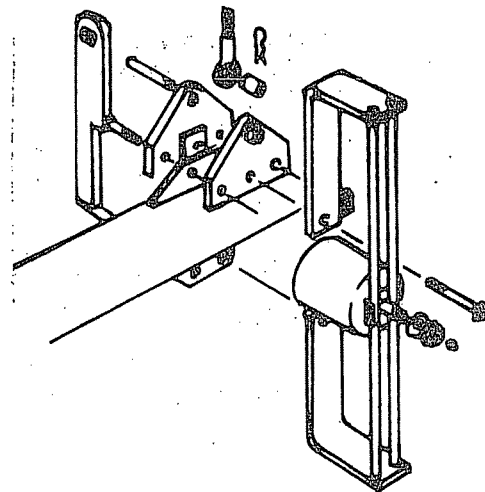
6/ Reach Link

Fit the long (or short) reach socket as required over the end of the angling ram piston rod and secure with the locking pin and spring cotter. Adjust the Ram centres until the outer end of the Reach Link can be fitted over the peg on top of the crosshead and secure with the spring cotter. If the hoses are coupled between the Ram and the control valve it will be necessary to start up the tractor and operate the red lever to adjust the ram centres. If the hoses are not connected the Piston Rod can be withdrawn or closed by hand.



7/ Cable plates and Belt tension frame

These are assembled to the cable lugs on the initial arm. The top stud of the guide plate and the top bolt of the tensioner frame are used to attach the cable plates. The standard shackle is not used as the end of the power arm ram cable is secured with a special pin and bush running through the forged eye of the cable. Use of the bush is important to prevent rapid wear of the pin. The belt tensioner frame must be assembled to the outermost holes of the cable lugs on the initial arm.



8/ Armhead pulley

In order to avoid damage in transit the armhead pulley is supplied unfitted. To instal, clean off protective coating from crankshaft. Fit one or both of the spacing washers as required onto the crankshaft to take up end float when the holes in the pulley boss line up with the hole in the crankshaft.

HEDGER HY-FI

The Hy-fi 2 spindle control unit has been designed for use with all model U Power Arms and is intended for right hand use. It has one double acting spindle for control of the angling ram (red) and a single acting spindle for control of the black lift ram.

A hydraulic tap is provided to control the rate of drop of the black ram although in no way does it control the rate of ascent.

When fully closed the tap locks the armhead for transport purposes.

Maintenance of the Hy-fi is limited to oiling the lever pivots occasionally.

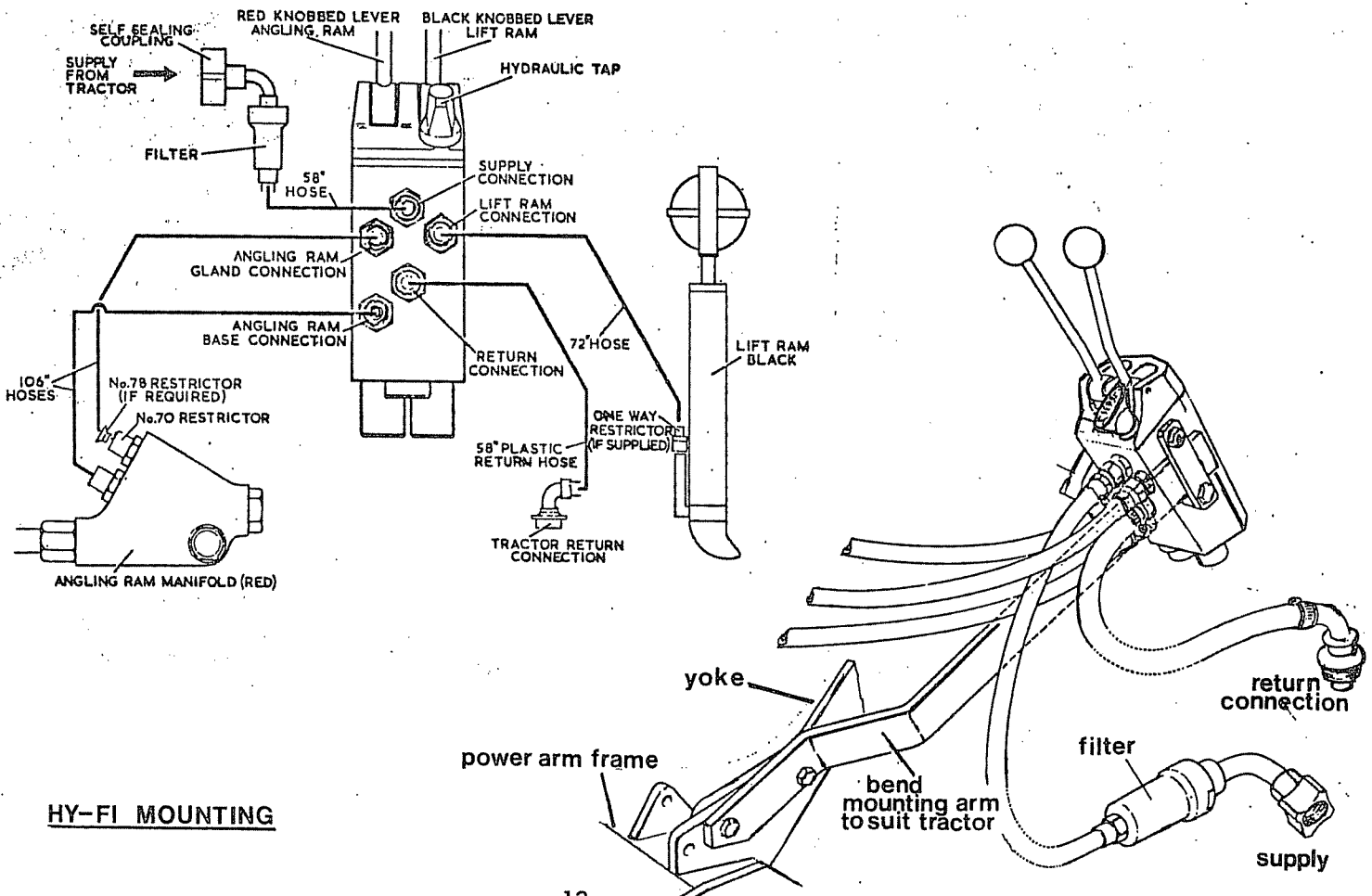
The Hy-Fi should not be dismantled in the event of a malfunction but returned to the factory or your authorised dealer for repair. In the event that the output hose nipple connections are removed from the valve care should be taken to see that the nylon balls behind the connections are not lost.

Hoses should be carefully identified before being disconnected. It should be noted that oil is discharged from both ports on the angling bank when the lever is operated. In the event of a crossed connection the ram will operate the angling mechanism in one direction only.

For the first week the McConnel filter in the supply line should be cleaned daily and thereafter once a week.

NOTE: When installing Armhead 12A customers should return their Hy-Fi unit to the factory for replacement with a 3 spool control valve.

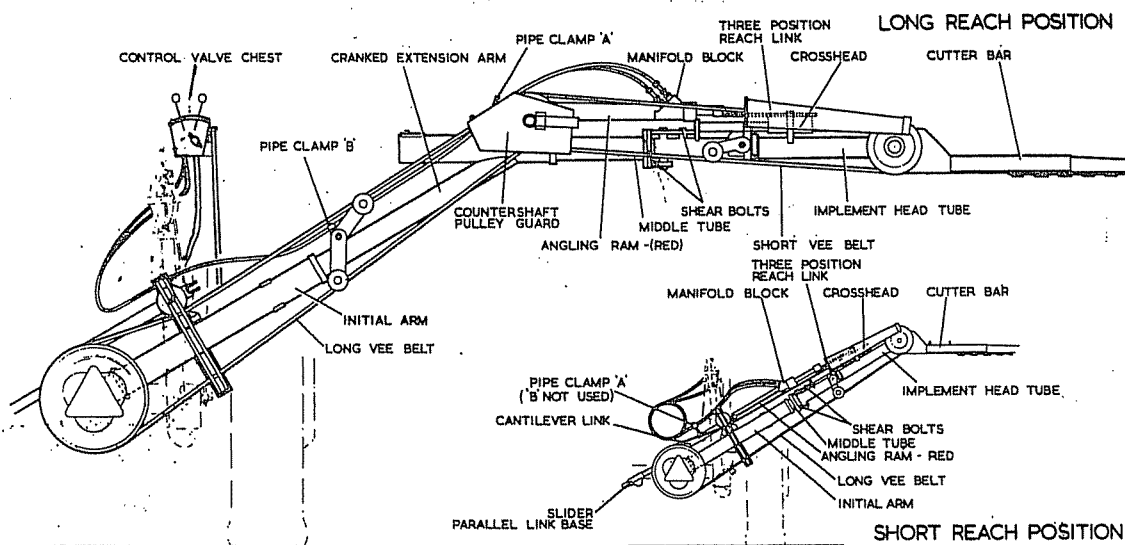
HYDRAULIC LAYOUT



SECTION 6

REACH OVER EXTENSION

- 1/ The extension arm must be fitted in the close reach position. The armhead is secured with a locking pin through the inboard holes in the top tube.



2/ Short Reach Position

This configuration is the same as the standard reach position of the normal armhead 1. The extension arm and short belt are not used, and the long belt is fitted to the crankshaft pulley and the rear groove of the central pulley.

3/ To change from Long to Short Reach

- (a) Lower armhead to ground and disconnect reach link from crosshead. Close anangling ram down and remove pin from base end lug. Remove both pipe clamp spindles from extension arm.
- (b) Slacken both 'V' belts; remove outer pulley guard, release catch and remove countershaft guard.
- (c) Remove short belt and withdraw armhead from top tube of extension arm.
- (d) Remove long belt from countershaft pulley only and withdraw cranked extension from initial arm.
- (e) Fit armhead right home in initial arm, secure with locking pin and spring cotter.
- (f) Fit long vee belt to rear groove of central double-vee pulley and to crankshaft pulley. Tension belt by adjusting jockey roller.
- (g) Fit anangling ram to cantilever link, adjust stroke and fit outer hole of reach link to crosshead.
- (h) Fit pipe clamp A page diagram C. to cantilever link and coil surplus hose lengths over the Power Arm top yoke, securing as required to prevent accidental damage.
- (j) Re-fit outer pulley guard and adjust to clear belt by about 1/8". Adjust belt guide to just touch the inside belt surface.

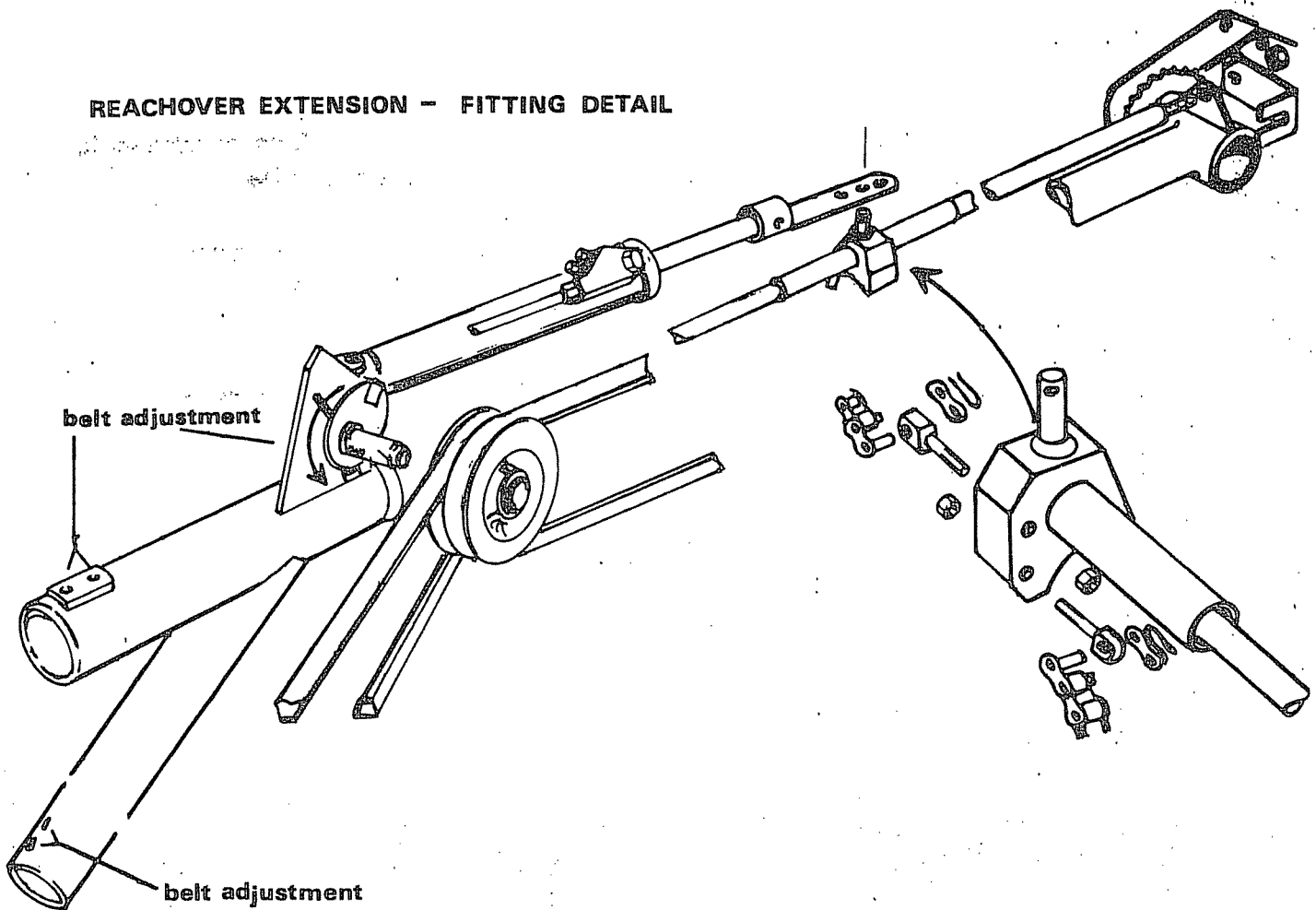
4/ Angling Ram

With this armhead, the ram base end pivots between the lugs welded to the bracket on the top tube. The reach link fits over the rod end and has three positions. Adjust ram centres so that centre hole can be fitted over the peg on the crosshead. The other two holes are provided to give extra anangling movement if required.

5/ Countershaft

This carries the small double 'V' pulley which is held in place by the countershaft guard. The guard is removed by pulling the spring latch clear of the groove in the spindle.

REACHOVER EXTENSION - FITTING DETAIL



6/ V belts

The long belt fits over the inner groove and the small belt over the outer groove.

