Publication 346
July 2000
Part No. 41486.50

PA 41

HEDGECUTTER/TRIMMER

Operator Manual

McCONNEL

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION

(Applies to UK Machines only)

UK DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with McConnel Limited within 7 days of delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register a machine go to the McConnel Limited web site at **www.mcconnel.com**, log on to '**DEALER INSIDE**' and select the '**Machine Registration button**' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.
Should you experience any problems registering a machine in this manner please contact the McConnel Service Department on 01584 875848.

Registration Verification (UK Machines)

Dealer Name: ……..

Dealer Address: ……..

Customer Name: ……

Date of Warranty Registration: ……/……/..…… Dealer Signature: ……

NOTE TO CUSTOMER / OWNER

Please ensure that the above section above has been completed and signed by the selling dealer to verify that your machine has been registered with McConnel Limited.

EC DECLARATION OF CONFORMITY

*Conforming to EEC Machinery Directive 98/37/EC**

We,

McCONNEL LIMITED,
Temeside Works, Ludlow, Shropshire SY8 1JL.

Declare under our sole responsibility that:

The product *(type)* Tractor Mounted Hedge Cutter / Trimmer

……

Product Code PA41

Serial No. & Date …… Type ……

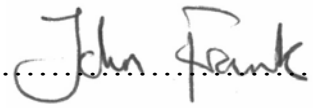
Manufactured by the above company/* ……

……
(insert business name and full address if not stated above)*

Complies with the required provisions of the Machinery Directive 98/37/EC, * previously Directive 89/392/EEC as amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.
The machinery directive is supported by;

- BS EN ISO 12100:2003 Safety of Machinery. This standard is made up of two parts; Part 1 Terminology, methodology, Part 2 Technical Specifications.
- BS EN 1050 Safety of machinery - Principles of risk assessment.
- and other national standards associated with its design and construction as listed in the Technical File.

The Machinery Directive is fully implemented into UK law by means of the Supply of Machinery (Safety) Regulations 1992 (SI 1992/3073) as amended by The Supply of Machinery (Safety) (Amendment) Regulations 1994 (SI 1994/2063).

Signed 

on behalf of McCONNEL LIMITED *Responsible Person*

Status: Chief Design Engineer *Date:* May 2005

For Safety and Performance …

ALWAYS READ THIS BOOK FIRST

McCONNEL LIMITED

Temeside Works
Ludlow
Shropshire
England

Telephone: 01584 873131
www.mcconnel.com

NOISE STATEMENT

The equivalent daily personal noise exposure from this machine measured at the operators' ear is within the range 78 – 85 dB, these figures apply to a normal distribution of use where the noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a 'quiet' cab with the windows closed in a generally open environment. We recommend that the windows are kept closed. With the cab rear window open the equivalent daily personal noise exposure will increase to a figure within the range 82 – 88 dB. At equivalent daily noise exposure levels of between 85 – 90 dB ear protection is recommended – it should be used if any window is left open.

Notes

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GENERAL INFORMATION

Always read this manual before fitting or operating the machine – whenever any doubt exists contact your dealer or the McConnel Service Department for advice and assistance.

Use only McConnel Genuine Service Parts on McConnel Equipment and Machines

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 damage to either machine or equipment if not observed carefully.

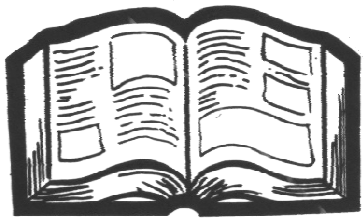
NOTE
An operating procedure, technique etc., which –
is considered essential to emphasis.

LEFT AND RIGHT HAND
This term is applicable to the machine when attached to the tractor and is viewed from the rear – this also applies to tractor references.

MACHINE DEALER INFORMATION

Record the Serial Number of your machine on this page and always quote this number when ordering parts. Whenever information concerning the machine is requested remember also to state the make and model of tractor to which the machine is fitted.	
Machine Serial Number:	**Installation Date:**
Machine Model details:	
Dealer Name:	
Dealer Address:	
Dealer Telephone No:	
Dealer Email Address:	

SAFETY INFORMATION



This machine has the potential to be extremely dangerous, in the wrong hands it can kill or maim. It is therefore imperative that the owner, and the operator of this machine, read the following section to ensure that they are both fully aware of the dangers that do, or may exist, and their responsibilities surrounding its use.
The operator of this machine is responsible not only for their own safety but equally for the safety of others who may come into the close proximity of the machine, as the owner you are responsible for both.

POTENTIAL SIGNIFICANT DANGERS ASSOCIATED WITH THE USE OF THIS MACHINE:

- ▲ *Being hit by debris thrown by rotating components.*
- ▲ *Being hit by machine parts ejected through damage during use.*
- ▲ *Being caught on a rotating power take-off (PTO) shaft.*
- ▲ *Being caught in other moving parts i.e.: belts, pulleys and cutting heads.*
- ▲ *Electrocution from Overhead Power Lines (by contact with or 'flashover' from).*
- ▲ *Being hit by cutting heads or machine arms as they move.*
- ▲ *Becoming trapped between tractor and machine when hitching or unhitching.*
- ▲ *Tractor overbalancing when machine arm is extended.*
- ▲ *Injection of high-pressure oil from hydraulic hoses or couplings.*
- ▲ *Machine overbalancing when freestanding (out of use).*
- ▲ *Road traffic accidents due to collision or debris on the road.*

BEFORE USING THIS MACHINE YOU MUST:

- ▲ *Ensure you read all sections of the operator handbook.*
- ▲ *Ensure the operator is, or has been, properly trained to use the machine.*
- ▲ *Ensure the operator has been issued with and reads the operator handbook.*
- ▲ *Ensure the operator understands and follows the instructions in operator handbook.*
- ▲ *Ensure the tractor front, rear and side(s) are fitted with metal mesh or polycarbonate guards of suitable size and strength to protect the operator against thrown debris or parts.*
- ▲ *Ensure tractor guards are fitted correctly, are undamaged and kept properly maintained.*
- ▲ *Ensure that all machine guards are in position, are undamaged, and are kept maintained in accordance with the manufacturer's recommendations.*
- ▲ *Ensure flails and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.*
- ▲ *Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.*
- ▲ *Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.*
- ▲ *Check that the machine fittings and couplings are in good condition.*
- ▲ *Ensure the tractor meets the minimum weight recommendations of the machine's manufacturer and that ballast is used as necessary.*
- ▲ *Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.*
- ▲ *Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).*
- ▲ *Ensure the operator is protected from noise. Ear defenders should be worn and tractor cab doors and windows must be kept closed. Machine controls should be routed through proprietary openings in the cab to enable all windows to be shut fully.*
- ▲ *Always work at a safe speed taking account of the conditions i.e.: terrain, highway proximity and obstacles around and above the machine. Extra special attention should be applied to Overhead Power Lines. Some of our machines are capable of reach in excess of 8 metres (26 feet) this means they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines. It cannot be stressed enough the dangers that surround this capability, it is therefore vital that the operator is fully aware of the maximum height and reach of the machine, and that they are fully conversant with all aspects regarding the safe minimum distances that apply when working with machines in close proximity to Power Lines. (Further information on this subject can be obtained from the Health & Safety Executive or your Local Power Company).*

- ▲ *Always disengage the machine, kill the tractor engine, remove and pocket the key before dismounting for any reason.*
- ▲ *Always clear up all debris left at the work area, it may cause hazard to others.*
- ▲ *Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props provided and secured if necessary.*

WHEN NOT TO USE THIS MACHINE:

- ▲ *Never attempt to use this machine if you have not been trained to do so.*
- ▲ *Never use a machine until you have read and understood the operator handbook, are familiar with it, and practiced the controls.*
- ▲ *Never use a machine that is poorly maintained.*
- ▲ *Never use a machine if guards are missing or damaged.*
- ▲ *Never use a machine on which the hydraulic system shows signs of wear or damage.*
- ▲ *Never fit, or use, a machine on a tractor that does not meet the manufacturer's minimum specification level.*
- ▲ *Never use a machine fitted to a tractor that does not have suitable front, rear and side(s) cab guarding made of metal mesh or polycarbonate.*
- ▲ *Never use the machine if the tractor cab guarding is damaged, deteriorating or badly fitted.*
- ▲ *Never turn a machine cutting head to an angle that causes debris to be ejected towards the cab.*
- ▲ *Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing. WARNING: Some Cutting Heads may continue to 'freewheel' for up to 40 seconds after being stopped.*
- ▲ *Never attempt to use a machine on materials in excess of its capability.*
- ▲ *Never use a machine to perform a task it has not been designed to do.*
- ▲ *Never operate the tractor or machine controls from any position other than from the driving seat, especially whilst hitching or unhitching the machine.*
- ▲ *Never carry out maintenance of a machine or a tractor whilst the engine is running – the engine should be switched off, the key removed and pocketed.*
- ▲ *Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.*
- ▲ *Never leave a tractor with the key in or the engine running.*
- ▲ *Never carry out maintenance on any part or component of a machine that is raised unless that part or component has been properly substantially braced or supported.*
- ▲ *Never attempt to detect a hydraulic leak with your hand – use a piece of cardboard.*
- ▲ *Never allow children near to, or play on, a tractor or machine under any circumstances.*

ADDITIONAL SAFETY ADVICE

Training

Operators need to be competent and fully capable of operating this machine in a safe and efficient way prior to attempting to use it in any public place. We advise therefore that the prospective operator make use of relevant training courses available such as those run by the Agricultural Training Board, Agricultural Colleges, Dealers and McConnel.

Working in Public Places

When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.

Warning Signs

It is advisable that any working area be covered by suitable warning signs and statutory in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – '*Non-authorised placement of road signs may create offences under the Highways Act'.*

Suggested Warning Signs Required

"Road works ahead" *warning sign with a supplementary* ***"Hedge cutting"*** *plate.* ***"For 1 mile"*** *or appropriate shorter distance may be added to the plate.*

"Road narrows" *warning sign with supplementary* ***"Single file traffic"*** *plate.*

White on blue ***"Keep right"*** *(*) arrow sign on rear of machine.*
** Note – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow sign will depend on the country of use and the Local Highway Authorities regulations in the locality.*

Use of Warning Signs

- ▲ *On two-way roads one set of signs is needed facing traffic in each direction.*
- ▲ *Work should be within 1 mile of the signs.*
- ▲ *Work only when visibility is good and at times of low risk e.g.: NOT during 'rush-hour'.*
- ▲ *Vehicles should have an amber-flashing beacon.*
- ▲ *Ideally, vehicles should be conspicuously coloured.*
- ▲ *Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.*
- ▲ *Collect all road signs promptly when the job is completed.*

Although the information given here covers a wide range of safety subjects, it is impossible to predict every eventuality that can occur under differing circumstances whilst operating this machine. No advice given here can replace 'good common sense' and 'total awareness' at all times, but will go a long way towards the safe use of your McConnel machine.

FITTING

TRACTOR SELECTION

Linkage requirements

Tractor must be equipped with Category 1 Linkage.

Linkage isolation

A linkage isolation facility is necessary for Si models only.

Check chains/stabilisers

Check chains or stabiliser bars must be fitted and tightened.

Tractor relief valve

For Si models only tractor relief valve must be set above 160 Bar (2300 PSI).

Tractor hydraulic flow rate

Hydraulic flow rates are not crucial for Si models

P.T.O. shaft

Tractor must be equipped with live drive independent PTO shaft to enable forward movement to be halted while the flail head continues to operate.

Horse power requirements.

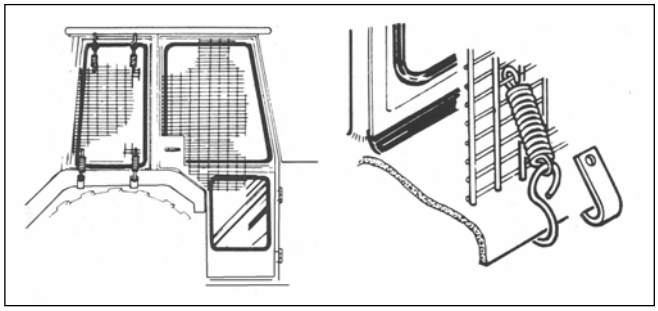
25 H.p. min PA41 with cutterbar
30 H.p. min PA41 with flail head

Stability requirements

PA41 with cutterbar:- 1300 kg min tractor weight including front ballast.

PA41 with flail head:- 1600 kg min tractor weight including front ballast and with a minimum outside tyre width of 1.4m.

VEHICLE/TRACTOR PREPARATION



We recommend vehicles are fitted with cabs using safety glass windows and protective guarding when used with our machines.
Fit Operator Guard *(part no. 73 13 324)* using the hooks provided. Shape mesh to cover all vulnerable areas.
Remember the driver must be looking through mesh and/or polycarbonate glazing when viewing the flail head in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing. If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.

