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TILLAERATOR

Operator & Spares manual



LIST OF CONTENTS

GENERAL INFORMATION	Page 2
INTRODUCTION	Page 3
Section 1	
SAFETY PRECAUTIONS	Page 4
Section 2	
TRACTOR SELECTION AND FITTING	Page 6
Power requirement	" 6
Tractor preparation	" 6
Machine attachment	" 6
Transportation	" 6
Section 3	
OPERATION	Page 7
P.T.O. speed	" 7
Working conditions	" 7
Adjustments	" 8
Working checks	" 9
Front tines	" 9
Levelling bar	" 10
Forward speed	" 10
Selecting and changing gear	" 11
Drill linkage - optional extra	" 12
Section 4	
MAINTENANCE	Page 14
Lubrication	" 14
Drive chain	" 14
Chain adjustment	" 14
Gearbox	" 14
Clutch	" 15
Rotor	" 15
Section 5	
SPARE PARTS	Page 16
Main casing	" 17
Rotor-crumbler and levelling bar	" 21
Toolbar	" 23
Gearbox - 540 RPM	" 25
Gearbox 1000 RPM	" 27
P.T.O. shafts 540 RPM	" 29
P.T.O. shafts 1000 RPM	" 30
Clutch 540 RPM	" 31
Clutch 1000 RPM	" 32
540 RPM - 1000 RPM conversion kit	" 33

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. This manual includes an illustrated spare parts breakdown and the interpretation which precedes it should be read before ordering replacement components.

DEFINITIONS

The following definitions apply throughout this manual:

WARNING

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

CAUTION:

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

NOTE:

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

Left and Right Hand

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

Record the serial number of your machine on this page and always quote this number when ordering spares. Whenever information concerning the machine is requested remember to also state the type of tractor to which it is fitted.

MACHINE SERIAL NUMBER		INSTALLATION DATE
MODEL DETAILS		
DEALERS NAME		
DEALERS TELEPHONE NUMBER		

LIMITATIONS

The McConnel Warranty specifically excludes any hydraulic pump and controls supplied with the machine if they are used to power equipment other than the McConnel machine for which they were supplied. Prior confirmation and warranty cover that the pump is suitable for any other purpose must be obtained from the hydraulic manufacturers.

INTRODUCTION

The Tillaerator, a linkage mounted P.T.O. driven cultivator was developed primarily to produce a seed-bed in one pass on burnt or chemically treated stubble ground. The machine is also capable of producing an excellent seed-bed on ploughed ground at a higher work rate than most other conventional machines.

It is recommended for use with tractors of 75HP and upwards fitted with Category II or Category III linkage and with 540 RPM or 1000 RPM P.T.O shafts.

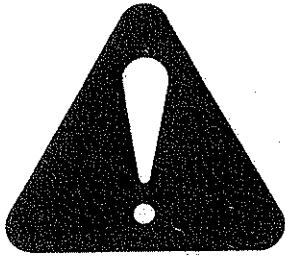
Drive is transmitted from the tractor's PTO through a three speed gearbox, a slip clutch, and finally to the rotor by heavy duty duplex chain.

One of the most important features of the machine is its low power requirement.

This is achieved by the tool bar thoroughly loosening the soil thus allowing the rotor to be driven at low speed which reduces fuel consumption and maintenance.

Remember for safe operation with the best results read and follow these instructions carefully. Minutes spent now could save hours and £s. later on.
READ THE BOOK FIRST

SECTION 1



WARNING

SAFETY PRECAUTIONS

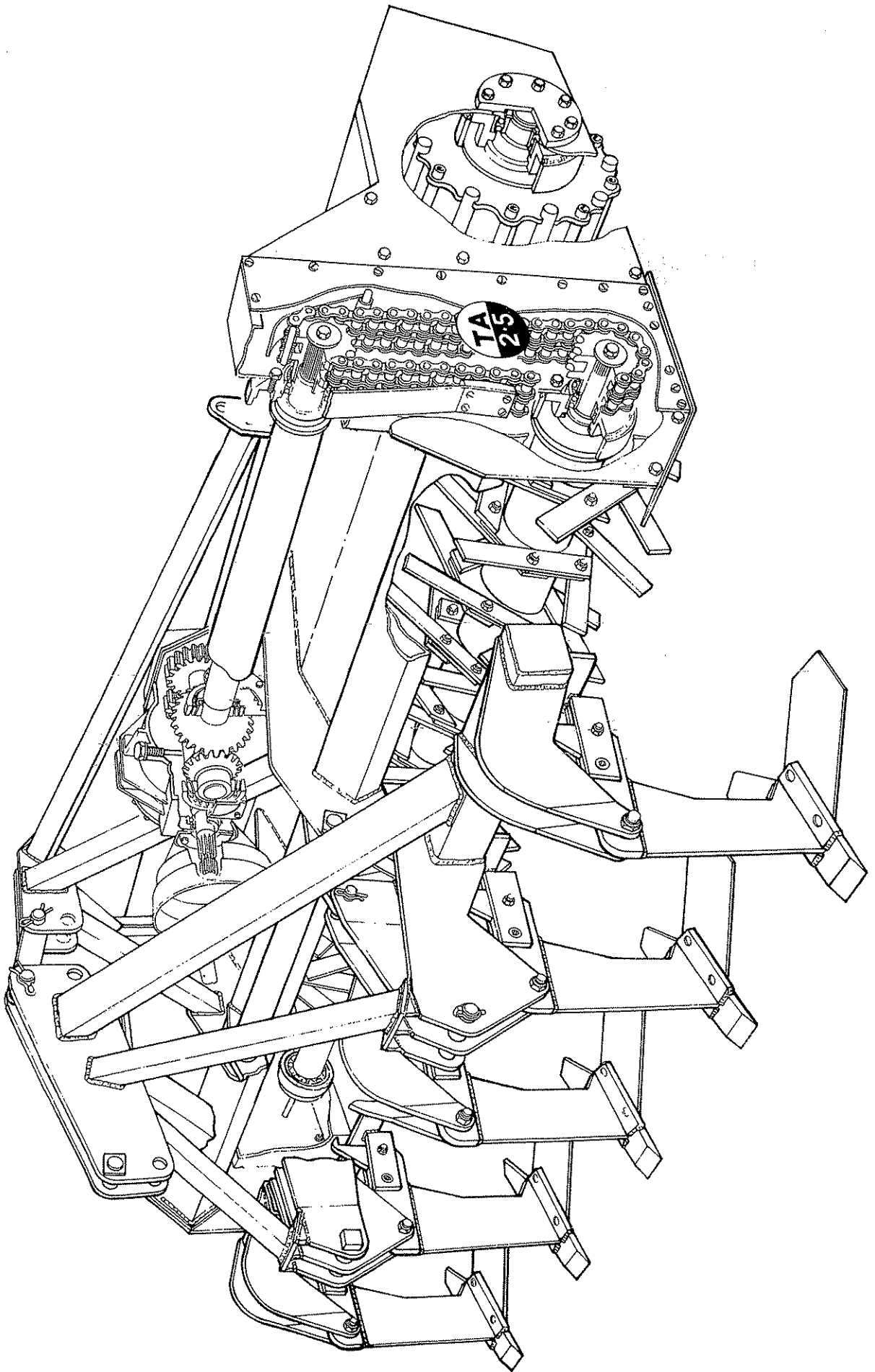
Ensure all guards and covers are in good condition and correctly fitted before starting work.

Disengage PTO and apply parking brake before dismounting from tractor. Stop tractor engine before making any adjustments.

Do not work under the frame while the machine is suspended on the tractor's hydraulic linkage. Use substantial supports.

Never allow anybody to ride on the equipment, whether in transport or at work.

GENERAL ASSEMBLY



SECTION 2

TRACTOR SELECTION & FITTING

Power Requirement Guide

- 2.5 metre width use tractor 75HP (56Kw)
- 3.0 metre width use tractor 90HP (67Kw)

Tractor Preparation

The Tillaerator is equipped with Category II linkage only. Tractors equipped with Category I linkage are generally considered of insufficient capacity to carry the loads. Front end weight should be added to the tractor for stability.

Machine attachment

The Category II linkage pins are secured through a double clevis hitch. For Category III working the outer clevis and bush on the same pins are used. Secure the top link to the uppermost hole on the implement.

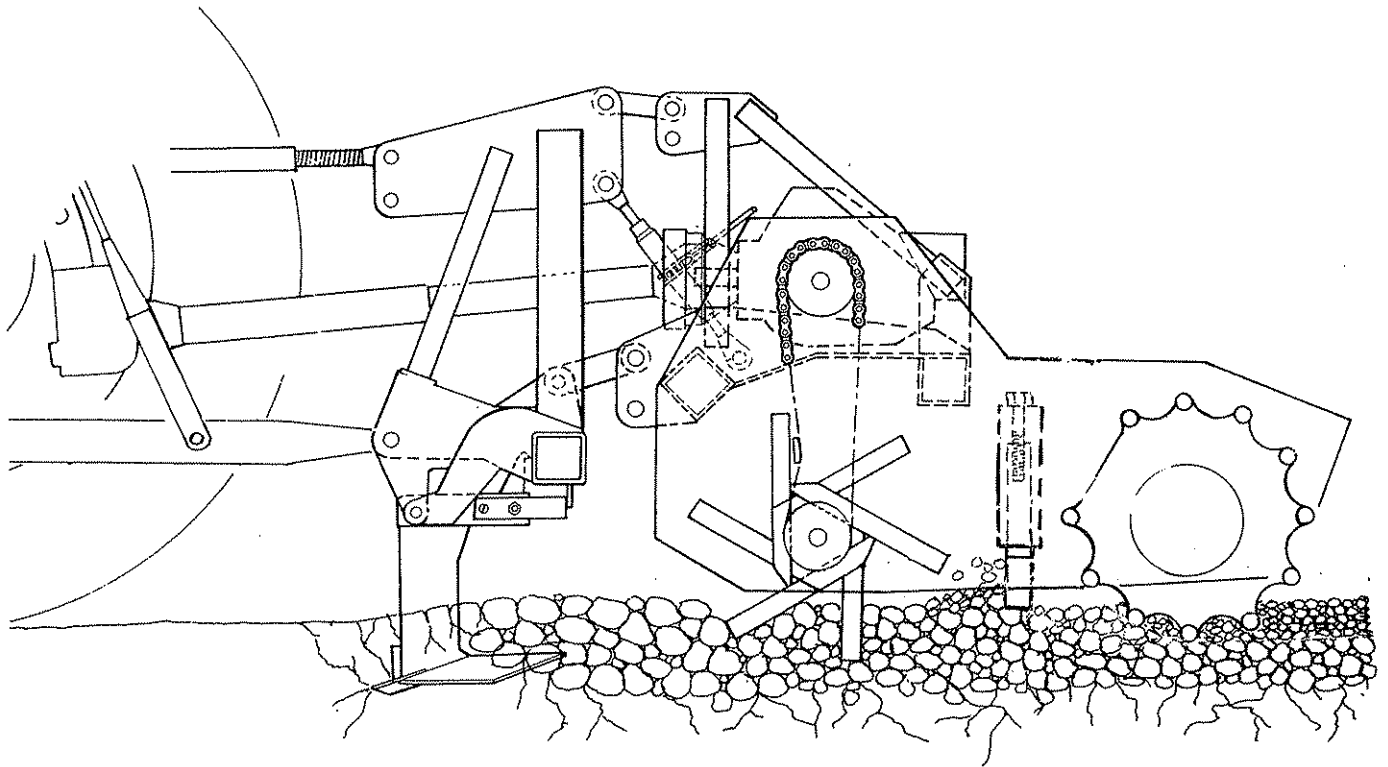
Tractor P.T.O. shaft heights can vary between 37cms and 81 cms (14" - 31") and although the standard driveshaft length supplied will suit the majority of tractors, a careful check should be made to ascertain that in the shortest possible position it is not allowed to 'bottom out'. A minimum of 13mm ($\frac{1}{2}$ ") clearance must be maintained. Both driving and driven members should be shortened with a hack-saw by the same amount, care being taken not to cut off more than necessary on either section. A minimum engagement of 150mm(6") is required.