7/ Belt Adjustment

Outer pulley guard and belt guides should be clear of belts before adjusting tension. The short belt should be adjusted first, with the long belt slack.

Short Belt

- (a) With the countershaft guard in place release spindle locknut.
- (b) Rotate snail cam in the direction indicated in diagram, sufficient to eliminate slippage and excessive belt flapping. Retighten locknut.
- (c) If belt stretch has allowed the snail cam to reach the end of its travel, slacken off completely and reposition the armhead in the outer holes of the extension tube.

Long Belt

- (a) Adjust the jockey roller to bear against the top of the belt.
- (b) When no more effective adjustment can be made with the jockey roller, slacken off completely and withdraw the extension arm from the initial arm about 2" and refit the locking pin in the outer holes.

8/ Belt Guides

These should be adjusted to just touch the inner face of the belt. They should not be used to create additional belt tension.

SECTION 7

GENERAL MAINTENANCE

1. Safety Breakaway

This is fitted between the implement head tube and the initial arm and incorporates a folding pivot for overload when topping, and a twisting pivot for overload when siding. Alignment of the cutter bar is maintained in each case by a single 3/8" mild steel shear bolt. Never use high tensile bolts.

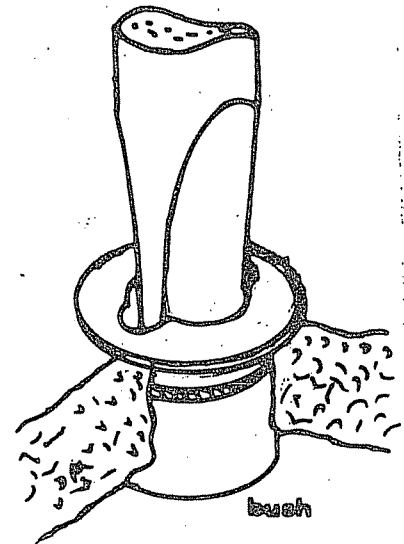
2. Replacing Shear Bolts

Do not use excessive force to remove broken pieces or to drive in new bolts, as the hardened bushes may easily be cracked or chipped. Make sure that the two holes are in proper alignment before inserting the new bolt. Replace damaged bushes at once, as the breakaway load is increased by a poor shearing action.

If no previous experience has been had with a Power Arm Hedge-trimmer, check the action of this breakaway by withdrawing each shear bolt in turn to find out how much travel it allows. In use, the frequency with which shear bolts are broken tends to decrease as users become more expert. Excessive breakage can be caused by driving too fast or using a blunt knife.

3. Replacing Shearbolt Bushes

Tap out the damaged bush using a screwdriver or similar tool through the slot of the retaining washer, taking care not to disturb the washer. Press the new bush into the hole until its face is exactly flush with the surface of the plate. Test the breakaway for freedom of movement before fitting a new shear bolt.



4. Vibration

Wherever possible 'Aerotight' nuts are used to resist vibration but all bolts and nuts should be regularly checked and tightened as some bedding down is bound to occur. Pay particular attention to the con-rod adjuster locknut and the finger bolts and nuts.

5. Lubrication

In addition to the normal grease points the following should also be kept greased.

- (a) The parallel motion slider
- (b) The cantilever link where it passes through the guide plate
- (c) The angling chain
- (d) The cutter bar wearing surfaces, knife clips, and knife heel slides should be oiled every two hours.
- (e) No grease nipple is fitted to the heavy duty crankshaft which is lubricated from the grease nipple in the armhead. Grease should be pumped in at this point until it is seen to be exuding from the crankshaft bushes.

6. Wearing Parts

The following are wearing parts which must be examined and renewed from time to time.

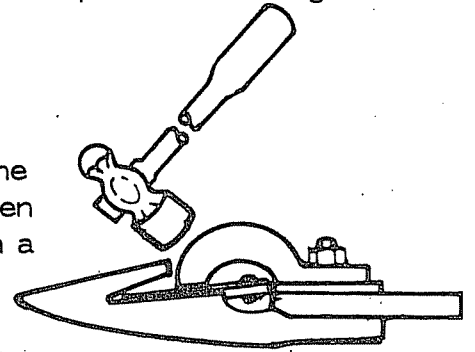
(a) Top, back and bottom wearing plates

These are the guides for the knife heel and if allowed to wear excessively will cause 'hammering' and con-rod breakages. Adjustment of the top slide is obtained by use of the two $\frac{1}{2}$ " diameter nuts immediately above the knife heel and the top and bottom wearing plates. This should be checked daily because excessive tightness will cause inefficiency and possible damage to the slide or connecting rod.

(b) Cutter bar

(i) Knife guide wearing plate

The knife clips should press lightly against the knife so as to give a good scissor action between the knife and fingers; knock the clips down with a hammer to take up wear.



(ii) Knife

The knife should be kept sharp, the fingers in line and the cutting edge of the fingers squared up by filing the sides if they get rounded.

(iii) Adjustment of stroke

The full stroke of the knife is $3\frac{1}{2}$ ". This is $\frac{1}{2}$ " longer than the distance between the centres of the fingers and each section should therefore travel from $\frac{1}{4}$ " beyond the centre of one finger to $\frac{1}{4}$ " the far side of the of the centre of the next one. Adjustment is made by lengthening or shortening the connecting rod. Remember to tighten the adjuster locknut after adjusting the con-rod length.

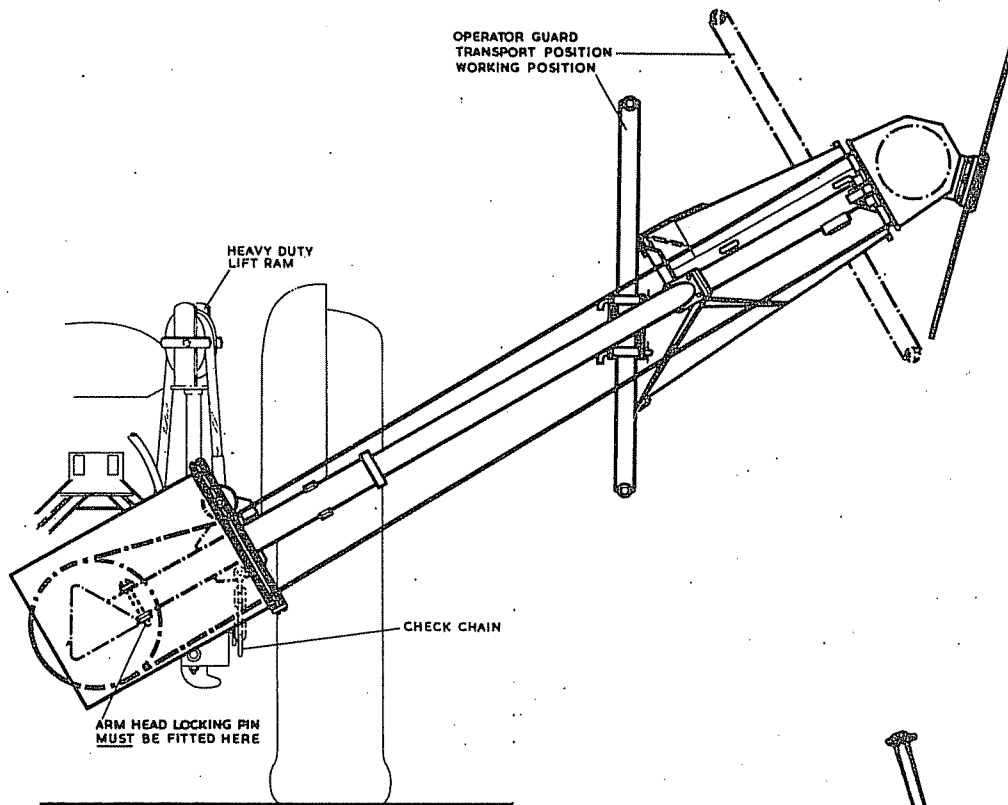
- (c) Knife heel bush and crankshaft bushes should be regularly checked for wear and renewed as required.

SECTION 8

NO. 1 S SHAPESAW

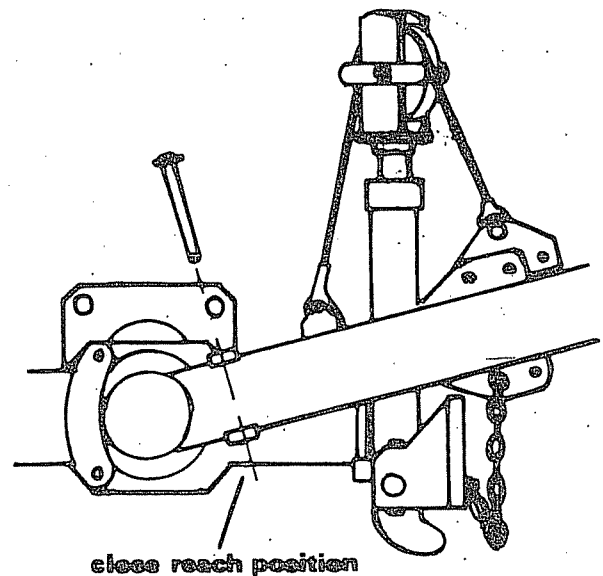
No apology is made for again drawing your attention to the safety precautions printed in the front of this book.

It is strongly recommended that the shapersaw is used with a tractor fitted with a cab. Wheel weights or ballast should be used on the left hand side of the tractor for added stability. Note that the armhead cannot be converted to left hand working.



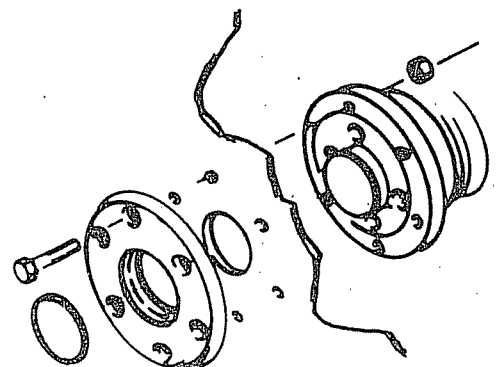
1. Fitting Saw Arm

- a) A heavy duty shackle must be used in the right hand main frame lug.
- b) The saw arm must be fully engaged in the close reach position of the initial arm and secured with locking pin. A check chain should be assembled as shown to stop the sawhead going over the top when being driven in the raised position over rough ground.
- c) A bracing strut on the front side of the saw arm incorporates a tensioner device. The bolt should be kept tight.



2. Fitting the Blade

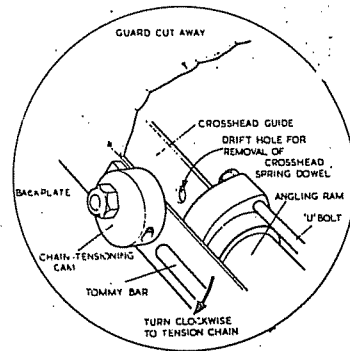
- a) Turn the gearbox so that the blade can be fitted at a convenient angle. The gearbox is despatched from the works with the blade securing bolts, retaining plate and locking ring assembled on the saw flange.
- b) Fit the blade so that the cutting edge cuts upwards and secure with the special bolts and nuts and locking ring.



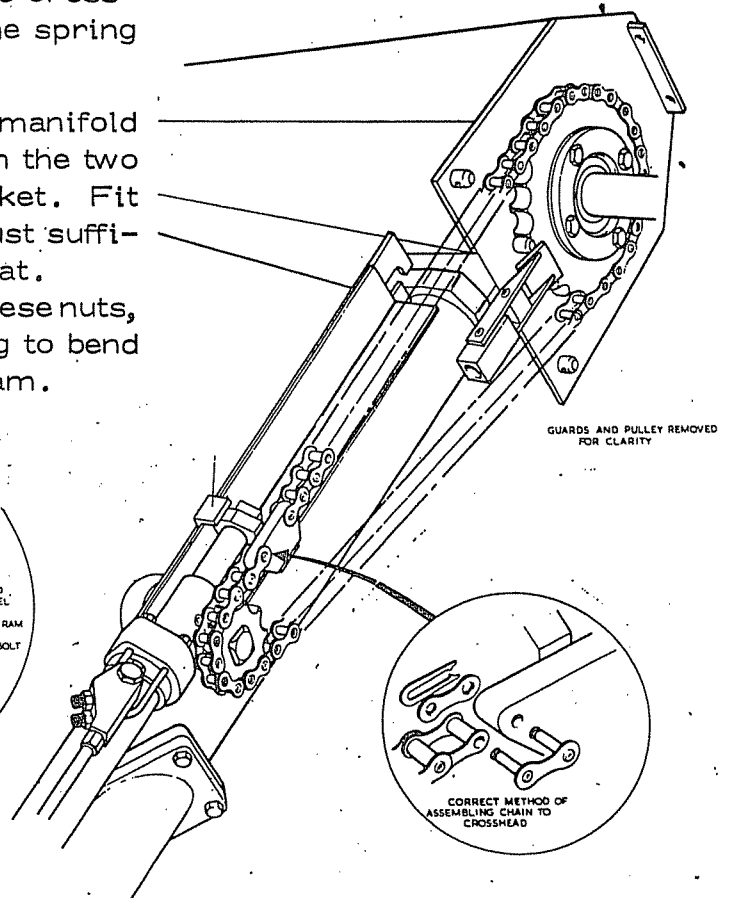
3. Fitting and Timing Hydraulic Angling Assy.

a) Fitting ram to crosshead

- (i) Place the gland end of the ram in the socket at the end of the crosshead guide, turn the ram so that the hole in the piston and the hole in the crosshead line up and drive in the spring dowel.
- (ii) Fit the 'U' bolt round the manifold block on the ram and through the two holes drilled in the ram socket. Fit and tighten 'U' bolt nuts just sufficiently to take up all end float. Note:- Do not overtighten these nuts, or the 'U' bolt will be tending to bend the manifold block off the ram.



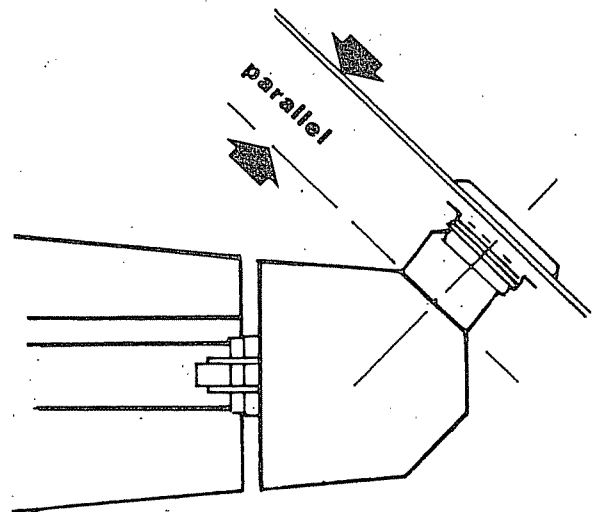
Blade positioned parallel to this face and locked in position as shown before fitting chain



b) Timing & Tensioning Chain

The initial setting of the saw flange is important because it sets the timing of the blade angle in relation to the ram stroke.

