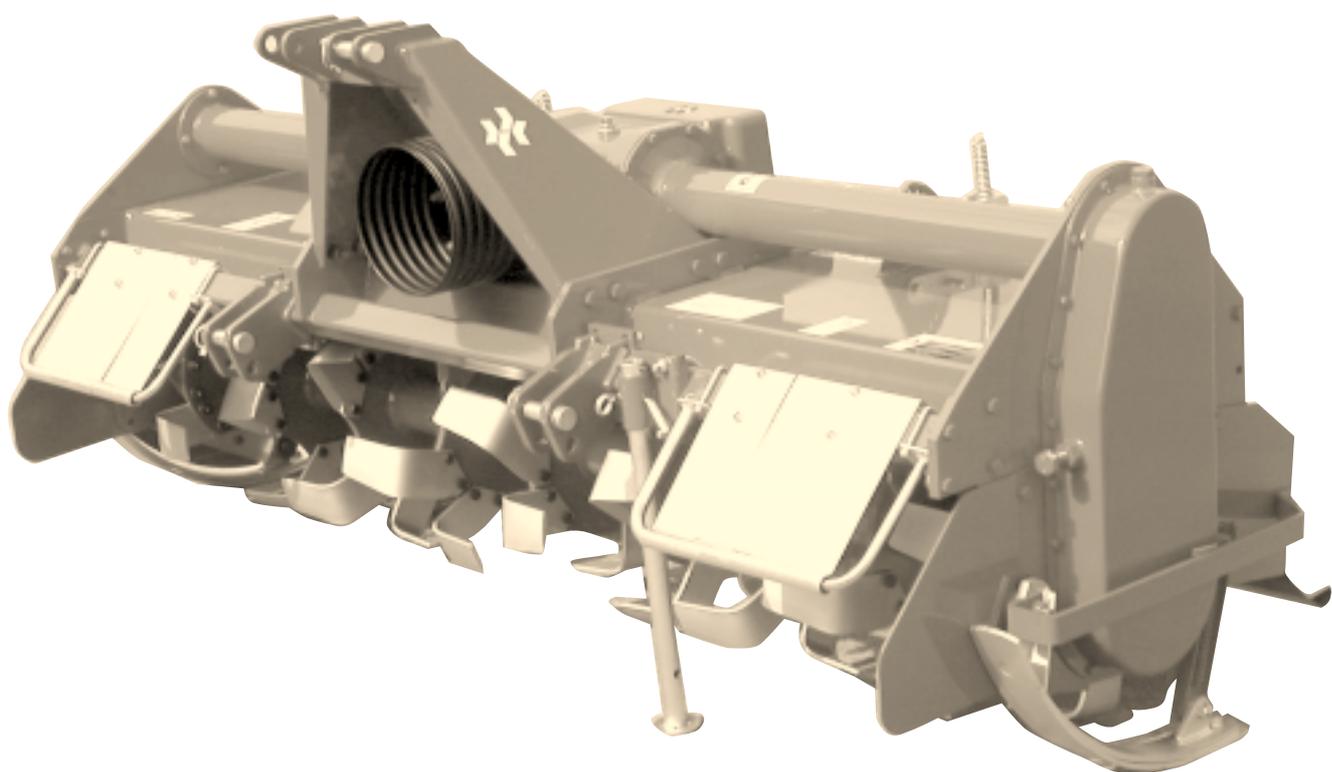




ROTAVATOR / ROTALABOUR 500

R500 / RL500



Operating Instructions

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Introduction

Howard would like to thank you for purchasing this Rotavator and offer their support and assistance throughout its productive life.

This Rotavator has been designed and manufactured as a tractor driven, ground cultivator - no other use is intended.

Please read and understand this manual before operating the Rotavator.

Warranty

The warranty applicable to your machine is detailed on separate documentation which should accompany this manual. If this is missing, please contact your dealer.

Serial Number

The Serial Number and Model are stamped on the Identification Plate attached to your Rotavator. For future reference record this information below. Always quote them when ordering spare parts.

MODEL _____

SERIAL No. _____

Date Purchased: _____

SAFETY PRECAUTIONS



PLEASE READ. IT MAY SAVE A LIFE. SAFETY IS YOUR RESPONSIBILITY.

The safety of operators and any other connected personnel is a major component of; machine design, manufacture, retailing, commissioning, operation and maintenance. Howard have designed and manufactured this Rotavator with as many safety features as possible. The retailer's responsibility is to ensure you have selected the correct Rotavator for your tractor/application and to commission this machine.

Your responsibilities as owner or operator are to ensure the safety of any personnel in connection with; the operation, transport, maintenance or storage of this Rotavator. Be aware of your responsibilities and carry them out. The owner or an appropriately designated officer, if the owner is a company or corporation, is responsible for all safety issues related to this Rotavator.

The most important safety device attached to this Rotavator is a Safety Conscious Operator whose training and experience must include:

- Correct and complete installation and commissioning of the machine to ensure safe and reliable operation in the intended application.
- Training in safety issues, operation and maintenance of this machine in its application prior to beginning work. This training is to be reviewed or repeated annually.
- Being aware of their environment to the extent that unforeseen safety issues that may arise are dealt with to ensure the safety of all personnel (including operators, maintenance personnel and bystanders).

This is the SAFETY ALERT symbol and means:



ATTENTION ! SAFETY ISSUE !

Failure to comply with the given instruction could result in severe injury or death.

If you have questions not answered in this manual please contact your dealer or distributor.

If you require more copies of this manual please contact your dealer. Alternatively you are welcome to copy and distribute this manual to the operators and maintenance personnel.

SAFETY DECAL LOCATION

Explanations of pictogram decals (Fig 1).
Note: Decals may differ slightly from those shown.

P/N 187250 Read Manual !

Prior to operating machine, read the operator's manual and observe all safety instructions.

P/N 629551 Shut off engine !

Shut off engine and remove key before performing maintenance or repair work.

P/N 629548 Flying Objects !

Keep safe distance from the machine as long as the engine is running.

P/N 624367 Revolving Rotor !

Stay clear of the rotor area as long as the tractor engine is running and the PTO connected.

P/N 209095260 Drive Shaft Entanglement !

Keep clear of and also keep loose clothing away from rotating PTO shaft to avoid entanglement.

- Ensure that these decals are always legible and that they are replaced immediately if they are damaged, lost or their supporting parts are replaced. Decals can be ordered from your dealer.

SAFETY DECAL CARE

- Keep safety decals clean and legible at all times. Replace any missing safety decals or any that have become illegible. Safety decals can be purchased from you dealer or distributor.
- If any part is replaced that supports a safety decal ensure that a decal is affixed to the replacement part.

ATTACHING SAFETY DECALS

1. Clean and dry the area where the decal is to be affixed. Warm soapy water is the best as some cleaning agents leave an oily film which may prevent the decal adhering.
2. Remove/fold back a small portion of the backing and affix the exposed portion of the decal in the desired position.
3. Peel back the remaining backing paper from under the decal and smooth down the decal with a rag, working any bubbles towards the edge of the decal.
4. Any bubbles that remain trapped can be pierced with a pin and smoothed down.

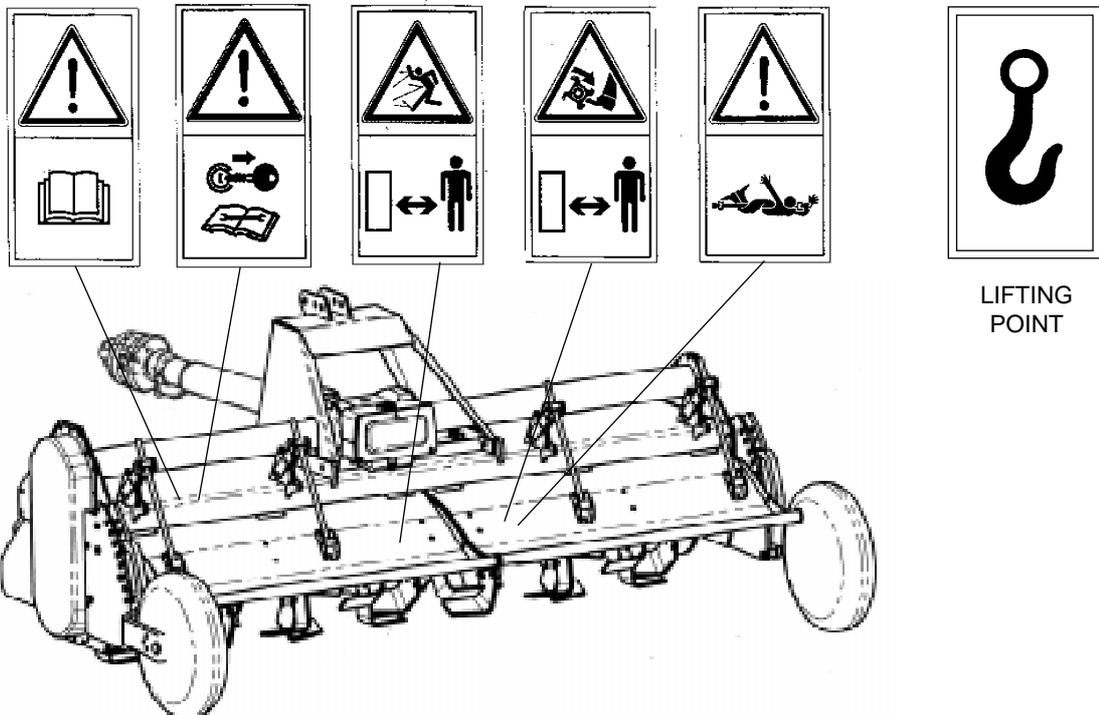


Fig. 1

AT ALL TIMES

- Use the Rotavator only for the purpose for which it has been designed, and in accordance with the instructions in this operators manual.
- Ensure that only responsible, properly instructed people operate this machinery. Inexperienced operators will require training, followed initially by careful supervision.
- Children are not permitted to operate this machinery.
- Keep children well clear and appropriately supervised when connecting/disconnecting the tractor, operating or maintaining this machinery.
- Do not wear clothes that are loose fitting or with drawstring ties which can catch in moving parts.
- Wear appropriate protective clothing and equipment. Boots are a minimum, however if your tractor is not fitted with a controlled environment cab you may also need protection from prolonged exposure either to noise, dust or sunlight.
- Interpret 'Left' and 'Right' as if seated in the operators seat and facing forward.