The angle of operation of universal drive shafts has recommended limits. On tractors with low PTO output shafts the angle becomes acute when the implement is lifted to its maximum travel. This should not present a hazard as the PTO drive should be disengaged before lifting the implement clear of the ground or alternatively the lift height should be restricted.

Transportation

Stabilizer bars or check chains should be secured to prevent the implement swaying when travelling on the highway. In work, they should be loosened sufficiently to allow steering of the tractor whilst still preventing the toolbar feet fouling the rear tyres.

SECTION 3 OPERATION



Models can operate at either 540 rpm or 1000 rpm PTO speed depending on the gearbox fitted.

At these speeds a finished seed bed is achieved with a single pass which incorporates a progressive three stage operation.

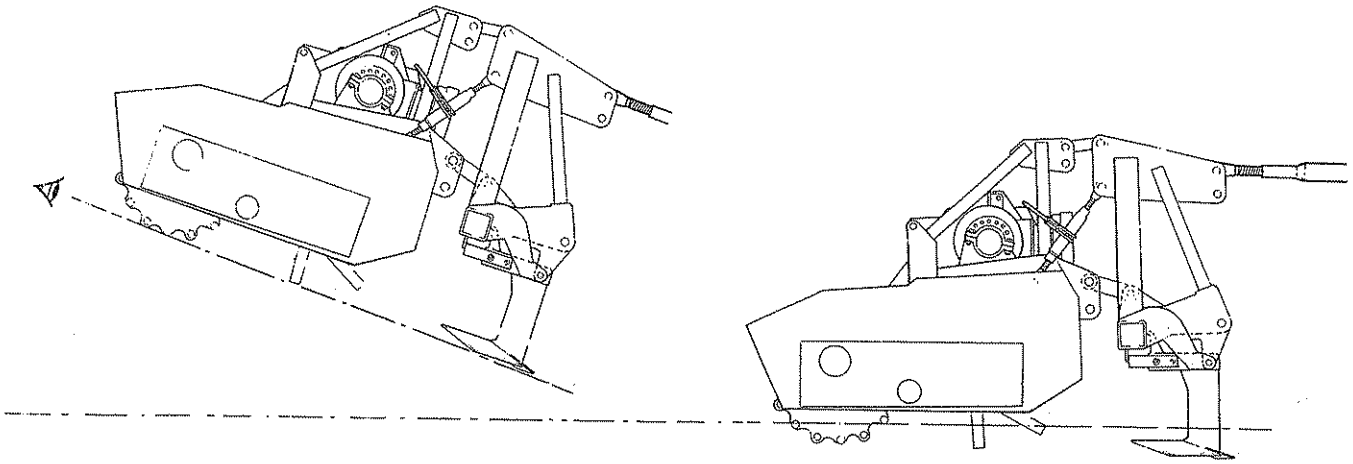
- 1 The front tines lift and shatter the soil.
- 2 The bladed rotor breaks down the clods.
- 3 The crumbler completes the tilth.

These three stages are necessary. No attempt should be made to operate the rear section on its own as a conventional rotary cultivator. The front tines not only shatter the soil in preparation for the rotor but also stabilize the machine. Without these the rear section would merely ride over the surface and leave an unacceptable finish.

Conditions

In difficult, borderline, wet soil conditions it is still possible to produce a reasonable seed bed in one pass whereas in hard sunbaked soils more than one pass may be necessary.

When working on fresh unburnt stubble two passes over the ground will often make a better job of breaking up and mixing in the surface trash with the soil. This would normally be carried out as a stubble cleaning operation.



ADJUSTMENTS

The Tillaerator is a machine of two separate sections, each section having its own independent depth control adjustment.

When in work the machine pivots about the crumbler which acts as a depth control. Operating the adjusters merely raises or lowers the tines or rotor in relation to the crumbler.

As a start off point it is suggested that the machine is raised on the linkage and by adjusting the ratchet turnbuckle bring the lowest bar of the crumbler, the lowest rotor tip, and the front edge of the front tine wings into line.

Setting.

First set the front tines to the depth required by adjusting the tractor's top link. Shortening the top link will increase penetration and vice-versa. The adjustment has the effect of tilting the whole machine forwards or backwards.

Engage the P.T.O. and draw the machine into the ground and check the front tine penetration. When satisfied check the penetration of the rotor. Rotor depth adjustment is carried out with the ratchet turnbuckle and will alter the rotor depth in relation to the crumbler without interfering with front tine settings. Lengthening the bottle screw increases penetration and vice-versa.

At maximum rotor depth the skids should remain just clear of the ground.

Adjustments may need to be re-set after changing gear, a higher gear will allow the crumbler, thus the whole machine to go deeper.

When setting depth of engagement experience will dictate the allowances to make for the effect of forward speed on soil engagement.

Rear Guard.

- * The machine side plates are drilled to allow the rear guard to be operated in the standard or raised position; the latter allowing a greater clearance between the guard and the crumbler should clogging occur in wet conditions. For access to the rotor the rear support tube is merely released from its spring clips and the guard is rolled or folded out of the way.

WORK

Before commencing work check that all safety guards are in place and in good condition.

Where the tractor is equipped with a dual hydraulic control system, the Tillaerator should be operated in 'Position control'. The limited lift may then allow the PTO to be left in gear when turning at the headlands.

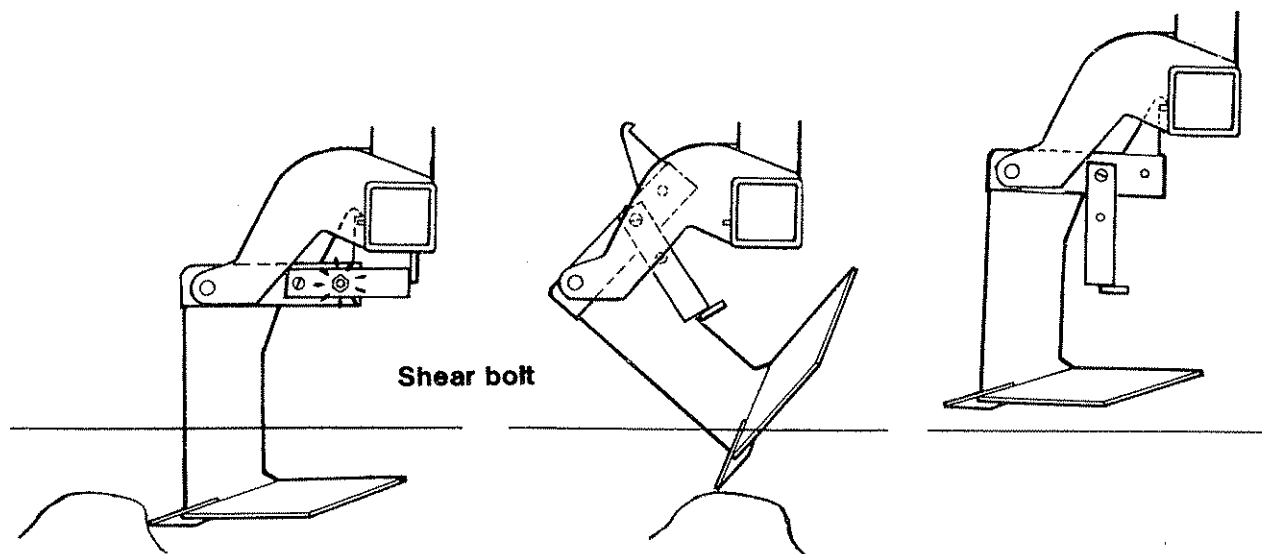
Where a position control is not available, on the PTO shaft continues to make protesting noises the PTO must be disengaged before lifting the machine. If the tractor is fitted with a PTO brake reduce the engine speed before disengaging the drive. Damage to PTO driven machines can occur if a fast revolving PTO shaft is brought to a sudden stop.

i) Front Tines

For top surface cultivation in stubble the front tines should be set slightly lower than the following rotor with the crumbler breaking down the top surface and firming the seed-bed.

For working in ploughed ground it is permissible to raise the front tines above the level of the rotor working depth to avoid buried turf being brought to the surface. The tines are still necessary to stabilize the machine and in addition level the tops of the furrows and eradicate the tractor wheel marks.

Clearance between the P.T.O. shaft and the front tine frame should be checked as a situation can arise with certain tractors when a foul occurs on raising the machine on the linkage. To check, lower the tool bar to the limit of its travel and raise the machine on the tractors linkage. Raise the toolbar to the limit of its travel. If no clearance exists lower the toolbar slightly and mark the setting on the ratchet link. This position is then the highest working setting for the front toolbar. If this restricts operation e.g. when it is required to set the tines high when working on ploughed land, it may still be possible to achieve this higher line setting by limiting the lift using the tractor position control. The clearance check could be carried out again with the position control in the desired setting. It remains the operators responsibility to remember that a foul situation exists.



Each front tine assembly is fitted with a shear bolt to prevent damage should an obstacle be encountered. On shearing, the reaction bracket collapses allowing the tine to swing backwards and ride over the obstacle. The catch, protruding above the reaction bracket prevents the tine swinging down and puncturing the tractor tyre when lifted clear of the ground. In the event of failure of the shear bolts do not substitute an ordinary bolt or metal rod.

i) Levelling bar

The levelling bar, situated between the rotor and the crumbler, assists in the break up of the soil by providing a face against which any clods thrown from the rotor will shatter.

Adjustable for height at both ends by threaded rods, the correct height for any particular conditions is a matter of trial and error. Too high and the bar will clear the earth and therefore be of no advantage, too low and the bar will push a bow wave of soil before it which increases the tractor pulling power needed and in extreme instances will clog the rotor and perhaps cause breakage.

Adjustment can be carried out by releasing the rear hood spring clips and rolling the hood to the front until access can be gained to the threaded rods.

iii) Forward speed and gear selection.

The gear selected should be the lowest one available which will give the required tilth with the prevailing operating conditions.

In soft or damp conditions first gear is usually suitable for forward speeds of up to 4mph and second gear above. If a finer tilth is required in hard dry conditions a higher gear should be tried.

iv) Gearbox.

The machine is delivered from the factory with the gearbox filled with 7½ litres of EP140 oil, and the gears fitted in the lowest ratio:

540rpm.