- (i) Free sprocket and rotate saw flange to the position shown in diagram and re-lock sprocket.
- (ii) Close the ram right down and lift the angling ram assembly into place on the main arm looping the chain over the sprocket and fit the two studs on the back of the crosshead guide into the slots in the belt guard.



- (iii) Place the chain tensioner eccentric on the longer of the two studs and a plain washer on the shorter stud. Fit both locking nuts.
- (iv) Check sprocket chain engagement on sprocket and idler sprocket teeth. Then tension the chain by placing the tommy-bar in the eccentric and turning clockwise. Tighten both locking nuts. Note:- Both locking nuts must be slackened before the eccentric will operate. Chain must be kept tight for efficient hydraulic angling.
- (v) Unlock the sprocket which must then remain unlocked for hydraulic use. It must be locked for transport.

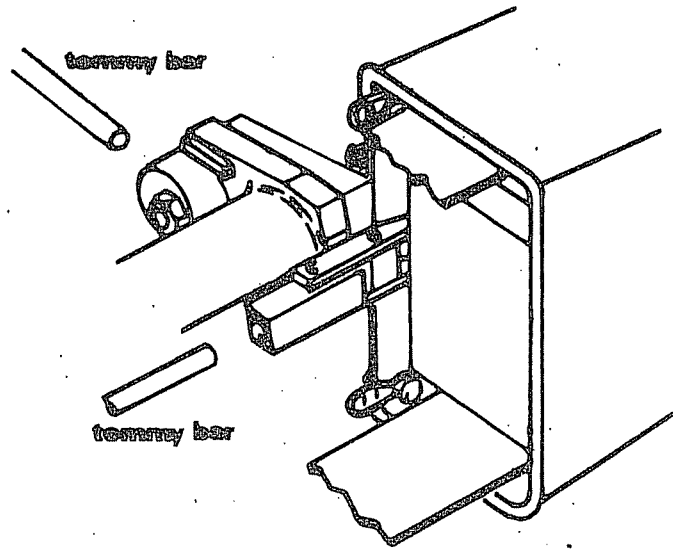
4. Operational Adjustments

Blade Angle

- a) The blade angle is altered by freeing a sprocket at the back end of the sawhead and timing the blade to the required angle by hand. Return the plunger cam to the locked position and move gearbox slightly until it clicks and locks into position.

b) Pitch Angle

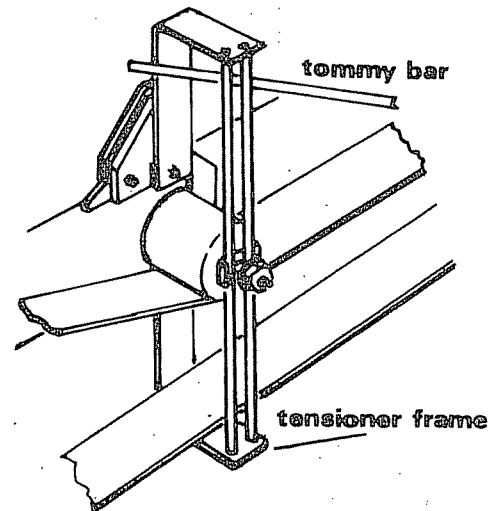
When the blade is fitted, it must be given a slight forward pitch angle, i.e. it must be tilted so that it dips forward into the hedge as it cuts and the trailing edge of the blade does not mutilate the stumps already cut. Apply forward pitch by slackening the lock nut, placing the tommy-bar in the socket of the eccentric and turning clockwise.



5. Belt Adjustment

- a) Raise armhead clear of ground and check that operator guard is in working position and that no danger exists.
- b) Engage the tractor P.T.O. clutch and spin up the blade. It will soon be obvious if the driving belt is not running true and is tending to run off the pulleys.
- c) Adjust the running of the belt by the tractor levelling box lever, and by manipulating the jockey tensioner roller with the tommy-bar inserted in the tensioner frame. Twisting the frame slightly will cause the jockey pulley to steer the belt onto the crown of the armhead pulley.
- d) Experience will show when belt is running correctly and is properly tensioned.

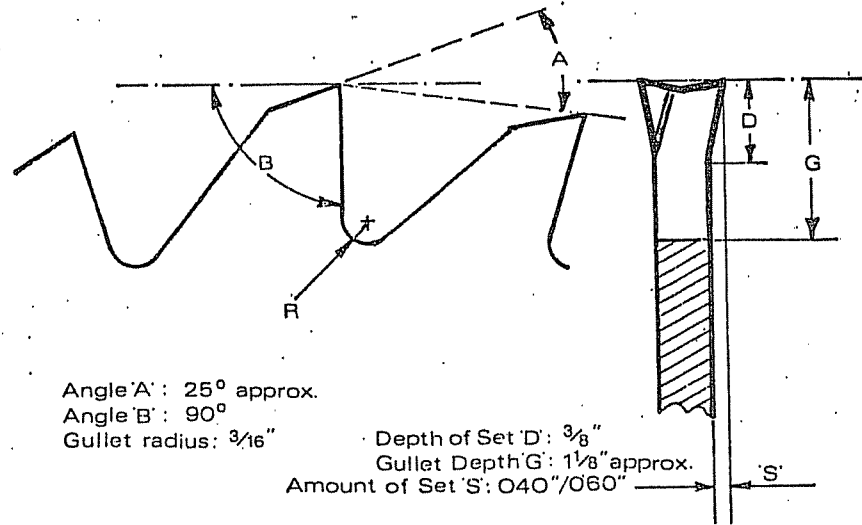
NOTE: It is important that the belt is properly lined up. Chafing against the power arm sides or the pulley guards will quickly reduce the belt's working life.



- e) While the blade is spinning, check that it is running true, with no wobbling.
- f) When the jockey tensioner pulley has been adjusted as far as possible, slacken right off and reposition the saw arm in the initial arm so that the locking pin can be relocated in the outer hole of the saw arm.

SAWBLADE MAINTENANCE

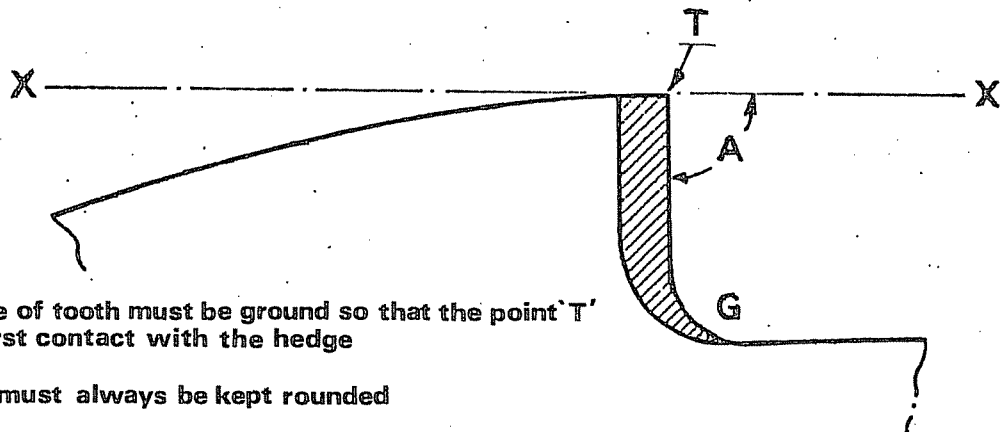
To obtain the best results from your saw, use the correct blade and keep it sharp. A blunt blade can absorb a lot of power, become overheated and crack. Using a cracked blade is highly dangerous. Become familiar with the ringing tone the blade makes when struck by a lump of wood. If the blade cracks, the tone will alter, in extreme cases to a dull thud. After striking any stone or metal object, this test should be carried out.



Sawtoothed Blade

The sawtooth blade is a very heavy gauge to prevent cracking therefore all work which involves setting or gulleting should be entrusted to a skilled saw doctor or to the manufacturers. Touching up the blade tips with a file or stone however should be done frequently, at least twice a day during normal working and after striking any suspect object.

Although the sawtooth blade is capable of cutting down very heavy growth, we strongly recommend that material larger than 6" diameter is removed with a chain saw.



Back edge of tooth must be ground so that the point 'T' makes first contact with the hedge

Gullet 'G' must always be kept rounded

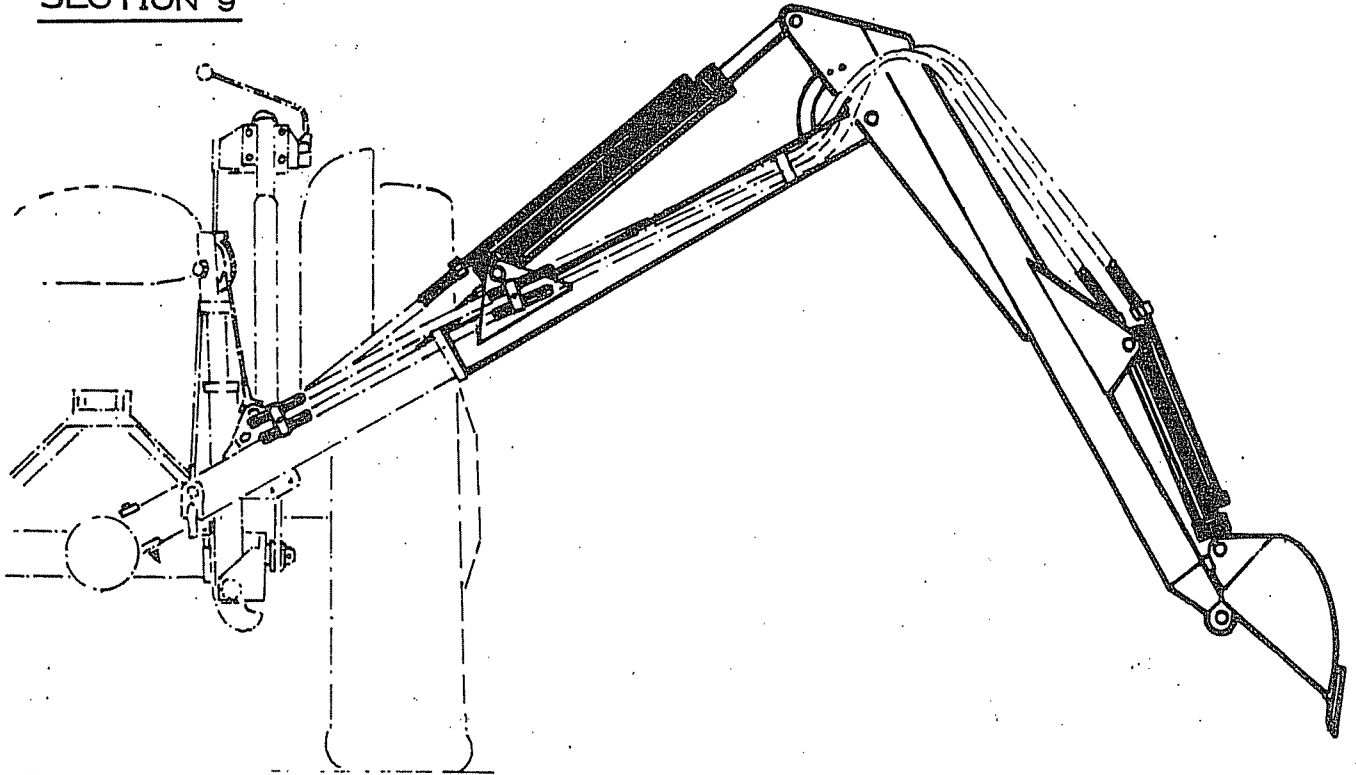
Angle 'A' must be 90°

Shading denotes ground area

Slasher 8

Used on light growth up to 3" diameter and in certain circumstances gives a cleaner cut than a saw toothed blade. The cutting edge can be touched up with a file or stone, but care must be taken not to leave a sharp corner in the gullet where a crack may start due to stress concentrations. If the point T is allowed to become rounded off, the blade will 'hammer' at the hedge, become overheated and possibly crack, and leave a very poor hedge finish. It should be noted that a slasher blade has no 'set' on the tooth.

SECTION 9



12A DITCH CLEANING ATTACHMENT

Slots into the initial arm and should be secured in the short reach position only. PTO shaft and 14" diameter pulley are not required. Requires a 3 spindle hydraulic control unit in place of the hedger Hy-Fi normally supplied with other armheads.

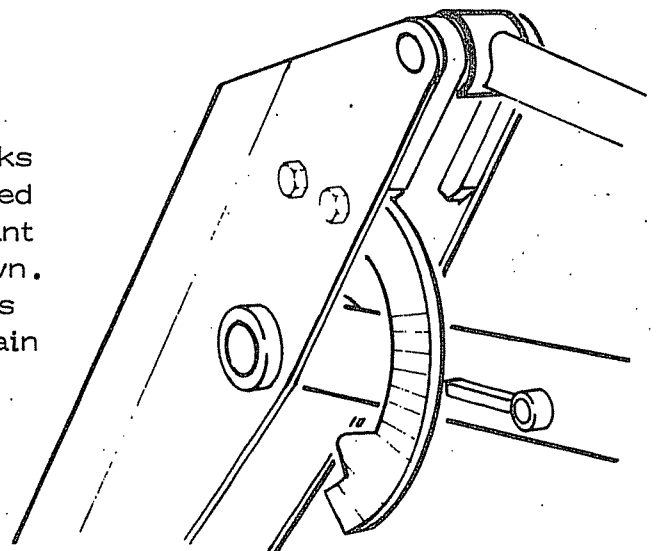
1. Extension Plates

On some tractors there may be a risk of striking the rear tyres with the bucket teeth when in the fully retracted position.

