

Merlin

Heavy duty flail

OPERATOR MANUAL



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*) Linkage Mounted Flail Mower.....

.....

Product Code HD18, HD22, HD25 & HD27.....

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 John Frank.....

on behalf of McCONNEL LIMITED

Responsible Person

Status: Chief Design Engineer

Date: 25th January 2005

READ THE BOOK FIRST

It might save hours and pounds later !

When ordering spare parts always quote

- ***The Machine Type***
- ***The Machine Serial Number***
- ***The Part Number***

Factory re-built service exchange units of the major hydraulic components are available from your Dealer

NOISE

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 and 90 DB, ear protection is recommended, it should be used if any window is left open.

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FOR NOTES

GENERAL INFORMATION

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

Use only McConnel spare parts on McConnel equipment and machines.

DEFINITIONS

The following definitions apply throughout this manual:

WARNING

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

CAUTION

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

NOTE

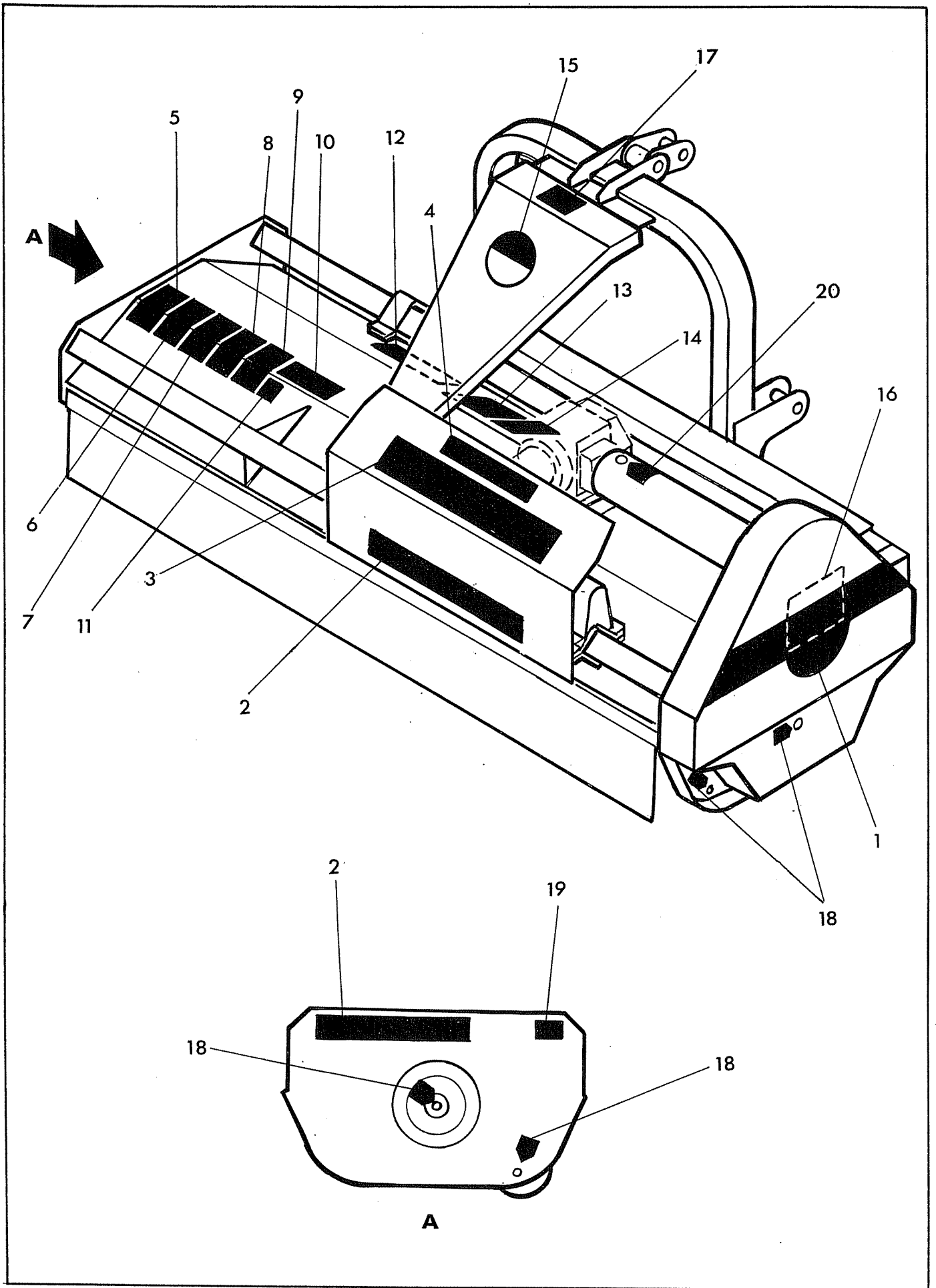
An operating procedure, technique etc., which is considered essential to emphasise.

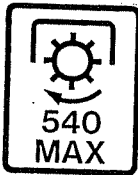
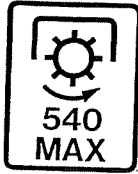
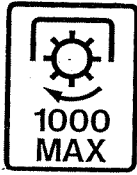
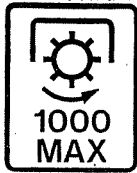
Left and Right-Hand

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

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

STICKERS





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MDL 275
MOR 275
MDL 250
MOR 250
MDL 220
MOR 220
MDL 180
MOR 180

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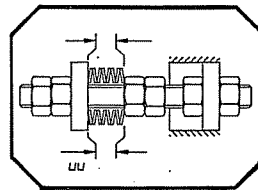
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McCONEl

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KEEP BOLTS TIGHT
 CHECK AFTER 1 HOUR, 4 HOURS,
 10 HOURS & THEREAFTER, DAILY.

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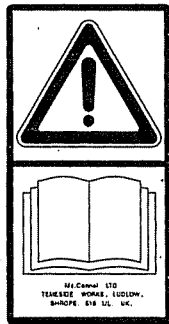
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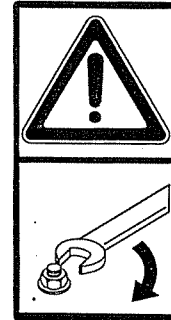
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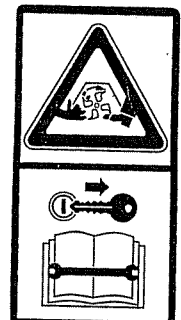
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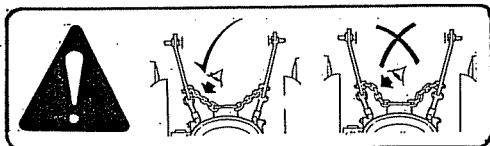
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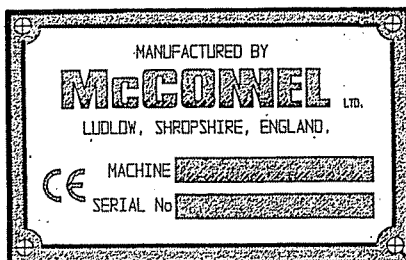
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MERLIN

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FLAIL PARTS INFORMATION

McCONEl Flail Mowers use dynamically balanced and mated system components for Cutter Shafts (Rotors), Knives (Flails), Knife Hangers (Shackles), Bolts, Bushes, Rollers, Drivetrain Components, Bearings-Belts and Belt Pulleys. McCONEl parts are made and tested to meet close-tolerance specifications of balance, quality and consistency that assure long, trouble-free service. "Will-Fit" parts do not ordinarily meet McCONEl Standards and could reduce Mower performance, void warranties, and present an increase in the safety hazard potential.

DON'T GAMBLE!
 USE GENUINE McCONEl SERVICE PARTS
 See your McCONEl dealer

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MACHINE SPECIFICATION

Machine Feature	180	220	250	275
Cutting width	1800mm	2200mm	2500mm	2750mm
Overall width	2100mm	2500mm	1800mm	3000mm
Max sideshift	700mm	700mm	700mm	700mm
Weight	720kg	780kg	880kg	980kg
No. of flails	20	24	28	32
P.T.O.	540 and 1000	540 and 1000	540 and 1000	540 and 1000
Cutting speed	40/45 m/sec	40/45 m/sec	40/45 m/sec	40/45 m/sec
Rotor rpm	2100	2100	1900	1900

P.T.O.