Vehicle Ballast: It is imperative when attaching 'third-party' equipment to a tractor that the maximum possible stability of the machine and tractor combination is achieved – this can be accomplished by the utilisation of 'ballast' in order to counter-balance the additional equipment added.
Front weights may be required to place 15% of total outfit weight on the front axle for stable transport on the road and to reduce 'crabbing' due to the drag of the cutting unit when working on the ground.
Rear weights may be required to maintain a reasonable amount of rear axle load on the opposite wheel from the arms when in work; for normal off-ground work i.e. hedge cutting this should be 20% of rear axle weight or more for adequate control, and for ground work i.e. verge mowing with experienced operators, this can be reduced to 10%.
All factors must be addressed in order to match the type and nature of the equipment added to the circumstances under which it will be used – in the instance of Power Arm Hedgecutters it must be remembered that the machines centre of gravity during work will be constantly moving and will differ from that during transport mode, therefore balance becomes critical.

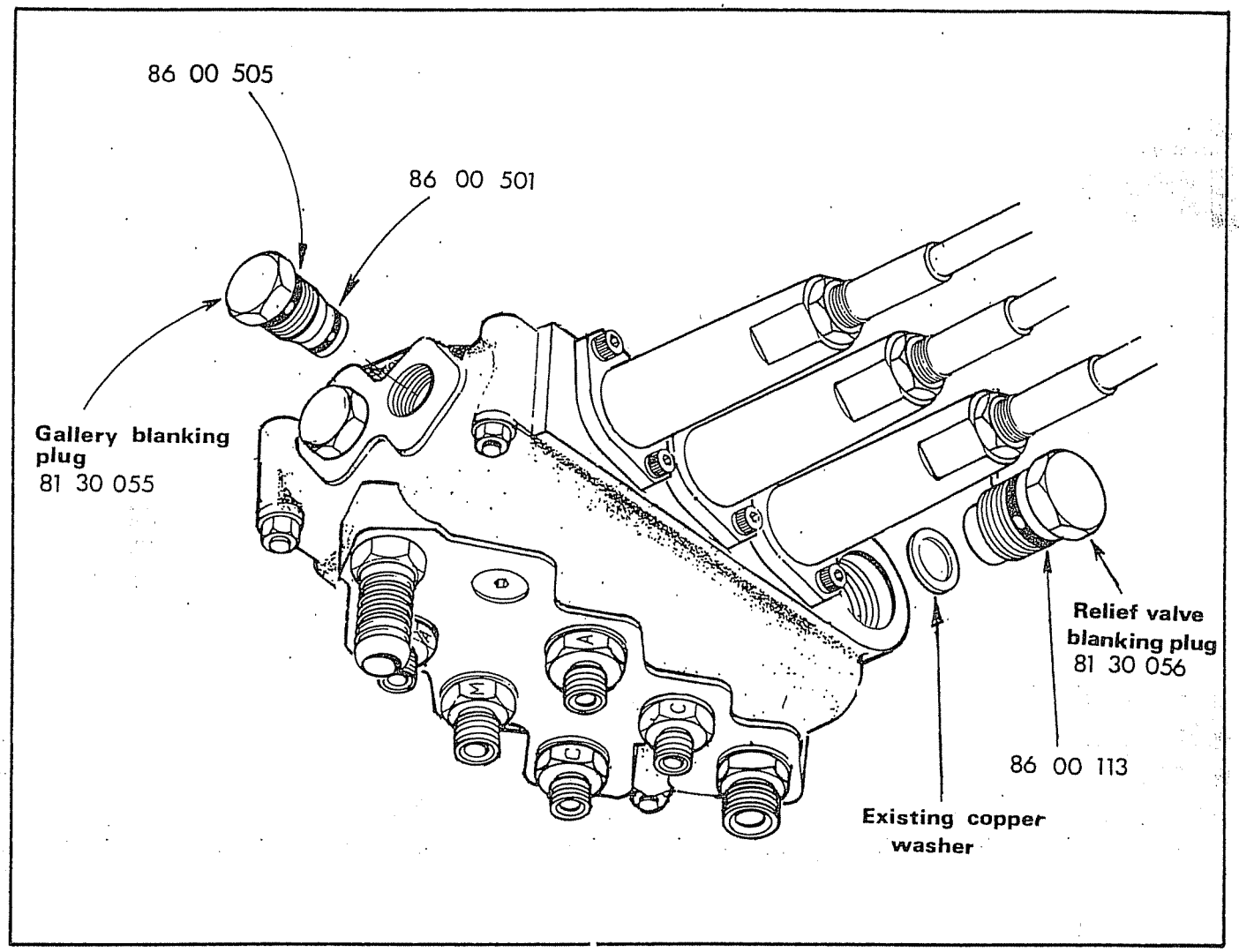
Factors that effect stability:

- *Centre of gravity of the tractor/machine combination.*
- *Geometric conditions, e.g. position of the cutting head and ballast.*
- *Weight, track width and wheelbase of the tractor.*
- *Acceleration, braking, turning and the relative position of the cutting head during these operations.*
- *Ground conditions, e.g. slope, grip, load capability of the soil/surface.*
- *Rigidity of implement mounting.*

Suggestions to increase stability:

- *Increasing rear wheel track; a tractor with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition of weights – care should be taken in selecting the location of the weights to ensure they are added to a position that offers the greatest advantage.*
- *Front axle locking; a ram can be used to 'lock' the front axle in work only – locking the axle moves the 'balance line' and can be used to transfer weight to the front axle from the rear (check with tractor manufacturer).*

The advice above is offered as a guide for stability only and is not a guide to tractor strength - it is therefore recommended that you consult your tractor manufacturer or local dealer to obtain specific advise on this subject, additionally advice should be sought from a tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machine you intend to fit.



CLOSED CENTRE CONVERSION KIT 81 30 059 for S.i. models only

A control valve conversion kit Part No. 81 30 059 consists of a relief valve blanking plug which should be installed in place of the existing relief valve and a pressure gallery blanking plug which is installed in place of the standard blanking plug at the valve outlet end next to the lift ram gland connection.

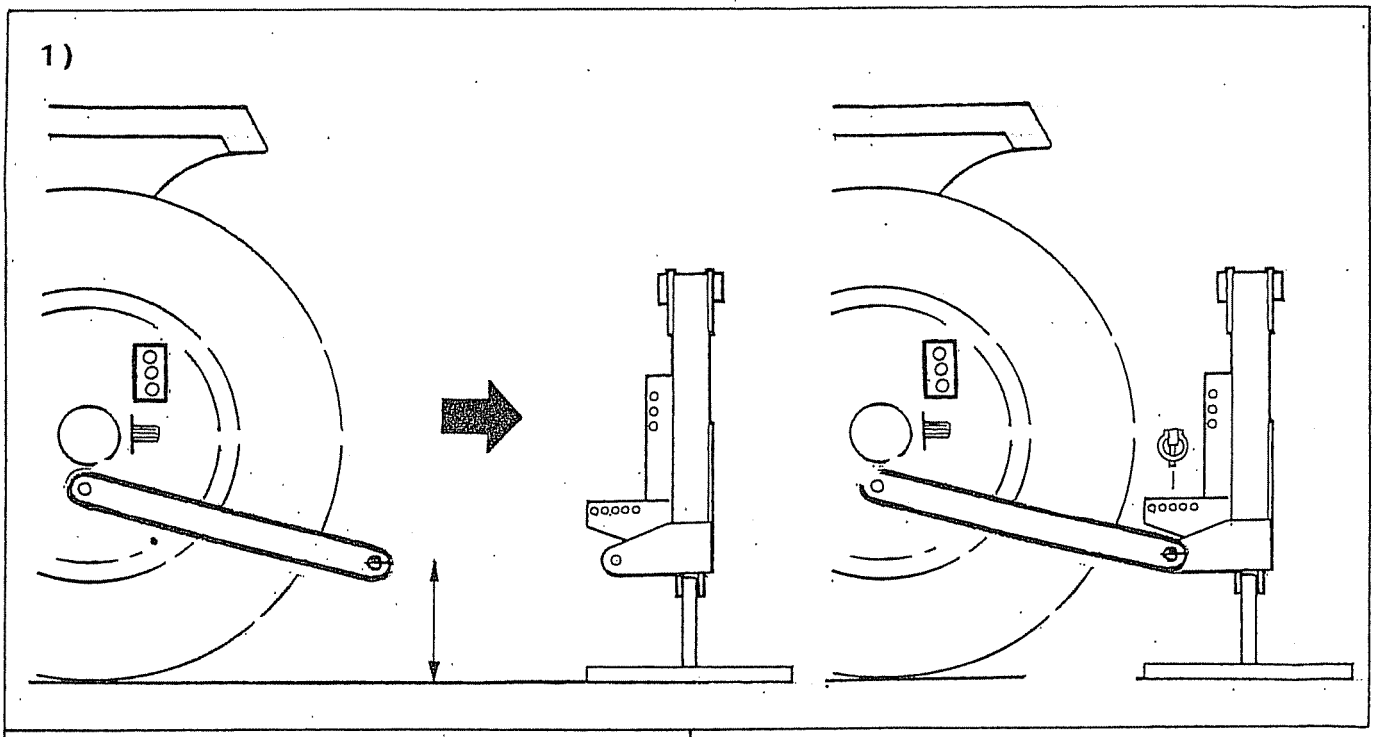
Take care when extracting the relief valve not to damage the copper sealing washer as it is re-used.

When working in this mode the tractor's pressure control valve must not exceed 2500 P.S.I. (170 Bar).

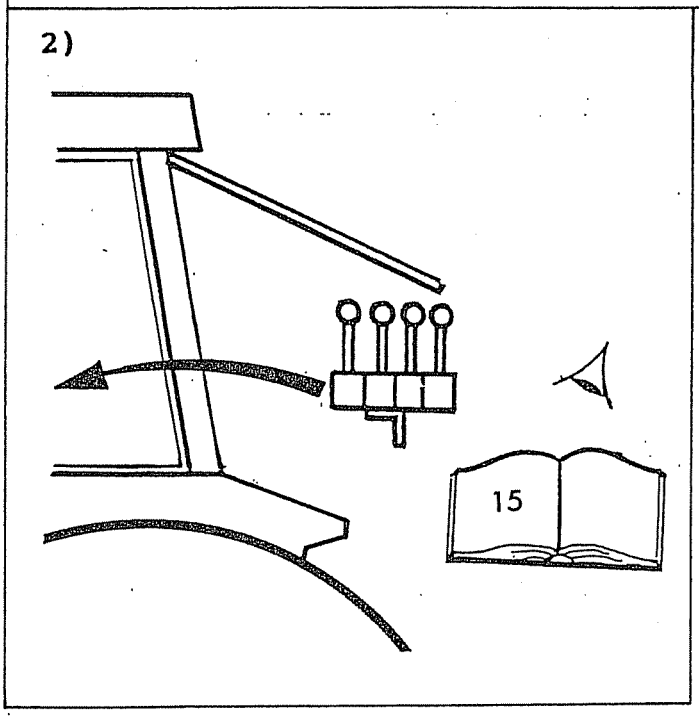
ATTACHMENT TO TRACTOR

Before commencing select a firm level site, cut the banding straps and remove loose items and the stabiliser. Leave the transport straps at this stage.

1)



2)



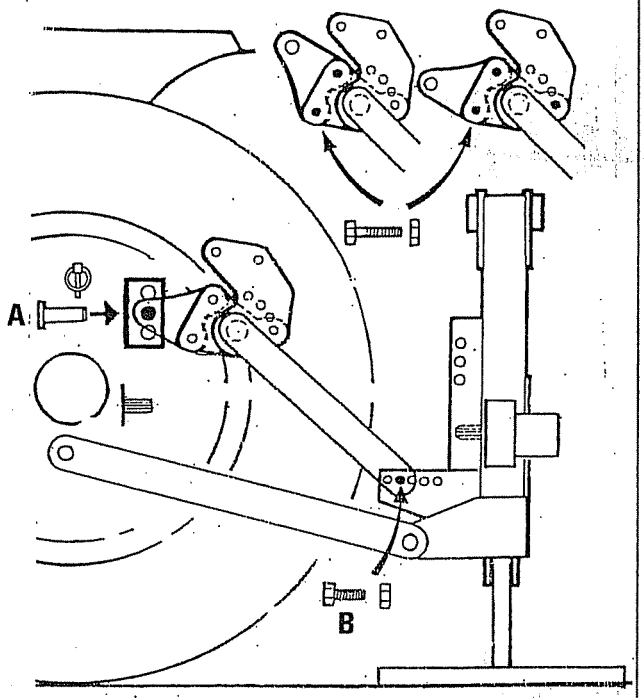
3) Si only

Connect supply and return hoses to tractor. Supply is taken from the tractors auxiliary service. Return is direct to the tractors transmission casing (see tractors handbook for correct procedure). Extra hoses and fittings may be required.