BEFORE OPERATION

- Read and understand this manual.
- The tractor to be connected to the Rotavator:
 - Must be the tractor that the Rotavator has been commissioned to operate with. Check that it has been correctly maintained and has not been re-configured (for example front weights removed etc) which may reduce stability and control.
 - Consult the Tractor Manufacturers Manual for instructions on mounting implements and safe working methods.
 - Is recommended to be fitted with a Roll Over Protection System (ROPS).
 - Must be one the operator is familiar with.
- Prior to starting the tractor ensure the PTO is disengaged and the tractor is in neutral.
- Do not allow anyone to stand between the tractor and Rotavator while backing the tractor up to attach it.
 - Quick hitch systems are recommended for both Safety and convenience.
 - Before attempting to connect the universal drive shaft to the tractor, lower the Rotavator to the ground, stop the tractor, apply the park brake and remove the key.
- Visually inspect the Rotavator and check:
 - Hitch pins and drive shaft are secure.
 - No components are excessively worn, cracked or otherwise defective and all bolts are tight.
 - Guards, covers, warning labels and safety devices are all correctly fitted and operative.
 - Maintenance as per schedule has been carried out.
 - No tools or other unsecured items have been left on the Rotavator.
- Practice operation of the tractor and Rotavator combination.
 - Take sufficient time to become completely familiar with all controls, particularly those required to bring both tractor and Rotavator to an emergency stop if so required.
 - Progress slowly initially and check stability, steering and braking are satisfactory.

- Ensure the work area is clear, especially of children or animals.
- Inspect the work area for hidden obstructions which may constitute a hazard.

DURING OPERATION

- Ensure the work area is clear, especially of children or animals.
- Do not attempt to start the tractor or engage the PTO until correctly seated in the driver's seat.
- Never leave the tractor running unattended.
- Do not allow passengers on the Rotavator. [Or on the tractor unless approved seating is available.]
- Never attempt to make adjustments or perform maintenance functions while the Rotavator is operating.
- Observe all safe driving procedures:
 - Reduce speed when working on sloping ground or during sharp turns.
 - Do not attempt to work on steeply sloping ground where there is a risk of the tractor overturning.
 - Do not attempt to work near the edge of drop-offs or banks.
 - Avoid sudden starts and stops.
- After striking an obstacle, stop the tractor and implement and inspect it for damage. Repair as necessary before continuing.
- Disengage the PTO when transporting the implement or when not in use.
- When halting operation, even temporarily, lower the Rotavator to the ground, stop the tractor, apply the park brake and remove the key.
- Allow the Rotavator sufficient time to cool down before performing any maintenance, or changing gears in the Selectaspeed gearbox. [Oil and other transmission components may be hot enough to inflict burns.]
- Note:
 - By virtue of its mode of operation it is not possible to totally enclose a Rotavator with guards.
 - Contact with the blades while operating can result in severe injury or death.
 - Do not allow anybody (operators, maintenance personnel, bystanders or especially children) anywhere near the blades whilst the implement is operating. Note that children will often be attracted to placing objects into the blades if you leave it running - this machine is not a toy.
 - Be aware that Rotavator blades will not only cut, but drag limbs etc. into further danger.
 - Ensure that all shielding is in place before operating. If guards are removed for maintenance work, ensure they are replaced correctly upon completion. Repair or replace any damaged guards.
 - NEVER place hands or feet under the Rotavator, nor endeavour to make any repairs or adjustments while the blades are rotating; they are capable of inflicting serious injury.
 - NEVER touch the blades or attempt to free any jammed obstacle while the tractor engine is running. The clutch may be slipping and removal of any obstruction may allow the blades to rotate, the result possibly being serious injury.

FOLLOWING OPERATION

- Visually inspect the Rotavator and check:
 - All bolts are tight.
 - That no components are excessively worn, cracked, damaged or otherwise defective.
- Note and organise any maintenance required.
- Allow the Rotavator sufficient time to cool down before performing any maintenance. The gearboxes, lubricant and other transmission components may be hot enough to inflict burns.
- Refer to TRANSPORT SAFETY and STORAGE SAFETY for issues related to travel to/from operation and disconnection of the Rotavator from the tractor.

STORAGE SAFETY

- When unhitching the Rotavator and before leaving the tractor to disconnect the universal drive shaft and remove hitch pins:
 - Check that the PTO drive has been disengaged.
 - Stop the tractor, apply the park brake and remove the key.
- Store the Rotavator away from human activity and in particular do not permit children to play around, or on, stored equipment.
- Store the Rotavator in a dry level area and ensure parkstands and wheels/roller are securely positioned to prevent it tipping, falling over or rolling onto any personnel (particularly children).

MAINTENANCE SAFETY

- Maintain the Rotavator as detailed in the given schedule and check for any damage after use. Poor maintenance is an invitation to trouble.
- Ensure that all shielding is correctly in place when maintenance is completed. Repair or replace any damaged guards. Warning or instruction decals are to be kept in a readable condition; unreadable decals must be replaced.
- NEVER place hands or feet under the Rotavator nor endeavour to make any repairs or adjustments, while the blades are rotating; they are capable of inflicting serious injury.
- If working on the implement whilst it is raised on the tractor's three-point linkage, ensure:
 - That the tractor is turned off and the ignition key is removed to prevent accidental starting.
 - The park brake is engaged and the wheels chocked to prevent the tractor moving.
 - The PTO drive is disengaged.
 - The Rotavator is properly supported by blocks or stands. DO NOT rely on the tractor's hydraulic system to support the implement.
- Modifications or fitment of non genuine replacement parts.
 - If the equipment is modified in any way from the original design, the manufacturer will not accept any liability for any injury or warranty as a result of their use or attempted fitment.
- Fasteners.
 - Fit only the correct replacement fasteners and tighten fasteners to the torque specified in the manual. Incorrect (too weak) fasteners may break when torqued

to the required setting or, if too strong, may induce failures in other components.

- Follow safe workshop practices during any maintenance:
 - Keep working area clean, dry and in particular free of oil spills.
 - Ensure the workshop is adequately ventilated. Do not run the tractor engine inside a closed building. The exhaust fumes can reduce mental alertness initially and will progressively cause death by asphyxiation.
 - Use tools, lifting or jacking equipment suitably capable of the intended task.
 - Ensure electrical equipment is safe to use before operating.
 - A fire extinguisher and first aid kit should be readily accessible during maintenance.
 - Tools, parts and other service equipment must be removed to appropriate storage locations prior to any test running.
 - Do not wear baggy, ill-fitting or frayed clothing when working around transmission components.
 - Wear suitable gloves when handling or working with sharpened cutting elements.
 - Ensure bystanders, especially small children, are kept clear during maintenance or while making any adjustments.
- Hydraulic fluid can be dangerous.
 - When disconnecting any hydraulic fluid line, shut off the hydraulic supply and relieve the hydraulic pressure.
 - Never use hands to locate hydraulic fluid leaks. Escaping hydraulic fluid is capable of cutting and penetrating skin. Use a small piece of cardboard or wood.
 - Minor cuts are susceptible to infection from hydraulic fluid. Gangrene can result. If injured by escaping hydraulic fluid or you suspect you have been infected, seek medical treatment immediately.

TRANSPORT SAFETY

- When transporting the implement on a tractor on public roads ensure that you comply with the relevant regulations.
 - Class of roads permitted for travel may be restricted.
 - Transport may restricted to daylight or, off peak traffic hours.
 - Signs indicating width may be required.
 - Lights indicating vehicle width if transported within the hours of darkness may be required.

If in doubt, contact your government department responsible for road transport.