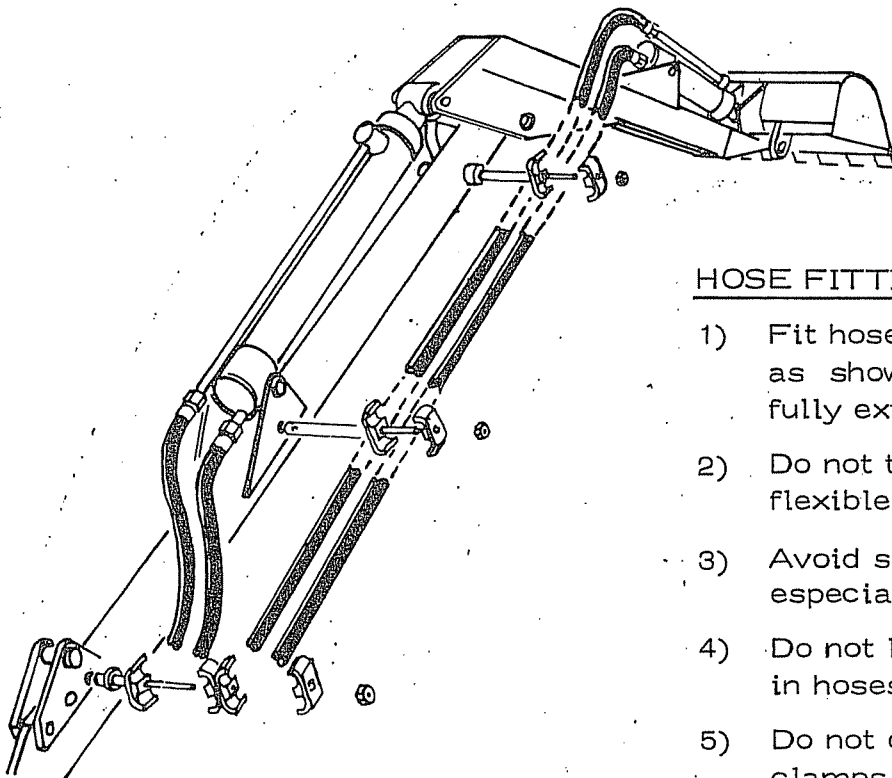
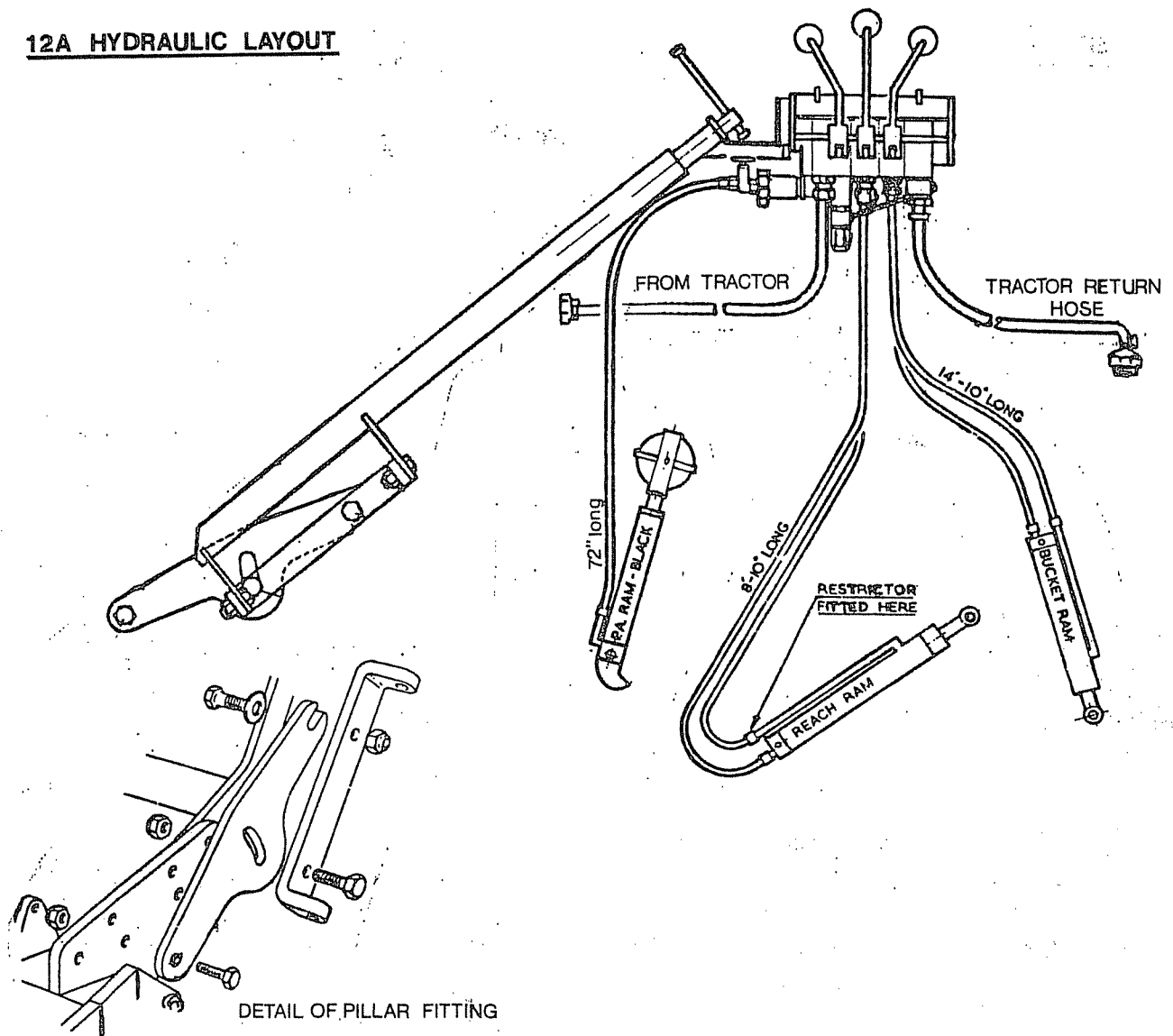
Check the PAU tractor fittings chart and if required, fit linkage extension plates to the PAU main frame. It is of course prudent to physically check every tractor/12A installation as wheel spacings, tyre sizes etc will all affect clearance figures.

2. Reach Indicator

To avoid irregular or stepped ditch banks the stroke of the reach ram can be gauged by the operator. The indicator quadrant should be bolted to the drop arm as shown. The cutting action of the bucket teeth is obtained by raising and dropping the main arm with the black ram.



12A HYDRAULIC LAYOUT

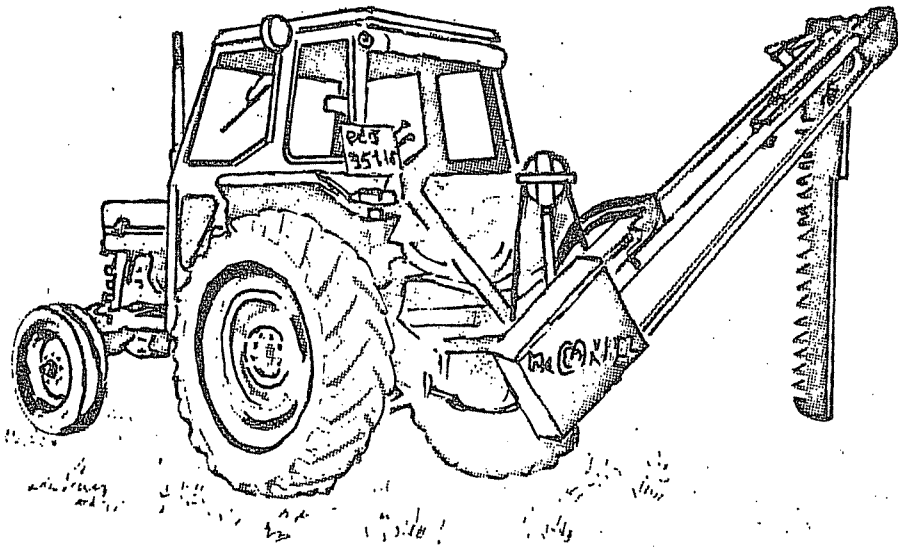


HOSE FITTINGS

- 1) Fit hose clamps from rear as shown, with Drop Arm fully extended.
- 2) Do not twist or cross the flexible hoses.
- 3) Avoid sharp bends or strains especially near hose ends.
- 4) Do not leave excessive slack in hoses.
- 5) Do not over tighten the hose clamps.

**SPARE PARTS MANUAL
FOR**

**POWER ARM
UNIVERSAL**



FOR BEST PERFORMANCE....

USE ONLY McCONNEL SPARE PARTS

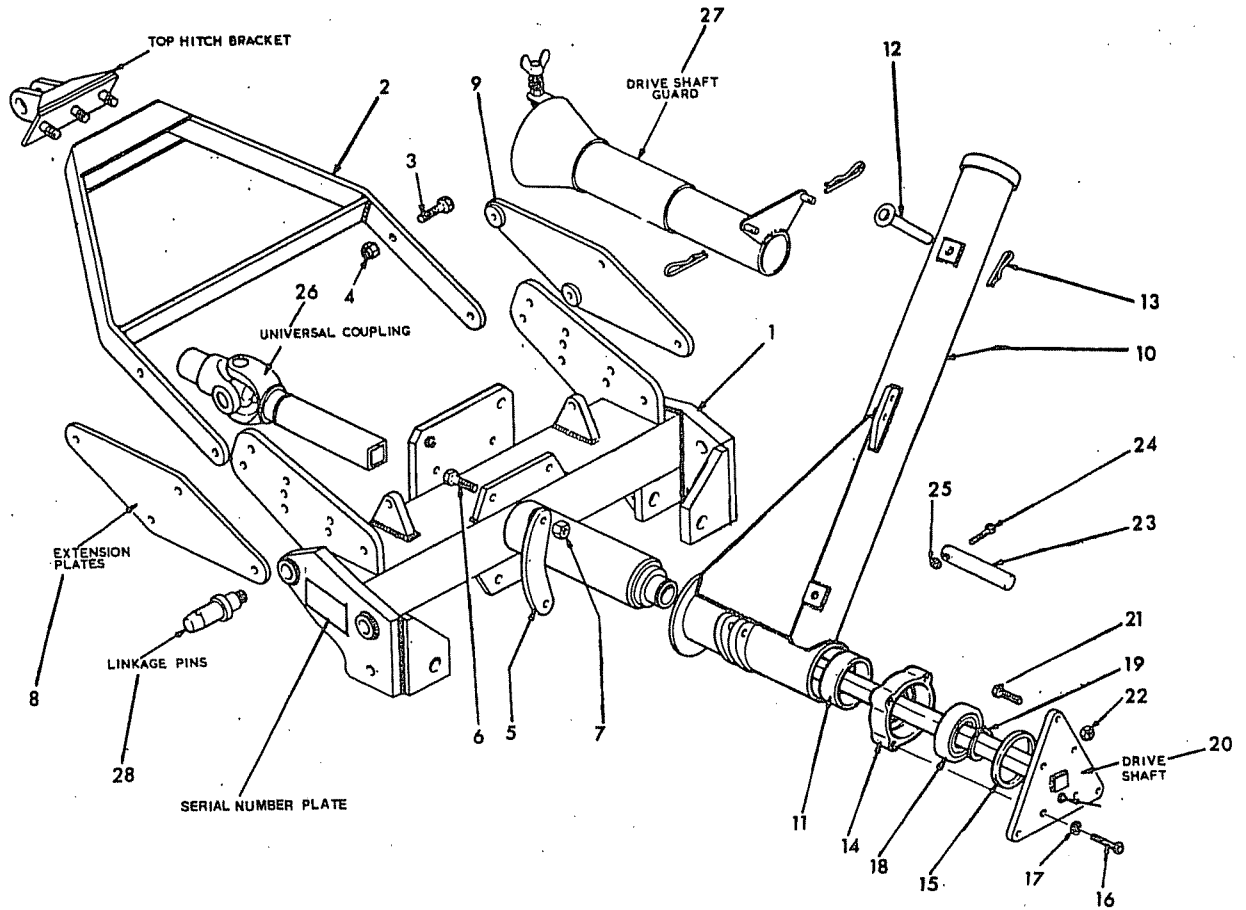
To be assured of the latest design improvements purchase your genuine replacements from the original equipment manufacturer F.W. McConnell Ltd. through your local dealer or stockist.

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

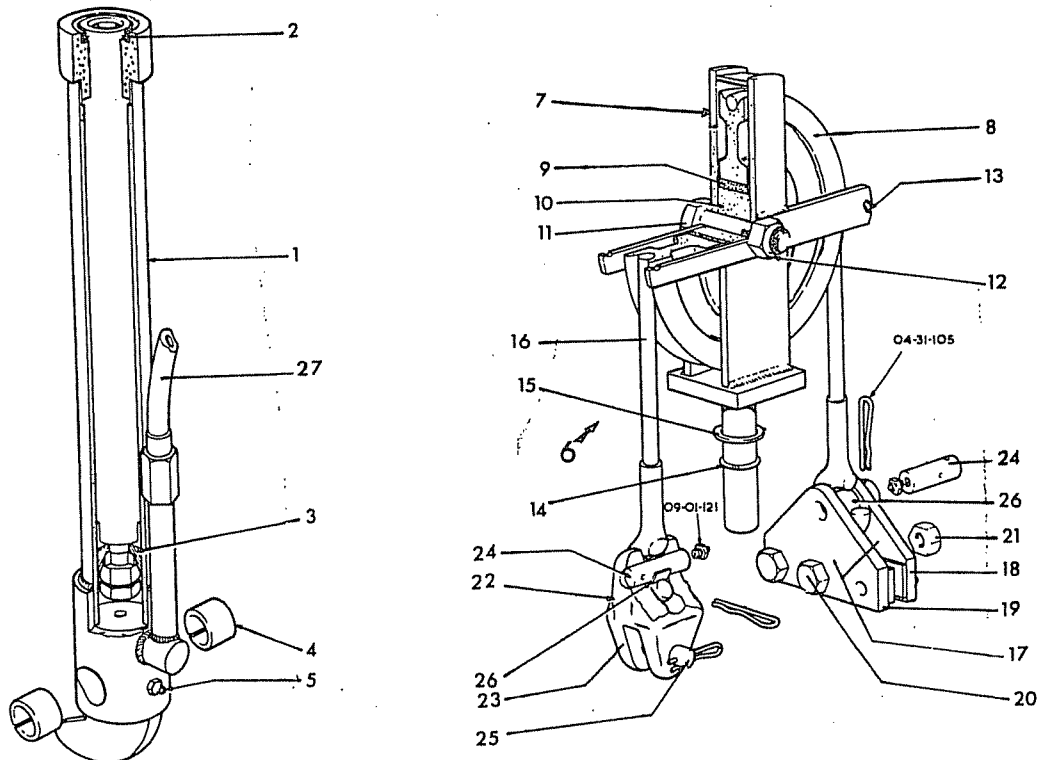
Design improvement may have altered some of the parts listed in this manual - The latest part will always be supplied when it is interchangeable with an earlier one.

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.