4)

A

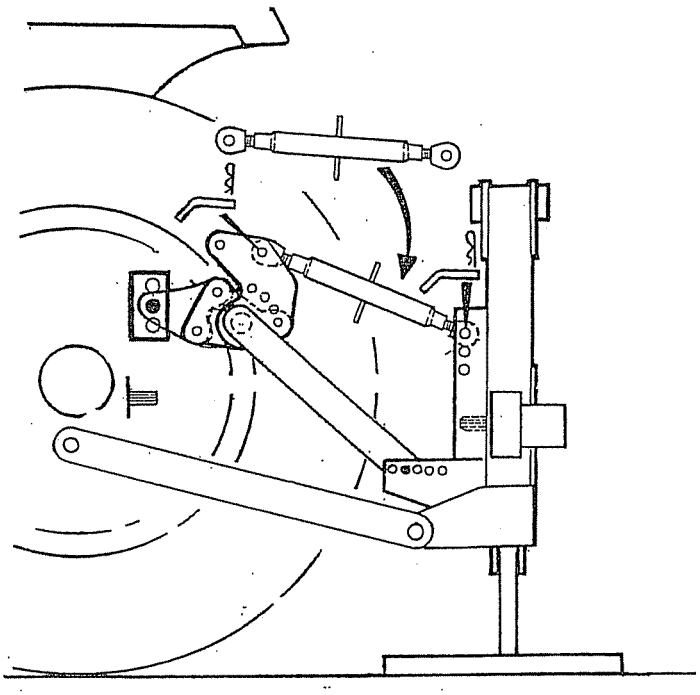
Fit the stabiliser nose into the tractors top link position. Use the highest position available avoiding any load sensing properties. The bolt on nose of the stabiliser is reversible to accommodate a variety of tractor linkage designs



B

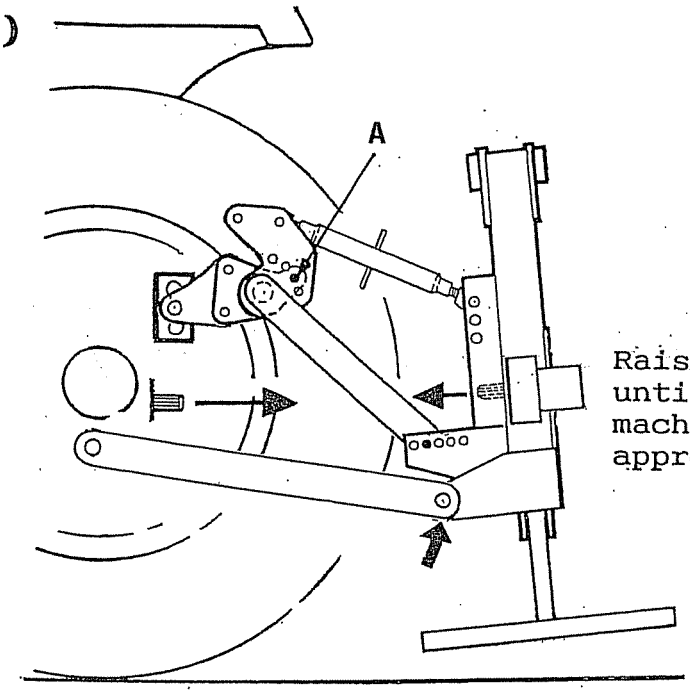
Stretch out the stabiliser and bolt to the machine using the holes farthest from the tractor that the stabiliser will reach. Do not fully tighten bolts at this stage and do not replace the stabiliser nose quadrant pin.

5)



Fit the machines top link

6)



Raise machine on tractors linkage until the tractors p.t.o. and the machines gearbox stub shaft are approx. in line

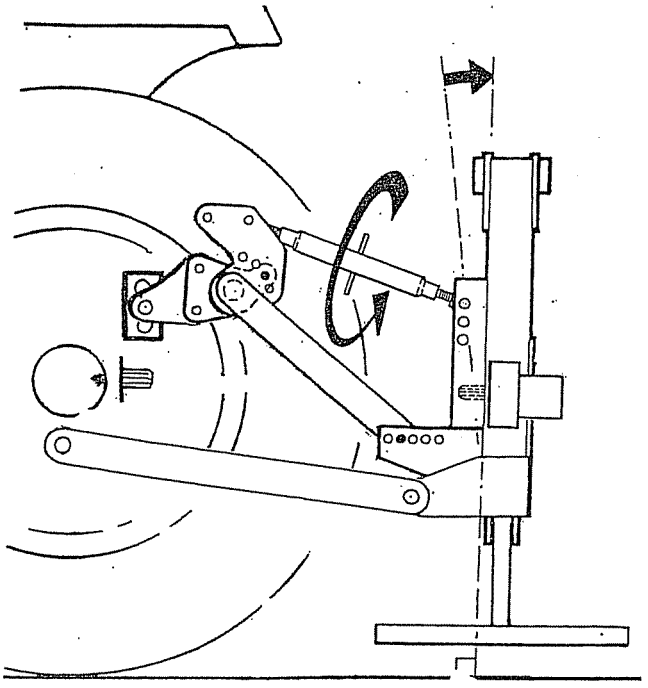
WARNING

The quadrant lever or machine controls must be operated from the tractor seat. During this operation ensure no one is standing on or amongst the linkage arm or bars.

Note:
As lift occurs be aware the machinery may tilt slightly.

7)

Adjust the top link to bring the machines frame vertical

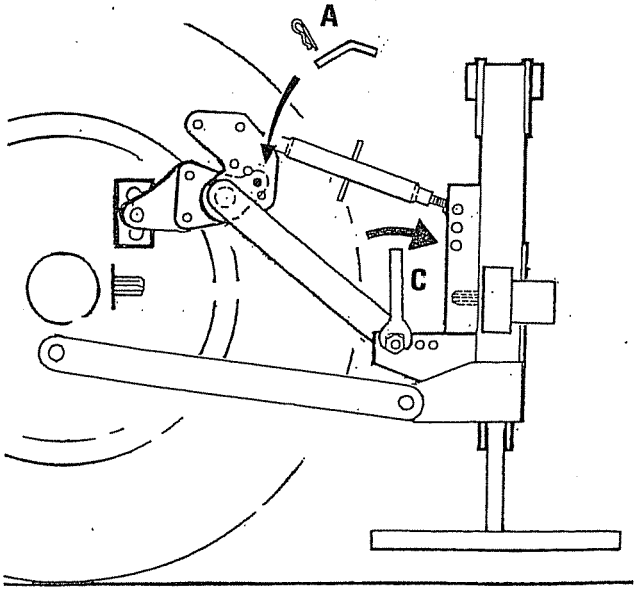


8)

A Refit the top link nose quadrant pin, fine adjust position using the tractors draft lift

B Lower tractor linkage control so that machines weight is taken by the yoke

C Fully tighten the stabiliser lower bolts



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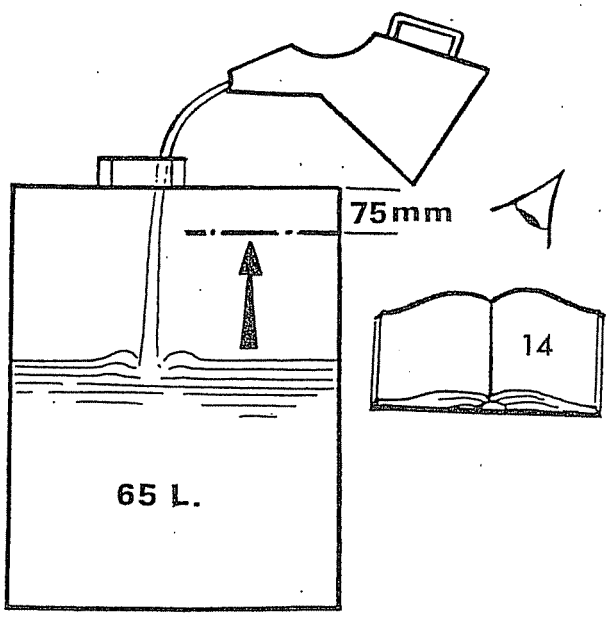

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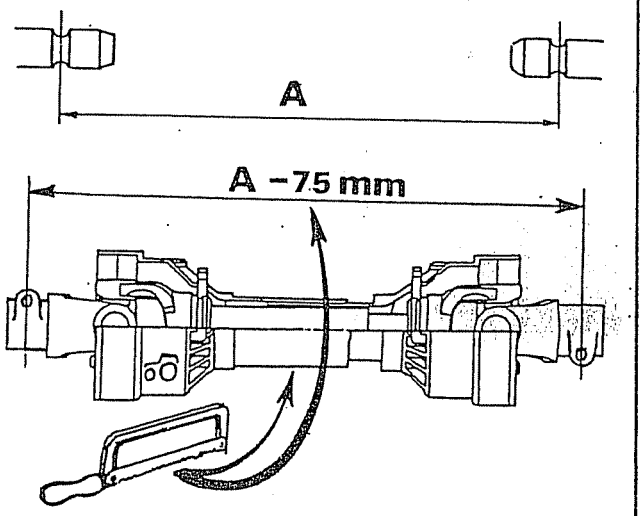
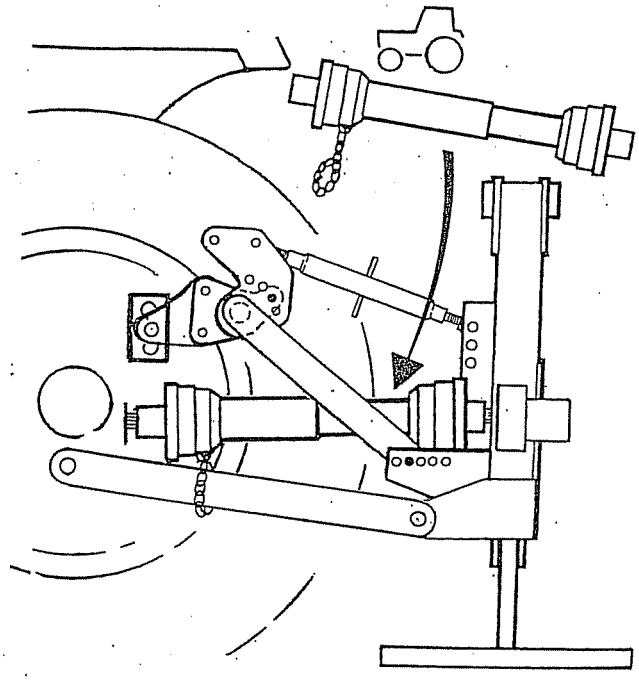


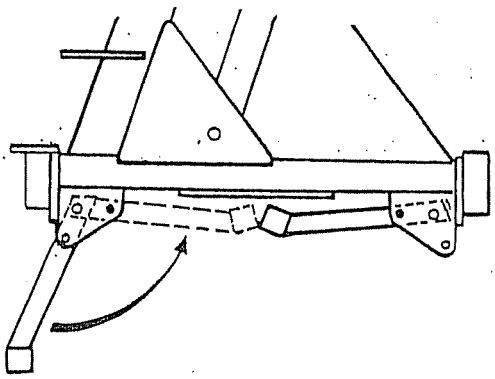
Measure p.t.o. and cut to dimension shown. See maintenance section for details. Note:- for subsequent use on different tractors measure again. There must be a minimum of 150mm of shaft overlap

11)



Fit PTO shaft and attach torque chain to a convenient point to prevent the shaft guard rotating.