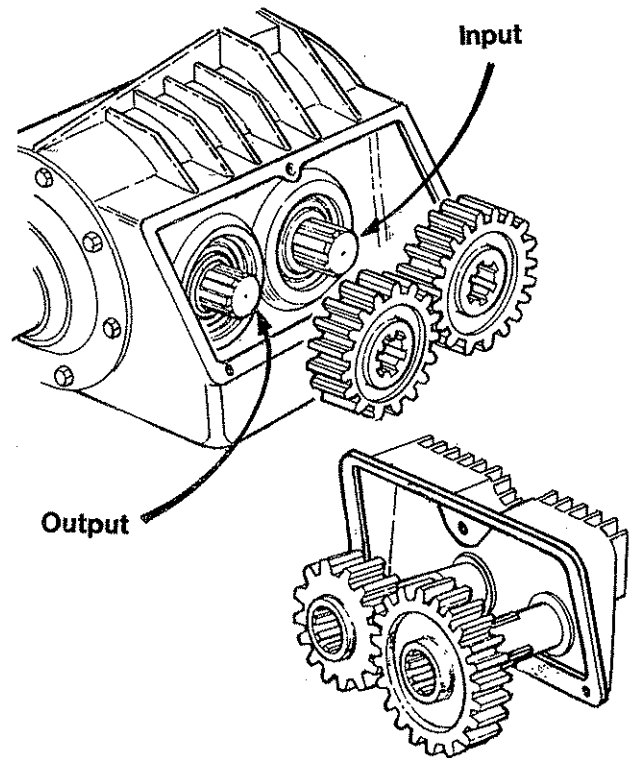
The gearbox is fitted with four spur gears which operate in pairs. Using the 18 and 20 teeth gears, these can be transposed between driver and driven to give second and third gears.

When using the 22 and 16 teeth gears the smaller one should be the driver and the large the driven, this combination provides first gear.

A setscrew and locknut is purposely fitted to the bottom of the gearbox to prevent the 22 teeth gear being used as a driver. Resist temptation to operate in this way as fourth gear would cause the clutch to slip with resultant overheating and rapid wear of the friction plates.

1000rpm

The gearbox is supplied with 6 spur gears which when working in pairs give three ratios. The pairs are as follows with the input quoted first (13 25), (15 23) and (17 21). The setscrew and locknut on the input side of the gearbox is to physically prevent the larger gears being used as the driving gear. Do not remove the obstruction and operate in this manner as it would cause the clutch to slip with resultant overheating and rapid wear of the friction plates.



v) Changing gear.

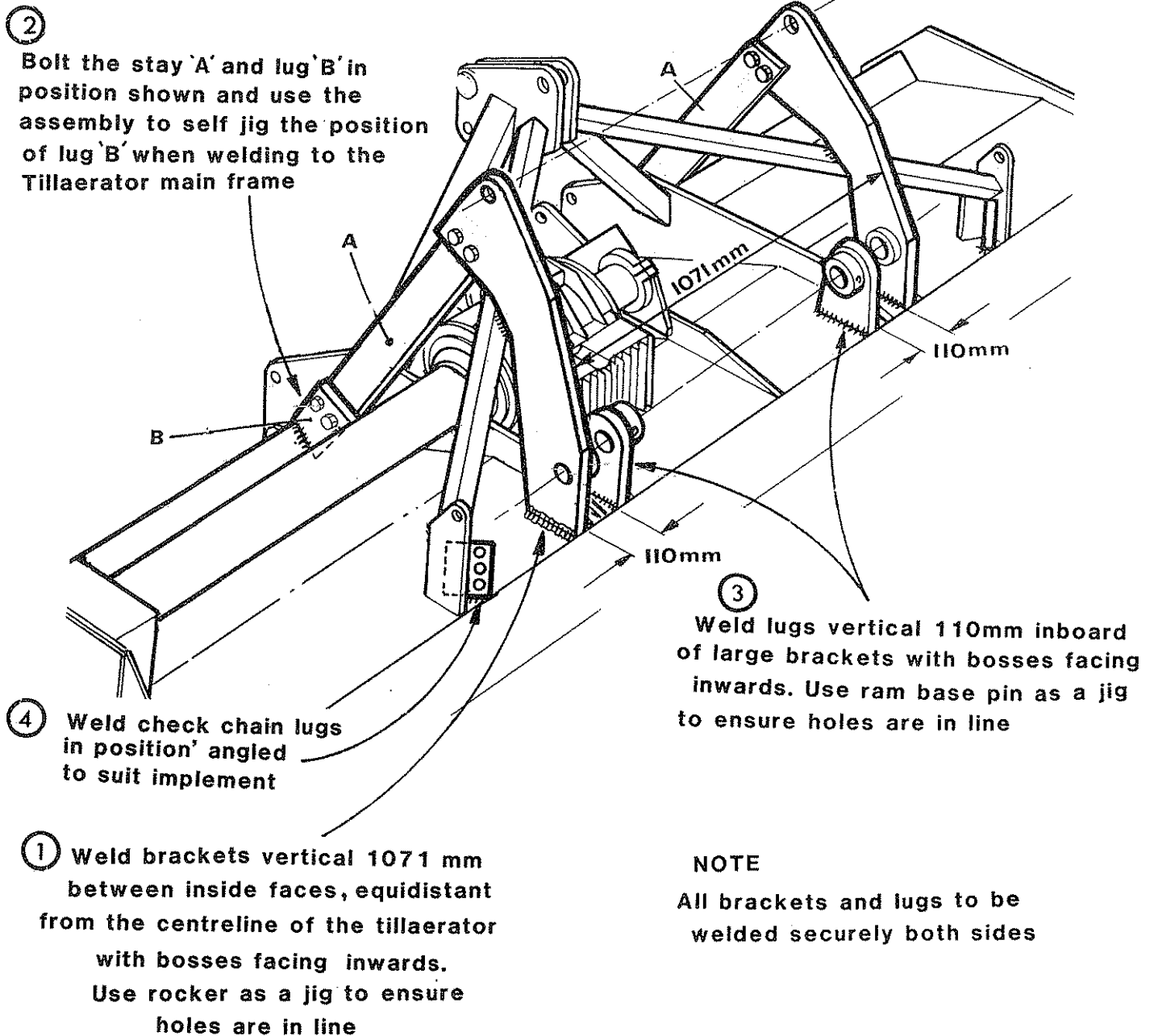
To change the gearing, bias the machine in a forward attitude to minimise oil loss and clean off around the lid to prevent dirt falling in when the wing screws are loosened. The gears can now be slid from their shafts. When withdrawing the gears take care to avoid grazing the back of the fingers or hand on the gearbox edge. On replacement it may take more than one attempt to locate the spline position where the teeth will mesh. Check the gasket for damage and ensure that it is correctly located on re-assembly.

Gear	TEETH				Rotor RPM
	540 RPM		1000 RPM		
	Output	Input	Output	Input	
1st	22	16	25	13	159
2nd	20	19	23	15	207
3rd	19	20	21	17	230

Tillaerator Drill Linkage

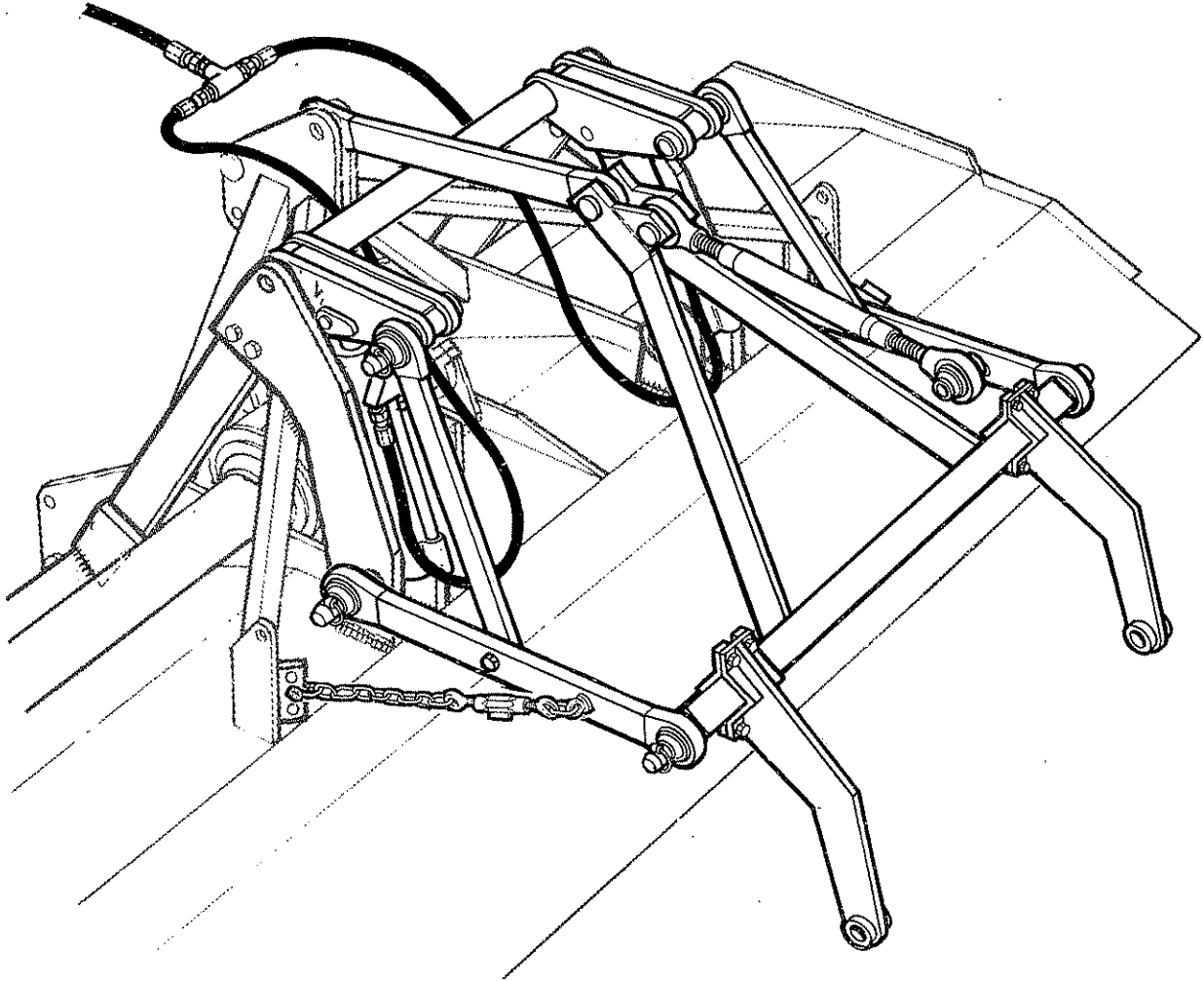
The Tillaerator is available equipped with an ancilliary Cat II linkage capable of lifting a following implement e.g., a drill, of a maximum of $1\frac{1}{4}$ – $1\frac{1}{2}$ tons with a tractor relief valve setting of 2500 psi (170 Bar)

For subsequent conversion the kit consists of weld on mounting brackets, linkage arms, top link, lift rams and the necessary pins and clips for fitting.



The mounting brackets are welded on to the tillaerator in the position shown above. It is a wise precaution to remove the plastic rear guard before commencing to prevent the likelihood of any weld spatter damaging it.