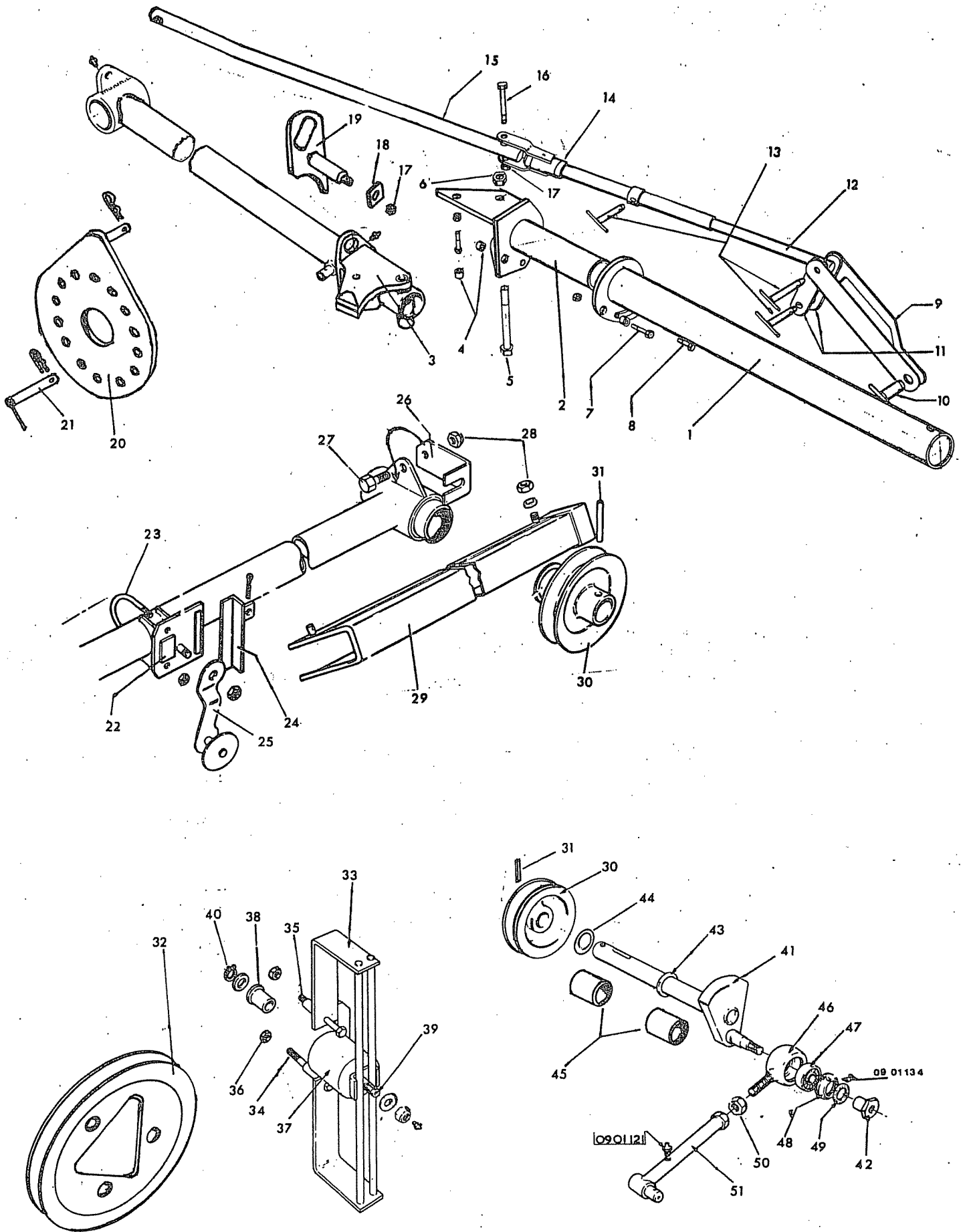
MAIN FRAME ASSEMBLY



RAM and PULLEY ASSEMBLY

Ref. No.	Part No.	Qty	Description
			PAU MAIN FRAME ASSEMBLY
1	68 01 251	1	.Main frame, bare
2	68 01 252	1	.Top yoke c/w bolts and nuts
3	02 11 146	4	.5/8" x 1 1/4" UNF bolt
4	01 41 006	4	.5/8" UNF nut
5	60 00 022	1	.Initial arm retaining plate
6	02 11 125	2	.1/2" x 1 1/2" UNF bolt
7	01 41 005	2	.1/2" UNF Aeronut
8	68 01 270	1	Yoke extension plate L.Hand
9	68 01 269	1	Yoke extension plate R.Hand
	60 00 269	1	Initial Arm Assembly
10	60 00 252	1	.Initial arm c/w bushes
11	60 00 161	2	..Initial arm bush
12	60 00 039	1	.Tube locking pin c/w spring cotter
13	04 31 105	1	..Spring cotter
14	68 02 080	1	.Bearing housing assembly
15	68 02 081	1	..Distance piece
16	03 11 083	4	..3/8" x 1" UNF setscrew
17	01 00 203	4	..3/8" Spring washer
18	06 07 228	1	.Ball bearing
19	04 01 128	1	.Circlip
	60 00 253		Driveshaft short 21 7/8"
20	60 00 285	1	Driveshaft medium 26 7/8"
	60 00 286		Driveshaft long 28 7/8"
21	02 11 123	3	3/8" x 1 1/2" UNF bolt
22	01 41 003	3	3/8" UNF Aeronut
23	68 01 063	1	Ram base pin
24	02 11 181	1	1/4" x 2 1/4" UNF bolt
25	01 41 001	1	1/4" UNF Aeronut
	60 00 086		Universal coupling short 11"
26	60 00 027	1	Universal coupling long 13 3/4"
	68 01 289		Driveshaft guard short
27	68 01 290		Driveshaft guard medium
	68 01 291		Driveshaft guard long
28	68 03 011		Category I linkage pin
	68 03 012		Category II linkage pin
	68 03 630	1	RAM & PULLEY ASSEMBLY complete
1	68 03 257	1	.Ram only
2	86 40 224	1	..Wiper seal
3	86 30 901	1	..Pressure cup c/w washer
4	68 03 010	2	..Steel bush
5	09 01 121	1	..Grease nipple
6	68 03 262	1	.Ram top assembly
7	68 03 008	1	..Pulley bracket
8	60 00 162	1	..Pulley
9	60 00 160	1	..Pulley bearing
10	60 00 163	1	..Bearing shaft
11	02 11 246	1	..Bolt 5/8" x 3" UNF
12	01 51 006	1	..5/8" UNF Aeronut
13	60 00 146	2	..Wire retaining pin
14	68 03 009	1	..Spring steel ring
15	01 00 109	1	..Washer 1" diam.
16	60 00 098	1	.Wire rope
17	60 00 141	1	.Set of cable plates
18	60 00 090	1	..Cable lug front
19	60 00 091	1	..Cable lug rear
20	02 11 205	2	..Bolt 1/2" x 2 1/2" UNF
21	01 61 005	2	..Nylok nut 1/2" UNF
22	60 00 165	1	.Special shackle complete
23	60 00 093	1	..Shackle bare
24	60 00 094	2	..Pin c/w greaser and cotter
25	60 00 089	1	..Shackle pin and cotter
26	60 00 092	2	..Cable bush
27	85 11 043	1	Hydraulic hose 58"

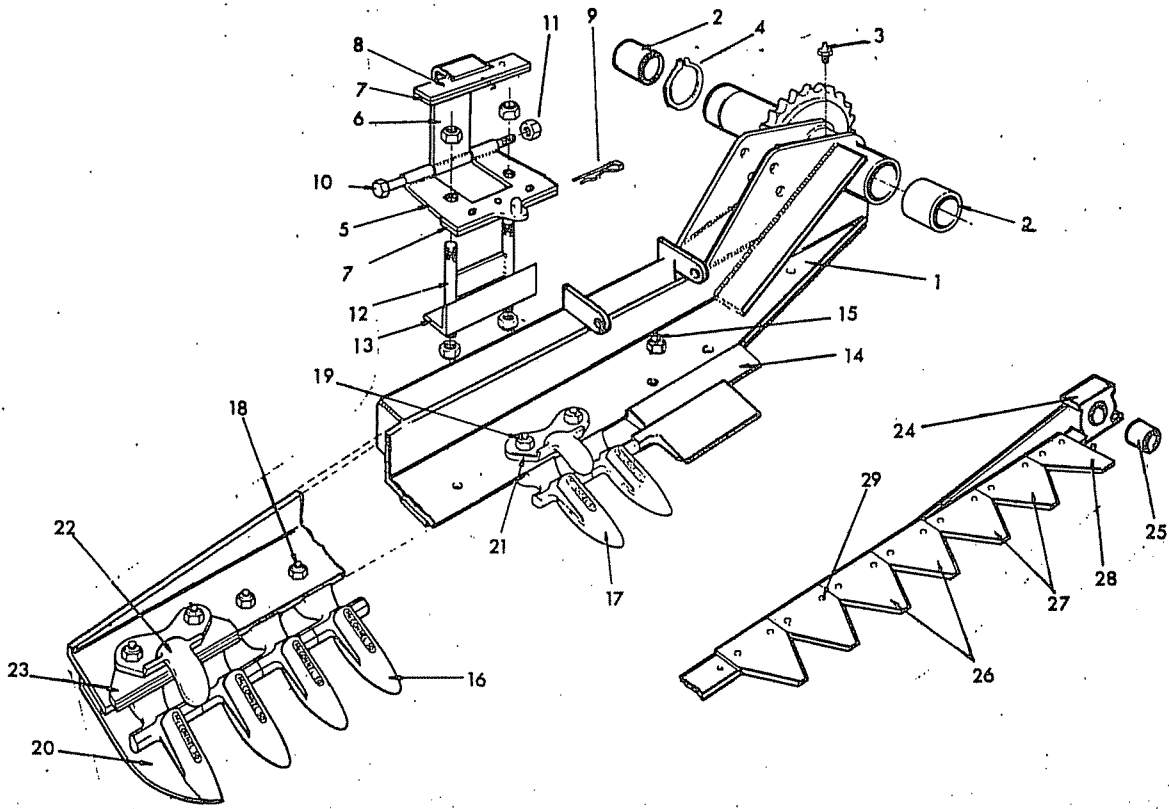
ARMHEAD 1 MANUAL ANGLING



ARMHEAD I MANUAL ANGLING

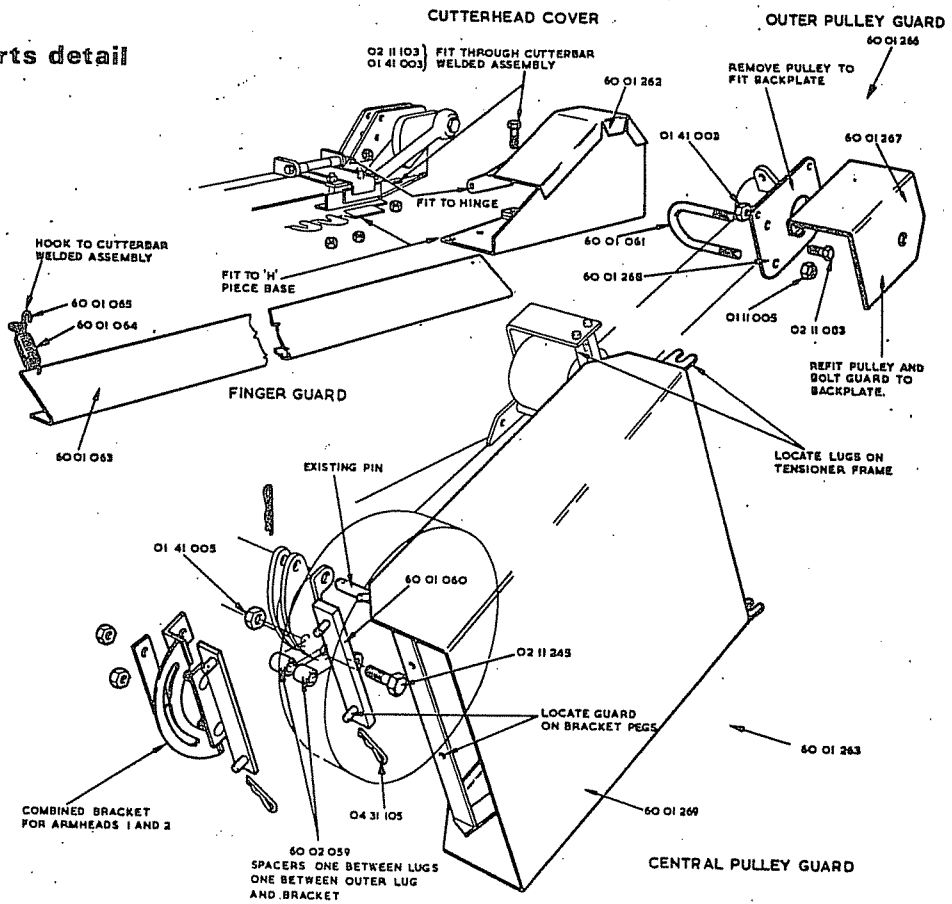
Ref.	Part No.	Qty.	Description
	60 01 275	1	ARMHEAD Assembly Vee Belt drive
1	60 00 263	1	.Inner Section c/w bush
2	60 00 262	1	.Centre section c/w bushes
3	60 01 352	1	.Implement head tube c/w greaser
4	60 00 079	4	.Hardened steel bush
5	60 01 059	1	.Pivot bolt & nut
6	01 51 006	1	..5/8" UNF Thin aeronut
7	60 00 099	2	.3/8" Shear bolt & nut
8	02 11 095	1	.1/2" x 1 1/8" UNF bolt
9	60 01 034	1	.Strut
10	60 01 035	1	.Connecting pin c/w spring cotter
11	60 01 033	2	.Link strips
12	60 01 093	1	.Inner bar
13	60 01 020	3	.Connecting pin c/w spring cotter
14	60 01 094	1	.Outer tube - swivel yoke
15	60 01 095	1	.Tube outer end
16	02 11 245	1	.1/2" x 3" UNF Bolt
17	01 61 005	1	.1/2" UNF Nyloc nut
18	60 01 098	1	.Collar
19	60 01 096	1	.Guide plate
20	60 01 004	1	.Quadrant plate
21	60 01 007	1	.Angle adjusting pin
22	60 01 180	1	.Mounting bracket
23	60 01 182	1	. 'U' Bolt c/w nuts
24	60 01 181	1	.Guard adjusting stay
25	60 01 183	1	.Belt Guide Strut
26	60 01 179	1	.Guard attachment bracket
27	03 11 106	1	.5/8" x 1 1/4" UNF Bolt
28	01 51 006	1	.5/8" UNF Aeronut
29	60 01 379	1	.Outer pulley guard
30	60 01 170	1	.Vee pulley 7 1/2" single c/w dowel
31	04 22 740	1	..Spring dowel
32	60 01 278	1	.Vee pulley 14 3/4" diam.
	09 13 173	1	.Vee belt short
	09 13 220	1	.Vee belt long
	60 01 332	1	.Belt tensioner assembly
33	60 01 056	1	..Tensioner frame c/w bolts & nuts
34	02 11 245	1	...1/2" x 3" UNF bolt
35	02 11 305	1	...1/2" x 3 3/4" UNF bolt
36	01 61 005	2	...1/2" UNF Nyloc nut
37	60 02 085	1	..Jockey roller c/w bushes
38	60 02 150	2	...Bush
39	60 01 057	1	..Spindle c/w nut, washers, circlips & greaser
40	04 01 112	1	...Circlip
41	60 01 157	1	Crankshaft c/w nut, spacer & thrust washers
42	60 01 076	1	.Con rod retaining nut & spacer
43	60 01 136	1	.Brass washer
44	60 01 161	1	.Shim washer
45	60 01 003	2	Crankshaft bush
	60 01 027	1	Connecting rod assembly
46	60 01 028	1	.Big end c/w bearing and cover screw
47	06 00 001	1	..Ball bearing
48	60 01 074	1	..Cover screw
49	60 01 075	2	..Oil seal: felt
50	01 11 007	1	.Locknut
51	60 01 029	1	.Crook end
	60 01 286		Conversion kit Flat belt to Vee belt drive