- Secure the Rotavator for transport.
 - Disengage the PTO when transporting.
 - Ensure all hitch pins are correctly fitted with retaining pins.
 - Mechanically secure hydraulic cylinders to prevent cylinders creeping.
- Observe the tractor manufacturers regulations and recommendations - specifically those relating to:
 - Maximum transport loads.
 - Maximum speed.
- Passengers

Rotavator 500 / Rotalabour 500

- Do not allow passengers to ride on the tractor unless a specific seat is provided.
- Do not allow anyone to ride on the implement when it is being transported.
- Consider other road users.
 - Plan your route to avoid heavy traffic and peak traffic periods.
 - Be a safe and courteous driver. Give way to oncoming traffic in all situations, including narrow bridges, intersections etc.
- Adopt safe driving practices:
 - Lock tractor brake pedals together. Never use independent breaking at transport speeds.
 - Drive at a safe speed to ensure control and ability to stop in an emergency. Ensure the additional weight of the Rotavator on the linkage does not compromise steering and braking - for example front weights or repairs to the brakes may be required if the tractor is not safe to drive.
 - Reduce speed during turns. Tractors have not been designed for fast cornering.
 - Use engine braking when going down hills - do not coast.
 - Do not drink alcohol and drive.
- Watch for obstructions, particularly if over-width.
- Observe any load ratings applicable on bridges.

IDENTIFICATION OF HAZARDS

- Owners and operators must be prepared to assess their; equipment, operators, maintenance procedures and applications to identify safety hazards.
- Appropriate methods to reduce the hazards identified must then be applied.

MACHINE SUITABILITY TO APPLICATION

Rotavators have been designed and manufactured as a tractor driven, ground cultivator - no other use is intended. However over the years some models have been adapted for new uses, such as road-base preparation and semi-industrial mixing operations.

- Before beginning work it is necessary to assess the effect of the machine on the safety of both the operator and any potential bystanders. It is recommended that you contact the manufacturer or distributor for assistance in this area.

AUTHORISED OPERATORS & TRAINING

If you are an employer, do not assume an operator is trained for use of this equipment, (you would not let an unlicensed driver borrow your car !).

- Ask to see licences if applicable, and record numbers and validity dates.
- Request details of previous experience, in writing and check them out if appropriate and ensure such records are retained.
- Devise a suitable training course for operators if appropriate, and ensure records of their completion are retained.

MAINTENANCE RECORDS

Recommended maintenance is detailed in the Lubrication & Maintenance section. Failure to follow these may jeopardise safety as well as economic operation.

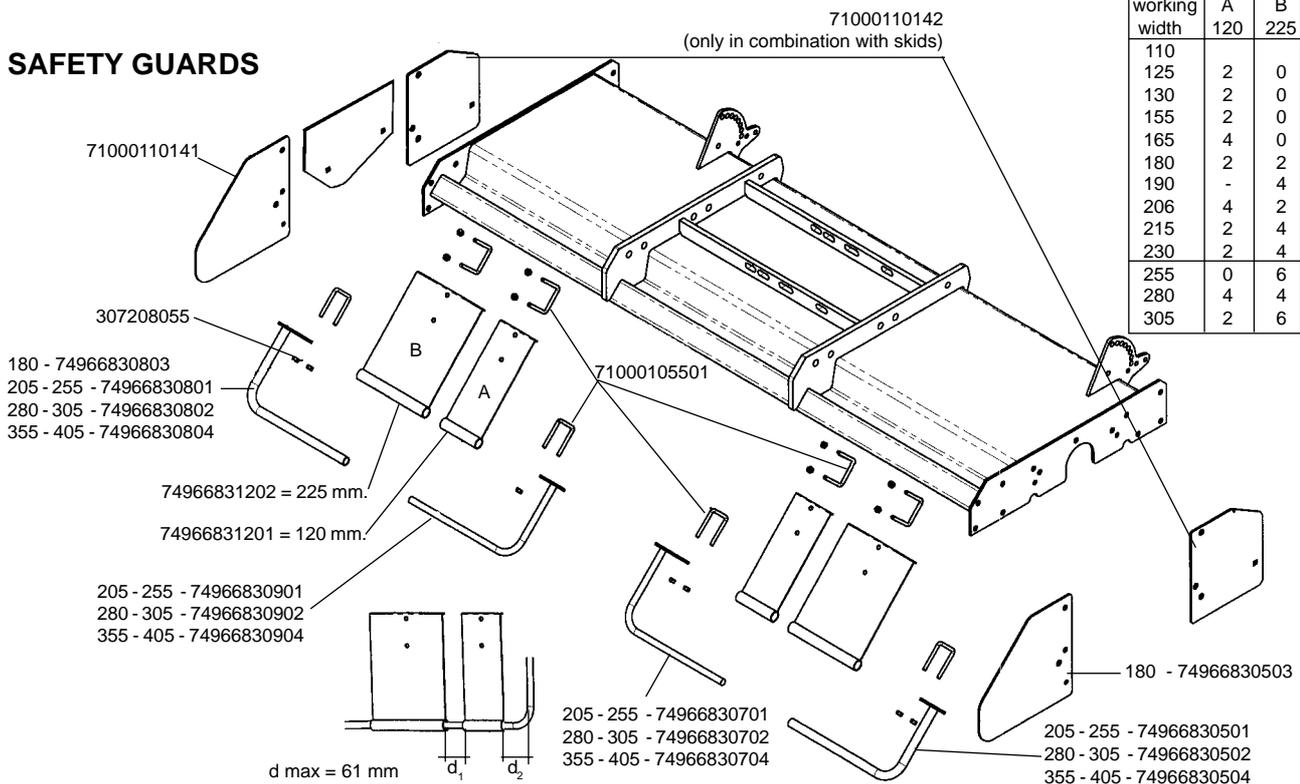
Records of periodic maintenance are important as they detail when and who carried out the last maintenance and inspection. Appropriate checklists should include maintenance as detailed and in particular the following safety aspects:

- SAFETY DECALS AFFIXED & LEGIBLE.
- GUARDING - All fitted and secure.
- CRITICAL FASTENERS SECURE



Fit all safety guards before operating. Operation is not permitted without safety guards fitted. These are not fitted at the factory due to freight limitations.

SAFETY GUARDS



NEVER

- Touch any moving parts of the Rotavator or parts which may be hot from operation.
Check oil levels whilst the Rotavator is running.
- Carry out adjustments or repairs to a mounted Rotavator unless the tractor engine is stopped and the Rotavator firmly supported or lowered to the ground.
- Leave the tractor seat unless the Rotavator is lowered, the pto drive disengaged, the gear shift in neutral, the brake applied, the engine stopped and the ignition key removed

BE A SAFE OPERATOR BY THINKING – BEFORE ACTING

PTO DRIVE SHAFT GUARDS

HOWARD PRODUCTS are supplied with non-rotating PTO Drive Shaft which must be correctly fitted and well maintained.

Before and after each use PTO driven implements should be examined to ensure the Drive Shaft rotates freely in the guards, the guards are undamaged, securely fitted, correctly seated on the shaft grooves and the restraining chains attached to the tractor and implement.

Should the guards be broken, damaged or badly fitted the implement must not be used damaged parts have been replaced and/or bad fitting corrected.

Always ensure the guard tubes do not separate at the PTO Drive Shaft's longest working or transport length, or at its shortest.

Avoid damage to guards when the PTO Drive Shaft is being connected or disconnected from the tractor by resting it on a support.

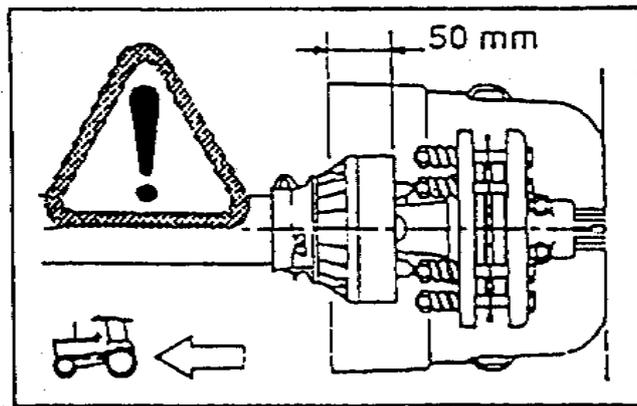
Never allow PTO Drive Shaft Guards to fall into the implement or drop to the ground: damage will almost certainly occur.

Always ensure the sliding surfaces of the guard tubes are clean and the guard bearings lubricated.

When replacing worn or damaged sections of the Guard, use special tools available from the makers.

Always follow the fitting, lubrication and maintenance instructions supplied by the makers of the PTO Drive Shaft Guard.