1 3/8 x 6 spline supplied as standard.

1 3/8 x 21 spline available as option.

MACHINE MOUNTING

All models available to mount on left or right hand and the front or rear of the tractor.

SAFETY PRECAUTIONS



WARNING...

Set the tractor wheel widths as wide as required to maintain sideways stability in all working conditions.

Operate the machine only on a tractor fitted with a roll over protection system. Wear seat belts if fitted. Do not alter the R.O.P.S. structure.

Make sure the P.T.O. shield is installed when using the P.T.O. driven equipment and always replace the P.T.O. shield if damaged.

Always wear 'hard hats', safety glasses and safety footwear.

Never allow inexperienced or untrained personnel to operate the tractor/mower combination without supervision.

Always read and understand the instruction manual first. If anything is unclear consult your dealer or McConnell direct.

Always familiarise yourself with the local highway regulations and abide by them at all times.

Never transport the machine even for a short distance with the flails rotating.

If working across slopes turn very slowly. Never transport or operate on steep slopes.

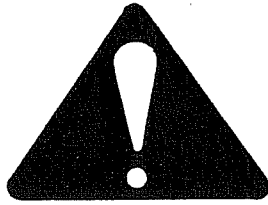
Always operate the machine at the recommended P.T.O. speed. Never exceed the maximum permitted.

Ensure the work area has been inspected and any dangerous or loose items are removed and that all flail head guards are in position and in good condition.

Never allow the flails to contact hard immovable objects or to become entangled in wire.

Never allow riders on the tractor or mower head.
KEEP BYSTANDERS CLEAR.

Inspect all machine parts regularly and maintain in safe working condition.



Do not operate machine with high pressure oil leaks. Never test for oil leaks with your hand, use cardboard. If high pressure oil contacts the skin seek medical assistance instantly.

Never continue to operate the machine if a damaged or lost flail is causing vibration.

Never become complacent and ignore any safety instructions.

Always disengage the P.T.O., switch off tractor and wait for the flail to stop rotating before leaving the tractor seat.

Always check all nuts, bolts, hoses and other fixings daily for tightness, security and damage. Repair immediately if required.

Should wire become entangled in the rotor despite all precautions always remove it by unwinding by hand or by using shears.

Always replace a lost or damaged flail together with its opposite one in pairs as soon as possible.

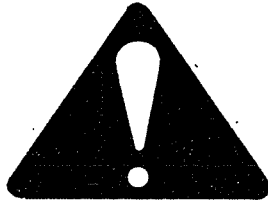
Never work under a raised mower unless it is independently supported. Never rely on the tractors linkage to hold the machine in the air whilst carrying out maintenance.

Always read carefully and comply fully with the manufacturers instructions when handling oil, solvents, cleansers and any other chemical agent.

Always maintain the safety decals in good readable condition. If the decals become damaged or unreadable, reorder them immediately.

Although designed to be as safe as possible flails are still dangerous. Always be aware of the potential hazards and operate with care and responsibility.

If operating without a quiet cab or with the cab windows open always wear ear defenders.



P.T.O. DRIVE SHAFT SAFETY PRECAUTIONS

ON EACH TRACTOR CHECK:

All machines

Ensure the correct end of the driveshaft is fitted to the tractor. See labels on the drive shaft.

Check carefully that the drive shaft does not bottom out and that a minimum of 6" (150mm) of engagement is maintained.

Ensure that the guards are always in position, can rotate freely and the check chains are not stretched when the machine is raised or lowered.

Check that when in the continuous working position the drive shaft is not at an angle of more than 20 degrees to the P.T.O. centre line.

Ensure the drive shaft does not foul the tractor P.T.O. guard, the gearbox input shield, the tractor drawbar or the sideshift ram cylinder.

The P.T.O. shaft incorporates an overrun clutch to relieve inertia loads on tractor P.T.O. drive when running down. Beaware that rotor can continue to rotate for some time even with the P.T.O. disengaged and the tractor engine switched off.

FITTING

TRACTOR REQUIREMENTS

MIN HP REQUIREMENTS

180	-	45hp
220	-	60hp
250	-	75hp
275	-	90hp

LINKAGE

Category 11

Check chains/stabilizers

Check chains or stabiliser bars must be fitted and tightened.

PTO SHAFT

Tractor must be equipped with a live drive independent P.T.O. to enable forward motion to be stopped while the flail head continues to operate.

540r.p.m. or 1000r.p.m.

1 3/8 x 6 spline or 1 3/8 x 21 spline

Note: Machines are individually designed for a particular P.T.O. speed and are not interchangeable.

TRACTOR PREPARATION

Adjust the drop links on the tractor's linkage to allow the draft link ends to descend to at least 150mm below the pick up point on the machine.

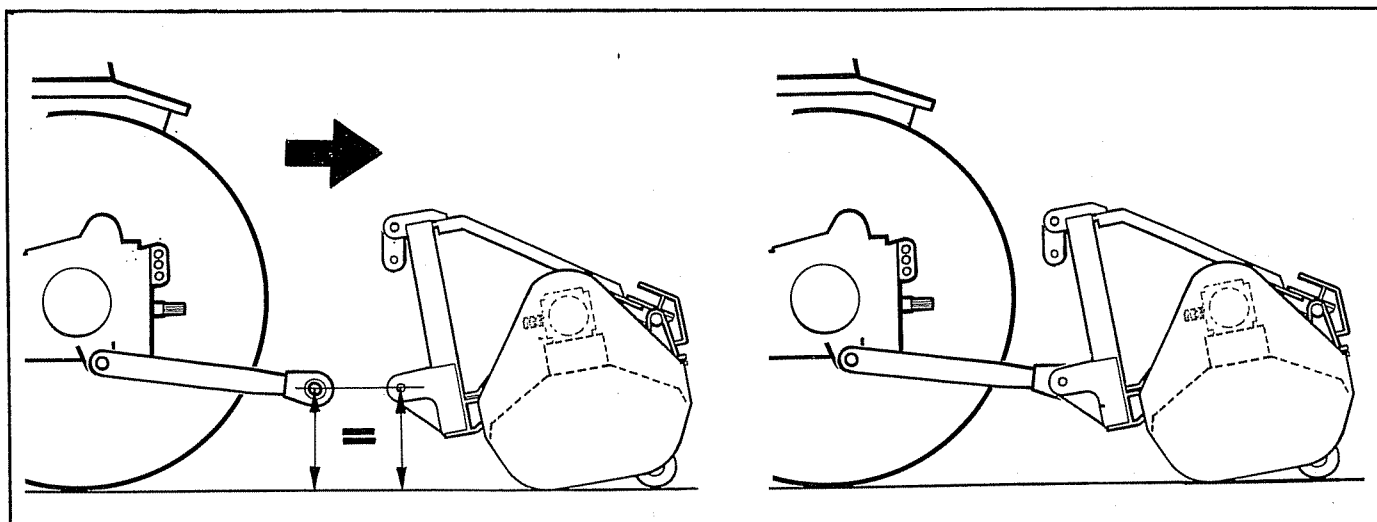
PREPARATION

Read and understand the instruction manual before attempting to do anything with the machine