CUTTER BAR GROUP



ARMHEAD 1 GUARDS

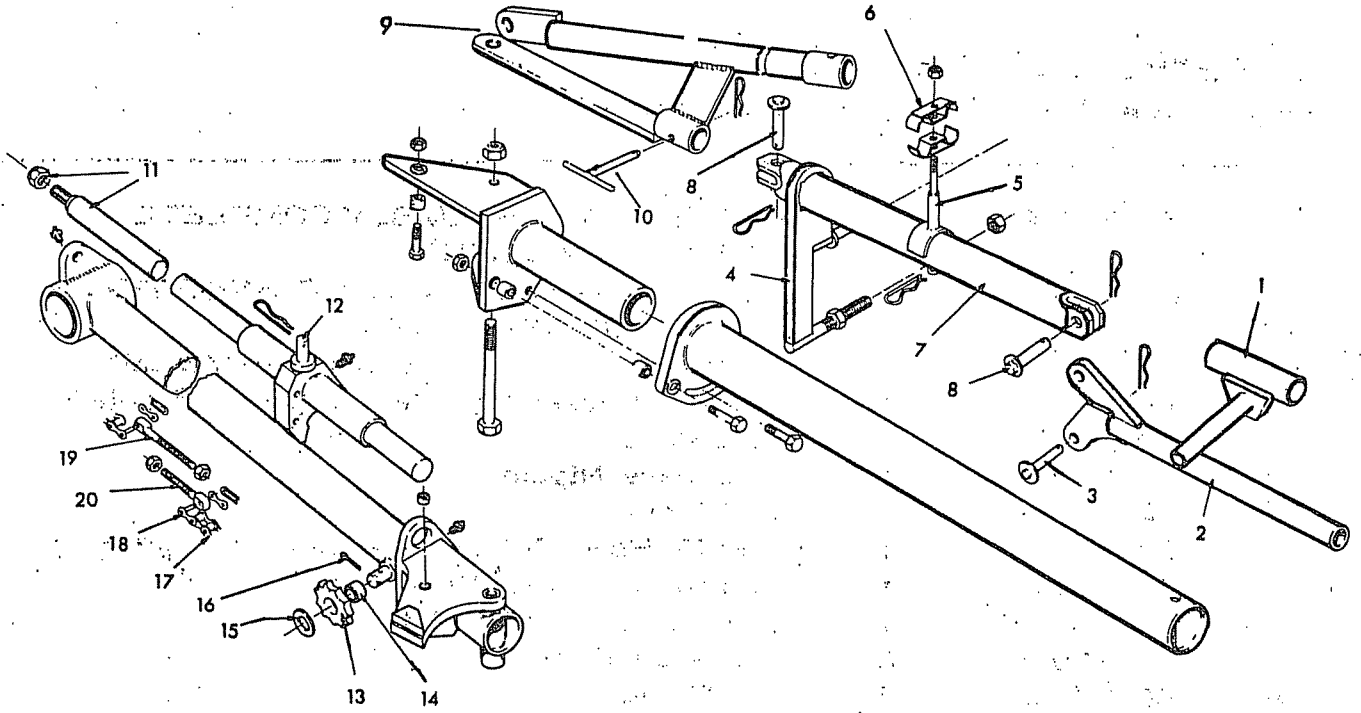
Fitting and Spare parts detail



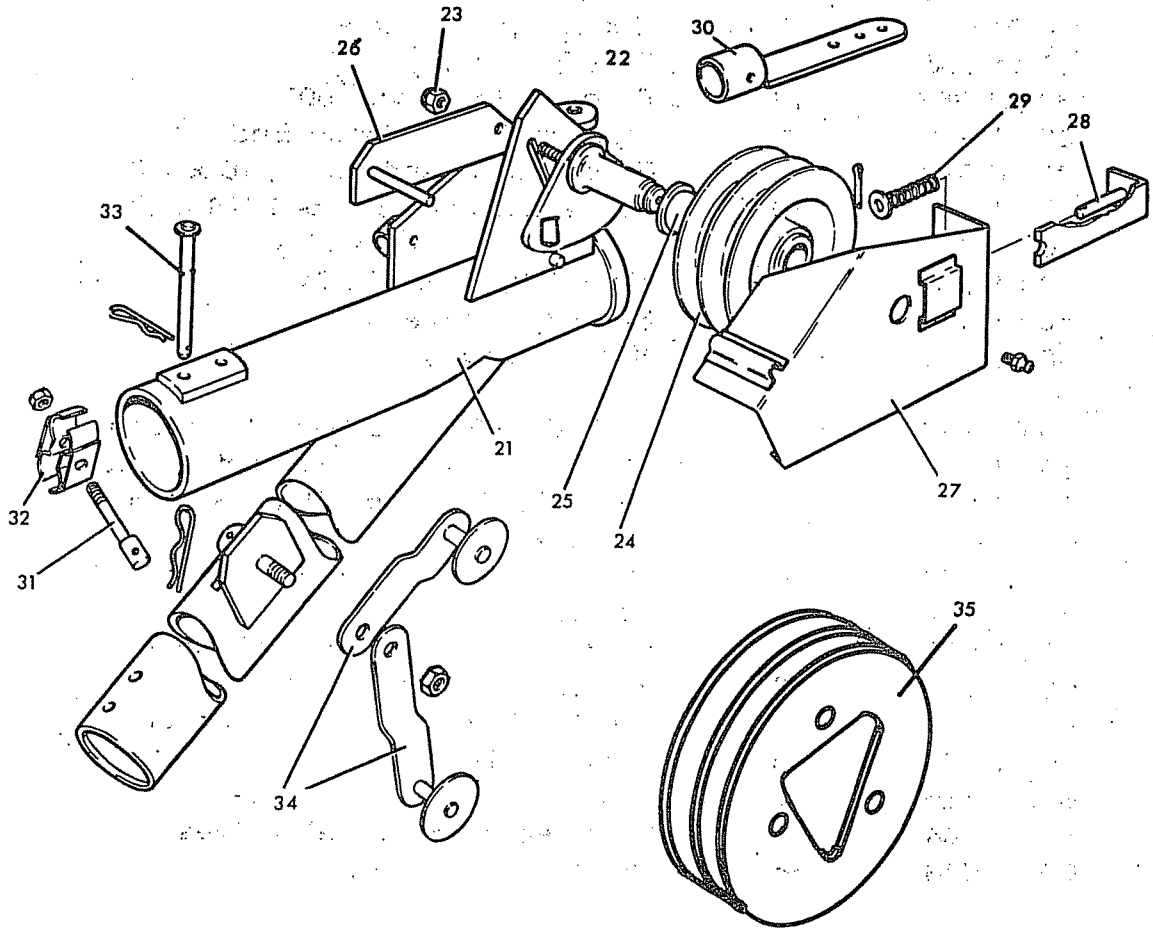
ARMHEAD 1 CUTTER BAR GROUP

Ref.	Part No.	Qty.	Description
	60 01 272	1	CUTTER BAR ASSEMBLY COMPLETE (MANUAL) ANGLING
	60 01 167	1	CUTTER BAR ASSEMBLY COMPLETE (HYDRAULIC) ANGLING
1	60 01 252	1	. Welded Assembly c/w bushes (Manual)
	60 01 351	1	. Welded Assembly c/w Bushes (hydraulic)
2	60 01 003	2	.. Bushes
3	09 01 121	1	.. Grease Nipple
4	04 01 140	1	.. Circlip
	60 01 067	1	. Knife Head Guide Assembly comprising:-
5	60 01 013	1	.. Top Slide c/w Wear Plate
6	60 01 015	1	.. Latch c/w Wear Plate
7	12 57 046	2	... Wear Plate
8	60 01 068	4	... Rivets
9	04 31 105	1	.. Spring Cotter
10	02 11 475	1	.. Hinge Bolt
11	01 61 005	1	.. Nut ½" UNF Nyloc
12	11 77 017	1	.. H Piece with nuts
13	11 77 018	1	. Back Wearing Plate
14	60 01 011	1	. Bottom Wear Plate
15	02 11 085	1	. Bolt ½ x 1" UNF
16	60 01 257	14	. Fingers 'McConnel 50'
17	60 01 271	1	. Double Finger Inner End
18	60 01 078	8	. Finger Bolts and nuts 7/16 x 1½"
19	60 01 079	10	. Finger Bolts and nuts 7/16 x 2"
20	60 01 258	1	. Outer Finger Assembly
21	60 01 051	1	. Knife Clip Inner MXX
22	60 01 053	4	. Knife Clip Outer N.9.
23	60 01 054	4	. Wear Plate N.11
	60 01 091	1	KNIFE COMPLETE Serrated Section
	60 01 090	1	KNIFE COMPLETE Sawtooth Section
	60 01 092	1	KNIFE COMPLETE Plain Section
24	60 01 025	1	. Knife Back c/w Bush
25	60 01 137	1	.. Bush
26	60 01 082	16	. Section Serrated
27	60 01 083	2	. Section Serrated for knife heel
26	60 01 085	16	. Section Sawtooth
27	60 01 086	2	. Section Sawtooth for knife heel
26	60 01 080	16	. Section Plain
27	60 01 081	2	. Section Plain for knife heel
28	60 01 084	1	. Half Section Plain (all knives)
29	60 01 073	38	. Rivets (135 to 1 lb)

HYDRAULIC ANGLING AND PARALLEL MOTION GROUP



REACH OVER EXTENSION

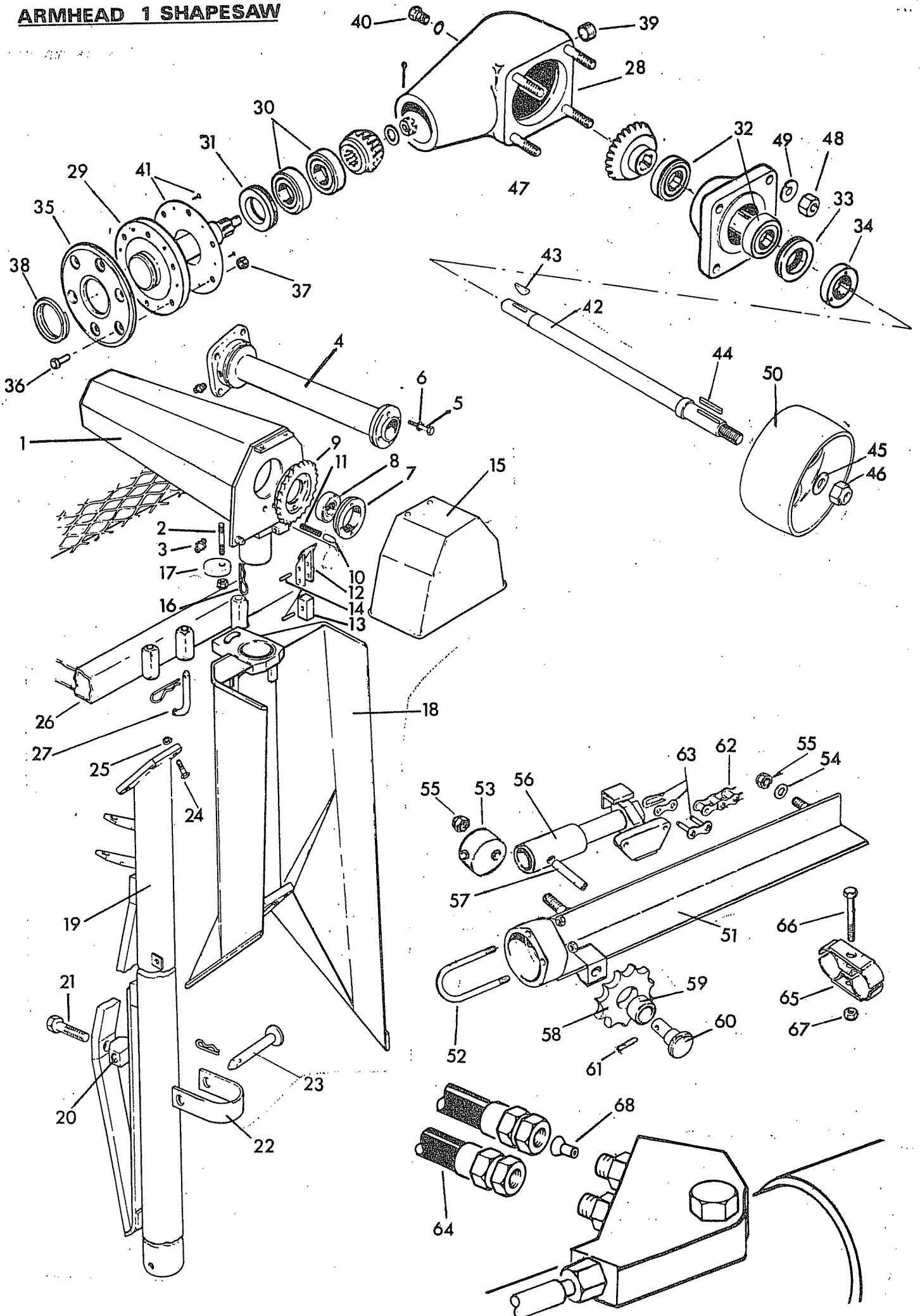


ARMHEAD 1 HYDRAULIC ANGLING CUTTER BAR

For the inner arm, centre breakaway, implement head and all drive parts refer to the manual angling model.