To tractor trailer pipe connection

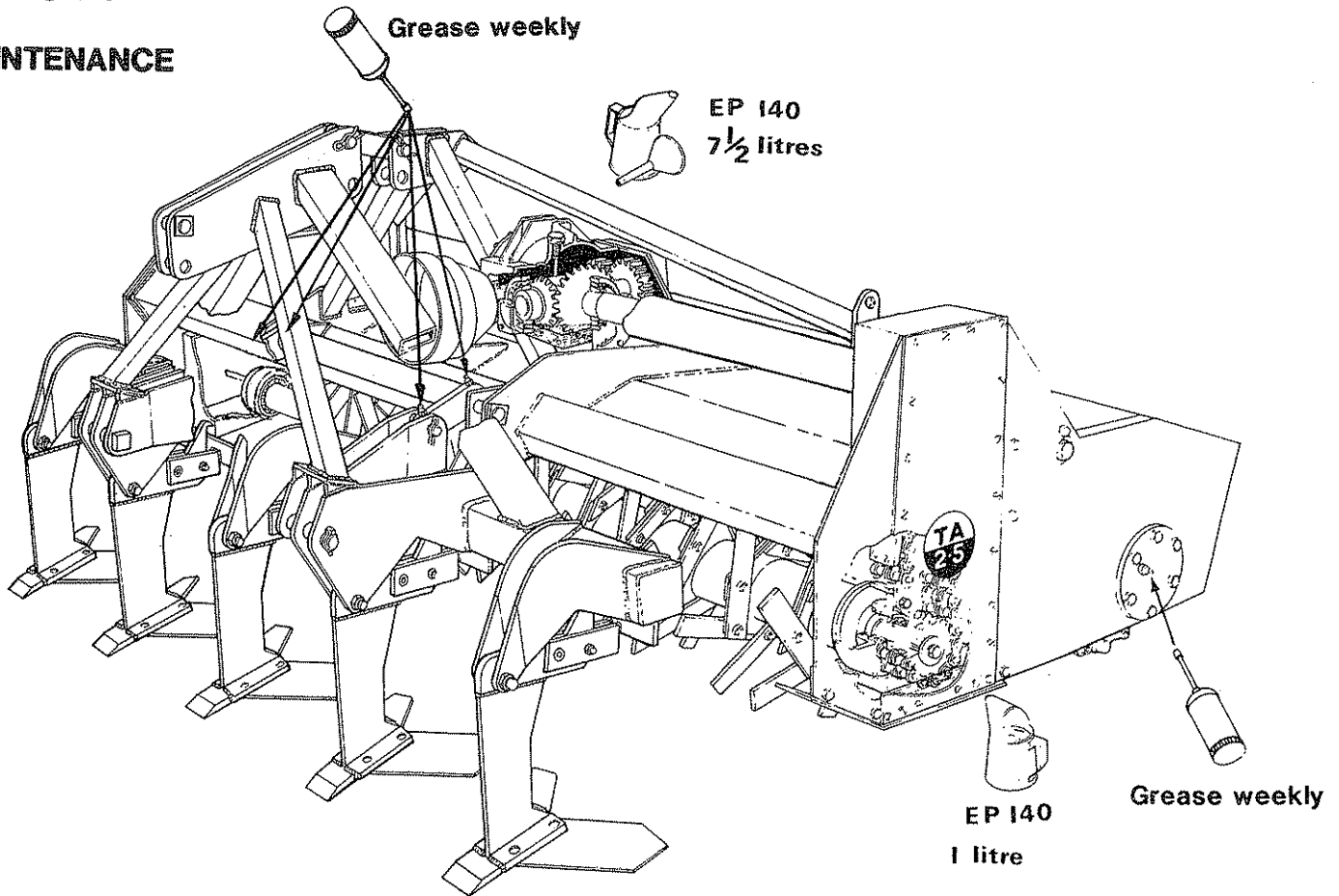


The linkage is then assembled as shown and the hydraulic connection is coupled up to the tractors trailer pipe service.

When adjusting the check chains ensure that there is adequate freedom of movement at all positions of the linkage.

SECTION 4

MAINTENANCE



OIL FOR GEARBOX & CHAINCASES IS EP 140 WITH CORROSION RESISTANT ADDITIVE

Primary Drive.

There should be sufficient oil in the chaincase to allow the chain to just dip into it as it runs round the lower sprocket. The level can be checked by removing the inspection panel.

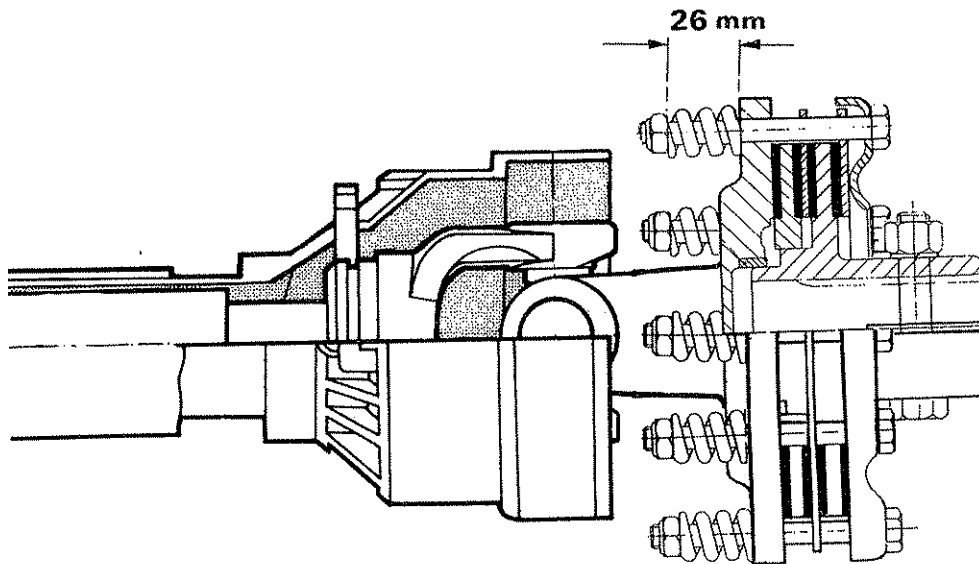
Oil should be level with the lower lip of the panel. Capacity 1 litre approx.

Chain adjustment

No adjustment of the chain is necessary. A spring loaded slipper bears on the slack side of the chain and automatically takes up excess movement.

2. Gearbox

Machine is despatched with the gearbox filled with E.P. 140 lubricant. Its total capacity is approximately 7½ litres (1 3/4 galls) Keep to the full mark on the hexagon headed dip-stick that is screwed into the top of the gearbox. The level should be checked before starting work.



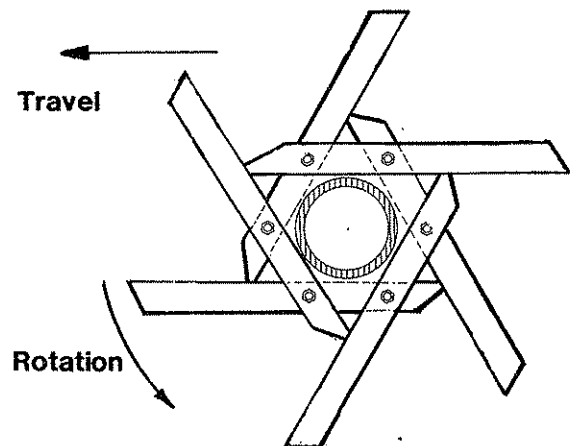
3. Clutch

The slip clutch is an integral part of the P.T.O. shaft assembly and protects the transmission should the rotor meet a solid object. If not correctly set the slipping friction discs will overheat. If this condition is allowed to continue, rapid wear will take place. The clutch pressure is correctly set when the springs are compressed to 26 mm in length.

Ensure grease and oil does not contaminate the friction discs. If the machine is to be stored or unused for any considerable time, the compression springs should be released by loosening the adjustment nuts. Before putting the machine back into service, the slip clutch should be spun to ensure plates have not corroded together before resetting the springs.

4. Rotor

Blades should be assembled on the rotor lugs to give a slicing action when in forward motion. See drawing.



Access can be gained to change single tines by releasing and rolling up the rear guard. For a complete change of tines it is easier if the front toolbar feet are removed. If possible remove and replace the tines on one lug at a time.

When reassembling a bare rotor start at one end and rotate until the flat of the lug is across the top of the rotor tube. Commence bolting the first tine across the top on the outside of the lug ensuring that rotation is correct and mark. Complete the assembly of tines on the lug as shown above and return lug to its original starting position. To determine start position for the second lug rotate in direction of travel until the first following flat on the lug is again across the top of the rotor tube. Bolt the tine in position on the outside of the lug and mark using this for finding the start position for the third lug. Follow the sequence until all lugs are assembled.

SPARE PARTS MANUAL



USE ONLY McCONNEL SPARE PARTS

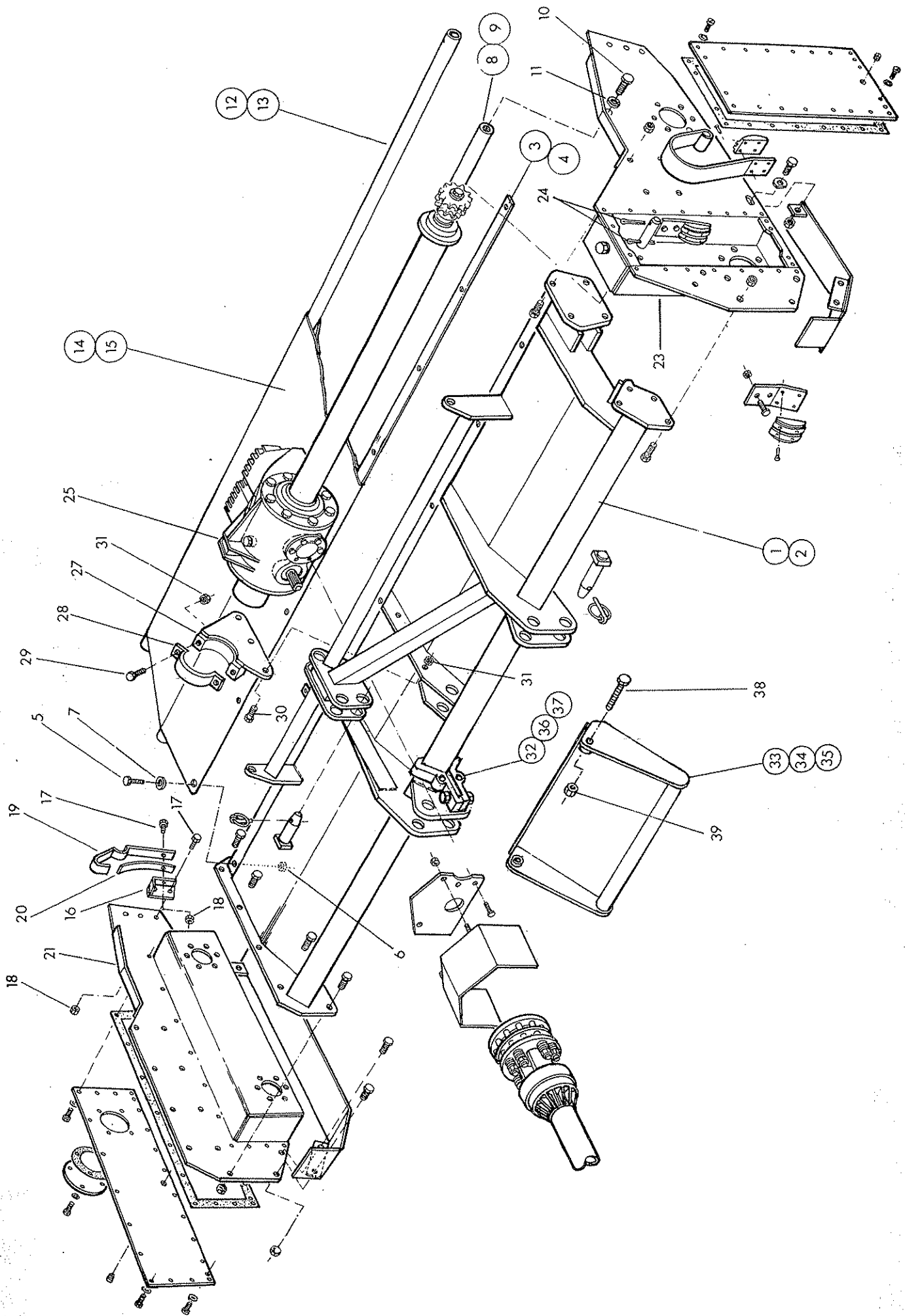
To be assured of the latest design improvements purchase your genuine replacements from the original equipment manufacturer F.W.McConnel Ltd. through your local dealer or stockist. Always quote machine type and serial number as well as the part number.