12)



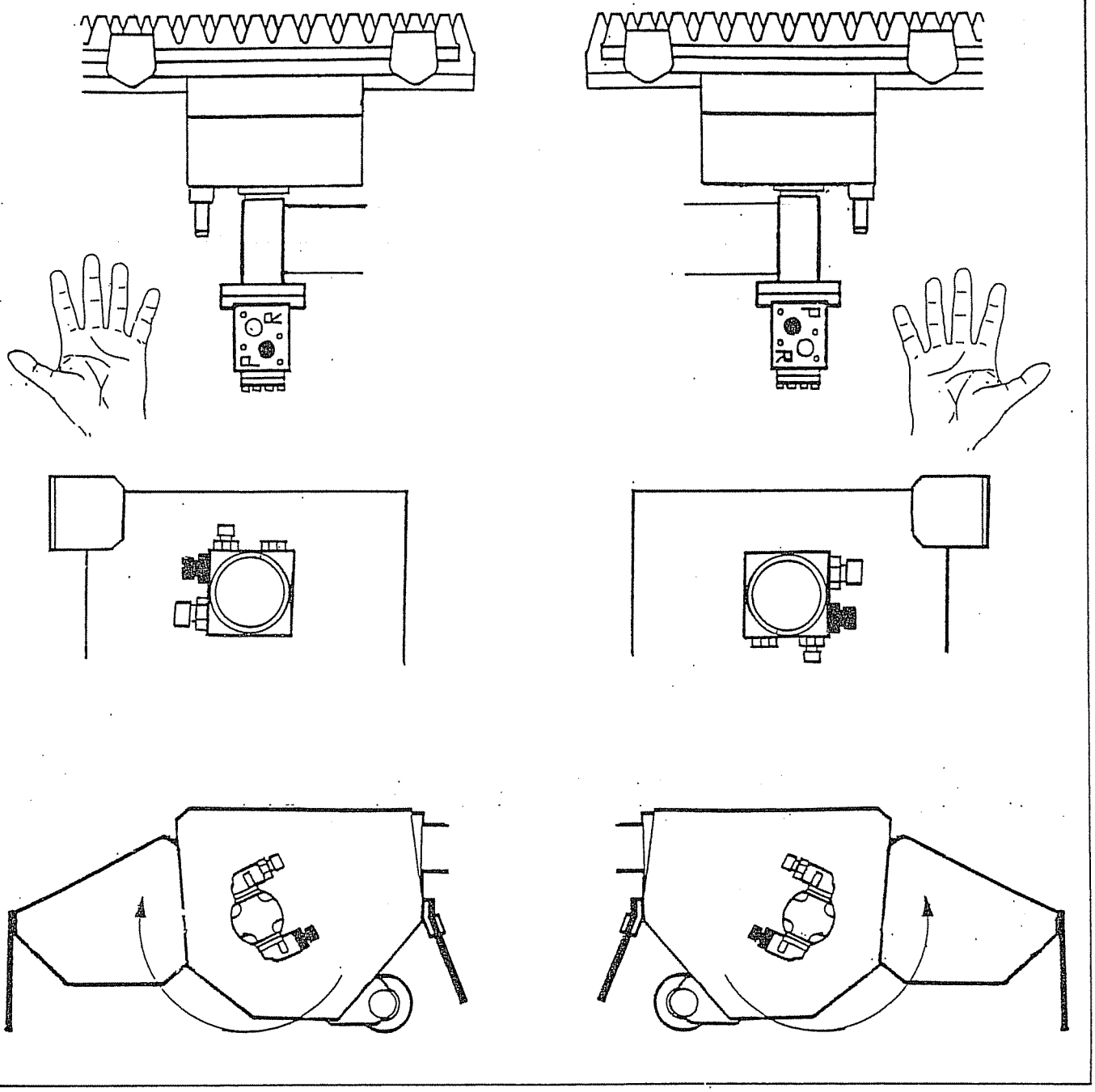
Raise the stand legs into the work position and secure

13.) Remove transport strap

14) With tractor external services activated on Si models or with PTO engaged on Ti models manoevre the arms into a position that will allow the cutter head to be fitted. Fill cutter head and secure with circlip, washers and split pin.

15) Cutterbar only
Engage motor splines in the drive tube and bolt in position with connection uppermost.

16) Schläuche anschließen.



17) With the arms at half reach and with the flail head clear of the ground carry out final adjustment of the lift arm levelling box to bring the main frame horizontal

18) Tighten check chains and/or stabiliser bars

19) Carefully operate the machine through its full rang of movements whilst checking that hoses are not strained, pinched, chafed or kinked and that all movements are functioning correctly

20) Fold the machine into the transport position (see page 21)
The machine is now ready to proceed to the work site.

OIL REQUIREMENTS

Tank

The machine is delivered from the factory without oil. Fill the reservoir with a light hydraulic oil as recommended in the chart until the oil level is approximately 3" below the top of the tank. The total capacity is approximately 65 litres (14 galls). Do not overfill.

Supplier	Cold or temperate climate	Hot climate
Castrol	Agricastrol hydraulic oil Hy-spin AWS46	Hy-spin AWS68
Shell	Tellus 46	Tellus 68
Mobil	D.T.E. 25	D.T.E. 26
Esso	Nuto 'H' or 'A' 46	Nuto 'H' or 'A'68
Texaco	Rando HD 46	Rando HD 68
Gulf	Hydrasil 46	Hydrasil 68
B.P.	Energal HLP 46	Energal HLP 68
Dalton	Silkolene Dove 46 or Derwent 46	Silkolene Dove 68
Elf	Hydrelf 46	Hydrelf 68
ISO VG	46	68
SAE	10W	20

Gearbox

Check the gearbox oil level. On level ground it should be filled until oil is visably level with the lip of the filler plug aperture. Do not attempt to fill by removing the breather as the depth of tapped thread in the casing at this point is insufficient to allow repeated loosening and tightening of the breather plug.

The gearbox capacity is 700 millitires (1 1/4 pint use EP 90 gear oil.

FITTING CONTROL UNIT IN CAB

An angled bracket is supplied to provide a mounting location for the control unit.

This bracket may be bolted to the mudwing or cab cladding in a convenient location ensuring that no structural member of the cab or roll bar is drilled.

In deciding the final position of the control box remember not to exceed the minimum acceptable bend radii of 8" for the cables.

When the control unit is removed from the cab ensure the rubber edge strip is fitted to the mounting bracket to cover any possible sharp edges.

RUNNING UP PROCEDURE

Ti models only - with flail head only.

Ensure that the rotor control valve is in "STOP" position, start tractor, engage P.T.O. allow the oil to circulate through the return line filter for about 5 minutes without operation of the armhead control lever.

Operate the armhead levers through their complete range ensuring that all movements are functioning correctly.

Place the flail head at a safe attitude and move the rotor control to "START" position. After initial fluctuation the rotor should settle to a steady speed. Increase P.T.O. speed to approximately 360 rpm. and run for a further five minutes before disengaging and stopping tractor.

Check the hose runs and observe that they are free from any pinching, chafing, straining or kinks. Re-check the oil level in the tank and top up as necessary.

Si models only - with cutterbar or flail head.

Ensure P.T.O. lever is in neutral position, and isolate tractor hydraulic linkage. Start tractor and select external service supply. Allow the tractor to run for several minutes **before** attempting to operate any of the machine control levers.

On operating move the levers through their complete range ensuring that all movements are functioning correctly.

Check the tractor rear axle oil level and top up if necessary.

On cutterbar models ensure the motor hoses are connected correctly - see page

Place the cutterhead at a safe attitude and bring tractor engine revolutions to 1000 rpm. Engage P.T.O. and allow the cutter to run for several minutes. Do not leave the tractor cab or allow anyone to approach the cutter head at this time.

Caution

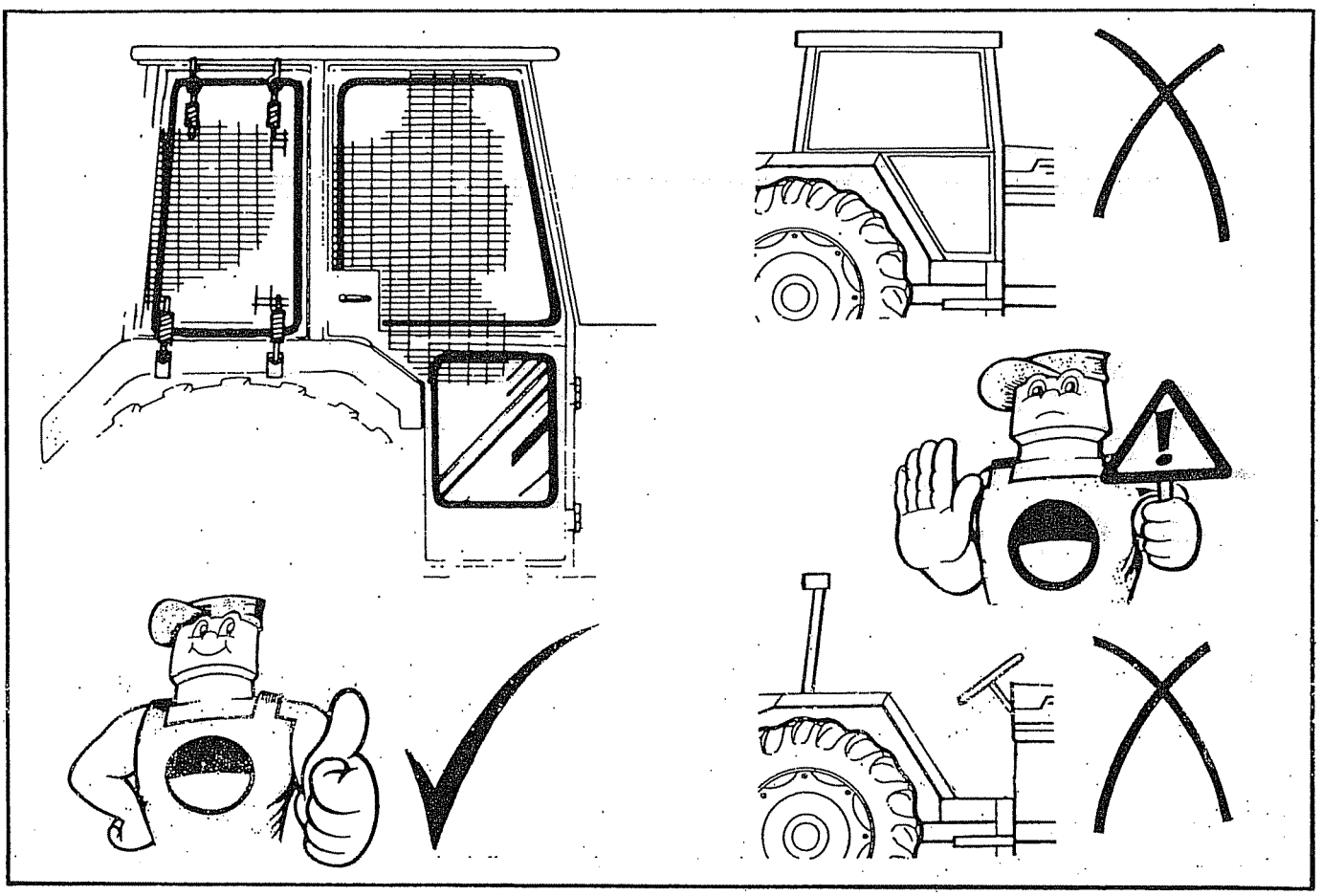
Do not allow the pump to continue working if the cutter does not operate. Overheating and serious damage to the pump can be caused in a very short time.

After running up the machine increase P.T.O. speed to approximately 360 rpm. and run for a further five minutes to allow the oil to circulate through the return line filter before disengaging the P.T.O. and stopping tractor.

Check the hose runs and observe that they are free from any pinching, chafing straining or kinks. Re-check the oil level in the tank and top up as necessary.

OPERATION

OPERATOR GUARD



MACHINE GUARDS

Before each period of work check that all the relevant machine guards are in position and are in good condition.

Small splits and abrasions to the lower edges of the rubber flaps are permissable but should one of these cuts or splits attain fifty per cent of flap height it will become ineffective for debris containment and should be replaced immediately.

OPERATOR SAFETY

During operation **all the tractor windows should be kept closed** except the rear window which may be open - **only sufficient** to allow the entry of control cables into the cab.

Should the tractor not be equipped with a "quiet" cab ear defenders **must** be worn or permanent damage to hearing may occur.

Although in normal circumstances rotating parts should **never** be approached it is a wise precaution to avoid wearing loose or flapping clothing especially scarves and neckties.

The operator should continually guard against the complacency that can arise from familiarity. Never attempt to take short cuts, always follow the correct procedures diligently and abide by the restrictions imposed by safety considerations. **REMEMBER: THE ONLY WAY IS THE SAFE WAY.**

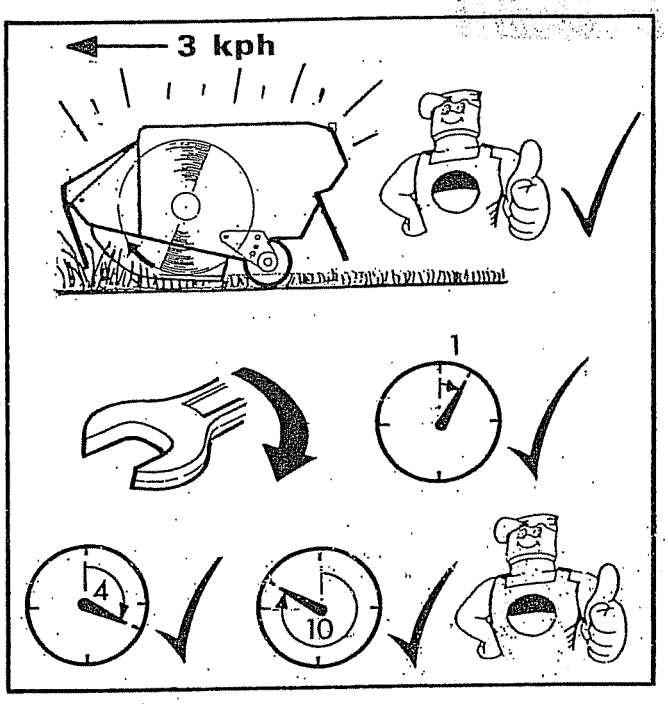
PREPARATION

Read the book first.