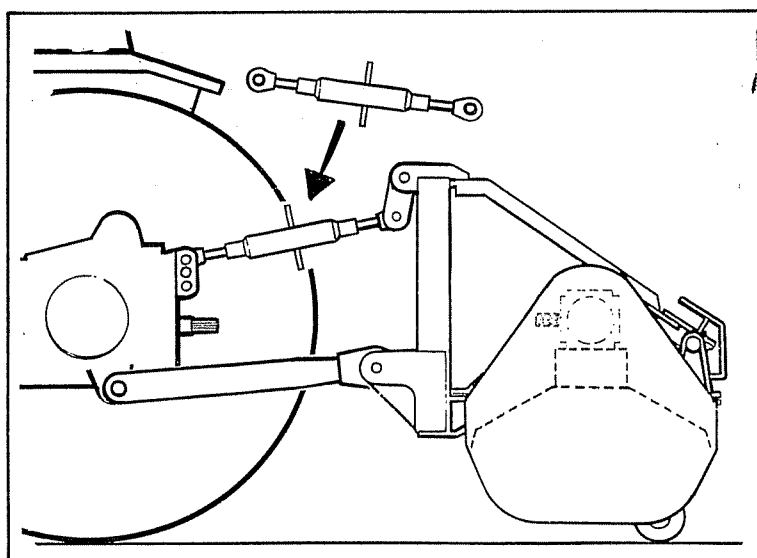
ATTACHMENT TO TRACTOR

All models:-

Select a firm level site



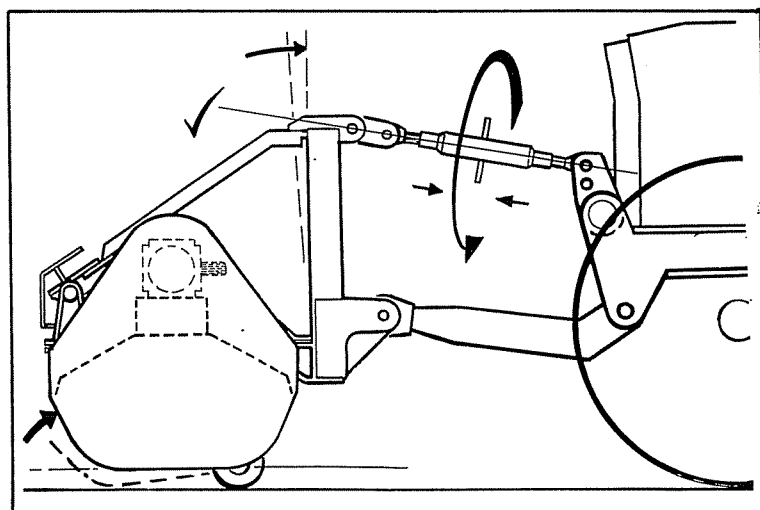
Drive tractor to machine and connect draft links



Fit top link

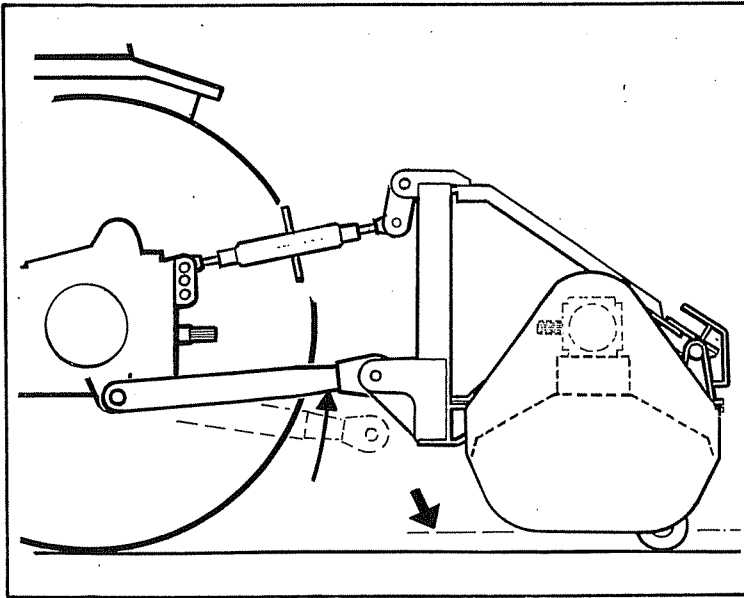
Fit suitable self seal couplings to the hose ends and connect to a double acting auxiliary service on the tractor.

Front mount machines only:-

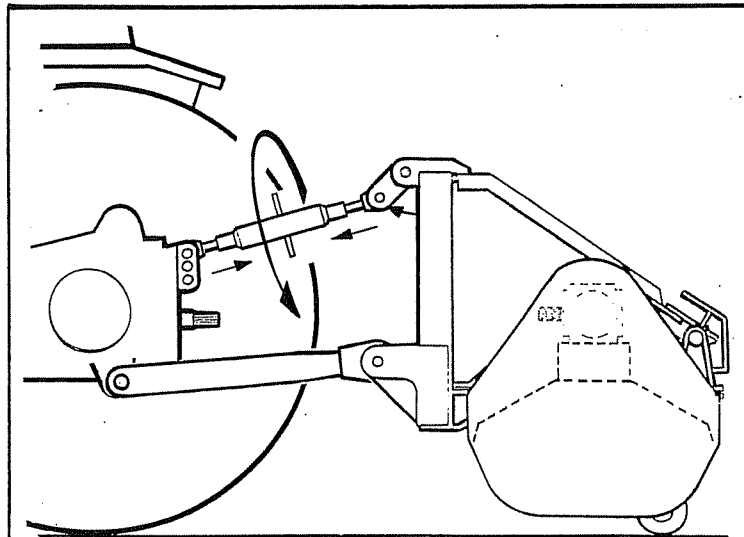


Adjust top link until the skid is horizontal

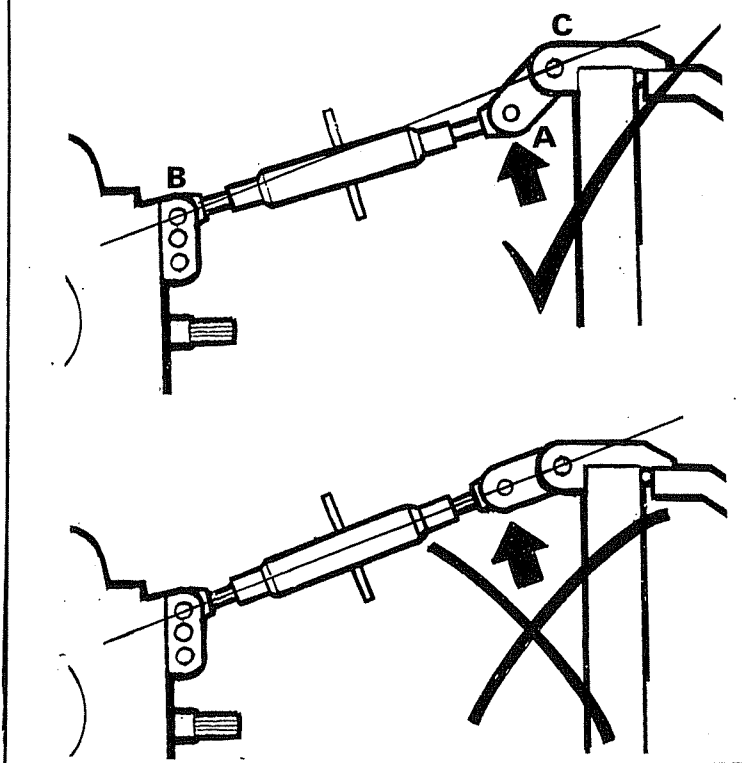
Rear mount machine only:-



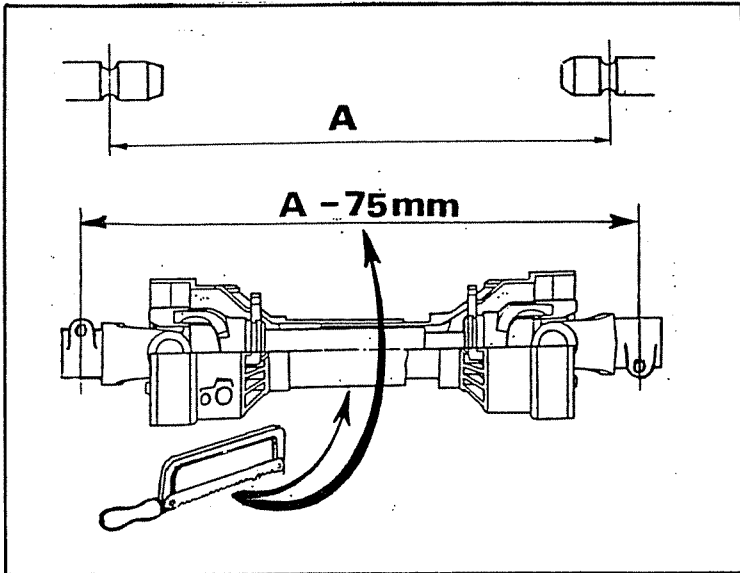
Raise the machine on the linkage sufficient only to raise the front of the machine until the skid is horizontal and the roller remains on the ground