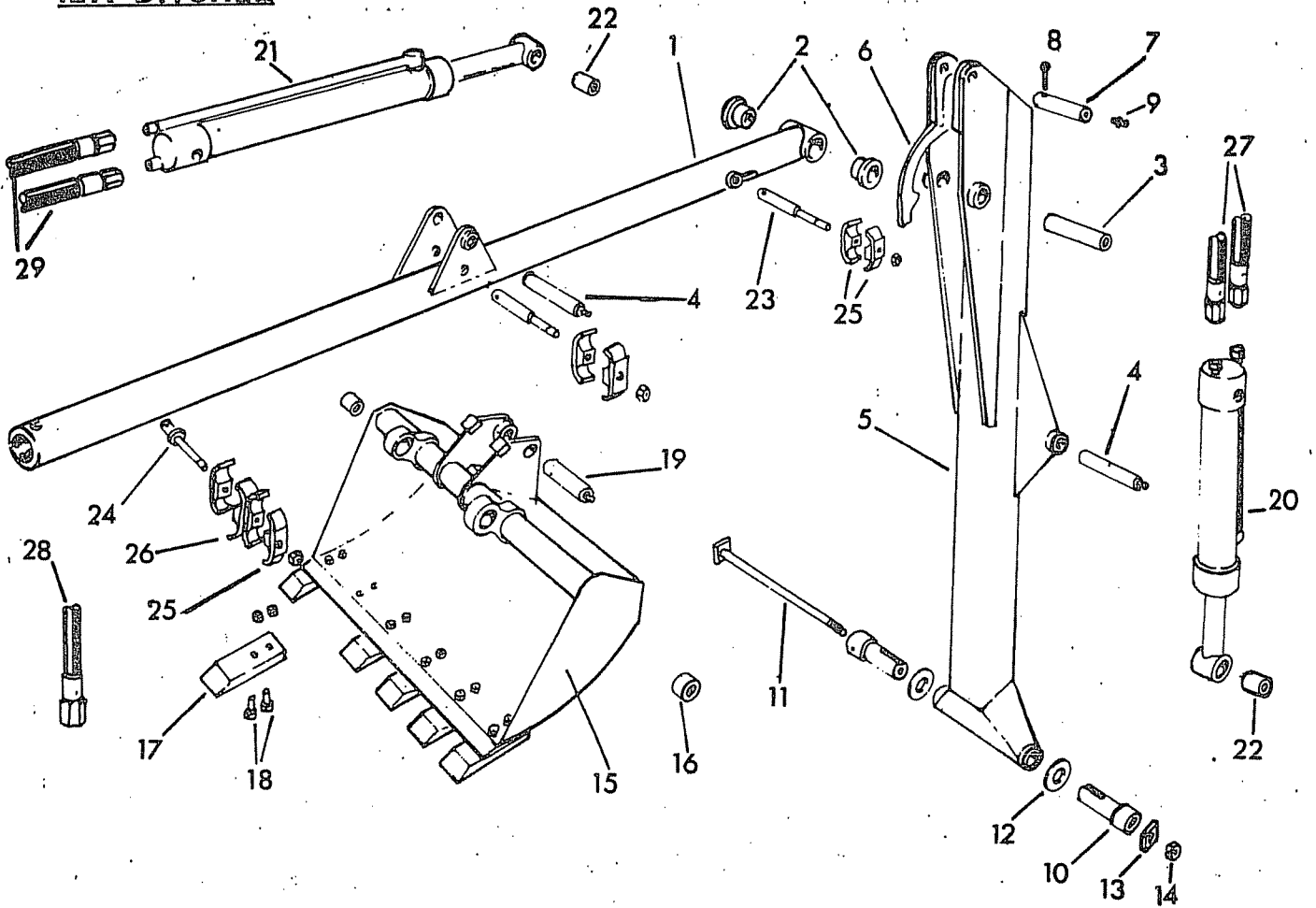
Ref.	Part No.	Qty.	Description
			<u>Parallel motion Group</u>
1	60 01 354	1	Parallel motion slider
2	60 01 353	1	Parallel motion lever
3	60 01 118	1	Parallel motion lever pin c/w spring cotter
4	60 01 119	1	Guide plate c/w nuts
	60 01 139	1	Pipe clamp assembly complete
5	60 01 131	1	. Clamp spindle
6	60 12 026	2	. Double clamp
7	60 01 120	1	Cantilever link
8	60 01 121	2	Link pins c/w spring cotters
9	60 01 358	1	Reach link (two position)
10	60 01 020	1	Connecting pin c/w springcotter
			<u>Angling Mechanism</u>
11	60 01 110	1	Crosshead guide tube c/w aeronut
12	60 01 112	1	Crosshead c/w springcotter and greaser
13	60 01 116	1	Idler sprocket c/w bush
14	60 01 216	1	. Bush
15	01 00 107	1	Washer
16	05 03 105	1	Splitpin
	60 01 163	1	Chain set complete
17	60 01 164	1	. Chain
18	60 01 165	2	. Connecting link
19	60 01 115	1	. Long drawbolt with nut
20	60 01 138	1	. Short drawbolt with nut
			<u>Reach Over Extension</u>
	60 01 375	1	<u>EXTENSION KIT</u>
	60 01 376	1	. Extension arm and countershaft c/w guard
21	60 01 362	1	.. Extension arm
	60 01 377	1	.. Countershaft assembly complete
22	60 01 173	1	... Countershaft c/w nut and greaser
23	01 41 006	1 5/8" UNF Aeronut
24	60 01 171	1	... Double Vee pulley 7½" c/w bushes
25	60 01 172	2 Bush
26	60 01 175	1	... Countershaft guard support
27	60 01 176	1	... Countershaft guard c/w latch and spring
28	60 01 178	1 Latch
29	60 01 155	 Spring
30	60 01 156	1	. Reach link (three position)
31	60 01 184	1	. Pipe clamp spindle
32	60 12 026	2	. Double clamp
33	60 00 039	1	. Tube locking pin c/w spring cotter
34	60 01 185	2	. Belt guide long
35	60 00 260	1	. Double Vee pulley 14¾ diam.
	85 10 063	2	. Hydraulic hose 173" long
	09 13 173	1	Vee belt (Lower drive)
	09 13 120	1	Vee belt (countershaft to cutterbar)

ARMHEAD 1 SHAPESAW

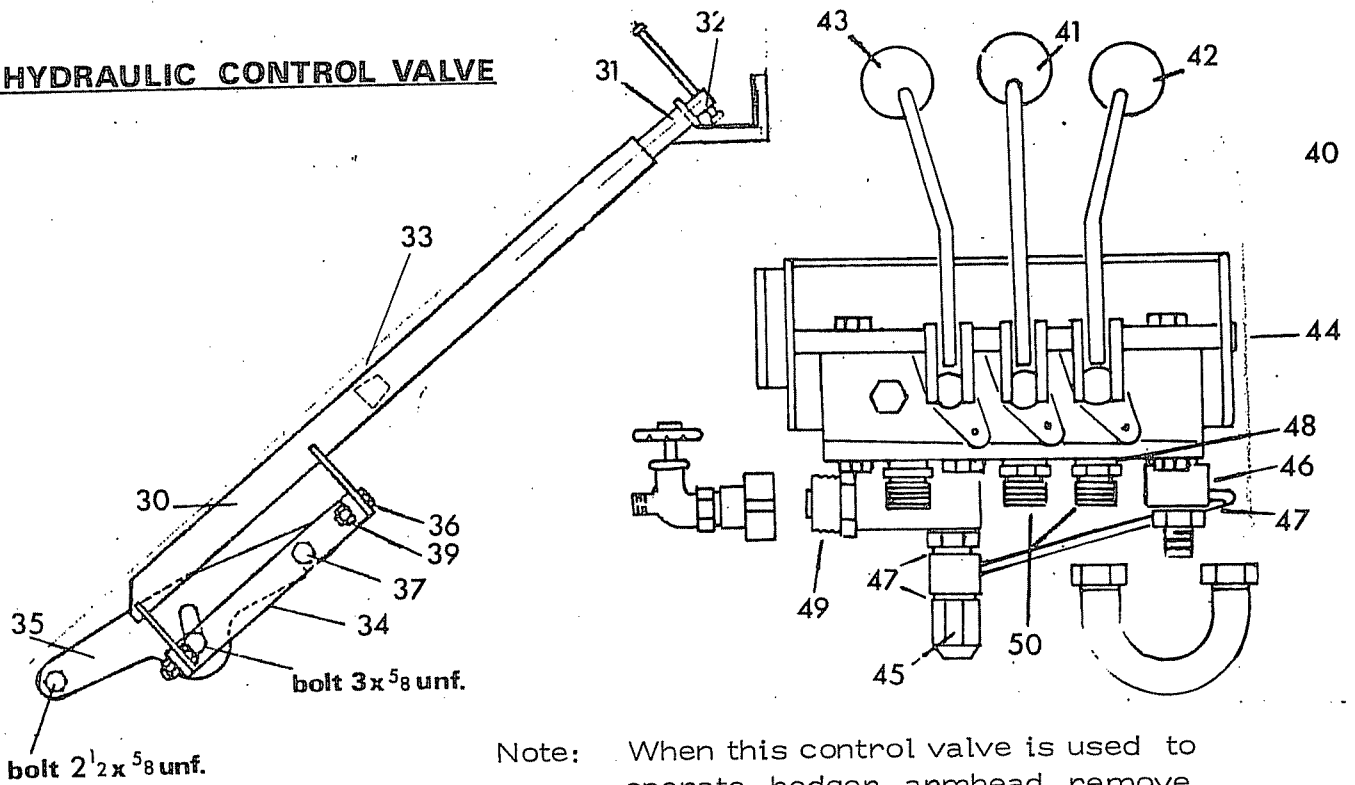


<u>Ref. No.</u>	<u>Part No.</u>	<u>Qty.</u>	<u>Description</u>
	60 01 400	1	SAWHEAD ASSEMBLY COMPLETE
1	60 01 302	1	. Sawhead welded assembly c/w stud & greaser
2	60 01 200	1	.. Stud 5/8 UNF nut
3	09 01 124	1	.. Greaser angled
4	60 01 404	1	. Bearing tube c/w bolts
5	02 11 163	4	.. Bolt 3/8 x 2" UNF
6	01 00 203	4	.. 3/8" spring washer
7	60 01 204	1	. Bearing housing c/w bearing
8	06 00 002	1	.. Ball bearing
9	60 01 205	1	. Sprocket
10	60 01 206	2	. Index plunger
11	60 01 207	2	. Compression spring
12	60 01 208	1	. Plunger lever c/w cam and dowels
13	60 01 209	1	.. Plunger cam
14	04 22 528	2	.. Spring dowel 5/16" x 1 1/2"
15	60 01 313	1	. Drive pulley guard c/w spring cotters
16	04 31 105	2	.. Spring cotters
17	60 01 212	1	. Eccentric
18	60 01 315		SAW ARM ASSEMBLY
19	60 01 369	1	INNER TUBE comprising:-
20	60 01 230	1	. Tee piece c/w bolt
21	02 11 286	1	.. Bolt 5/8 UNF x 3 1/2"
22	60 01 231	1	. Stirrup c/w pin
23	60 00 039	1	. Locking pin c/w spring cotter
24	02 11 124	4	. Bolt 7/16 x 1 1/2" UNF
25	01 51 004	4	. Aeronut 7/16 UNF
26	60 01 321	1	OPERATOR GUARD c/w pins
27	60 01 211	2	. Pin c/w spring cotter
	60 01 401	1	GEARBOX ASSEMBLY complete comprising:-
28	60 01 402	1	. Gearbox type A
29	60 01 405	1	.. Output shaft
30	06 00 006	2	.. Bearing for output shaft
31	86 29 102	1	.. Oil seal output shaft
32	06 00 007	2	.. Bearing input shaft
33	86 29 101	1	.. Oil seal input shaft
34	60 01 233	1	.. Ring nut input shaft
35	60 01 311	1	.. Blade retaining plate c/w bolts and nuts
36	02 11 123	6	... Bolt 3/8 x 1 1/2 UNF
37	01 41 003	6	... Aeronut 3/8" UNF
38	04 02 372	1	.. Locking ring
39	85 82 045	1	.. Filler plug
40	60 01 228	1	.. Breather plug
41	60 01 409	1	.. Shroud, output shaft c/w drive screws
42	60 01 403	1	. Drive shaft c/w keys
43	60 01 227	1	.. Woodruff key - gearbox end
44	60 01 203	1	.. Parallel key - pulley end
45	01 00 109	1	.. Washer, plain
46	01 41 009	1	.. Aeronut 1" UNF
47	60 01 229	4	. Stud 1/2" UNF
48	01 11 005	4	. Nut 1/2" UNF
49	01 00 205	4	. Spring washer 1/2"
50	60 01 323	1	FLAT PULLEY 9"
	60 01 325	1	FLAT BELT
	60 01 341		36" SLASHER BLADE
	60 01 342		36" SAW BLADE 60 tooth
	60 01 327	1	HYDRAULIC ANGLING ASSY comprising:-
51	60 01 328	1	. Crosshead Guide Assembly
52	60 01 217	1	.. U bolt c/w nuts 3/8" UNF
53	60 01 212	1	.. Eccentric
54	01 00 106	1	.. Washer plain 5/8"
55	01 51 006	2	.. Aeronut, thin 5/8" UNF
56	60 01 329	1	. Crosshead assembly
57	04 22 824	1	.. Spring dowel 1/2" x 1 1/2"
58	60 01 116	1	. Idler sprocket c/w bush
59	60 01 216	1	.. Bush
60	60 01 215	1	. Idler sprocket pin
61	04 21-720	1	.. Spring dowel 7/32" x 1 1/4"
62	60 01 330	1	. Chain c/w connecting links
63	60 01 165	2	.. Connecting link
64	85 40 013	2	. Hose 54"
65	60 12 026	4	. Hose clamp
66	02 11 163	2	. Bolt 3/8 x 1 1/2 UNF
67	01 61 003	2	. Aeronut 3/8" UNF
68	60 01 134	1	. Hydraulic restrictor, brass No.78