Practise in an open space without the rotor running until familiar with controls.

Caution: **Take care when working with the head close in as it can hit the tractor.**

RUNNING IN NEW MACHINE



For the first days work it is recommended that tractor forward speed is restricted to 3Km/hr max. This will allow machine components to bed in and the operator to become familiar with machine responses under working conditions whilst operating at a relatively slow speed.

If possible select a first days work that will provide a majority of light to average cutting with only occasional heavy duty work.

During this period check that nuts and bolts are tight after one hour, four hours and again at the end of the day.

CUTTING PRECAUTIONS

Inspect the work area, remove any hazardous material and note any immoveable obstructions.

If the type of work being undertaken makes this important precaution impractical always maintain a high degree of alertness and observation and restrict the tractors forward motion to a speed which will allow the operator to stop the tractor before contact is made with any hazard!

GENERAL WORKING PRACTISES

It is the operators responsibility to develop safe working procedures.

ALWAYS:-

Be aware of hazards in the vicinity.

Make sure **all** guards are in position and in good condition.

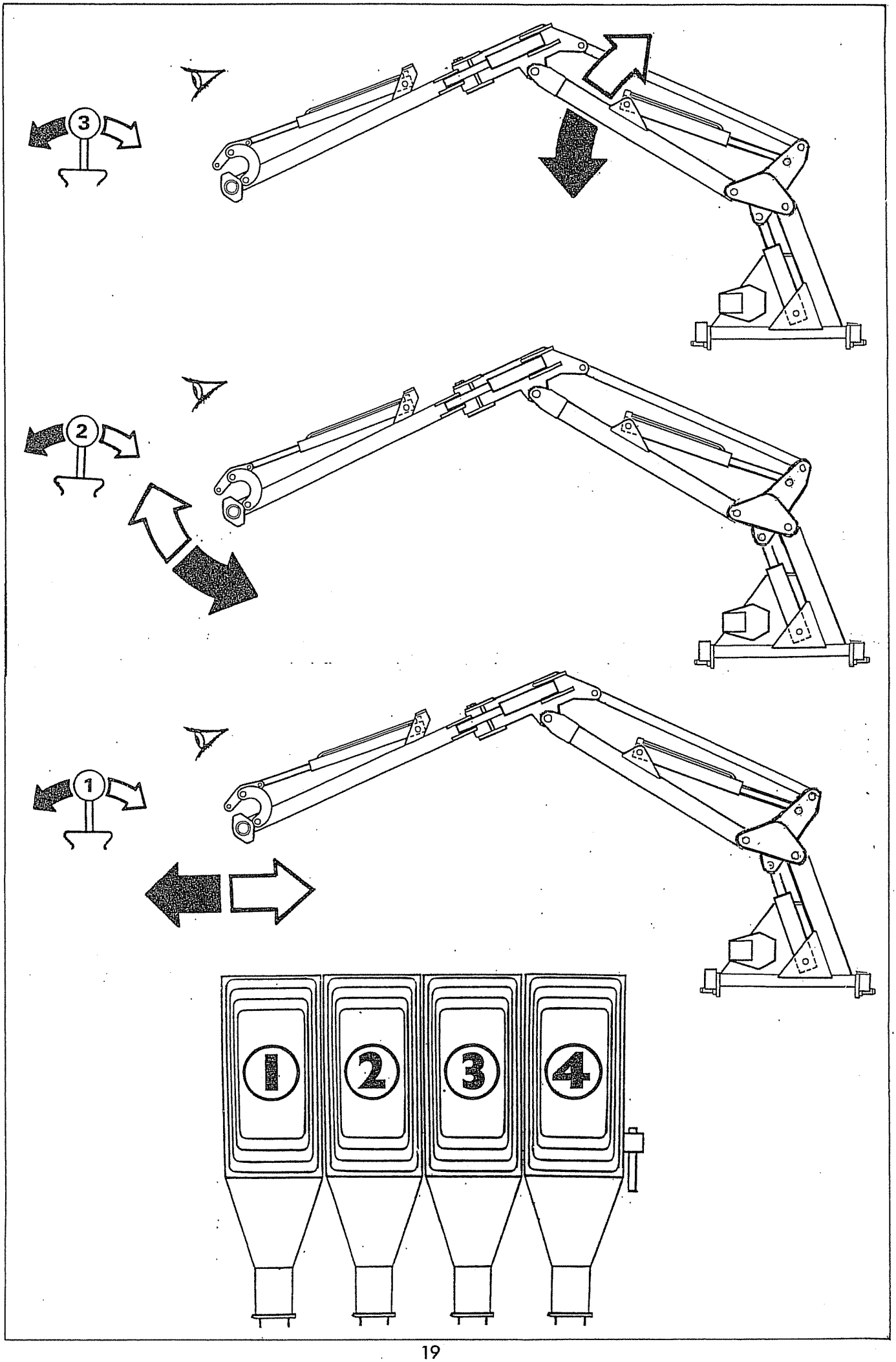
Disengage P.T.O. **before** stopping the engine.

Wait until the flail has stopped running **before** leaving the tractor seat.

Disengage the P.T.O. and **stop** the tractor engine **before** making any adjustments.

Check frequently that all nuts and bolts are tight.

Keep bystanders at a safe distance.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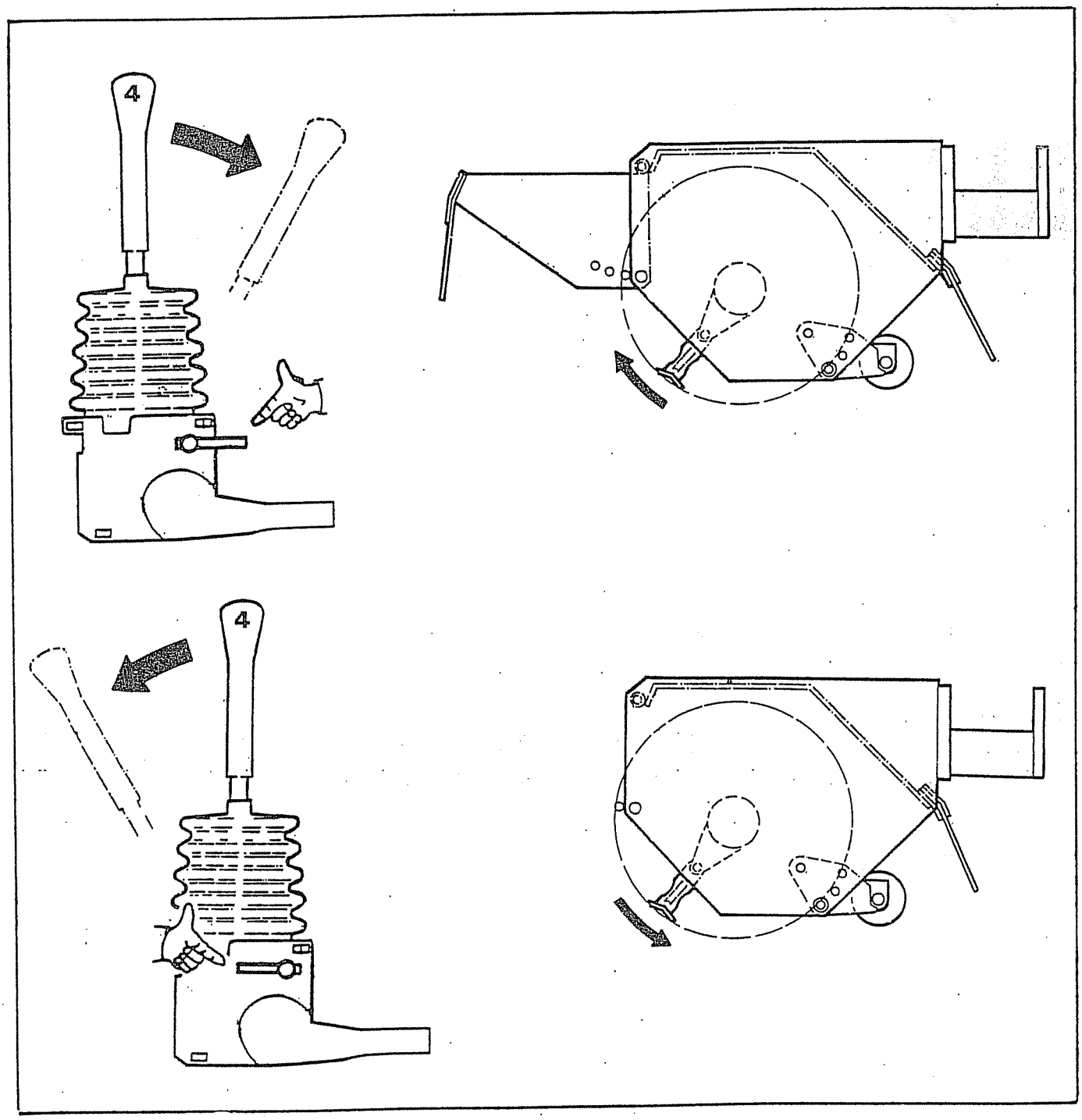


Reversing rotation Ti machines - PA41 with flailhead

Select "Rotor OFF"

WAIT until the rotor has stoppedturning.

Turn the small lever on the side of the rotor control lever pivot box through 180 degrees. This will reset the control lever stop inside the pivot box and allow opposite rotation to be selected.

Reversing rotation - PA41 with cutterbar

Always pull the lever towards the operator to start cutterbar operation.

Never reverse cutting direction

Reversing rotation Si machines - PA41 with flailhead

The flail hose connections on the junction bracket at the lower end of the dipper arm must be interchanged.
Note if machine is converted to cutterbar configuration check hose connections to cutterbar motor carefully as the wrong connections could damage the knife drive.

PA41 with cutterbar – Never reverse cutting direction

TRANSPORT POSITION

For transport on the public highway the flail must be folded within the overall width of the tractor.

PA 41 with flail head

Position the arm until the head is approximately four feet (1.5m) clear of the ground and the dipper is horizontal.

Pull the dipper arm to the rear to remove tension on the breakaway ram base pin and remove it.

Manually break back the dipper until the base of the ram is re located between the inboard holes in the ram lugs. Replace the ram base pin.

Select "Lift up" until the main arm is as high as it can go without projecting beyond the tractors width. Fully select "Reach in". Select "Angle down" to turn the flails towards the tractor.

For off road transport where width is not critical it will be sufficient to fully fold the arms.

PA 41 with cutterbar

With cutterbar horizontal and with tractor switched off fit knife guard. Remember to keep fingers away from the knife as it can move even with the tractor engine switched off.

Select "Lift up" until the main arm is as high as it can go without projecting beyond the tractors width. Fully select "Reach in". Fully select "Angle up".

To revert to 'work' mode the above procedures must be reversed.