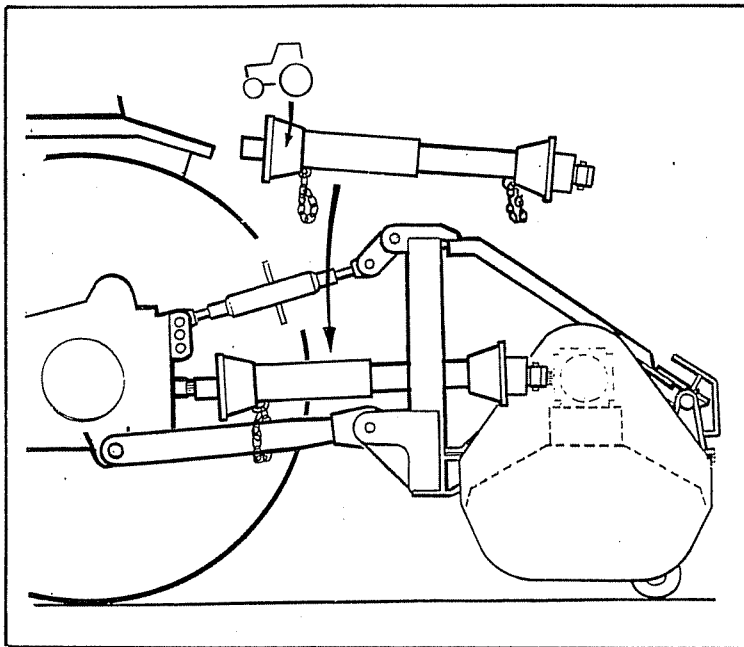
Adjust the top link until pin 'A' is slightly below a line between pins 'B' and 'C'



All models:-



With the gearbox stub shaft and tractor P.T.O. shaft as near as possible to being horizontally and vertically in line, measure dimension 'A'. If necessary shorten the P.T.O. shaft cutting equal amounts off both ends until it measures A - 75mm. It may be necessary to adjust the gearbox horizontally using the tractors auxiliary control.



Lower machine to the ground and fit P.T.O. shaft with the "overrun" clutch at the implement end.

Attach torque chains to convenient locations to prevent shaft guard rotating.

Tighten check chains/stabiliser bars.

Raise the machine to transport height ensuring the P.T.O. shaft does not contact the side shift ram.

The machine is now ready to proceed to the work site.

PRE-OPERATIONAL CHECKS

Check that:-

All nuts and bolts are tight

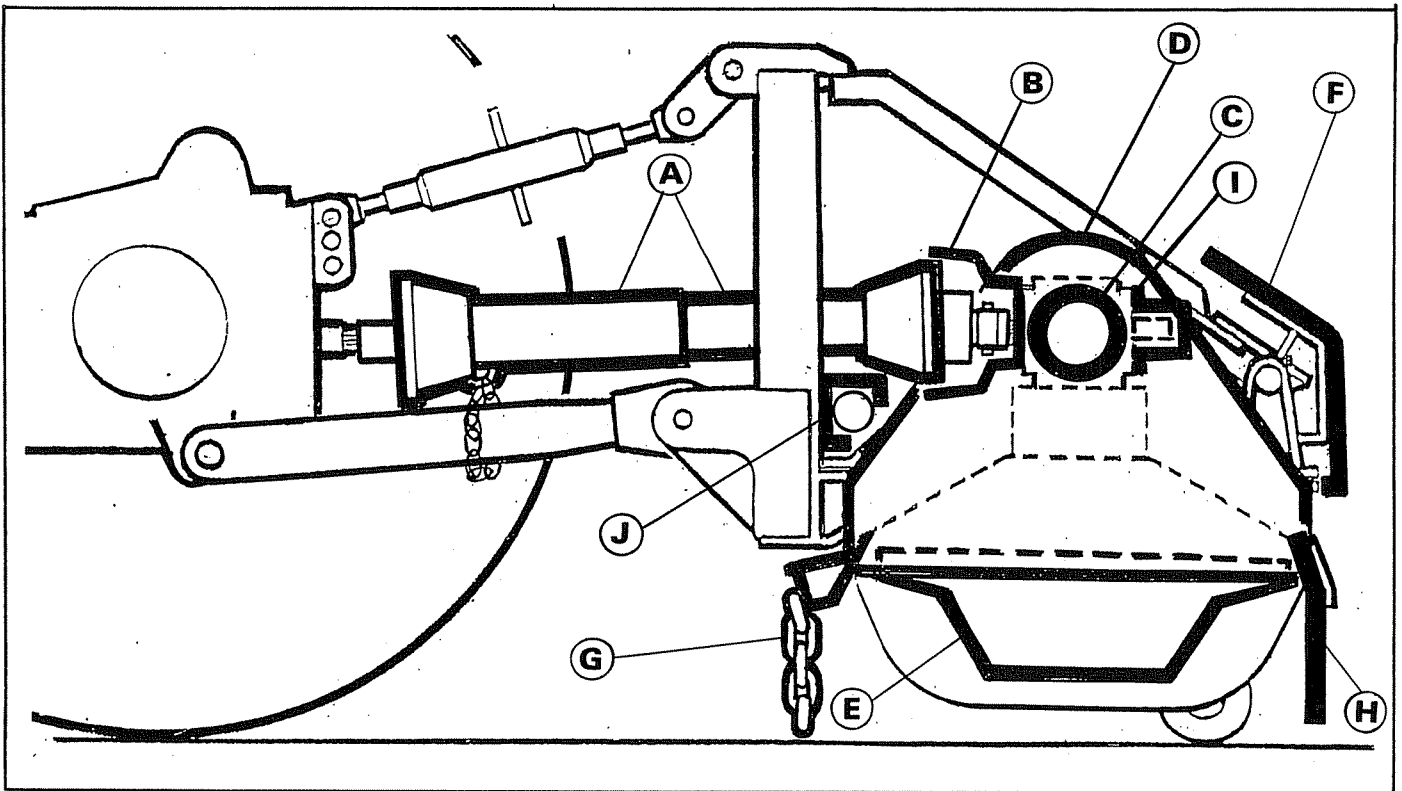
Belt tension is set correctly see page 23

All flails are present

Gearbox oil level is correct see page 22

The roller rotates freely and is set at the required height

All guards are in position and in good condition



A	P.T.O. shaft guard
B	Gearbox stub shaft guard
C	Secondary drive shaft guard
D	Belt guard upper
E	Belt guard lower
F	Rear slide roller guard
G	Front chain guard
H	Rear rubber flap
I	Gearbox free stub shaft guard
J	Ram rod guard

OPERATION

PREPARATION

Read and understand the instruction manual before attempting to do anything with the machine

TRANSPORT

The machine is transported raised on the tractors linkage with the sideshift ram fully extended

Remember when negotiating gateways, doors or other confined areas the machine may be wider than the tractor

Never transport the machine even for short distances, with the roller running along the ground or with the rotor rotating

The overall transport widths are:-

Model	Overall width
180	2100mm
220	2500mm
250	2800mm
275	3000mm

GENERAL WORKING PRACTISES

It is the operator's 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 make any adjustments.

Check frequently that all nuts and bolts are tight.

Keep bystanders at a safe distance.