 **UNLESS CORRECTLY GUARDED PTO DRIVE SHAFTS CAN KILL**



Minimum overlap in straight position

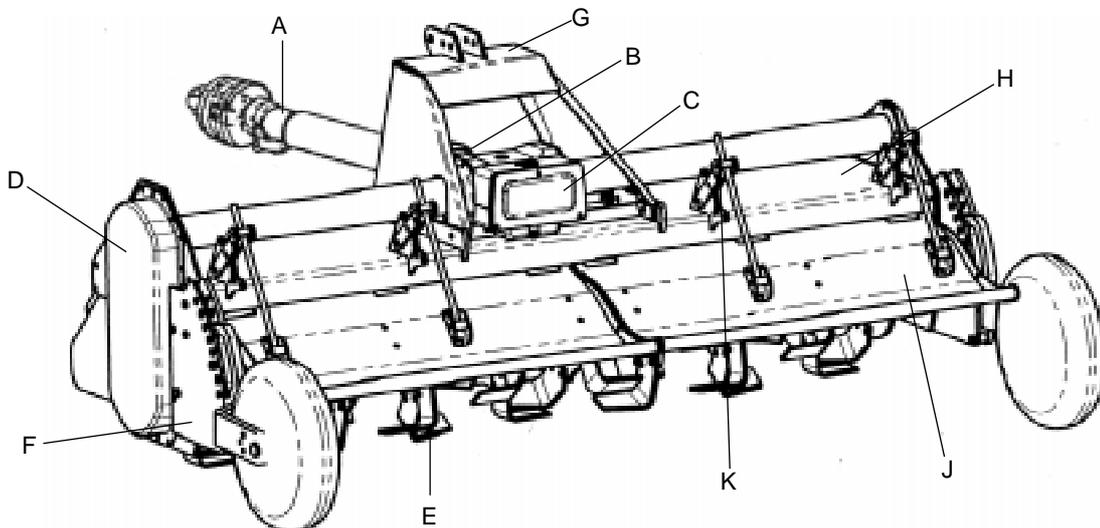


Fig. 2

ROTAVATOR 500B. Chain side drive

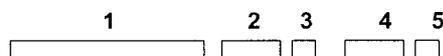
Model	Working width cm	Transport width cm	Speed rpm	Weight Kg	Rotavator No. of blades	Rotalabour n° of blades		Tractor engine Power HP
						2 bolt	F1	
R500B-110M	110	139	210	400	27	-	-	40-60
R500B-125M	125	154		420	30	-	-	40-60
R500B-130M	130	159		430	30	-	-	45-60
R500B-155M	155	184		480	36	-	-	50-70
R500B-165M	165	194		505	39	-	-	55-70
R500B-180M	180	209		530	42	54	30	60-75
R500B-190M	190	219		555	45	-	-	65-80
R500B-205M	205	224		580	48	62	36	70-85
R500B-215M	215	234		605	51	-	-	75-85
R500B-230M	230	259		630	54	70	40	75-90
R500B-255M	255	284	680	60	78	46	85-100	
R500B-130S	130	159	175 / 195 220 / 245	450	30	-	-	45-60
R500B-155S	155	184		500	36	-	-	50-70
R500B-165S	165	194		525	39	-	-	55-70
R500B-180S	180	209		550	42	-	-	60-75
R500B-190S	190	219		575	45	-	-	65-80
R500B-205S	205	224		600	48	-	-	70-85
R500B-215S	215	234		625	51	-	-	75-85
R500B-230S	230	259		650	54	70	40	75-90
R500B-255S	255	284		700	60	78	46	85-100
R500B-280S	280	300		185 / 205	1270	-	86	52
R500B-305S	305	335	275 / 300	1340	-	94	56	100-125

ROTAVATOR 500S. Gear side drive

Model	Working width cm	Transport width cm	Speed rpm	Weight Kg	Rotavator No. of blades	Rotalabour n° of blades		Tractor engine Power HP
						2 bolt	F1	
R500S-180M	180	209	210	530	42	-	-	60-75
R500S-190M	190	219		555	45	-	-	65-80
R500S-205M	205	224		580	48	-	-	70-85
R500S-215M	215	234		605	51	-	-	75-85
R500S-230M	230	259		630	54	-	-	75-90
R500S-255M	255	284		680	60	-	-	85-100
R500S-180S	180	209	175 / 195 220 / 245	550	42	-	-	60-75
R500S-190S	190	219		575	45	-	-	65-80
R500S-205S	205	224		600	48	-	-	70-85
R500S-215S	215	234		625	51	-	-	75-85
R500S-230S	230	259		650	54	70	40	75-90
R500S-255S	255	284		700	60	78	46	85-100
R500S-280S	280	305	185 / 205	900	66	86	52	95-115
R500S-305S	305	334	275 / 300	950	72	94	56	100-125

SPECIFICATION

The above list shows the standard range of Rotavator 600 together with working widths, power requirements and weights.



Rotavator 500B-205S

- 1 Type: Rotavator / Rotalabour
- 2 Series: 500
- 3 Version: B (Basic): Chain side drive
S (Super): Gear side drive
- 4. Working width in cm
- 5. Gearbox: M: Monospeed
S: 4 speed Selectatilh

Description

Fig. 2 indicates assemblies referred to in the text of this manual which are named below :

- A = PTO shaft
- B = Overload Clutch
- C = Gear box
- D = Side Drive
- E = Rotor
- F = Depth control
 - skids
 - wheels
 - Roller

G = Topmast

H = Hull

J = Trailing board

K = Trailing board adjustment

Rotavator 500 are designed for 40 to 125 HP tractors with cat. II or III linkage. The drive is by a PTO shaft from a 540 rpm tractor PTO to a multi-speed gear box. The jackshaft transmit power from the gearbox via the side drive to the rotor.

An overload clutch provides protection for the transmission. The normal tillage depth of 5-20 cm is adjusted by skids, depth control wheels, or by a roller.

The Rotavator 500 is ideal for general work, such as weed destruction, incorporation of green fertilizers, crop residues, scalping, vegetal production and orchards.

The Rotalabour 500 is ideal for:

- Preparation of spring seed beds
- Pasture renovation
- Stubble breaking
- Direct seed bed preparation

In view of these characteristics the Rotavator 500 is the ideal machine for medium farms and vegetable producers.

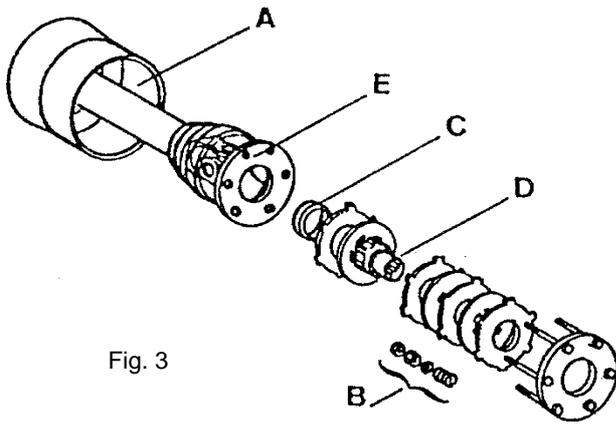


Fig. 3

NEW MACHINE

Power Take-Off Drive Shaft & Clutch

For transport purposes PTO shaft are dismantled and must be refitted as instructed below.

Remove the guard (A) from the gearbox. Remove the 6 exposed nuts, washers and springs (B).

- Fit the clutch plate (E) on the 6 exposed bolts and secure with the 6 springs, washers and nuts (See Fig. 3). Tighten the 6 nuts fully to ensure correct seating of the clutch components. Then slacken nuts and locknuts until the springs can easily turn by hand, then adjust the clutch following instructions on p. 21.

- Refit the guard (A)

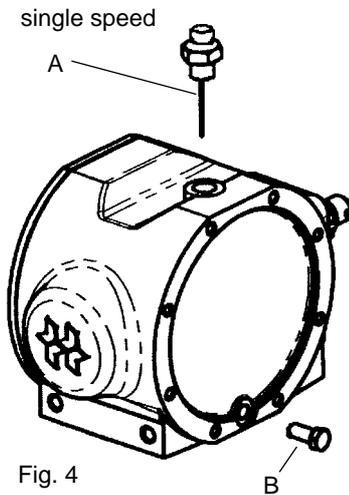


Fig. 4

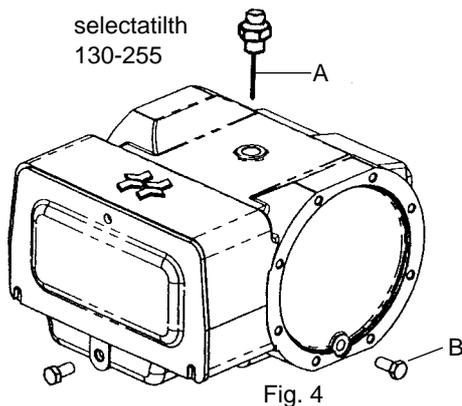


Fig. 4

Lubrication & General

With the machine standing level ensure the following preparatory work has been done:

1. The gearbox filled to the dipstick mark (A) - (B) is the draining-plug. See fig. 4.

- Single speed = 1,2 l.
- Selectatilh 130-255 = 3 l.
- Selectatilh 280-305 = 4 l.