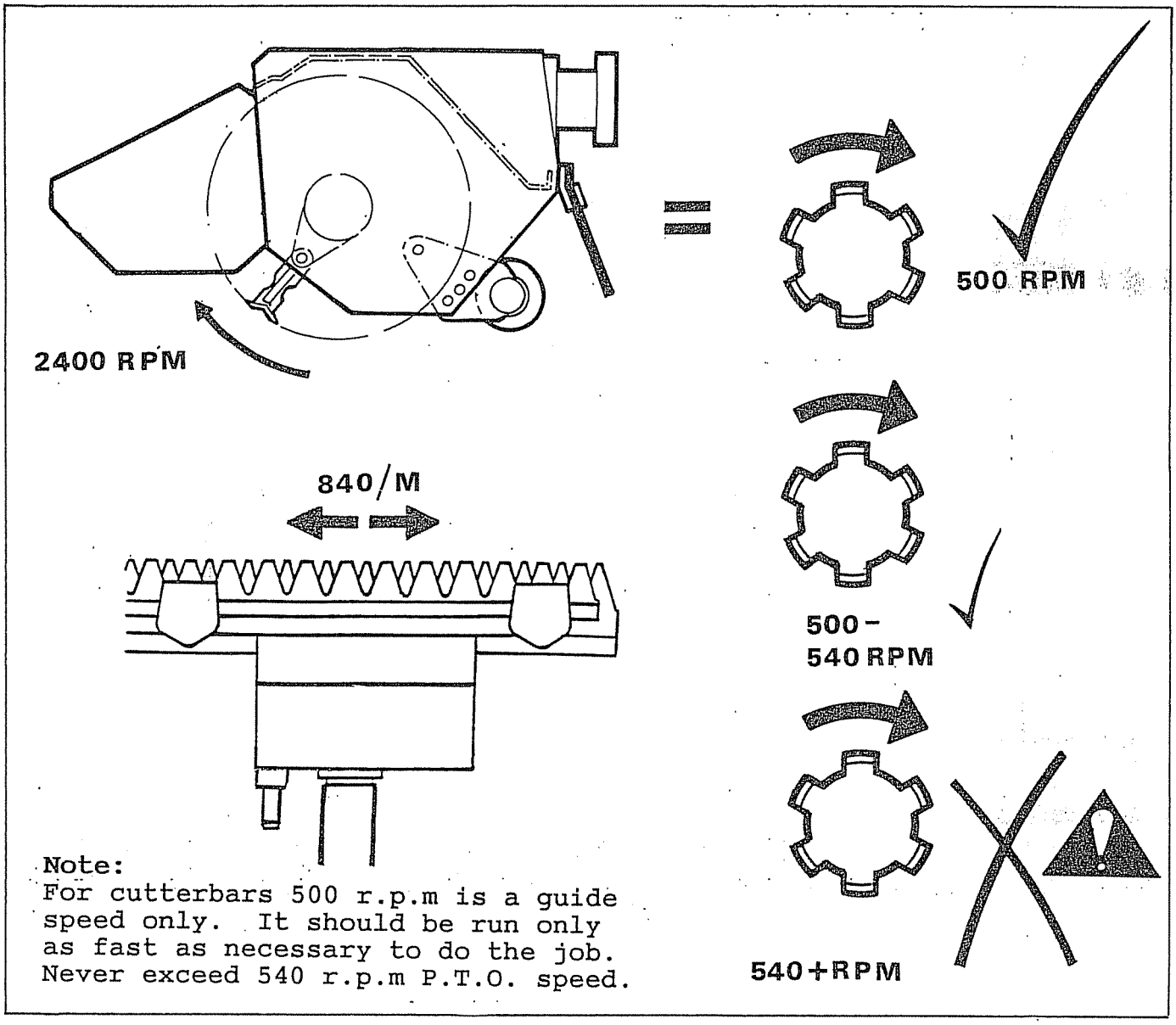
ENGAGING DRIVE

a) Ti models only

Ensure that the rotor control lever is in the 'Stop'position before engaging the P.T.O. shaft. Allow the oil to circulate for a minute or so before operating the armhead levers. Position the flail head in a safe position, increase the engine speed to a high idle and move rotor control lever to 'START'. After initial surging the rotor will run at an even speed.

b) Si models only

On cutterbar models ensure that the motor hoses are connected correctly - see page
Place the cutter head at a safe attitude and bring the tractor engine revolutions to 1000 rpm. Engage the P.T.O. and slowly increase revs. until operating speeds are attained.

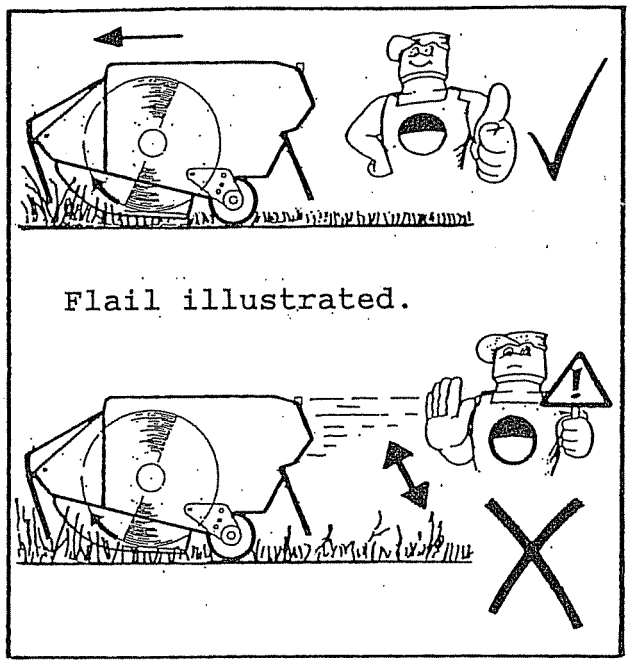


Note:
For cutterbars 500 r.p.m is a guide speed only. It should be run only as fast as necessary to do the job. Never exceed 540 r.p.m P.T.O. speed.

TRACTOR FORWARD SPEED

Tractor forward speed is determined by the material being cut. Forward speed can be as fast as that which allows the cutter head sufficient time to cut the vegetation properly.

Too fast a speed will be indicated by over frequent operation of the breakaway system, a fall off in tractor engine revs and a poor finish to the work



Flail illustrated.

PARALLEL MOTION GEOMETRY

This feature enables the operator to adjust the reach of the machine in and out without having to continuously adjust the lift service to compensate for the change in head pivot height as is the case with traditional geometries.

Note:- The performance of the feature is at its most accurate during the mid range of the reach travel with some deterioration in performance being experienced when the outer extremities of reach adjustment are approached.

BREAKAWAY

The pivoted arm is held and in line by the oil pressure in the fully extended breakaway ram. When the flail head meets an obstruction and the tractor continues to move forward oil pressure will build up, against a relief valve situated in the base of the breakaway ram. When the preset pressure is reached the valve will blow and the oil will be vented into the lift ram. This will allow the flail head to pivot backwards and at the same time cause the arms to rise. When the obstruction is cleared oil pressure contained in the lift ram will cause the arm and flail head to return to the work position.

WORKING CLOSE IN TO THE TRACTOR

When working close in to the tractor always be aware that the main arm projects beyond the tractors cab on the offside and potentially into the path of parked or oncoming vehicles.

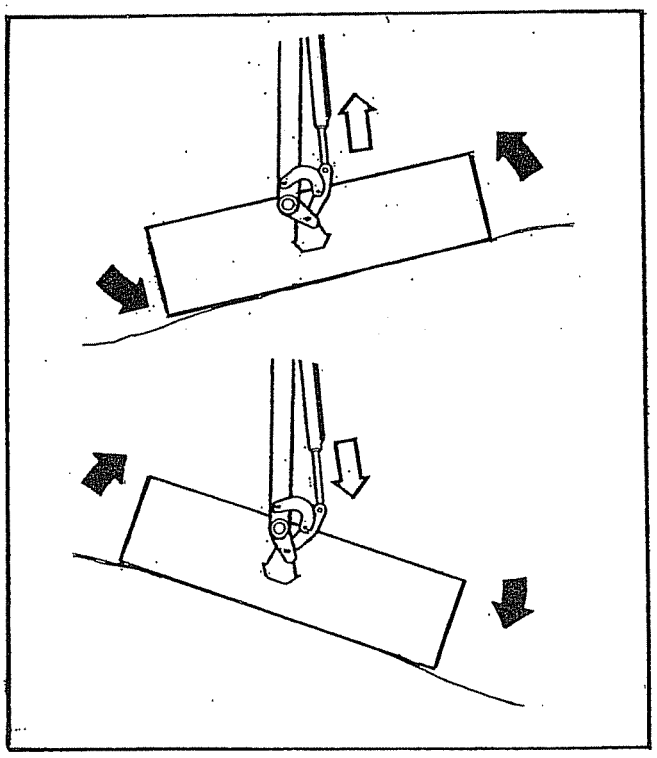
ANGLE FLOAT

The selection of angle float on the control box simultaneously connects both gland and base side of the angling ram to tank.

The ram rod can then extend and retract freely allowing the flail head to automatically follow the contours of the ground.

Angle float is an "operator friendly" mowing feature and can be used singly or in conjunction with lift float.

Note:-
for the feature to work to its maximum capabilities the head must be mounted such that it is balanced about the pivot



OVERHEAD OBSTRUCTIONS

Always take extra care when manoeuvering in areas with overhead obstacles especially power cables.

WORKING ON PUBLIC HIGHWAYS

When working on the public highway it is the operator's responsibility to familiarise himself with any national and local regulations concerning this type of activity and to abide by them at all times.

In addition he must remember that there is a potential for debris to be thrown long distances should it escape the head shrouds.

In inhabited areas work should only proceed with extreme caution and any bystanders must be kept away from the potential danger area.

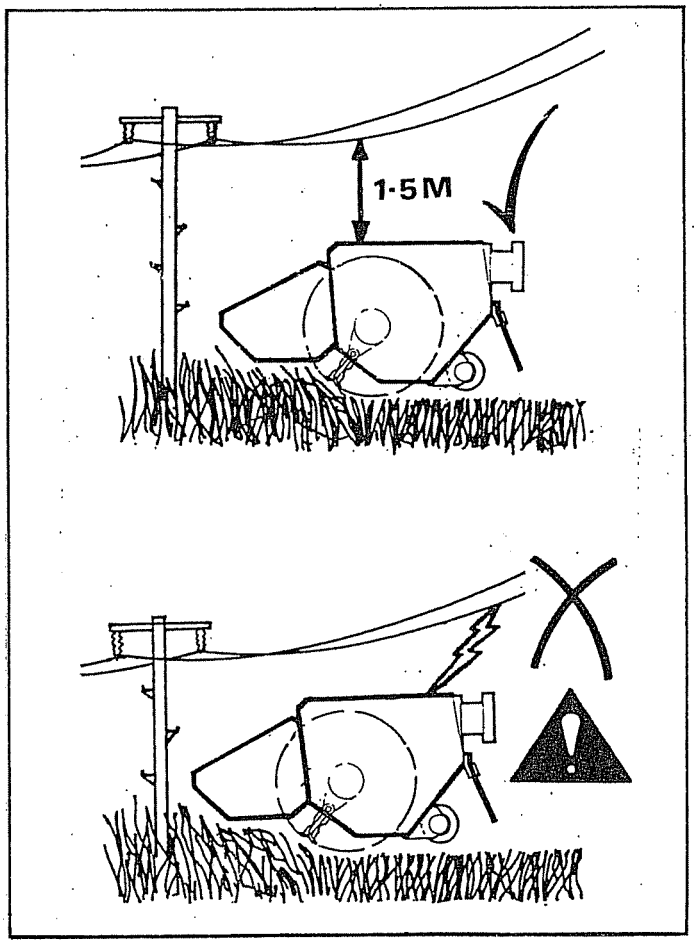
HIGH VOLTAGE CABLES

WARNING

Depending on the voltage of the cables and the weather conditions there is a danger of electric flashover if the head or arms approach the cables too closely.

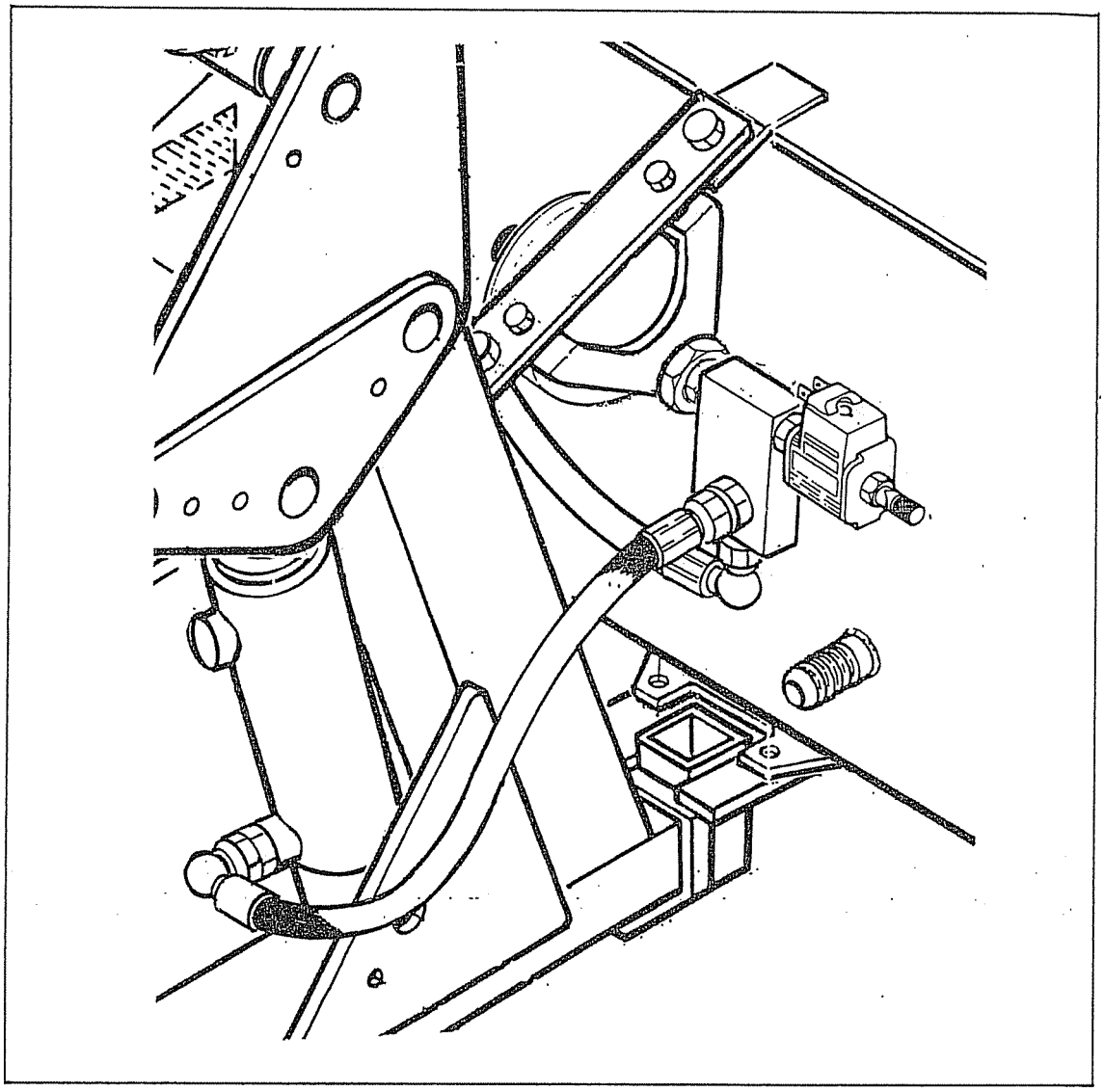
Always maintain a minimum clearance distance of 1.5m when operating near high voltage cables.