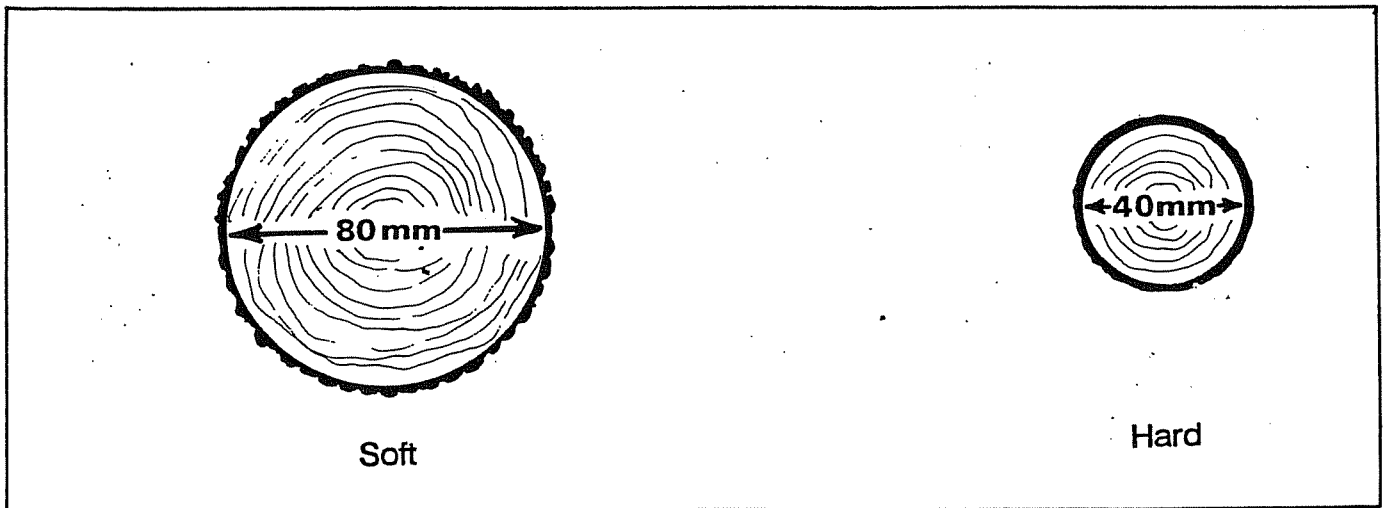
HIGHWAY WORKING

Local highway working regulations must be observed at all times.

WARNING

It is the operator's responsibility to observe these regulations and to keep bystanders at a safe distance.

CUTTING LIMITATIONS



CUTTING PRECAUTIONS

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

RUNNING UP PROCEDURES

Ensure the machine is on the ground in the work position

Ensure nobody is standing near the machine

Start the tractor and allow to run at idle speed

Engage the P.T.O. drive

Gradually increase P.T.O. speed to the working revs. i.e. 540 or 1000rpm and allow to run for a further five minutes

If rotor does not start or if excessive noise or vibration is apparent stop the machine immediately and refer to "Operational Checks" and "Maintenance"

WORKING (Rear mount machines)

At the correct working position the top link should be adjusted such that there is a slight kink where it is attached to the knuckle.

During operation on undulating ground this degree of kink should be maintained by raising or lowering the tractor draft link as the situation demands.

WORKING (Front mount machines)

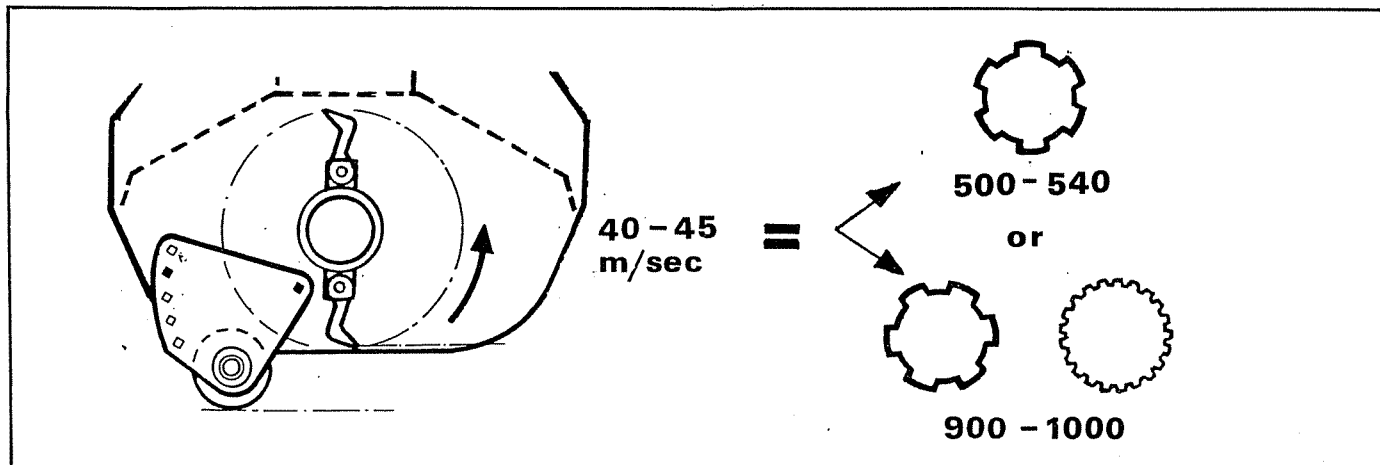
Place the tractor's quadrant lever fully down in "position control". This will allow the flail to follow any reasonable depression in the ground's surface.

RUNNING IN

During the first day of operation restrict the tractor's forward speed to approx. 3 miles per hour whilst maintaining the correct P.T.O. speed. This will allow the machine to 'bed in'.

During this period check bolts for tightness after 1 hour, 4 hours and at the end of the day.

ROTOR SPEED



For the rotor to make a clean cut it requires a flail tip speed of 40m/45m per second.

To achieve this the rotor revs. required are:

2100rpm for 180 and 220 models
1900rpm for 250 and 275 models

This will be achieved with a P.T.O. speed of 500 - 540rpm or 900 - 1000rpm depending upon machine specification.

WARNING

Never exceed the maximum recommended P.T.O. speed for the relevant machine specification

TRACTOR FORWARD SPEED

Tractor forward speed will be determined by the type of work and the material to be cut.

Always drive at a speed which will allow the machine sufficient time to do its job properly.

Too fast a speed will be noticed initially in a deterioration of the cut finish and in extreme cases, by a falling off of rotor speed leading to slipping belts or eventual stalling of the tractor.