2. The gearcases filled to the level plugs (fig. 5 C) - (7 l).

3. Rotor bearing non end drive the housing is filled to the oil level plug D fig. 5B.

USE ONLY: SAE 85 W 140 EP

3. All oil and grease points as indicated in page 29 lubrication.

4. All nuts and bolts tightened (re-tighten after first hour's work).

! SERIOUS DAMAGE CAN RESULT FROM FAILURE TO CARRY OUT THE ABOVE PROCEDURES

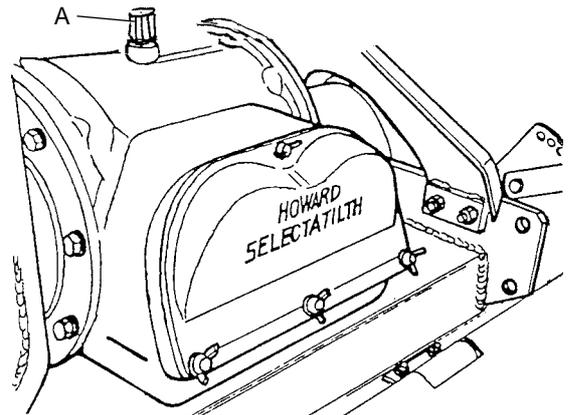


Fig. 5

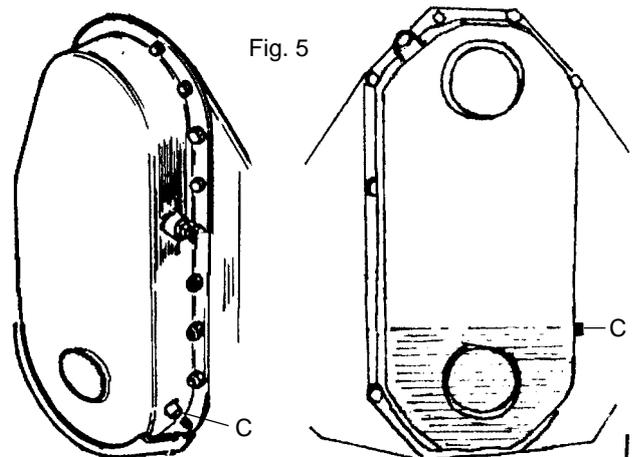
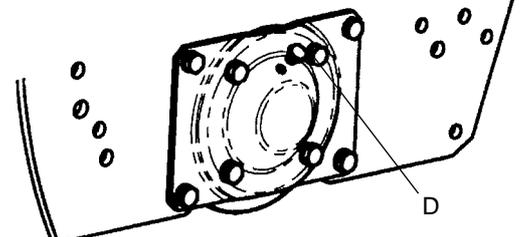


Fig. 5b



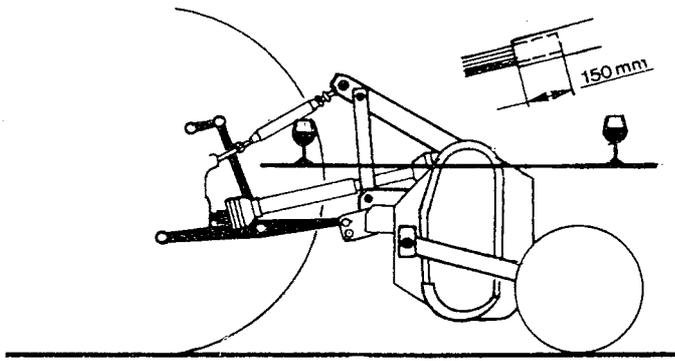


Fig. 6

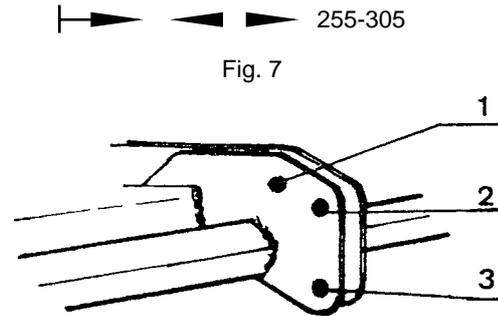


Fig. 7

Attaching the Rotavator to the tractor

The Rotavator 500 will suit Cat. II

The PTO Drive Shaft must be set to a safe working length to ensure the male shaft does not "bottom" or separate from the female tube under all conditions of use and transport.

To determine the correct mounting position: with the Rotavator on a firm level surface the Depth Control equipment should be adjusted until the Gearbox Input Shaft is horizontal (see Fig.6).

Position the tractor at a distance from the Rotavator to give 150 mm (6") minimum engagement of the male half of the PTO Drive Shaft in the female tube when connected to the tractor. This establishes the safe working length of the PTO Drive Shaft for connection to the tractor.

Position the tractor lower link ball joints in line with the mounting pins. Select a mounting bracket position (see Fig.7) which will provide a mounting pin hole to suit the length of the PTO Drive Shaft. Connect the tractor lower links. Fit the tractor upper link and secure. Attach the PTO

Drive Shaft to the tractor ensuring the quick release pin engages the spline shaft groove. Attach the PTO Drive Shaft Guard Chains to the tractor and Rotavator.

Attach stabiliser bar or check chains to limit sway to 50 mm (2"). Adjust tractor linkage to level the Rotavator laterally and longitudinally (see Fig.9).

Before engaging the tractor PTO, lift the Rotavator on the hydraulic lift linkage until the PTO Drive Shaft attains an angle of 40° and set the limit stop on the hydraulic lift control quadrant (see Fig.10). THE PTO DRIVE SHAFT ANGLE MUST NEVER EXCEED 40°.

Finally check that during transport and use the PTO Drive Shaft does not "bottom" or separate and that the maximum angle of 40° is not exceeded.

Should it not be possible to obtain the aforementioned settings with your tractor, SEEK ADVICE.

110 - 230

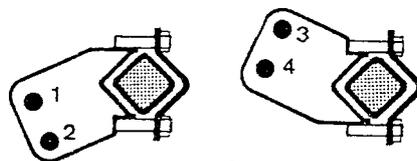


Fig. 8

Fig. 9

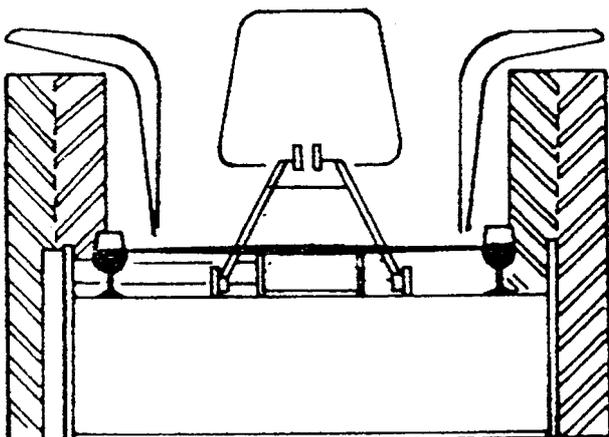
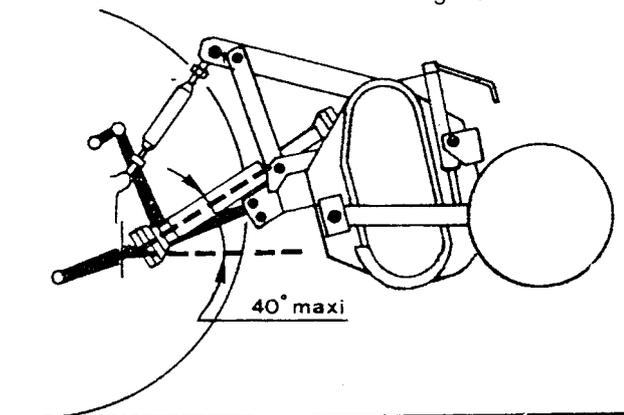
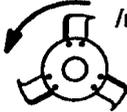
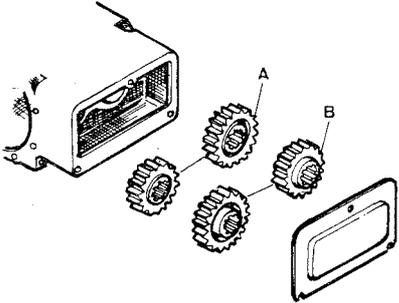
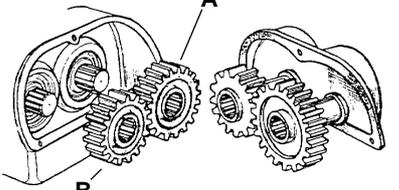


Fig. 10



	 min.	A	B	 /min	Rotavator	Rotalabour
 <p>R500-130-255S</p>	540	20	15	155	o	•
		19	16	175	•	•
		18	17	195	•	o
		17	18	220	•	o
		16	19	245	•	•
		15	20	275	o	•
		14	21	310	o	o
		13	22	350	x	o
	1000	22	13	220		o
		21	14	250	o	o
		20	15	290	o	•
		19	16	320	•	•
		18	17	355	x	o
		 <p>R500-280-305S</p>	1000	23	18	185
22	19			205	•	•
21	20			225	•	o
20	21			245	•	o
19	22			275	•	•
18	23			300	o	•
540	16		25	195	o	o
	15		27	225	o	o

• Standard o Optional x Not recommended

Fig. 11

Selectatilh Gearbox

The Selectatilh Gearbox enables rotor speeds to be altered by simply transposing or changing pairs of pick-off gears. Fig. 11 indicates the range of pick-off gears available and the rotor speeds resulting from their use. Pick-off gears are number of teeth coded for ease of identification and the range provide gears suitable for 540 or 1000 rpm tractor PTO speed.



BEWARE - OIL & COMPONENTS MAY BE HOT

To transpose the gears in use merely withdraw them from the shafts and exchange their positions ensuring that the protruding bosses are adjacent to the Gearbox bearings.