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

THE DOT SYSTEM

Many spares are supplied as Assemblies or as Sub-assemblies and, to help the customer determine the composition of an Assembly, the Dot System is used. The Main Assembly will not show a dot preceding its description and is printed in BLOCK CAPITALS. Subsequent listed parts are preceded by one or more dots until the next major assembly is reached. An increase in the number of preceding dots indicates that the item is an associated part of the preceding item. Whenever the number of dots are decreased by one this indicates the termination of an assembly.

MAIN CASING



Ref	Part No.	Qty 2.5M	Qty 3.0M	Description
				TILLAERATOR MAIN BODY 2.5M TILLAERATOR MAIN BODY 3.0M
1	13 45 312	1		.Main Frame.
2	13 45 313		1	.Main Frame
3	13 45 128	1		.Anchor strip for rear guard c/w bolts nuts etc. 2.5M
4	13 45 129		1	.Anchor strip for rear guard c/w nuts bolts etc. 3.0M

Items 5,6, and 7 are common to both anchor strips.

5	93 13 044	7	8	..Setscrew M8 x 20
6	91 43 004	7	8	..Self locking nut M8
7	91 00 104	7	8	..Plain washer Ø8
8	13 45 119	1		.Centre tube for rear guard c/w screws etc 2.5M
9	13 45 120		1	.Centre tube for rear guard c/w screws etc 3.0M

Items 10 & 11 are common to both centre tubes.

10	93 13-077	2	2	..Setscrew M16 x 35
11	91 00 207	2	2	..Spring washer Ø16
12	13 45 132	1		.Rear tube for rear guard 2.5M
13	13 45 133		1	.Rear tube for rear guard 3.0M
14	13 45 411	1		.Rear guard 2.5M
15	13 45 412		1	.Rear guard 3.0M
	13 45 130	1	1	.Spring carrier bracket L.Hand - not illustr.
16	13 45 131	1	1	.Spring carrier bracket R.Hand c/w nuts bolts.

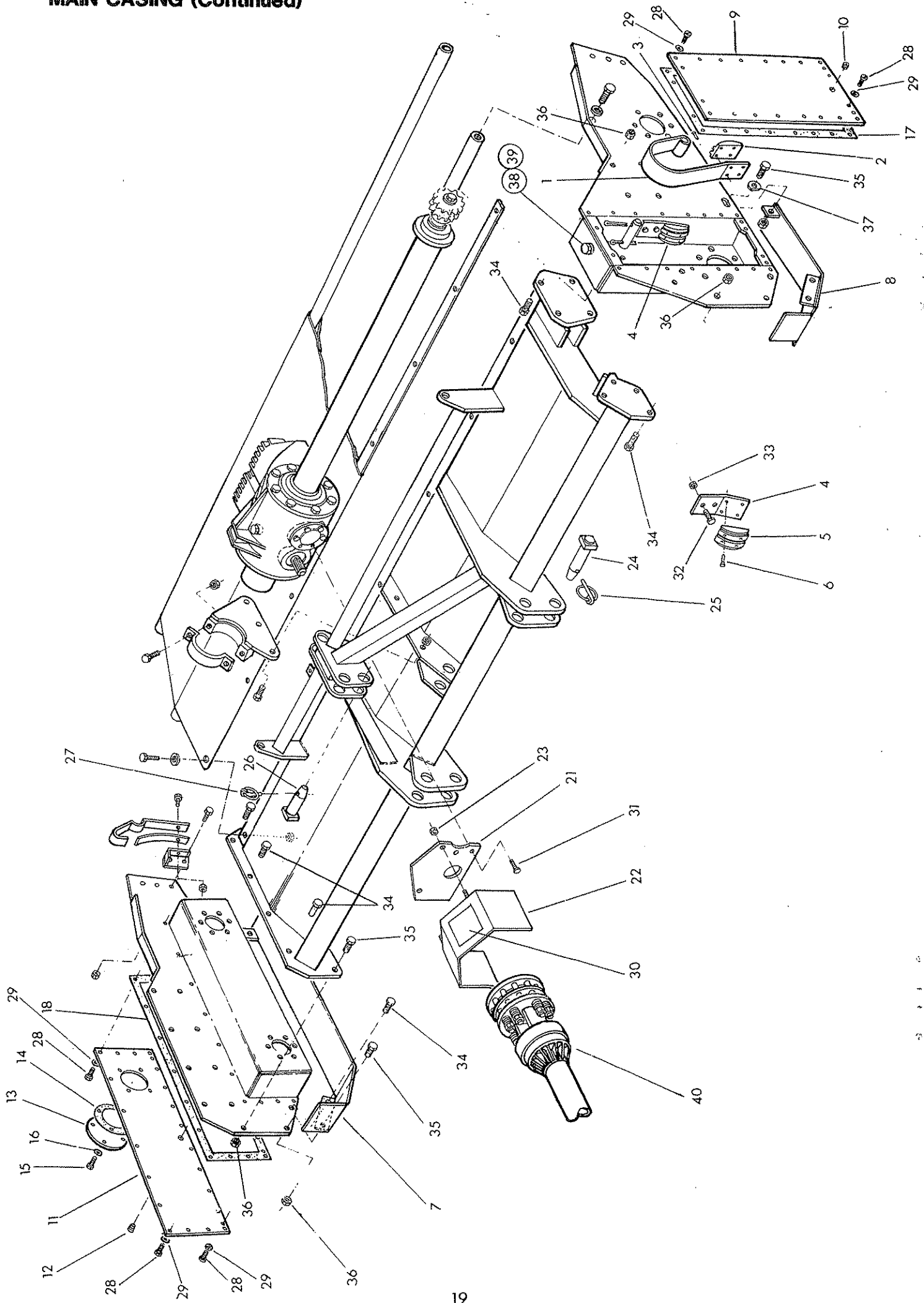
Items 17 & 18 are common to both spring carrier brackets.

17	03 11 083	3	3	..Setscrew 3/8 UNF x 1" long.
18	01 41 003	3	3	..Self locking nut 3/8 UNF.
19	13 45 423	2	2	.Spring clip
20	13 45 123	2	2	.Assistor - spring clip
21	13 45 286	1	1	.Side plate R.Hand c/w split pin
22	95 01 406	2	2	..Split pin Ø5 x 40
23	13 45 292	1	1	.Side plate L.Hand c/w split pin
24	95 01 406	2	2	..Split pin Ø5 x 40
25		1	1	.Gearbox assembly (see page 25-28)
26	13 45 055	1	1	.Gearbox clamp bracket assembly.
27	13 45 056	1	1	..Clamp bracket.
28	13 45 057	1	1	..Clamp
29	02 11 165	2	2	..Bolt ½" UNF x 2" long.
30	02 11 125	3	3	..Bolt ½" UNF x 1½" long.
31	01 41 005	5	5	..Self locking nut ½" UNF
* 32	13 45 211	12	12	.Guard clamp
* 33	13 45 715	1	1	.Centre guard
* 34	13 45 716	2		.Outer guard 2.5M
* 35	13 45 717		2	.Outer guard 3.0M
* 36	02 11 206	6	6	.Bolt 5/8 UNF x 2½" long
* 37	01 41 006	6	6	.Self locking nut 5/8 UNF
* 38	92 13 146	6	6	.Bolt M12 x 70
* 39	91 43 006	6	6	.Self locking nut M12

* Operation and Spares note

Items 32 to 39 inclusive are used only when the tillaerator is operating without its front toolbar.

MAIN CASING (Continued)