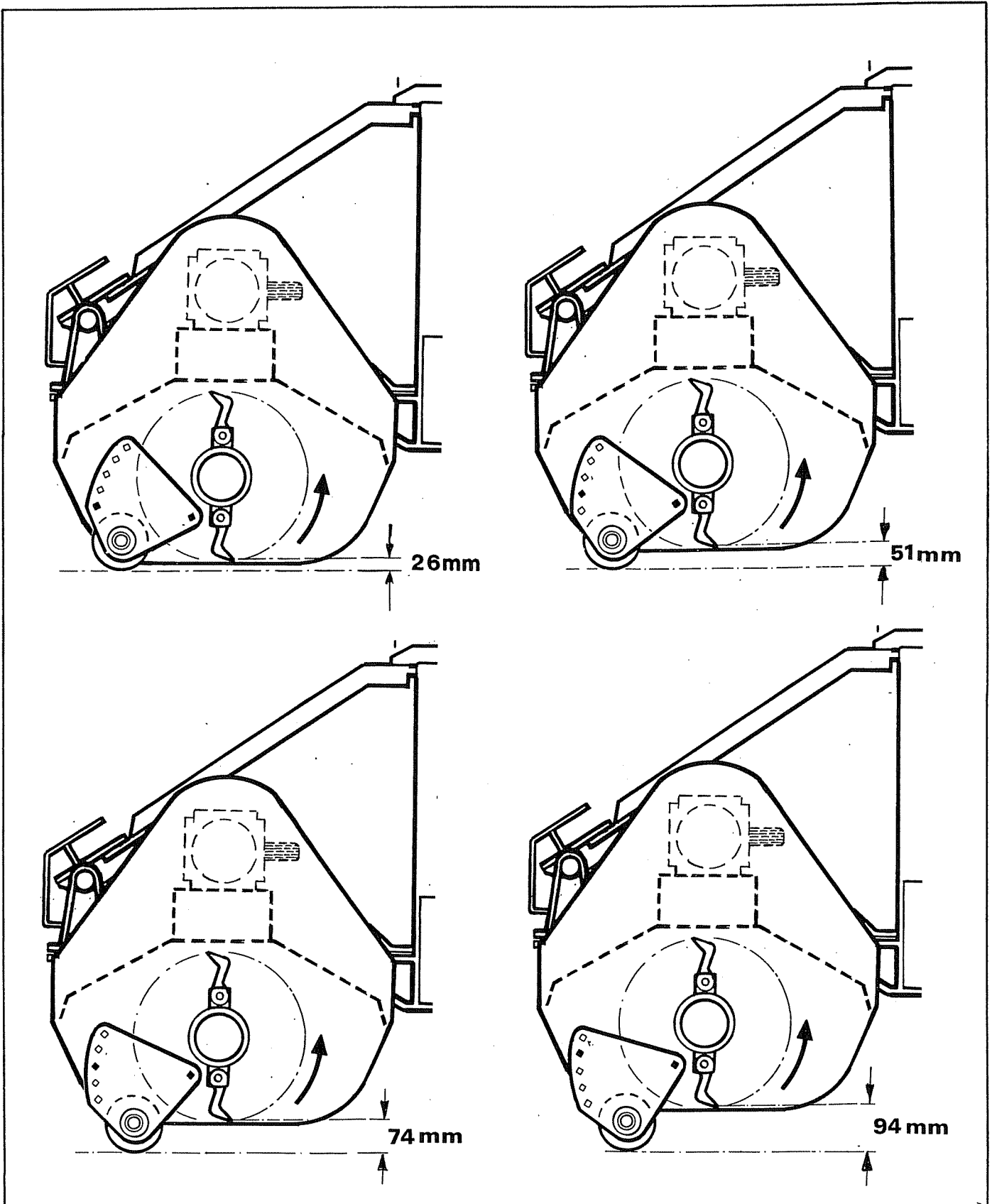
SIDESHIFT

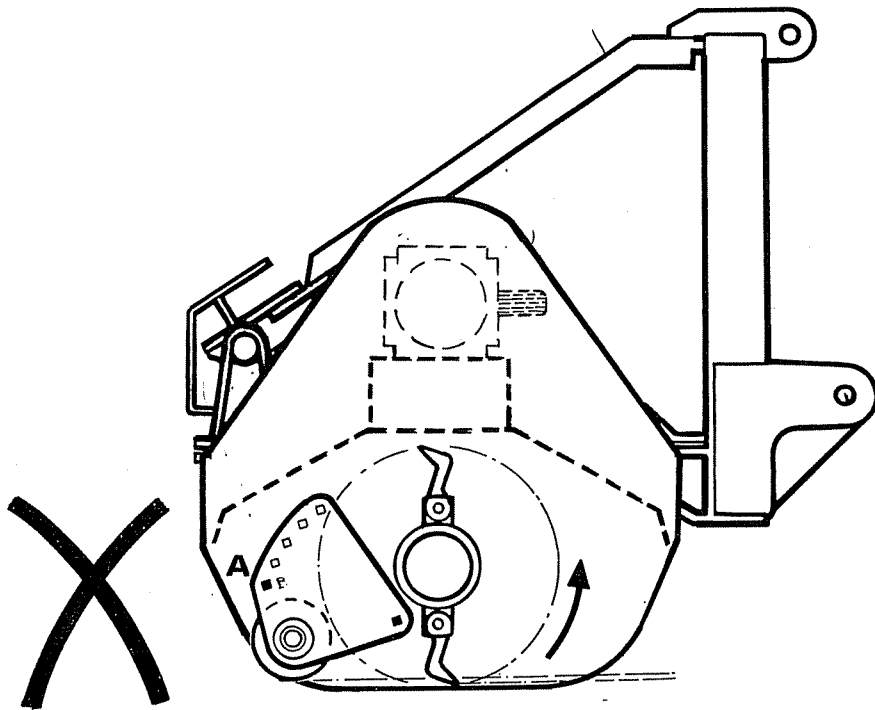
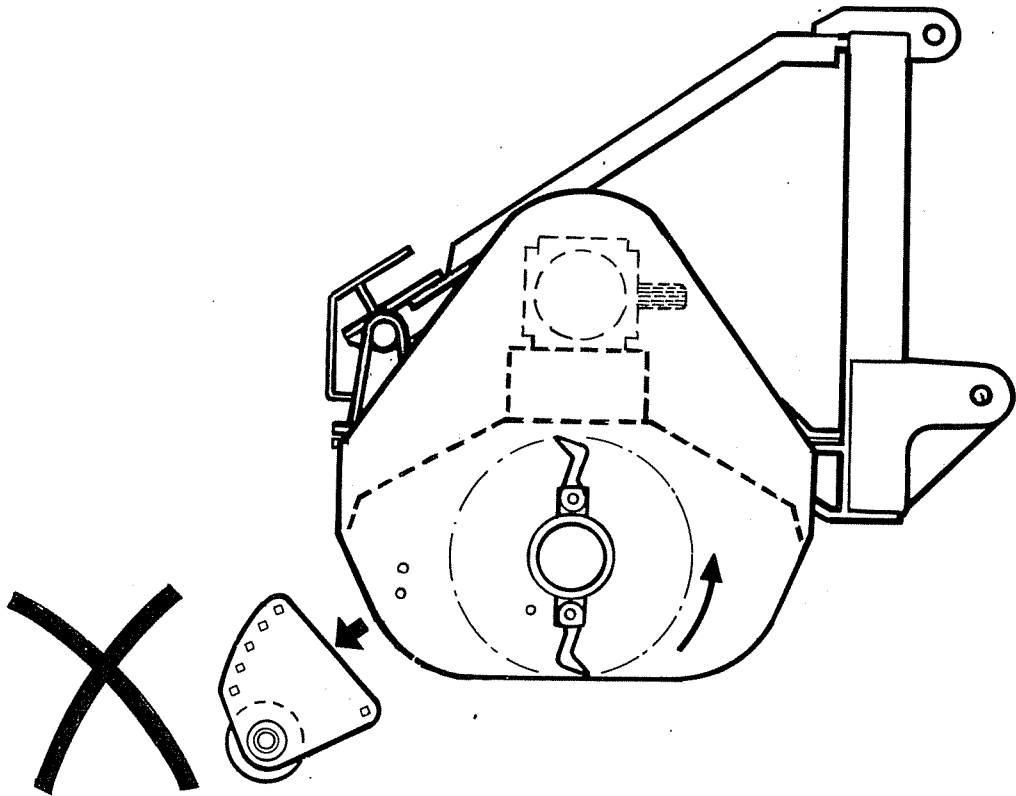
The sideshift feature can be used during operation to offset the mower up to a maximum of 700mm

ROLLER ADJUSTMENT

The roller can be adjusted to four working positions.

A second hole is drilled in the casing on the roller adjustment quadrant. This is to allow a bar to be inserted which can be used to locate and manoeuvre the roller in its new position to facilitate bolt fitting.