If in any doubt consult your local electric company regarding a safe procedure for work.



Flail head illustrated. Some dimension applies to cutterbar.

LIFT FLOAT KIT (Optional extra for ground cutting on flail machines only).



The hydraulic float kit, if fitted, should be mounted as shown bolted to the tank stay strap.

In work with the poppet valve open the flail head will automatically follow the ground contours.

The float action is engaged by manually lifting the knurled punger on top of the poppet valve out of the V groove and rotating through 90 degrees.

The lift control should be operated to take a proportion of the flail head weight off the flail roller. This is important, too little weight on the roller will leave uncut areas of grass while with too much weight on the roller the ground will be scalped in places and increased flail wear, damage, or even loss of flails could occur.

To revert to standard operation the accumulator is isolated from the lift ram by returning the knurled plunger to the 'off' position.

REMOVAL FROM TRACTOR

DANGER

READ CAREFULLY BEFORE COMMENCING TO REMOVE THE MACHINE FROM THE TRACTOR.

THE ORDER OF THE FOLLOWING STEPS MUST BE FOLLOWED EXACTLY

DISCONNECTING THE TOP LINK MUST BE THE LAST OPERATION PRIOR TO DRIVING THE TRACTOR AWAY FROM THE MACHINE.

WARNING
Do not operate quadrant lever or machine controls through the rear cab window whilst standing on or amongst linkage components. Always seek assistance.

Select a firm level site for parking the machine.

Lower the stand legs and fix

Raise the machine of the tractors linkage until the weight is taken off the stabiliser

Remove the stabiliser nose quadrant locking pin

Lower the machine to the ground

Operate machine controls and place the flail head on the ground

Disengage tractor P.T.O. and remove the drive shaft

Unbolt the control unit from the mounting pillar, remove from tractor cab and stow the lever or switchbox clear of the ground.

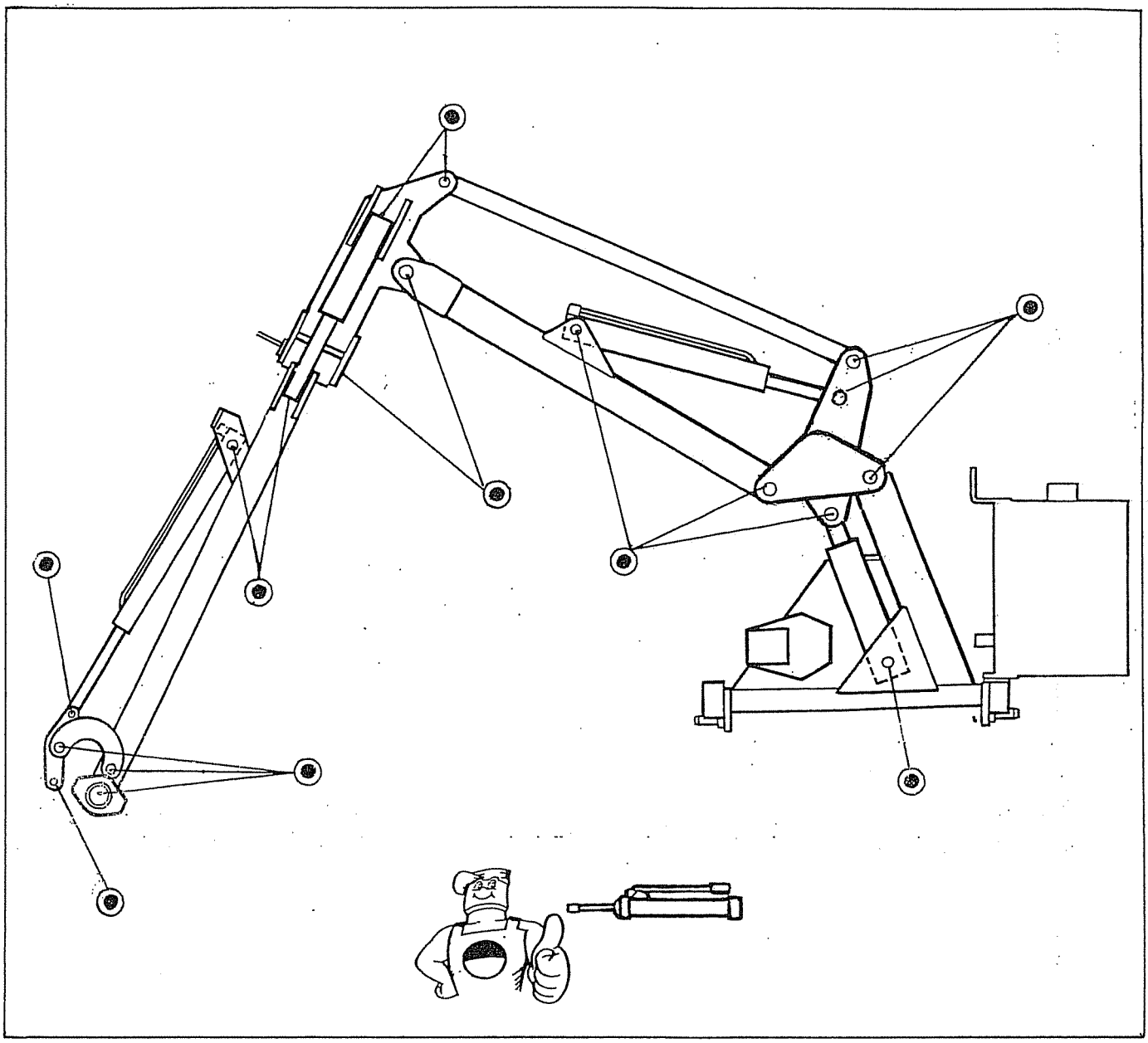
Disconnect the stabiliser from the tractors top hitch position.

Remove draft link pins and drive tractor away

STORAGE

If machine is to be left standing for an extended period of time, lightly coat the exposed portions of the ram rods with grease. Subsequently this grease should be wiped off before the rams are next moved.

If the machine has to be stored outside tie a piece of tarpaulin or canvas over the control assembly do not use a plastic fertilizer bag which could lead to rapid corrosion.



LUBRICATION

General

Grease daily all points shown.

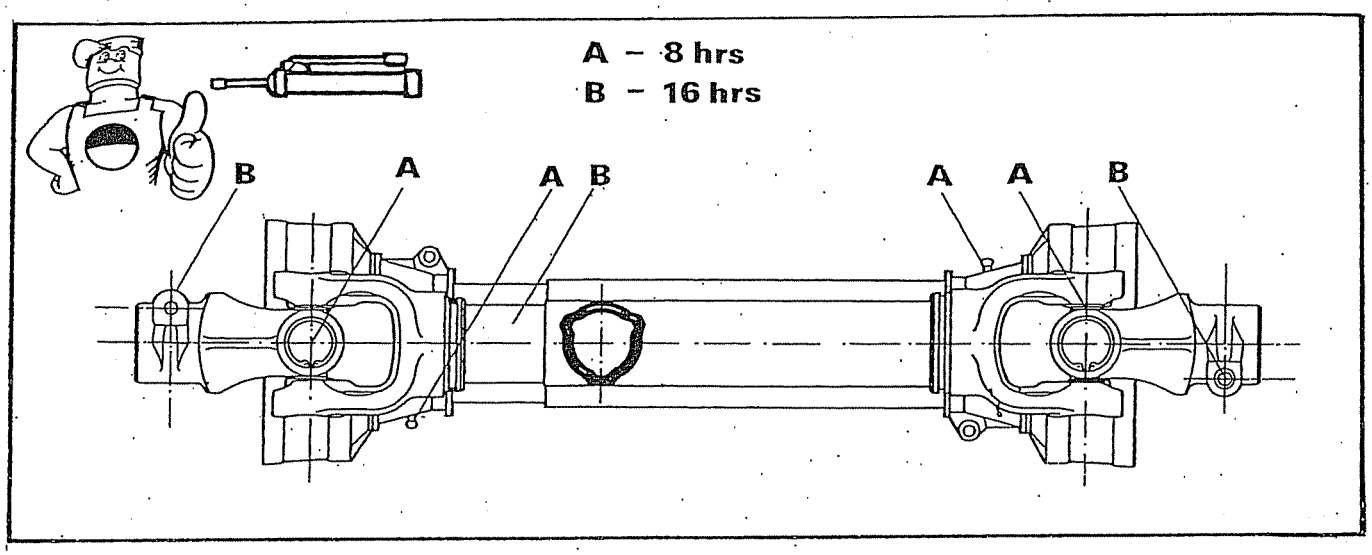
P.T.O. SHAFT

Regularly check the P.T.O. guards for damage and ensure the anti rotation chains are in place and that their anchor points are in good condition.

Do not operate the machine with any damage to guards, replace suspect items immediately.

Lubrication

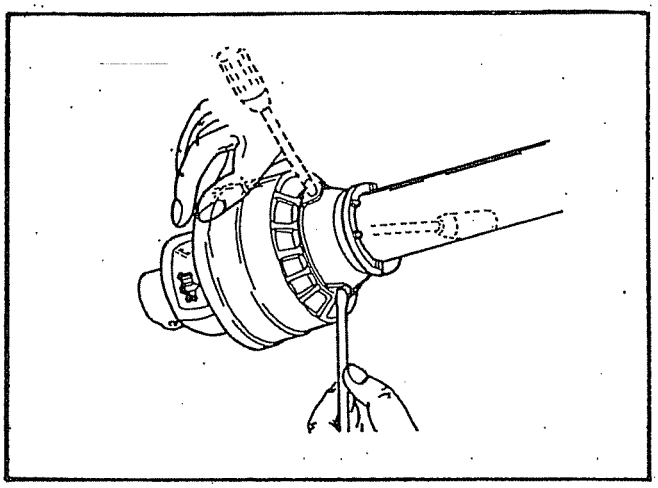
Lubricate the shaft at the points shown below at the intervals indicated using a general purpose lithium based grease.



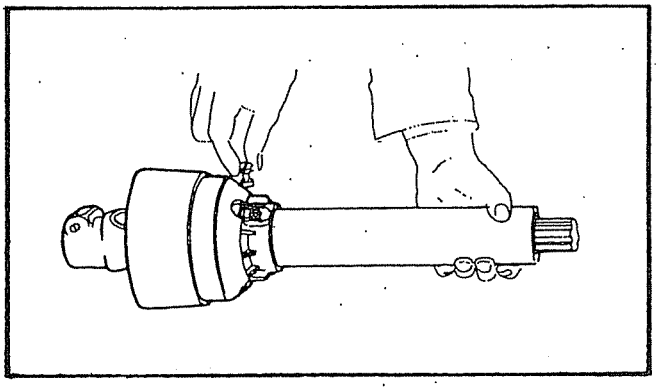
CUTTING P.T.O. SHAFT

Separate the two P.T.O. half shafts from one another.