Changing Selectatilh Gears

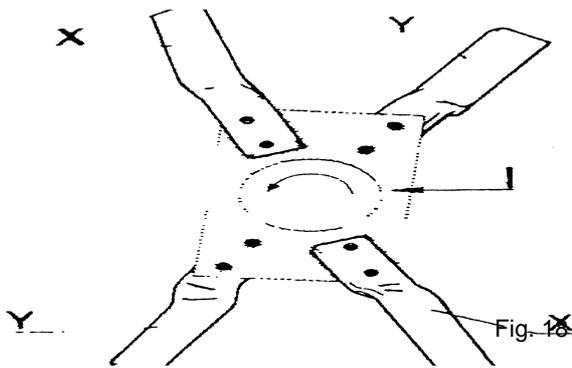


STOP THE TRACTOR AND DISENGAGE THE PTO

A spare pair of gears is attached to the inner face of the Gear-box Cover which is removed by unscrewing the top wing screw and slackening the 2 lower wing screw.

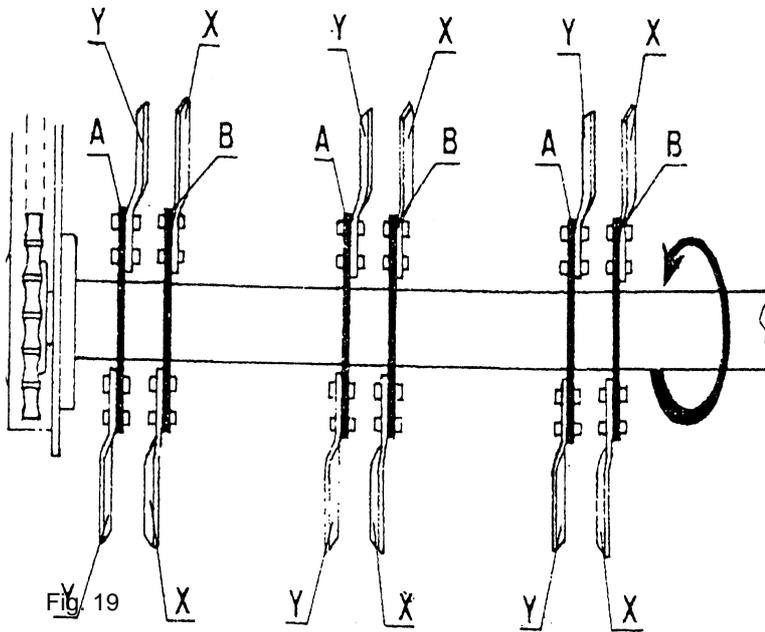


NEVER OPERATE THE ROTAVATOR WITHOUT A SPARE PAIR OF GEARS FITTED TO THE GEARBOX COVER.



ROTORS

Badly bent, worn or broken blades will impar efficiency and should be replaced immediately using genuine HOWARD BOLT ASSEMBLIES which are specially manufactured to a high strengh specification.



Blading standard rotors

Firstly identify left and right hand blades. Blades X on Fig. 18 is a left hand blade. Use only ORIGINAL-HOWARD-BLADES and HOWARD-BLADE-BOLTS. Always attach blades and clamping rings to the left of the rotor flanges. To blade a rotor to the 2-Blade system refer to Fig.19 and to Fig.20 for the 3-Bladed system proceeding as follows:

When correctly fitted, the blades must form a "scroll" pattern.

This ensures that they enter the soil at regular intervals to even out the load on the transmission. **When replacing worn blades, remove one blade and fit the new one in it's place before proceeding to the next.** This will ensure that the blade "scroll" pattern is maintained.

Use only HOWARD blade bolts which have the correct shank length and tensible strength. Fit the bolt head against the blade and the clamping ring and the spring washer and nut against the flange. Tighten the nuts to a torque of 240 Nm. To help provide alternative tilths the flanges are drilled for either 2 or 3 blade formation which allows for a rougher cloddy finish for overwintering or a finer tilth suitable for spring seed beds.

To simplify changing from one formation to another, each blade bolt hole has a number and the blades are fitted in the following fashion: (see Fig. 19 and 20).

Left hand blades

2 blade formation 1+2; 8+10

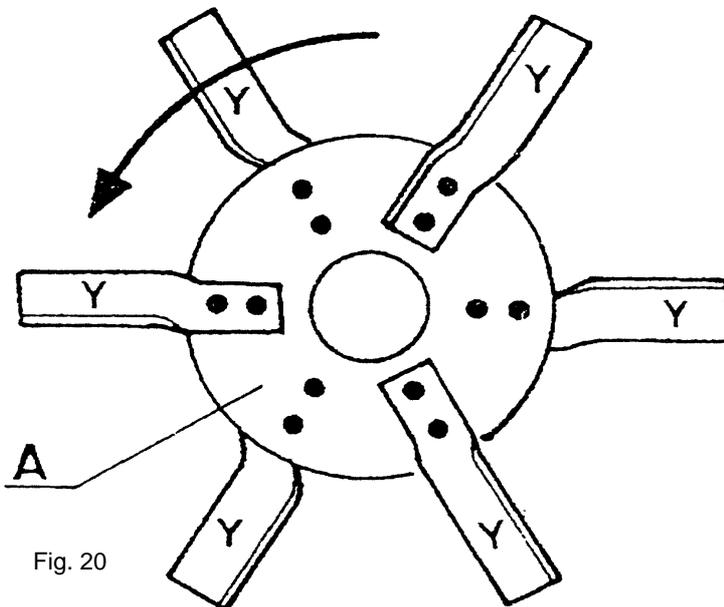
3 blade formation 1+2; 5+6; 12+14

Right hand blades

2 blade formation 3+4; 11+13

3 blade formation 3+4; 7+9; 15+16

Note that a left hand blade must preceede a right hand on the rotor flanges.



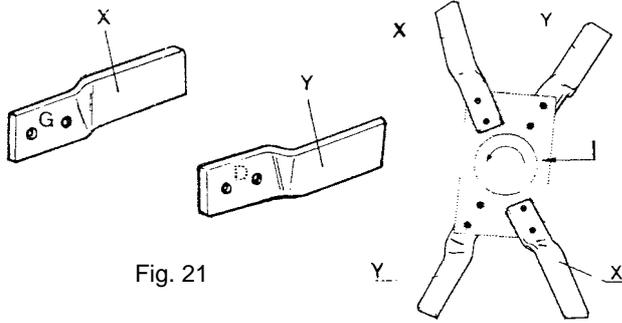


Fig. 21

Blading Superspike rotor

Firstly identify left and right blades. Blade (X) is a left hand blade and (Y) a right hand.

- On middle flanges (I) fit 2 right hand blades (Y) to the right hand side of the flange and 2 left hand blades (X) to the left hand side (See Fig. 21).
- Check that blades form a scroll pattern.
- Tighten the blade bolts to 240 N.m.
- Ensure that the head of the bolt is against the blade.

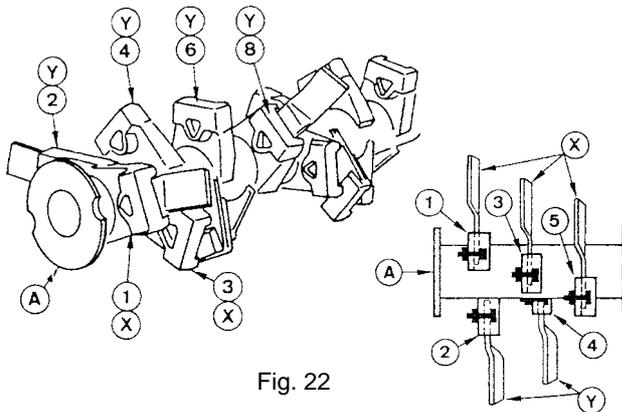


Fig. 22

Blading Rotalabour F1 rotor - Fig. 22

On the scroll pattern defined by blade supports (1), (3), (5), fit L.H. blades (X). Support (1) is the nearest from the rotor plate (A), driving shaft side .

On the other scroll pattern defined by blade supports (2),(4).(6), fit R.H. blades (Y).

Blading Rotasemis Rotor

- Identify left and right Blades. See fig. 17
- Fit 6 right hand blades (Y) to the left hand flange (A). See fig. 19 and 20.
- Fit 6 left hand blades (X) to the right hand flange (B). See fig.19.
- Tighten the blade bolts to 240 N.m
- Ensure that the head of the bolt is against the blade.

Changing rotors

To change rotors, the ROTAVATOR should be lifted 75 mm above the ground on the 3-point linkage and firmly supported for safety.

Take out the 8 bolts (A) securing the rotor to the drive shaft on the left hand side of the machine and the 4 bolts (B) securing the rotor bearing housing to the right and sideplate of the machine.

To fit an alternative rotor reverse the sequence of operations. (See Fig. 23).