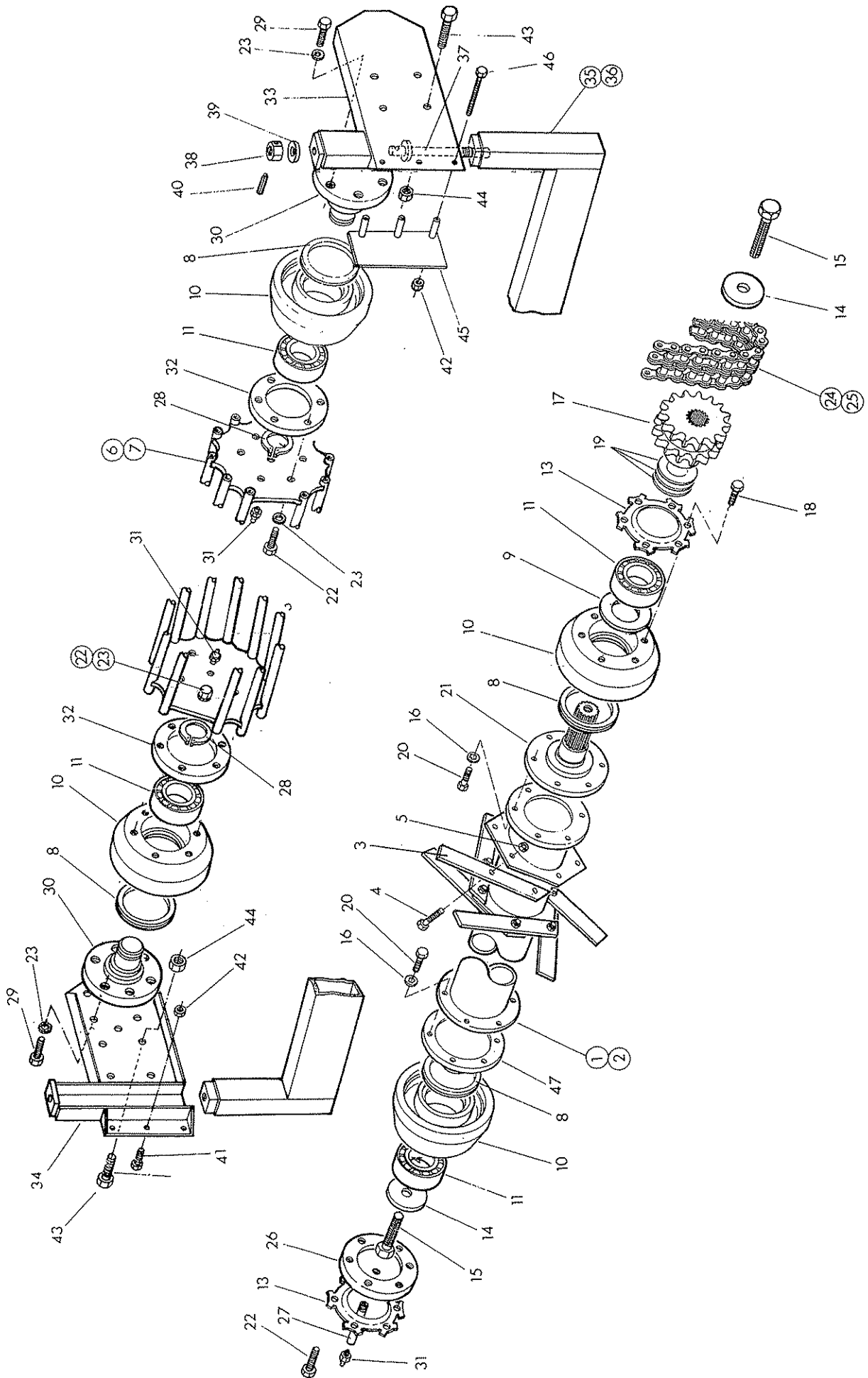


Ref	Part No.	Qty	Description
			TILLAERATOR MAIN BODY 2.5M continued
			TILLAERATOR MAIN BODY 3.0M continued
4	13 45 028	1	.Static chain tensioner c/w pad and rivets
5	13 45 041	1	..Tensioner pad
6	10 80 097	4	..Countersunk rivet $\varnothing 6 \times 15$
7	13 45 303	1	.Skid R. Hand.
8	13 45 304	1	.Skid L.Hand
9	13 45 307	1	.Chain case lid L.Hand c/w level plug.
10	85 82 042	1	..Taper plug $\frac{1}{4}$ " BSPT
11	13 45 308	1	.Chain case lid R.Hand c/w cover and plug.
12	85 82 042	1	..Taper plug $\frac{1}{4}$ " BSPT
13	13 45 040	1	..Drive pin cover.
14	13 45 038	1	..Gasket - drive pin cover
15	93 13 024	4	..Setscrew M8 x 12
16	13 45 143	4	..Plastic coated sealing washer for M8
17	13 45 305	1	.Gasket - chain case lid L. Hand.
18	13 45 306	1	.Gasket chain case lid R. Hand.
21	13 45 422	1	.Gearbox input guard plate
22	13 45 421	1	.P.T.O./Clutch guard c/w nuts.
23	01 41 003	2	..Self locking nut 3/8UNF
24	13 45 094	2	.Lower linkage pin c/w linch pin
25	04 31 217	1	..Linch pin
26	13 45 087	1	.Top link pin c/w linch pin
27	04 31 217	1	..Linch pin
28	93 00 117	44	. Pan headed s/screws M8 x 12
29	13 45 143	44	. Plastic coated sealing washer for M8
30	13 45 105	1	. Clutch label
31	93 13 065	2	.Setscrew M10 x 30
32	03 11 083	2	.Setscrew 3/8UNF x 1" long
33	01 41 003	2	.Self locking nut 3/8 UNF
34	03 11 105	17	.Setscrew $\frac{1}{2}$ " UNF x $1\frac{1}{4}$ " long.
35	02 11 125	6	.Bolt $\frac{1}{2}$ " UNF x $1\frac{1}{4}$ " long
36	01 41 005	23	.Self locking nut $\frac{1}{2}$ " UNF
37	10 65 078	2	.Special washer $\frac{1}{2}$ " dia.
38	81 03 001	1	.Plug $\frac{1}{2}$ " BSP
39	86 50 104	1	.Bonded seal $\frac{1}{2}$ " BSP

ACCESSORIES.

40		1	.P.T.O. Shaft/clutch assembly (see page 29-32)
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ROTOR, CRUMBLER & LEVELLING BEAM



Ref	Part No	Qty 2.5M	Qty 3.0M	Description
				TILLAERATOR MAIN BODY 2.5M (continued)
				TILLAERATOR MAIN BODY 3.0M (continued)
1	13 45 270	1		.Rotor assembly c/w tines etc 2.5M
2	13 45 271		1	.Rotor assembly c/w tines etc 3.0M

Items 3, 4 and 5 are common to both rotor assemblies

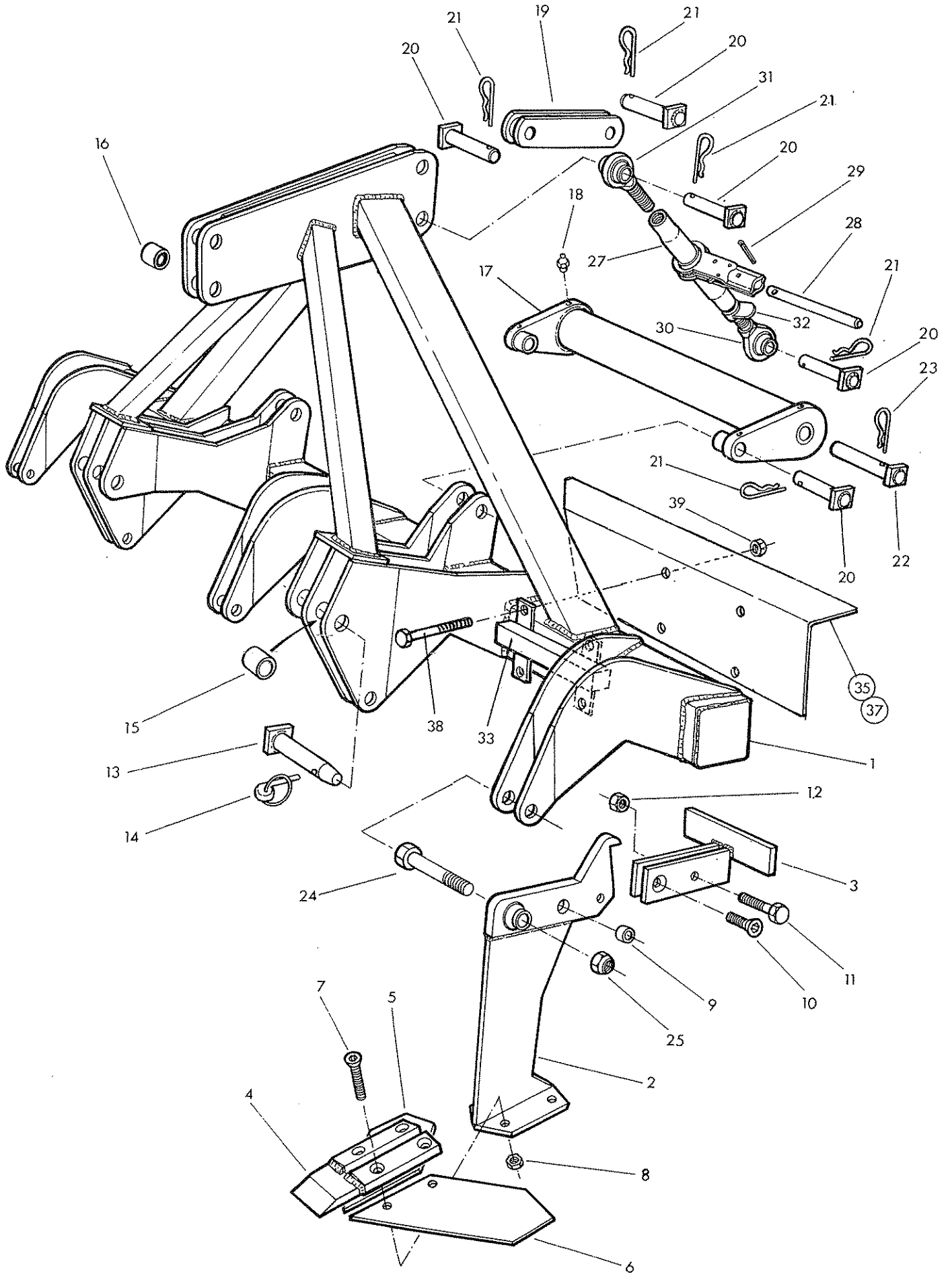
3	13 45 084	96	114	..Rotor tine
4	02 11 145	96	114	..Bolt ½" UNF x 1¾" long
5	01 41 005	96	114	..Self locking nut ½" UNF
6	13 45 709	1		.Crumbler roller 2.5M
7	13 45 710		1	.Crumbler roller 3.0M
8	86 29 145	4	4	.Seal
9	13 45 019	1	1	.Bearing shield
10	13 45 268	4	4	.Bearing housing
11	06 00 056	4	4	.Bearing
12	93 13 077	6	6	.Setscrew
13	13 45 024	2	2	.Tab washer
14	13 45 014	2	2	.Clamp washer
15	71 11 034	2	2	.'Longlok' bolt
16	01 00 305	12	12	.Internal serrated washer
17	13 45 263	1	1	.Sprocket - 15 tooth
18	93 13 067	1	1	.Setscrew M16 x 30
19	13 45 023	as reqd	as reqd	.Shim
20	02 11 125	12	12	.Bolt ½" UNF x 1½" long
21	13 45 265	1	1	.Stub shaft
22	92 13 107	18	18	.Bolt M16 x 50
23	01 00 406	23	23	.External serrated washer 5/8" dia
* 24	13 45 007	1	1	.Chain 46 pitches c/w conn link
25	13 45 107	1	1	..Connecting link
26	13 45-205	1	1	.Cover plate
27	13 45 208	1	1	.Greaser extension tube
28	04 06 265	2	2	.External circlip
29	93 13 087	11	11	.Bolt M16 x 40
30	13 45 706	2	2	.Roller stub shaft
31	09 01 121	3	3	.Greaser 1/8" BSP - straight
32	13 45 207	2	2	.Roller spacer ring
33	13 45 703	1	1	.Side plate L Hand
34	13 45 702	1	1	.Side plate R Hand
35	13 45 704	1		.Levelling beam 2.5M
36	13 45 705		1	.Levelling beam 3.0M
37	13 45 200	2	2	.Adjuster c/w nut etc.
38	13 45 201	1	1	..Special nut M20
39	91 00 208	1	1	..Washer M20
40	04 25 630	1	1	..Spring dowel
41	03 11 085	3	3	.Setscrew ½" UNF x 1" long
42	01 41 005	6	6	.Self locking nut ½" UNF
43	03 11 106	8	8	.Setscrew 5/8" UNF x 1¼" long
44	01 41 006	8	8	.Self locking nut 5/8" UNF
45	13 45 214	1	1	.Blanking plate
46	02 11 405	3	3	.Bolt ½" UNF x 5" long
47	13 45 700	1	1	.Rotor Stub Shaft