12A DITCHER



HYDRAULIC CONTROL VALVE

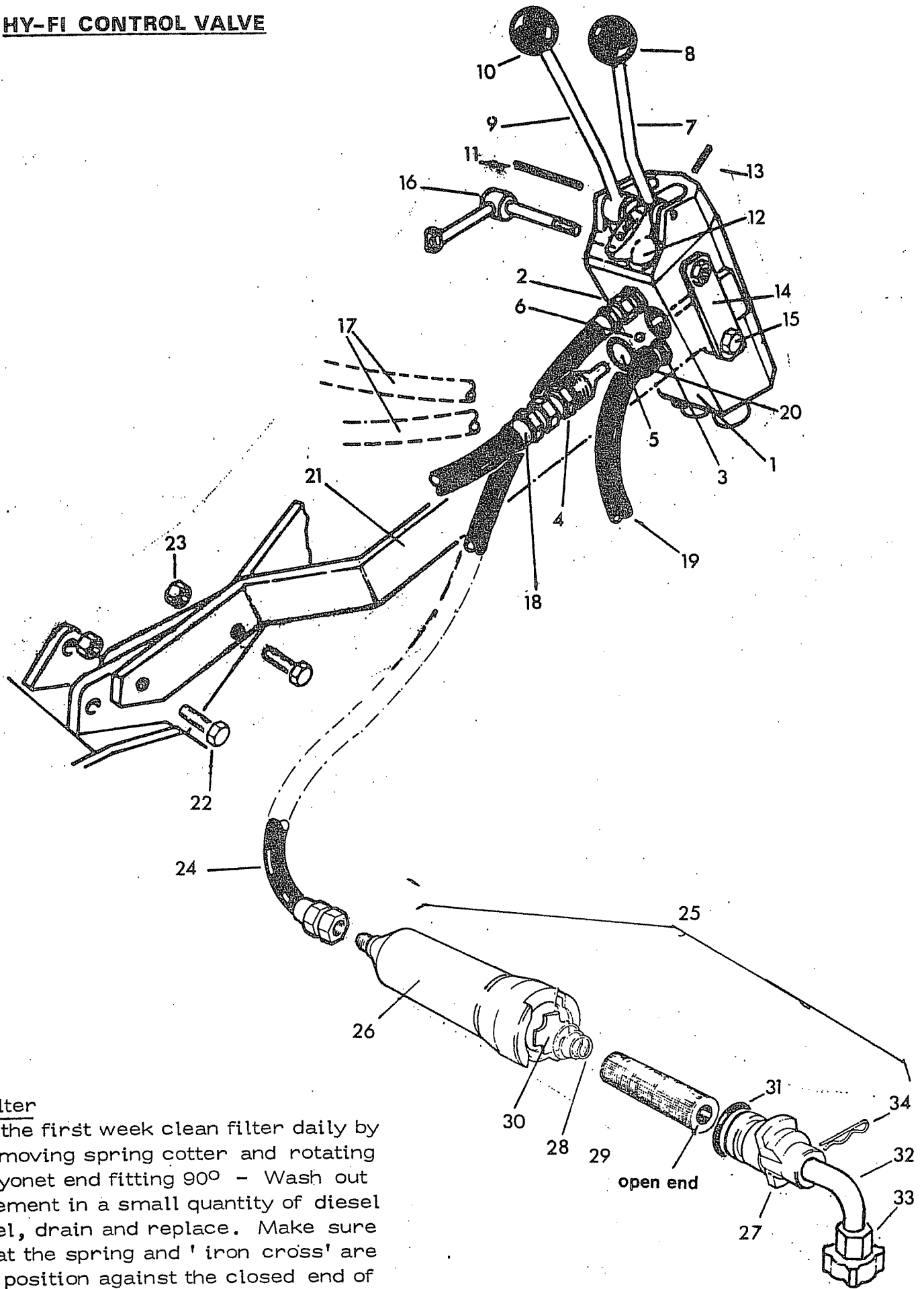


Note: When this control valve is used to operate hedger armhead remove bucket hoses and 'short circuit' bucket section with 'U' tube.

Part No. 60 01 129 'U' tube for Hamworthy
Part No. 60 01 132 'U' tube for Vickers

<u>Ref. No.</u>	<u>Part No.</u>	<u>Qty.</u>	<u>Description</u>
	60 12 250	1	12A DITCHER ATTACHMENT
1	60 12 251	1	. Main arm
2	60 02 030	2	.. Arm pivot bush
3	60 12 018	1	. Arm pivot pin
4	60 12 024	2	. Ram pivot pin
5	60 12 252	1	. Drop arm
6	60 12 013	1	. Reach indicator
7	60 12 025	1	. Rod pivot pin c/w split pin and greaser
8	05 03 166	2	.. Split pin 2" x 2"
9	09 01 121	2	.. Greaser
10	60 12 019	2	. Bucket pivot pin
11	60 12 020	1	. Tie bar
12	01 00 109	2	. Washer 1" plain
13	60 12 059	1	. Washer ½" square
14	01 11 005	1	. Aeronut ½" UNF
	60 12 255	1	. Bucket assembly complete
15	60 12 256	1	.. Bucket welded assembly
16	60 12 032	1	.. Bush
17	60 12 033	6	.. Bucket tine
18	60 12 034	12	.. Tine bolt and nut 7/16 x 1 3/8" UNC
19	60 12 025	1	.. Rod pivot pin complete
20	60 12 303	1	. Bucket ram complete with bush
21	60 12 300	1	. Reach ram complete with bush
22	60 12 022	1	.. Rod end bush
23	60 12 028	2	. Hose clamp spindle Single
24	60 12 027	1	. Hose clamp spindle Double
25	60 12 026	6	. Hose clamp
26	60 12 064	1	. Hose clamp, quadruple
27	85 10 063	2	. Hose 178" long (bucket ram)
28	85 11 073	1	. Hose 72" long (lift ram) this hose replaces 85 10 043 hose 58" long when converted to 12A armhead
29	85 11 053	2	Hose 106" long (reach ram)
	80 03 275	1	CONTROL PILLAR ASSEMBLY
30	80 01 256	1	. Pillar
31	80 01 253	1	. Extension complete with clamp rod and nut
32	60 00 117	1	.. Clamp rod and nut
33	60 00 140	1	... Cone nut
34	80 01 011	1	. Pillar support
35	80 01 012	1	. Quadrant plate
36	02 11 126	2	. Bolt 5/8" x 1½" UNF
37	02 11 166	1	. Bolt 5/8 x 2" UNF
38	01 00 106	1	. Washer 5/8" plain
39	01 41 006	3	. Aeronut 5/8" UNF
40	80 03 276		3 Spindle control valve complete
41	80 01 262		Control lever - red knob
42	80 01 263		Control lever - green knob
43	80 01 264		Control lever - yellow knob
44	60 00 101		Control lever shaft
45	80 01 035		External relief valve assembly
46	80 01 003		Rigid transfer pipe
47	86 50 104		Bonded Seal ½" BSP
48	86 50 103		Bonded Seal 3/8" BSP
49	85 90 013		Self seal coupling (male half)
50	60 00 113		Union 3/8" BSP male/male
	86 99 106		Seal kit Hamworthy (yellow painted)
	86 99 107		Seal kit Vickers (grey painted)

HY-FI CONTROL VALVE

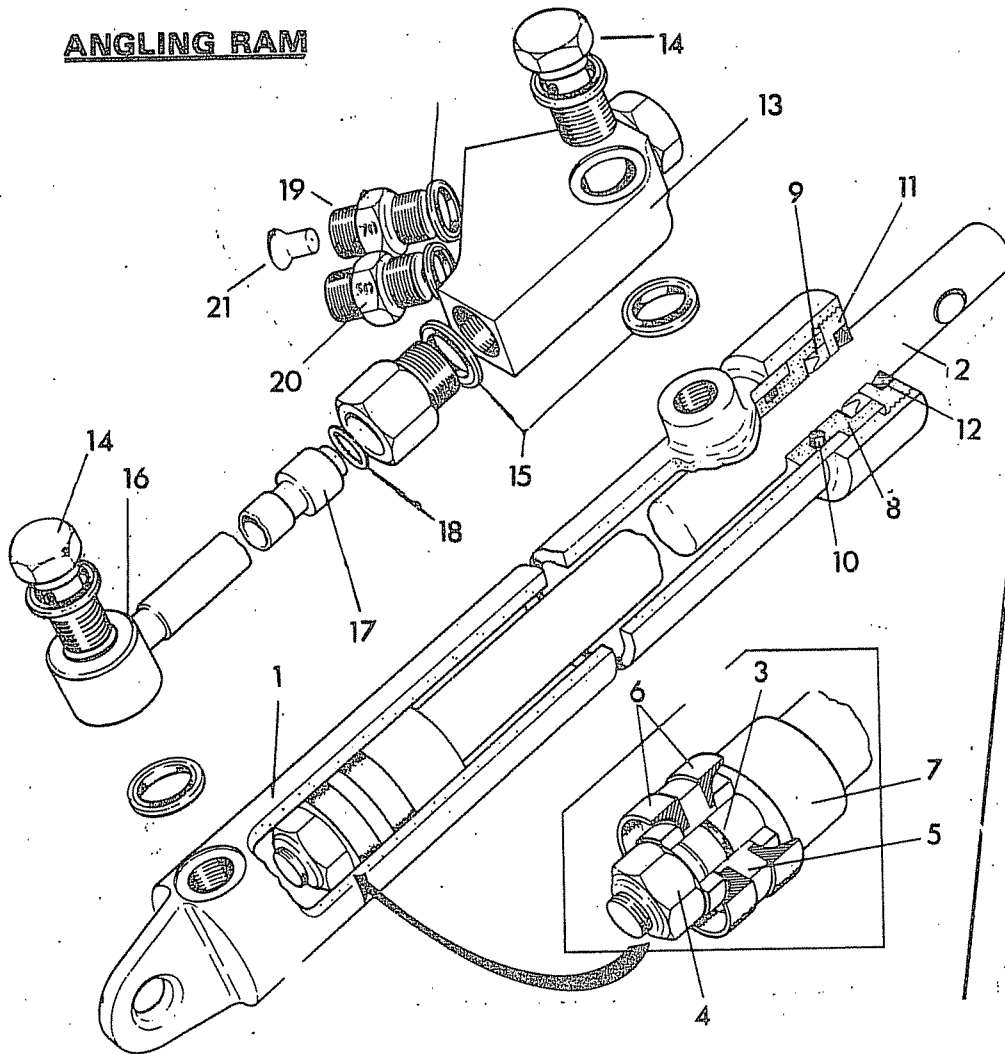


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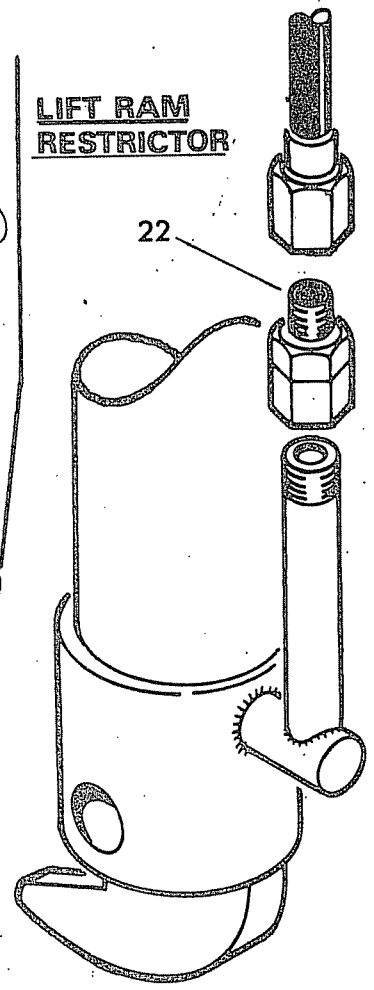
In the first week clean filter daily by removing spring cotter and rotating bayonet end fitting 90° - Wash out element in a small quantity of diesel fuel, drain and replace. Make sure that the spring and 'iron cross' are in position against the closed end of the element. Clean at weekly intervals thereafter.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Qty.</u>	<u>Description</u>
	80 07 250		HY-FI ASSEMBLY
1	81 08 250		. Hy-Fi 2 bank control valve comprising:-
2	81 08 021	1	.. Supply connection 3/8" BSP
3	81 08 022	1	.. Return connection
4	81 08 020	3	.. Ram hose connection
5	86 00 110	5	.. O ring seal
6	09 05 901	4	.. Nylon ball 5/16"
7	81 08 004	1	.. Control lever - lift, complete with knob
8	09 03 121	1	... Knob black
9	81 08 005	1	.. Control lever - angling, complete with knob
10	09 03 112	1	... Knob red
11	04 27 844	1	.. Spring dowel for levers
12	81 08 006	1	.. Tap handle complete with spring dowel
13	04 20 820	1	... Spring dowel
14	81 08 024	1	. Clamping strap complete with bolt
15	02 12 083	1	.. Bolt
16	81 08 034	1	. Clamping screw
17	85 11 053	2	FLEXIBLE HOSE 106" long
18	85 11 073	1	FLEXIBLE HOSE 72" long
19	85 05 058	1	HOSE LOW PRESSURE RETURN 58" long
20	09 04 204	2	Hose clip
21	81 06 030	1	MOUNTING ARM complete with bolts & nuts
22	02 11 186	2	. Bolt 5/8" x 2 1/4" UNF
23	01 41 006	2	. Aeronut 5/8" UNF
24	85 10 043		FLEXIBLE HOSE, SUPPLY 58" long
25	84 01 350	1	FILTER ASSEMBLY
26	84 01 001	1	. Filter body
27	84 01 002	1	. Bayonet end plug
28	84 01 003	1	. Compression spring
29	84 01 004	1	. Filter element
30	84 01 005	1	. Iron cross filter stop
31	86 00 121	1	. O ring
32	85 81 033	1	. 3/8" BSP bend
33	85 90 023	1	. Self seal coupling /Female
34	04 31 105	1	. Spring cotter

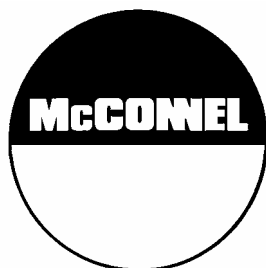
ANGLING RAM



LIFT RAM RESTRICTOR



Ref. No.	Part No.	Qty.	Description
	60 01 355	1	ANGLING RAM ASSEMBLY C/W Manifold
	60 01 356	1	.. Angling Ram
1	60 01 365	1	.. Ram cylinder
2	60 01 366	1	.. Ram rod c/w 'O' Ring and nut
3	86 00 111	1	... 'O' Ring
4	01 43 006	1	... Aeronut 5/8 BSF
5	60 01 222	1	.. Piston assembly c/w seals
6	86 30 123	2	... Piston seal
7	60 01 221	1	.. Piston stop
8	60 01 223	1	.. Gland Housing c/w seals
9	86 12 123	1	... Gland seal
10	86 00 123	1	... 'O' Ring
11	60 01 224	1	.. Gland nut c/w wiper seal
12	86 40 319	1	... Wiper seal
	60 01 122	1	.. Manifold block assembly
13	60 01 357	1	.. Manifold (bare)
14	60 01 127	2	.. Banjo bolt
15	86 50 103	6	.. Bonded seal 3/8" BSP
16	60 01 128	1	.. Ram Base connection c/w collar
17	60 01 130	1	... Collar (seal retainer)
18	86 00 110	1	... 'O' Ring
19	60 01 166	1	.. Restrictor nipple No.70
20	60 01 125	1	.. Restrictor nipple No. 50
21	60 01 134	1	.. Restrictor (brass cone) No.78
22	81 07 006	1	ONE WAY RESTRICTOR (required for Shapesaw only and is adjustable.



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