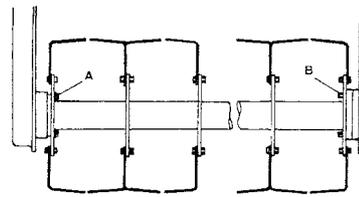


Fig. 23

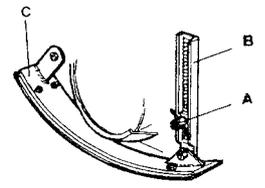


Fig. 24

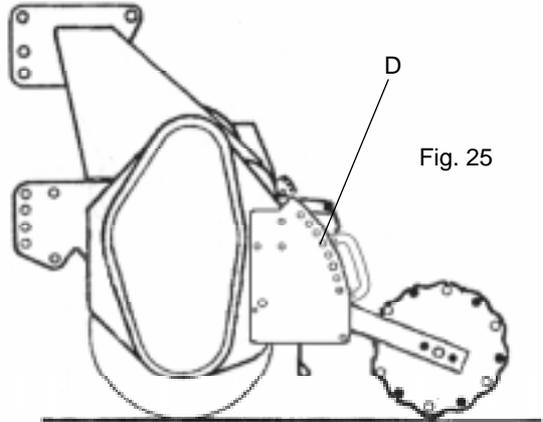


Fig. 25

Depth Control

Tillage depth is regulated by: rear mounted Depth Control Wheels, adjustable side mounted Depth Control Skids or a rear mounted Crumble Roller.

Side Mounted Depth Control Skids

Fig. 24 illustrates the attachment of a skid. Slacken nut (A) on the adjusting bar (B), position the skid (C) to the required depth of work and re-tighten the nut.

Side Mounted Depth Control Wheels

Fig. 25 illustrates the attachment of a wheel assembly which can be fitted to the right or left hand side of the machine. Ensure the Scraper is always positioned above the depth control wheel. Position the depth control wheel to the required working depth by turning the handle (A).

Rear Mounted Crumble Roller

Rotavators 500 can be equipped with Crumble Rollers specially designed for seedbed preparation. Fig. 25 illustrates the attachment of the Crumble Roller (A), Mounting Arm (B), to the roller and Depth Control Pin (D). The bolting position of the Mounting Arm allows variable distances of attachment of the Crumble Roller to the Rotavator, e.g. close mounting for Combi Trailing Board or distant for standard Trailing Board. The work depth is adjusted by the Control Pin (D).

Crumble Rollers can be rapidly replaced by Depth Control Wheels which incorporate their own Mounting Arm.

Protection Skids

To protect the chaincase and the rotor bearing housing from damage and wear replaceable skids are fitted to both sides of the Rotavator.

Parking Prop

To support the machine when it is not attached to the tractor one or two parking props (dependent on width) are fitted on the front tool bar. When the machine is attached to the tractor linkage the prop should be raised.

LUBRICATION & MAINTENANCE CHART

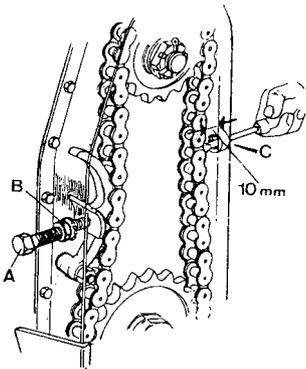
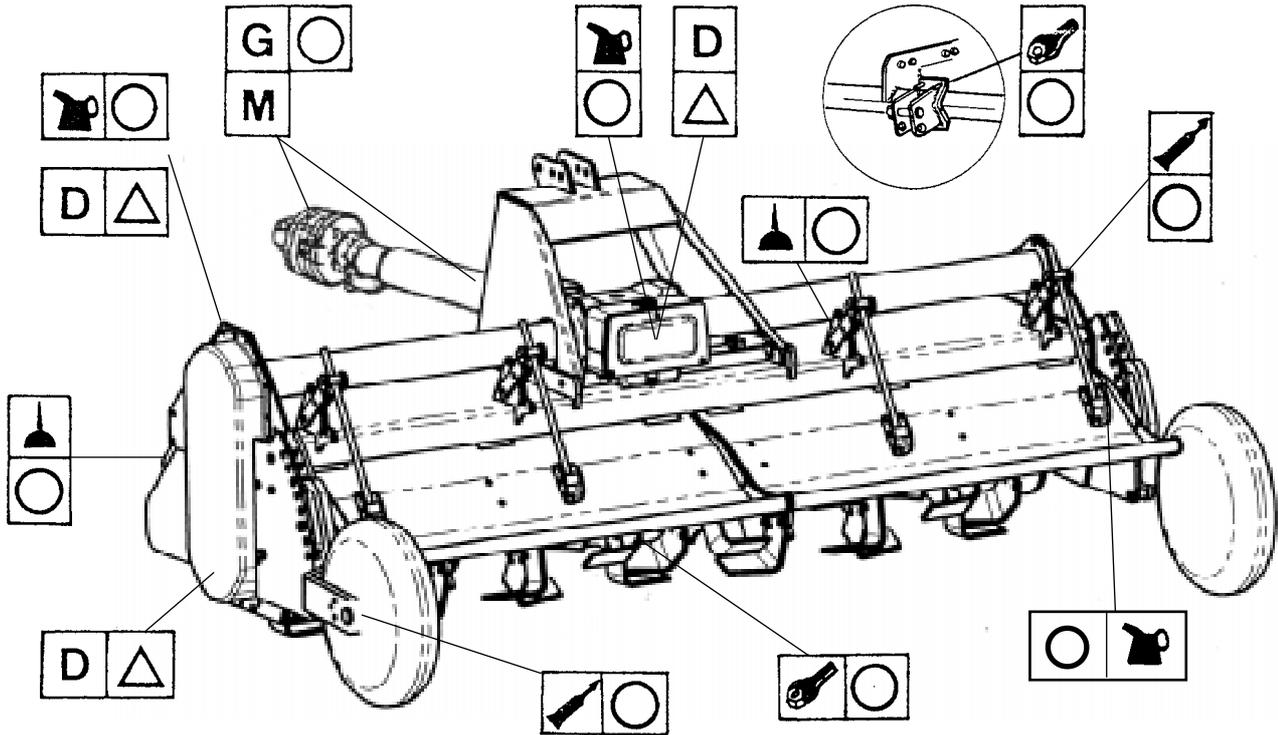


Fig. 27

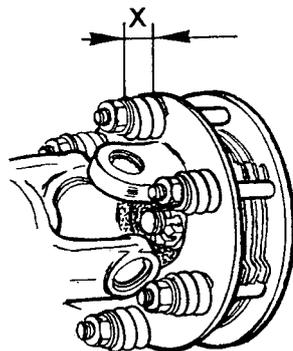


Fig. 28

PTO	Tractor H.P.	Turns of Nuts	. X (mm)
540	45	1 + 1/4	29,9
	55	1 + 1/2	29,5
	65	1 + 3/4	29,1
	85	2 + 1/10	28,4
1000	45	3/4	30,6
	60	1	30,2
	80	1 + 1/4	29,9

Fig. 29

Clutch

In general the clutch should be adjusted to give drive to the rotor during normal work. Should tree roots, rocks or similar obstacles be struck the clutch must slip to protect the ROTAVATOR and tractor transmission. If the clutch is set too loosely the rotor will turn erratically leading to excessive wear of the friction discs. Conversely a clutch set too tightly provides no protection, transmitting a shock load when obstacles are encountered.

To set the clutch, proceed as Follows:

- Take off the guard
- Slacken nuts and lock nuts until the springs can easily turn by hand.
- According to the power of the tractor used, adjust the spring length in accordance with the dimensions given here (turns of nuts and maximum length of springs) (See Fig. 28 and 29).

Weed cutters

Rotavator 500 are provided with small weed cutter blades at each end of the rotor. Long grass, weeds, etc., are thus prevented from wrapping round the rotor ends. The blades are slotted for adjustment and should be set to just clear the blade bolt heads in the end flanges. In weedy conditions correctly adjusted blades will avoid loss of power.

	Daily
	Weekly
	Every 500 hours
	Oil with can
	Top up with Oil SAE 90
	Use grease gun
D	Drain flush and fill (SAE 90)
G	Apply Graphite or Molybdenum Disulphide Grease
M	Follow makers instructions
	Tighten fasteners