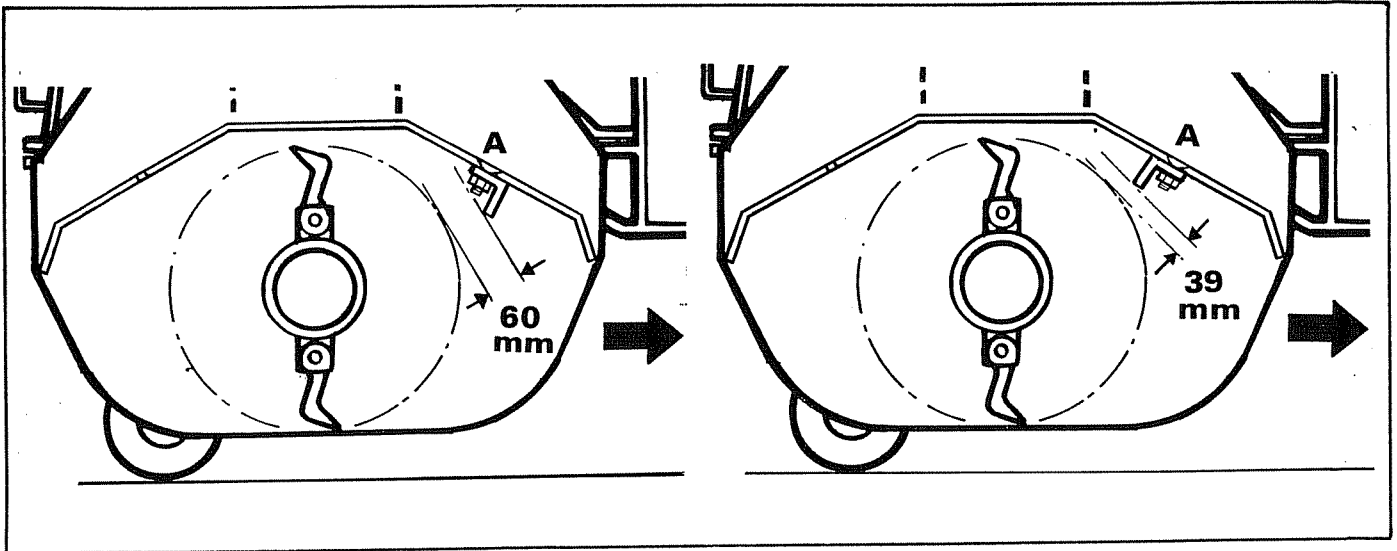




WARNING

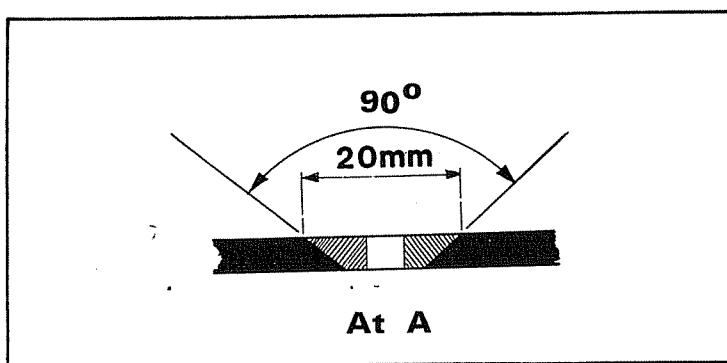
During operation the roller must never be removed or adjusted up into position 'A' where the roller is above the rotor tip

MULCH BAR (Optional extra)



A mulch bar is available to reduce the clearance between the rotor and the inner case. It is bolted into the front slope of the head using the M10 countersunk screws provided.

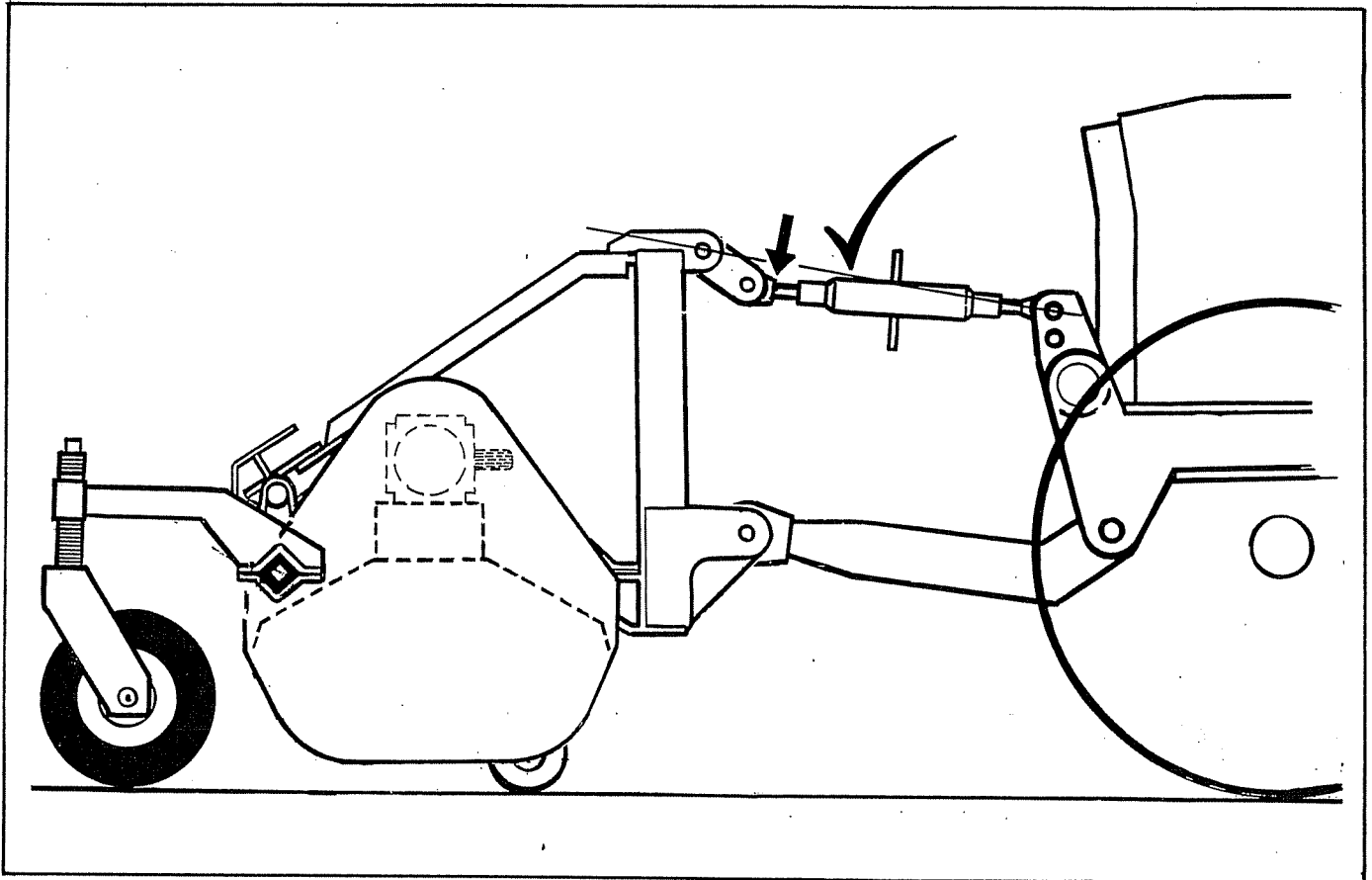
This will produce a mulched residue but will result in an increased power requirement and greater fuel consumption.



The mower case is pilot drilled at the mulch bar location. These holes will need to be opened up with 90° countersink drill until the countersink diameter measures 20mm.

The mulch bar can be bolted in two positions which will vary the clearance between it and the rotor and provide a coarser or finer mulch.

CASTOR WHEEL KIT - Recommended option for front mount machines



When the machine is mounted on the front of the tractor and the ground is undulating it is recommended that the castor wheel kit is fitted.

When installed it allows the mower to follow the contours of the ground.

The wheels are bolted to the outer ends of the front bar and the height adjusted by positioning the spacing collars such that the wheel runs at the same height as the roller.

The tractor's quadrant lever is placed fully down in "position control". This will allow the flail to follow any reasonable depression in the ground's surface.

The top link is lengthened which will buckle the knuckle joint and allow the top link to flex as the mower follows the ground contours.

REMOVAL FROM TRACTOR

Choose a firm level site

Ensure the sideshift ram is fully retracted.