* Spares Note

For Tillaerators with 1000 R.P.M. gearboxes the rotor drive chain is as follows

13 45 149	1	1	.Chain - 45 pitches c/w conn link
13 45 107	1	1	..Connecting link

TOOLBAR ASSEMBLY



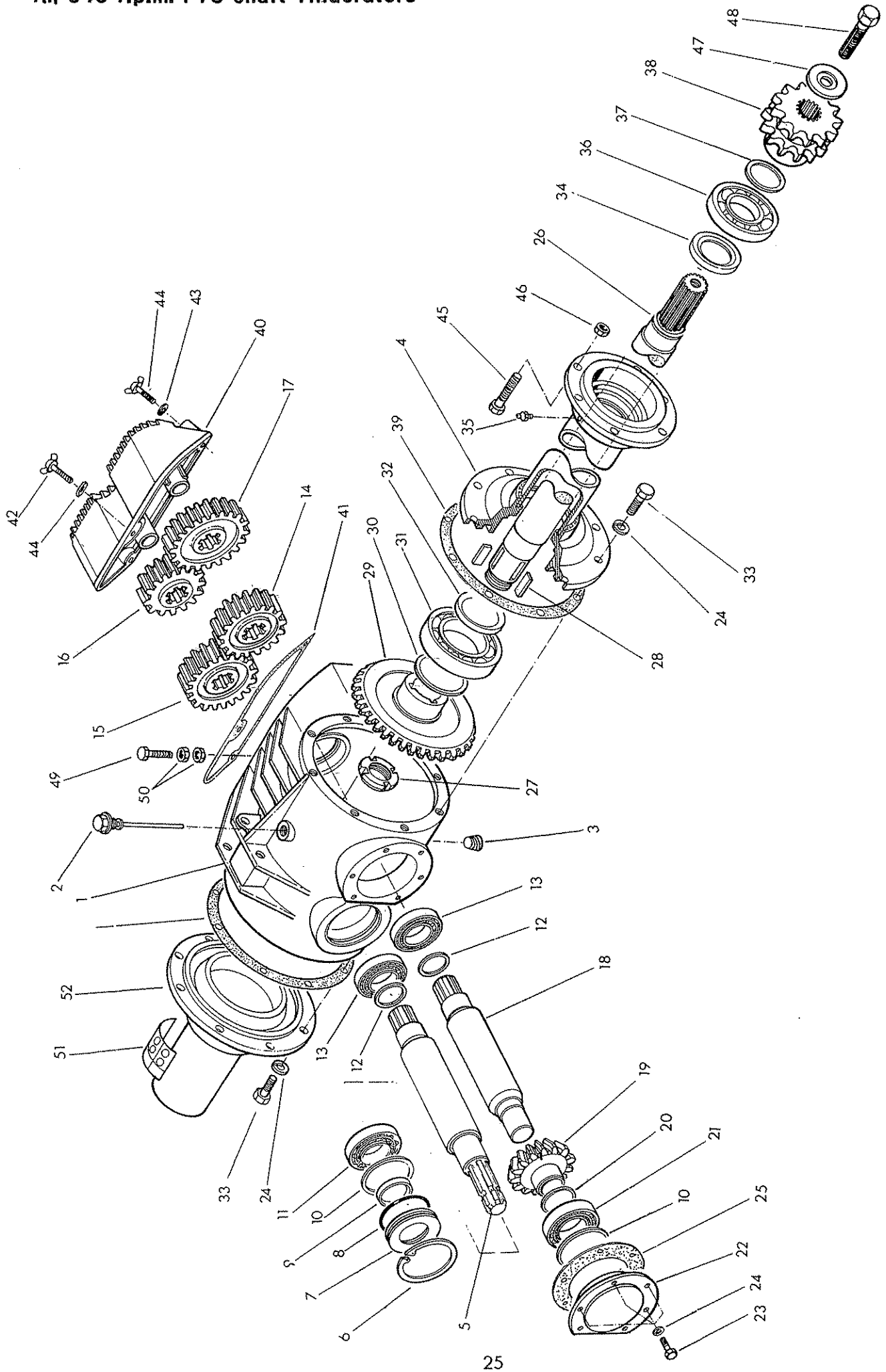
Ref	Part No.	Qty		Description
		2.5M	3.0M	
	13 45 251			TILLAERATOR TOOL BAR ASSY 2.5M
	13 45 501			TILLAERATOR TOOL BAR ASSY 3.0M
1	13 45 326	1		.Toolbar
	13 45 350		1	.Toolbar not illustrated
	13 45 325	5	6	.Tine assembly compr:-
2	13 45 330	1	1	..Shank
3	13 45 333	1	1	..Reaction bracket.
4	13 45 335	1	1	..Cultivator point.
5	13 45 404	1	1	..Cultivator wing. R.Hand.
6	13 45 405	1	1	..Cultivator wing. L. Hand.
7	60 12 034	4	4	..Tine bolt.
8	01 12 004	4	4	..Hexagon nut 7/16" UNC
9	13 45 070	1	1	..Pivot spacer.
10	03 51 145	1	1	..Socket head c/sunk setscrew ½" UNF x 1 3/4"
11	13 45 069	1	1	..Tine shear bolt c/w nut.
12	01 41 004	1	1	...Self locking nut 7/16 UNF
13	13 45 089	2	2	.Bottom hitch pin c/w linch pin
14	04 31 217	1	1	..Linch pin
15	13 45 086	2	2	.Cat 3 sleeve - lower hitch
16	13 45 085	1	1	.Cat.3 sleeve - top hitch
17	13 45 344	1	1	.Lower linkage frame c/w greasers
18	09 01 121	4	4	.Greaser 1/8"BSP - straight.
19	13 45 077	1	1	.Top link
20	13 45 088	6	6	.Pin c/w spring cotter.
21	04 31 105	1	1	..Spring cotter 5/32" dia x 1" long.
22	13 45 090	2	2	.Pin c/w spring cotter.
23	04 31 105	1	1	..Spring cotter 5/32" dia x 1" long.
24	02 11 327	5	6	.Bolt 3/4" UNF x 4" long.
25	01 11 007	5	6	.Hexagon nut 3/4" UNF
	71 15 276	1	1	.Adjuster link assembly compr:
26	71 15 350	1	1	..Tube ratchet c/w handle.
27	71 15 353	1	1	...Ratchet
28	71 15 217	1	1	...Handle c/w spring dowel.
29	04 21 820	1	1Spring dowel ¼" dia x 1¼" long.
30	71 15 206	1	1	..End - R. Hand.
31	71 15 207	1	1	..End - L. Hand.
32	71 15 153	1	1	..Locking collar.
* 33	13 45 210	2	2	.Clamp bar
* 34	13 45 711	1		.Guard R Hand 2.5M - Not illus.
* 35	13 45 712	1		.Guard L Hand 2.5M
* 36	13 45 713		1	.Guard R Hand 3.0M - Not illus
* 37	13 45 714		1	.Guard L Hand 3.0M
* 38	02 11 405	8	8	.Bolt ½" UNF x 5" long
*	01 41 005	8	8	.Self locking nut ½" UNF

* Operation and spares note

Items 32 - 38 inclusive are used only when the tillaerator is operated with its front toolbar in place