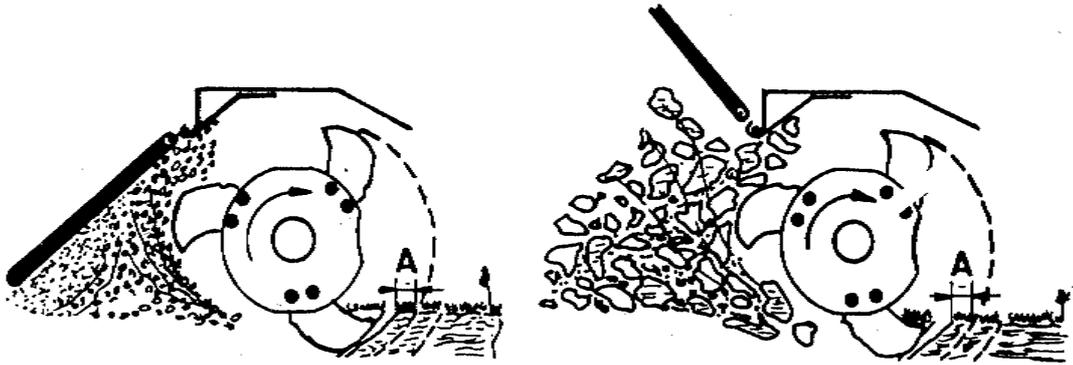


Fig. 30

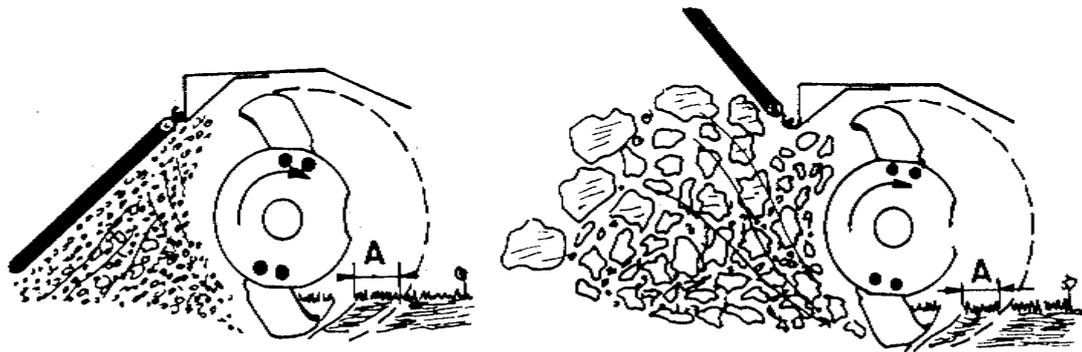


Fig. 31

OPERATING INSTRUCTIONS

Operational Information

By simple adjustments the Rotavator 500 will produce a range of tilths in most soil types and handle various cultivation techniques e.g. weed control, seedbed preparation, trash and chemical incorporation etc.

As a general principle fine tilths are produced by a combination of slow tractor speeds, fast rotor speeds and a lowered trailing board. Conversely, coarse tilths are produced by fast tractor speeds, slow rotor speeds and a raised trailing board (see Fig.30).

As an alternative to the standard 3-blade a 2-blade rotor configuration can be used which reduces the tendency for clogging and soil balling (see Fig. 31). The 2-blade configuration is specially suited to sticky soil conditions, trash incorporation and the production of a rough cloddy finish.

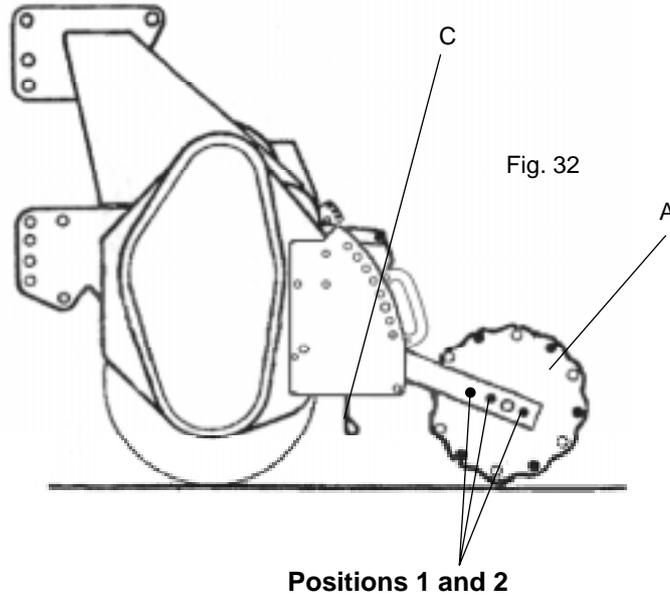
Intermediate grades of tilth from coarse to fine can be obtained by:

1. Varying the rotor speed with a Lever change Gearbox (see page 11 for detailed instructions).
2. Adjusting the height of the trailing board which by impact shatters the blade-cut "clods" (A). Raised trailing boards also deposit weeds and trash on the surface to wither, whilst lowered trailing boards bury trash as well as having a levelling effect on the soil.
3. Increasing or decreasing the tractor travel speed which alters the size of blade-cut "clods" (A). Higher travel speeds may also be used for shallow work on previously broken ground or scalping passes for weed control.

Working Instructions

Set the depth control equipment to the required tillage depth. Select a trial trailing board position and rotor speed (Level change Gearbox) to give the type of tilth required. Engage the tractor PTO and drive forward, progressively lowering the Rotavator into the ground. Proceed for a short distance and check whether the resultant tilth is satisfactory and the tillage depth is uniform across the rotor width. If not, make the appropriate adjustments to produce the required tilth utilising the slowest rotor speed which allows for a reasonable ground coverage. Fast rotor speeds demand more power and increase blade wear leading to less economic operation.

If in doubt consult the Operators Checklist page 25 which provides remedies for most operational problems.



ROTALABOUR USE

The ROTALABOUR is equipped with a special rotor fitted with twisted blades and a rear crumble roller (A) which also serves as a depth control (D).

The principal use of this implement is soil preparation, levelling and seed bed preparation in one pass. This is achieved by the combination of : rotor, blades, articulated trailing board (C) and roller, which break down and gauge the clod size and distribution to obtain a seed bed suitable for the crop to be sown.

NOTE: When using this machine in wet or heavy soil conditions, it is advisable to remove the alternative bars(B) on the roller to avoid balling-up.

See Fig. 32. Crumble roller with two positions (I) and (II).

OPTIONAL EQUIPMENT

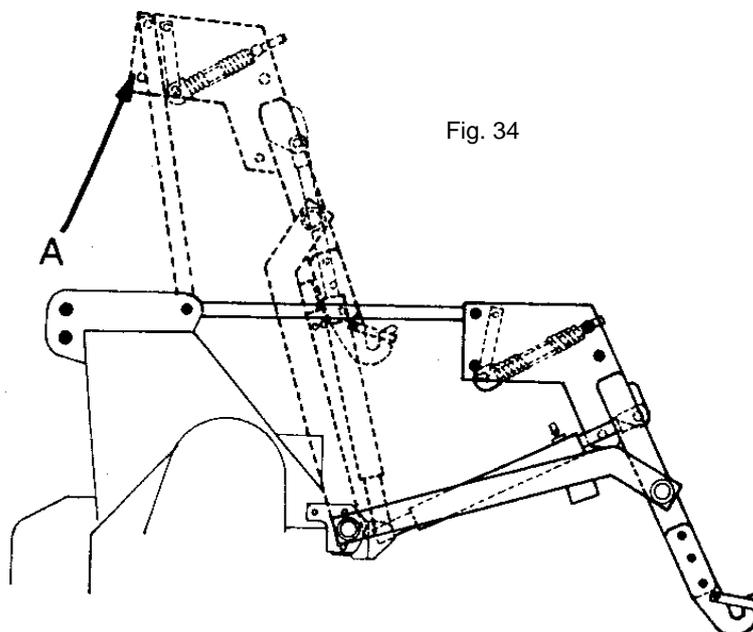
Hydraulic Combi-Hitch

The Rotavator can be fitted with a hydraulic combi hitch as a option, this enables the weight of the mounted implement to be transferred nearer the tractor when is transported, in the raised position the mounted implement is lifted over the top of the Rotavator.

Care has to be taken when attaching the implement to the combi hitch that the rams do not foul any bracketry. A safety pin (A) can be fitted to securely lock the hitch when in the raised transport position. See Fig. 34.

Rear PTO

The rear PTO enables the turbine of gear mounted seed drills and other equipment to be driven.



Operational advice**Insufficient Depth Obtained**

- (a) adjust depth control equipment
- (b) insufficient power : use lower tractor gear, reduce rotor speed
- (c) chaincase on hard soil. Further passes required
- (d) blades "trowelling" (rolling over ground), increase rotor speed or use lower tractor gear
- (e) blades incorrectly mounted

Tilth too fine

- (a) raise trailing boards
- (b) reduce rotor speed
- (c) use a faster tractor gear
- (d) convert to 2-blade configuration

Tilth too coarse

- (a) lower trailing boards
- (b) increase rotor speed
- (c) use lower tractor gear
- (d) wait until soil is drier if sticks
- (e) convert to 3-blade configuration

Blades "Balling up" with soil

- (a) ground too sticky for working
- (b) increase rotor speed
- (c) raise trailing boards
- (d) decrease tractor speed (e) convert to 2-blade configuration

Excessive Blade Wear

- (a) reduce rotor speed
- (b) replace loose or bent blades

Rotavator "Bumping" on Ground

- (a) obstacles entangled in blades
- (b) blades incorrectly mounted with no scroll effect or blades fitted with blunt edge leading or broken blades

Obvious Points

- (a) ROTAVATOR not level - cutting too deep on right side. Shorten right hand tractor lift rod or adjust depth control wheel (b) Not overlapping - drive closer to last run
- (c) Working on hillsides. Work up the slope if possible. If lateral work cannot be avoided, work from the top to the bottom in order to limit any terracing effect.

Rotavating

1. When operating the Rotavator the most suitable practice is to work in "lands"
2. The ROTAVATED ground should always be to the right of the driver.
3. ROTAVATING the field headlands should not be carried out until the "lands" have been completed.
4. Always raise the Rotavator before turning.



THE ROTAVATOR SHOULD NEVER BE LOWERED WHILST THE TRACTOR IS TURNING.