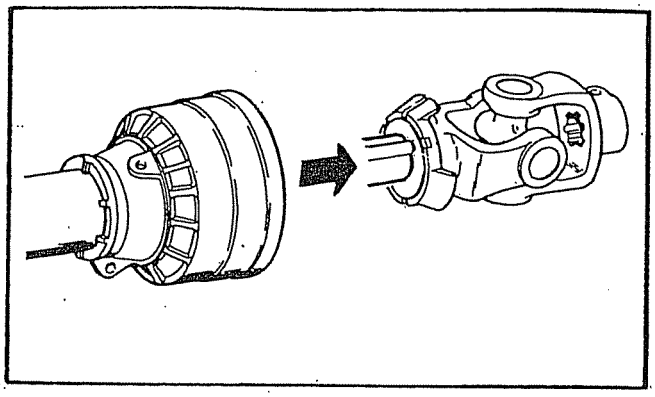
Turn the three guard fixing screws for each shaft half through 90°.



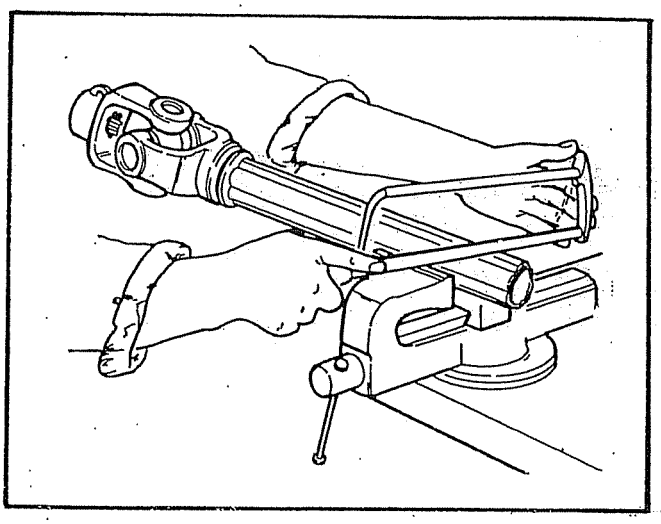
Extract the three screws for each shaft half.



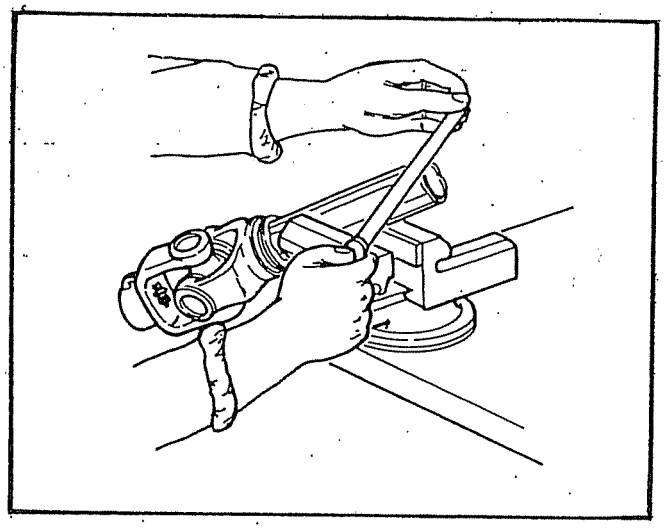
Separate the shafts from the guards/



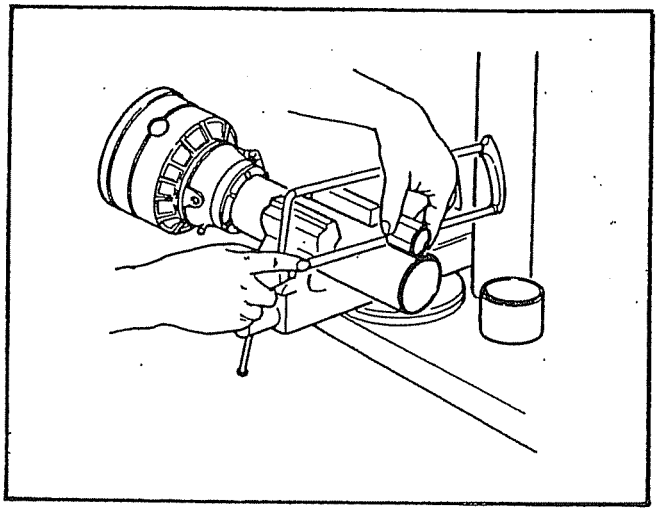
Cut the calculated shortening amount off both driver and driven shaft halves to give the required P.T.O. length.



De-burr the ends of the cut shafts.



Cut the same amount off both guard halves as cut off the shafts.



Slide the shafts into the guards. Refit the three screws, turn through 90° to secure and reassemble both shaft halves together

HYDRAULIC SYSTEM

Oil supply

Check the oil level in the reservoir daily.

No fixed time period can be quoted for oil changes as operating conditions and maintenance standards vary so widely. Burnt and scorched oil odours and the oil darkening and thickening are all signs of oxidation and indicate the oil should be changed.

Moisture which results from condensation can become entrapped in the oil and cannot be removed by filtration so that water contamination is progressive.

Contamination can be reduced by:-

1) Cleaning around the reservoir cap before removal, and keeping that area clean

11) Using clean containers when replenishing the system

111) Regular servicing of the filtration system

Filtration Maintenance

The machine is protected by a 125 micron suction strainer and a low pressure 10 micron full flow return line filter.

1) Suction strainer

The strainer is permanently fixed within the reservoir.

Should symptoms of pump cavitation or spongy intermittent operation occur the tank must be drained and flushed out with a suitable cleaning agent eg. clean diesel oil

111) Return Line Filter

The elements should be changed after the first 50 hours and thereafter at 500 hour intervals. It is important to note hours worked as if the filter becomes blocked an internal by-pass within the canister will operate and no symptoms of filter malfunction will occur to jog your memory.

P.T.O. GEARBOX

The gearbox oil should be changed every workingyear or at 600 hour intervals, whichever occurs first. On level ground gearbox should be filled until oil is visably level with the lip of the filler plug aperture. Do not attempt to fill by removing the breather as the depth of tapped thread in the casing at this point is insufficient to allow repeated loosening and tightening of the breather plug.

The gearbox capacity is 700 millitires (1 1/4 pint) use EP 90 gear oil.

HYDRAULIC 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. When 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.

Before changing hoses study the installation these are carefully calculated to prevent hose damage during operation. Always replace hoses in exactly the same manner. This is especially important for the flail hoses where they must be crossed, upper to lower, at the dipper and head pivots.

All Hydraulic Hoses (B.S.P.) now fitted to McConnel Power Arm Hedge/Grass Cutters have "Soft Seal" connections on both flail and ram circuit hoses.

Recommended torque settings for nut security are as follows:-

M 14	=	24 N.m	or	18 lbf ft
M 18	=	33 N.m	or	24 lbf ft
M 22	=	44 N.m	or	35 lbf ft
M 26	=	58 N.m	or	43 lbf ft
M 30	=	84 N.m	or	62 lbf ft
M 36	=	115 N.m	or	85 lbf ft

For hose unions (B.S.P.) fitted in conjunction with bonded seals the recommended torque settings are as follows:-

1/4" BSP	=	34 N.m	or	25 lbf ft
3/8" BSP	=	75 N.m	or	55 lbf ft
1/2" BSP	=	102 N.m	or	75 lbf ft
5/8" BSP	=	122 N.m	or	90 lbf ft
3/4" BSP	=	183 N.m	or	135 lbf ft
1" BSP	=	203 N.m	or	150 lbf ft

SAFETY NOTE

Soft Seal hose connections are capable of holding pressure when the nut is only "finger tight". It is therefore recommended that when dismantling the hose is manually flexed, to relieve any residual pressure, with the retaining nut slackened prior to complete disassembly.

CABLES

The cables operate on a push/pull system with the spool centering springs always returning the spool to the neutral position when the handle is released.

Care should be taken during installation and operation to ensure that the cables are not trapped or kinked. Any abrasion or damage to the outer casing should be sealed with plastic insulation tape to avoid moisture penetrating.

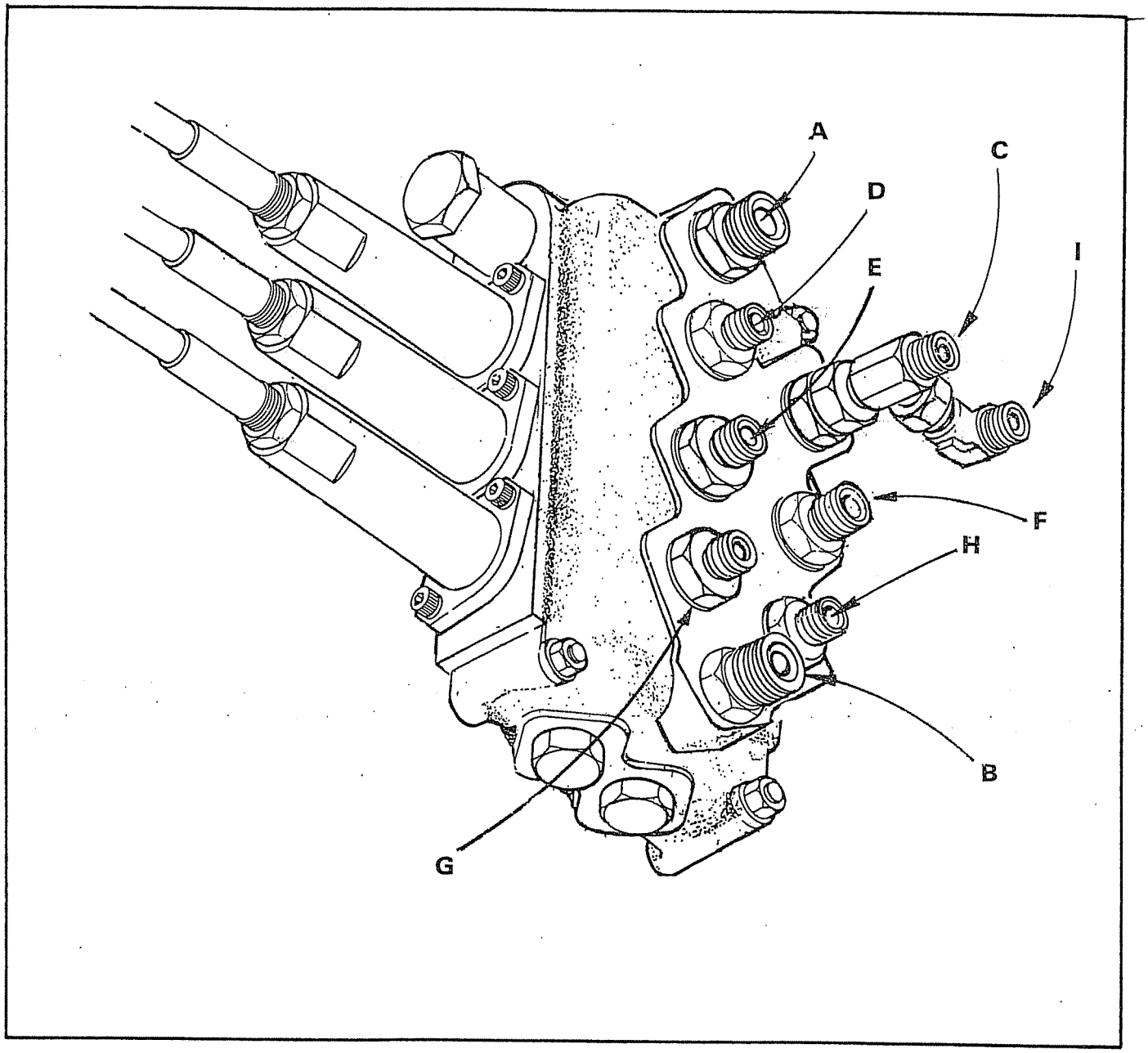
No routine adjustment of the cables are necessary as they do not stretch. The threaded collar is correctly adjusted when the lever is in a vertical position in its housing allowing an equal amount of travel in either direction.

CAUTION On no account should any attempt be made to lubricate the cables which are assembled with a special lubricant during manufacture.

NOTE Take care to ascertain the correct cable connections on both the control unit and the valve in the event of cable replacement.

HOSE CONNECTIONS

MAIN CONTROL VALVE



A Supply

B Return

C Lift base

D Lift gland

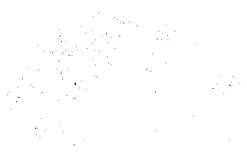
E Reach base

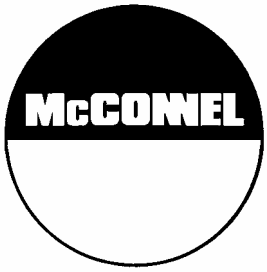
F Reach gland

G Angle base

H Angle gland

I Breakaway ram





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