For ease of subsequent attachment it is suggested that the machine is lowered onto supports which ensure the skids are horizontal and the roller is just clear of the ground

Slacken check chains and disconnect draft links

Disconnect hoses and support the ends clear of the ground

Disconnect the P.T.O. shaft

Disconnect the top link

The tractor may now be driven away from the machine

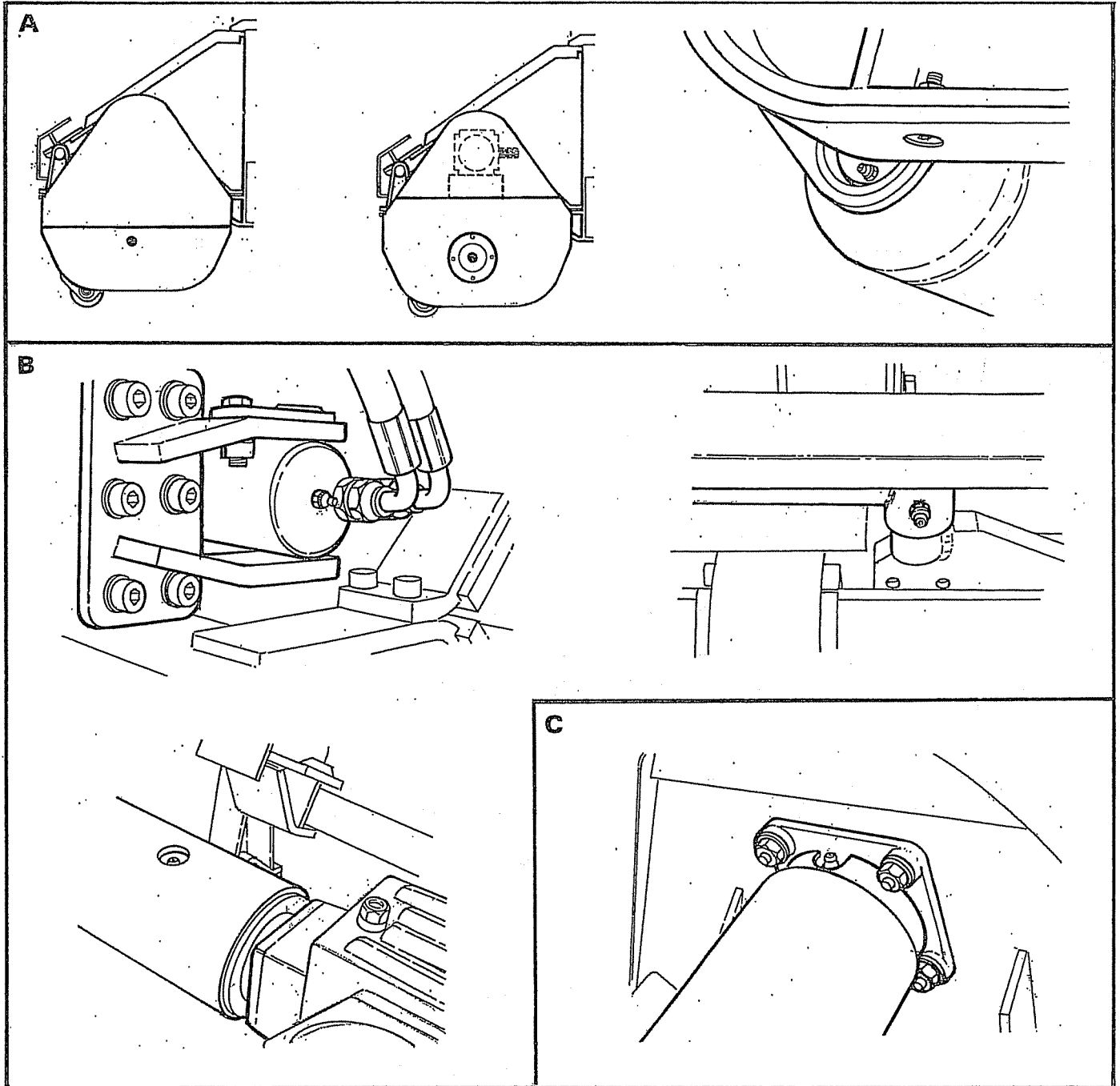
STORAGE

Grease all grease points and any areas where paint has worn away e.g. sideshift slide bars.

MAINTENANCE

Before carrying out any maintenance or adjustments ensure the P.T.O. is disengaged, the tractor engine is switched off and the rotor has stopped rotating.

Should the work require the machine to be in a raised position always ensure that it is securely and independently supported. NEVER, NEVER, NEVER rely on the tractor's linkage when working beneath the machine.



LUBRICATION

Grease all points shown.

A - Daily

B - Weekly

C - Annually

GEARBOX

The Gearbox is filled with SHELL SEMI LIQUID EP Grease before it leaves the factory and should not need topping up unless the gearbox is taken apart.

180 & 220 Models – fill with 1 litre of SAE 90 10W-30 Super Universal Agricultural Oil
250 & 275 Models – fill with 2.3 litres of SAE 90 EP

NOTE: Do not overfill the gearbox

PTO SHAFT

Regularly inspect the P.T.O. shaft and refer to separate booklet supplied with the individual shaft for maintenance instructions.

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.

All Hydraulic hoses (B.S.P.) now fitted to McConnell Mowers have "soft seal" connections on both flail and ram circuit hoses.

Recommended torque settings for nut security are as follows:-

3/8" BSP	=	33N.m	or	24lbf ft	REF 'O' RING 10 000 02
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For hose unions (B.S.P.) fitted in conjunction with bonded seals the recommended torque settings are as follows:-

3/8" BSP	=	75Nm	or	55lbf ft
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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.

MOWER HEAD

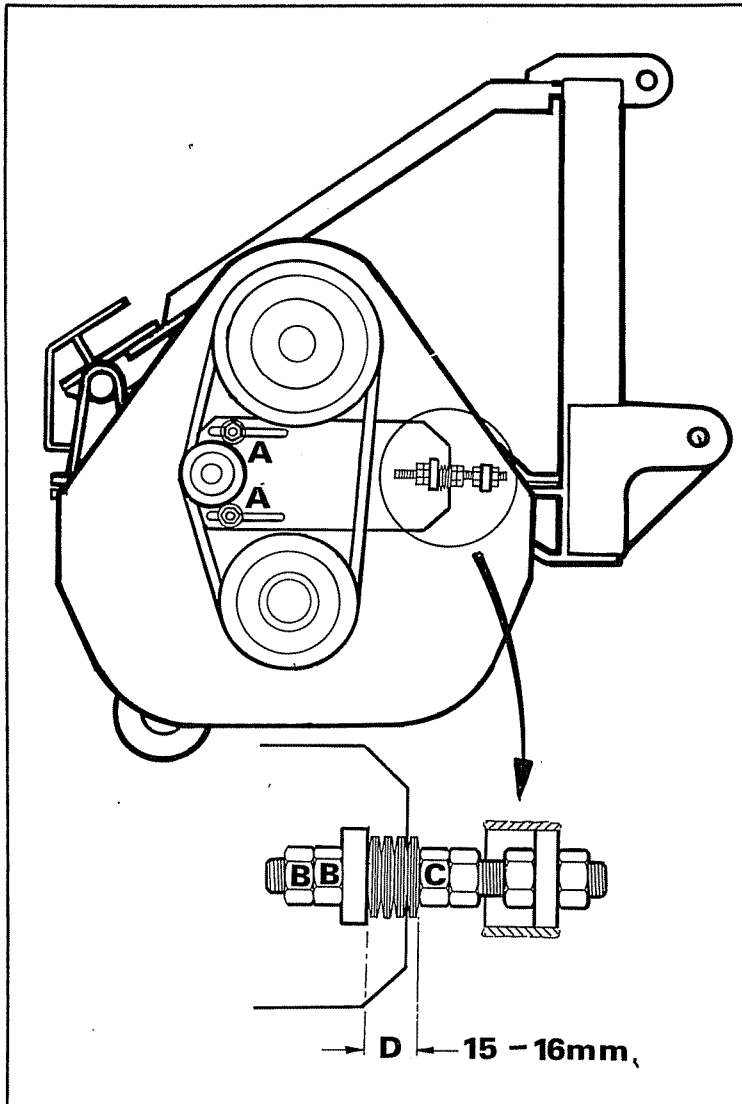
Check daily that all bolts are tight and other fasteners are secure.

Check all flails for condition and replace when required.

Flails should be replaced in complete sets or in pairs which are as near as possible directly opposite to one another on the rotor

Tighten flail bolts to 210 Nm

ADJUSTING BELT TENSION



Slacken A

Back off B

Adjust C until dimension D
measure 15/16mm

Lock C with locknut

Retighten B

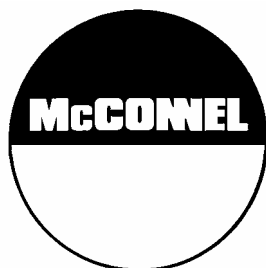
Retighten A

DO NOT OVERTIGHTEN

REAR RUBBER FLAP

Check for condition and replace when excessive wear becomes apparent.

Should the flap be split in any location greater than 50% of its height it should be replaced.



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