GEARBOX ASSEMBLY

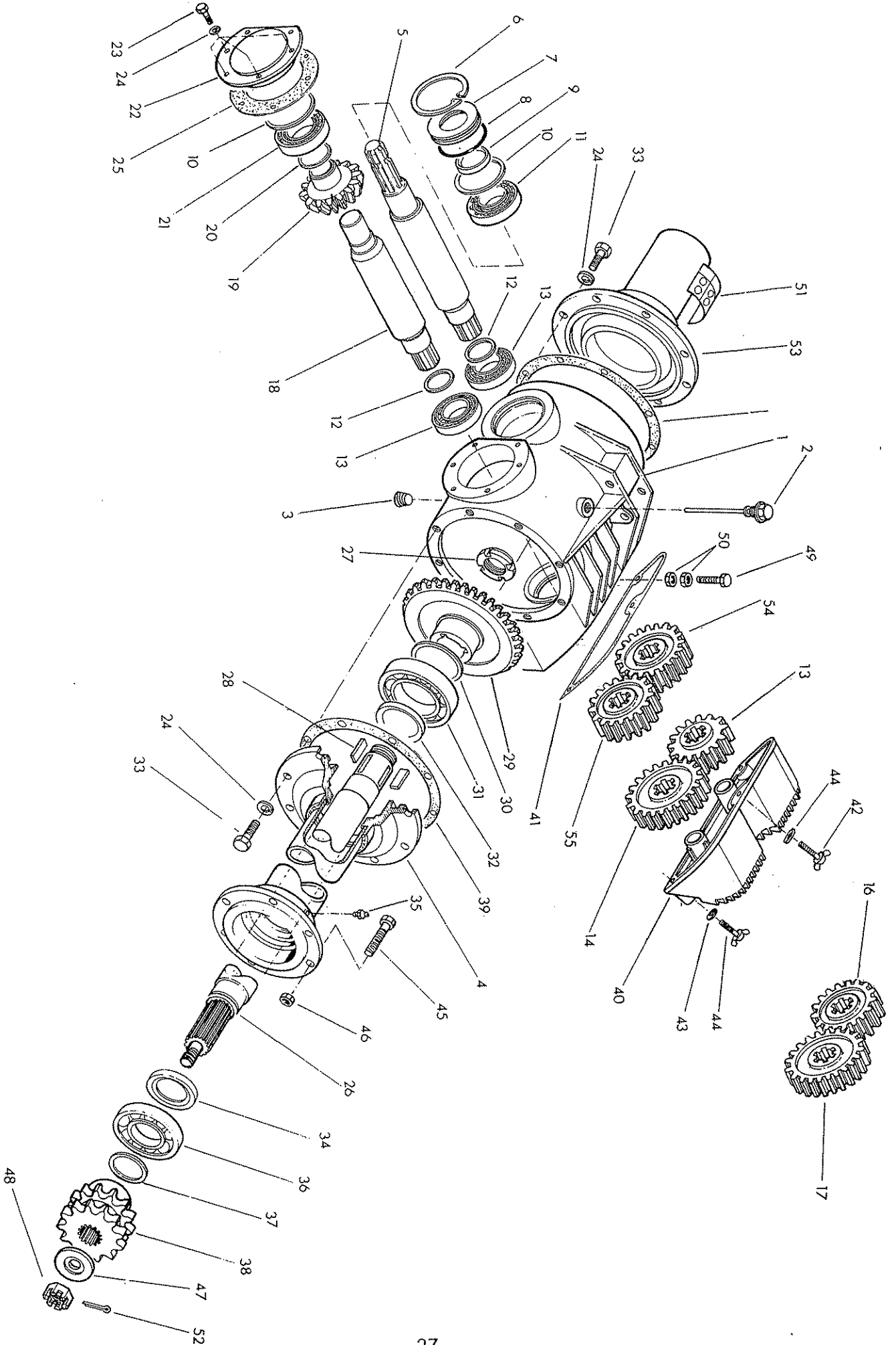
All 540 r.p.m. PTO shaft Tillaerators



Ref	Part No.	Qty	Description
	13 45 430		GEARBOX ASSEMBLY to suit tractors with 540rpm PTO shafts.
1	13 45 360	1	.Gearbox casing.
2	13 45 378	1	.Filler plug/dipstick
3	13 45 377	1	.Oil drain plug.
4	13 45 345	1	.Gearbox output extension hub
5	13 45 380	1	.Input shaft 1 3/4" dia x 6 spline
6	04 16 100	1	.Internal circlip Ø 100
7	13 45 383	1	.Input cover.
8	13 45 384	1	.'O' ring.
9	13 45 385	1	.Oil seal.
10	13 45 399	As Reqd.	.Shim
11	06 00 044	1	.Taper roller bearing.
12	13 45 388	As Reqd.	.Shim
13	06 00 058	2	.Taper roller bearing.
14	13 45 366	1	.Gear 18 teeth) Interposed to give
15	13 45 362	1	.Gear 20 teeth) 2nd and 3rd.
16	13 45 391	1	.Gear 16 teeth - driver)
17	13 45 361	1	.Gear 22 teeth - driven) to give 1st.
18	13 45 375	1	.Driven shaft
19	13 45 396	1	.Pinion
20	13 45 395	As Reqd	.Shim
21	06 00 057	1	.Taper roller bearing.
22	13 45 376	1	.Pinion cover
23	93 15 055	4	.Setscrew M10 x 25
24	91 00 205	22	.Spring washer Ø10
25	13 45 373	1	.Cover gasket.
26	13 45 371	1	.Output shaft
27	13 46 367	1	.Output shaft nut M45 x 1.5
28	13 45 368	2	.Drive key
29	13 45 364	1	.Crown gear
30	13 45 381	As Reqd.	.Shim
31	06 04 670	1	.Bearing.
32	13 45 372	1	.Oil seal
33	93 15 065	16	.Setscrew M10 x 30
34	86 29 150	1	.Oil seal
35	13 45 394	1	.Greaser M10 x 1
36	06 00 056	1	.Bearing.
37	13 45 142	1	.Spacer.
38	13 45 262	1	.Sprocket 13 tooth
39	13 45 363	1	.Gasket - extension hub
40	13 45 393	2	.Gear cover.
41	13 45 392	1	.Gear cover gasket
42	13 45 397	1	.Winged screw M8 x 25
43	91 00 204	3	.Spring washer Ø8
44	13 45 398	2	.Winged screw M8 x 40
45	02 11 146	6	.Bolt 5/8 UNF x 1 3/4" long.
46	01 41 006	6	.Self locking nut 5/8 UNF
47	13 45 014	1	.Clamp washer
48	71 11 034	1	.'Longlok' setscrew M16
49	03 11 085	1	.Setscrew 1/2" UNF x 1" long.
50	01 31 005	2	.Locknut 1/2" UNF
51	13 45 113	1	.Gearbox ratio label.
52	13 45 345	1	.Gearbox blank end cover plate.

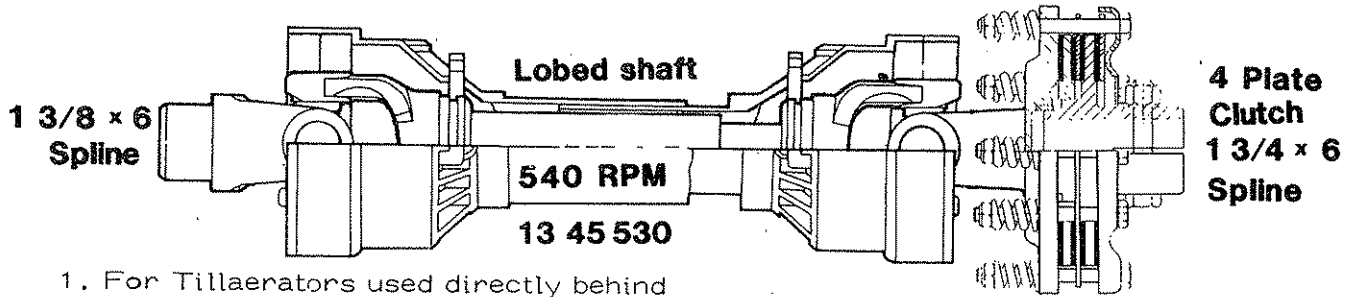
GEARBOX ASSEMBLY

1000 r.p.m. PTO shaft Tillage

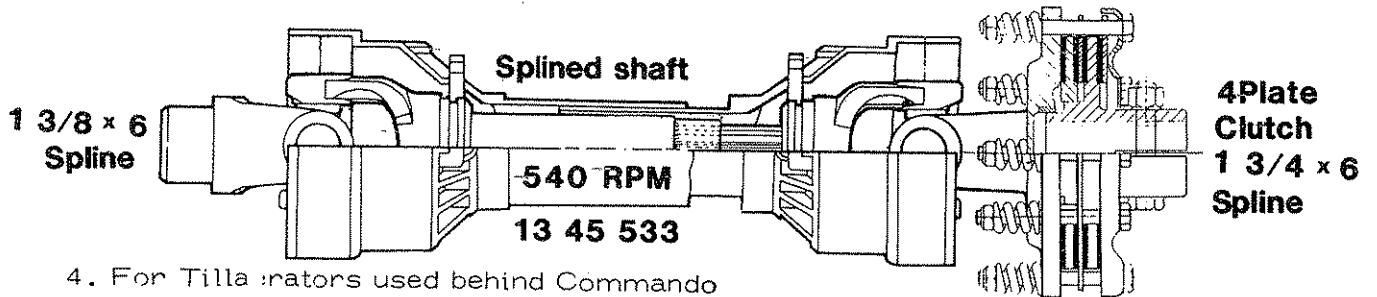


Ref	Part No	Qty	Description
	13 45 631		GEARBOX ASSEMBLY for tractors with 1000 rpm. P.T.O. shafts.
1	13 45 360	1	.Gearbox casing.
2	13 45 378	1	.Filler plug/dipstick
3	13 45 377	1	.Oil drain plug.
4	13 45 633	1	.Gearbox output extension hub
5	13 45 632	1	.Input shaft 1½" dia. x 6 spline.
6	04 16 100	1	.Internal circlip Ø100
7	13 45 383	1	.Input cover
8	13 45 384	1	.'O' ring.
9	13 45 385	1	.Oil seal.
10	13 45 399	As Reqd.	.Shim
11	06 00 044	1	.Taper roller bearing.
12	13 45 388	As Reqd	.Shim
13	06 00 058	2	.Taper roller bearing.
14	13 45 644	1	.Gear 13 teeth - driver)
15	13 45 643	1	.Gear 25 teeth - driven) to give 1st.
16	13 45 640	1	.Gear 15 teeth - driver)
17	13 45 639	1	.Gear 23 teeth - driven) to give 2nd.
18	13 45 375	1	.Driven shaft
19	13 45 638	1	.Pinion
20	13 45 395	As Reqd	.Shim
21	06 00 057	1	.Taper roller bearing.
22	13 45 376	1	.Pinion cover
23	93 15 055	4	.Setscrew M10 x 25
24	91 00 205	22	.Spring washer Ø10
25	13 45 373	1	.Cover gasket.
26	13 45 636	1	.Output shaft.
27	13 46 367	1	.Output shaft nut M45 x 15
28	13 45 368	2	.Drive key.
29	13 45 637	1	.Crown gear.
30	13 45 381	As Reqd	.Shim
31	06 04 670	1	.Bearing.
32	13 45 372	1	.Oil seal
33	93 15 065	16	.Setscrew M10 x 30
34	86 29 150	1	.Oil seal
35	13 45 394	1	.Greaser. M10 x 1
36	13 45 646	1	.Bearing 6411
37	13 45 142	1	.Spacer
38	13 45 634	1	.Sprocket 11 tooth
39	13 45 363	1	.Gasket - extension hub
40	13 45 393	2	.Gear cover
41	13 45 392	1	.Gear cover gasket
42	13 45 397	1	.Winged screw M8 x 25
43	91 00 204	3	.Spring washer Ø8
44	13 45 398	2	.Winged screw M8 x 40
45	02 11 146	6	.Bolt 5/8 UNF x 1½" long.
46	01 41 006	6	.Self locking nut 5/8 UNF
47	13 45 647	1	.Clamp washer
48	13 45 635	1	.Castle nut M36 x 3
49	03 11 085	1	.Setscrew ½" UNF x 1" long.
50	01 31 005	2	.Locknut ½" UNF
51	13 45 649	1	.Gearbox ratio label
52	95 01 607	1	.Split pin Ø6 x 60
53	13 45 648	1	.Gearbox blank end cover plate
54	13 45 642	1	.Gear 17 teeth - driver)
55	13 45 641	1	.Gear 21 teeth - driven) to give 3rd.

540 rpm PTO SHAFT/CLUTCH ASSEMBLIES

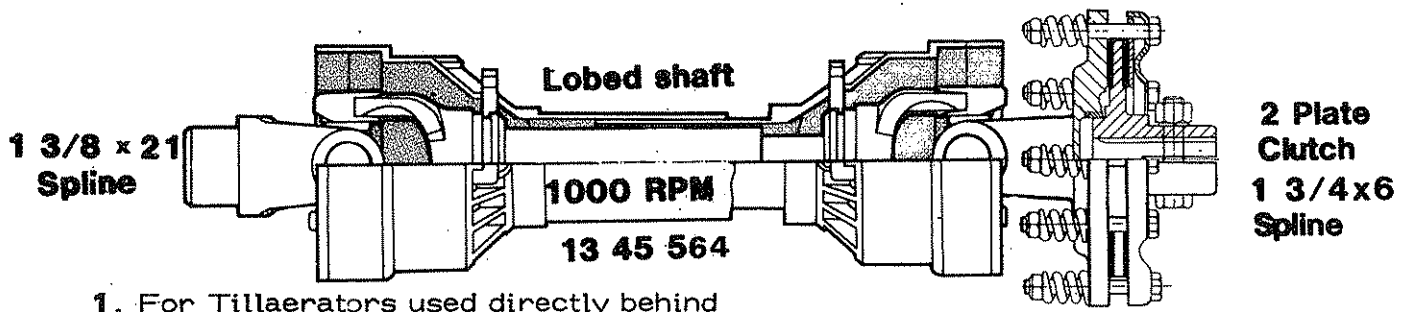


1. For Tillage implements used directly behind tractor with 540rpm P.T.O. shafts.

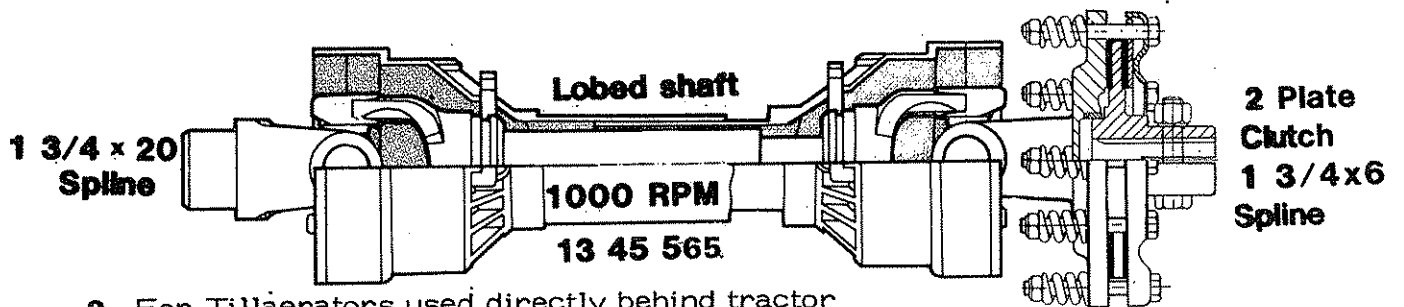


4. For Tillage implements used behind Commando with 540 rpm. through drive shafts.

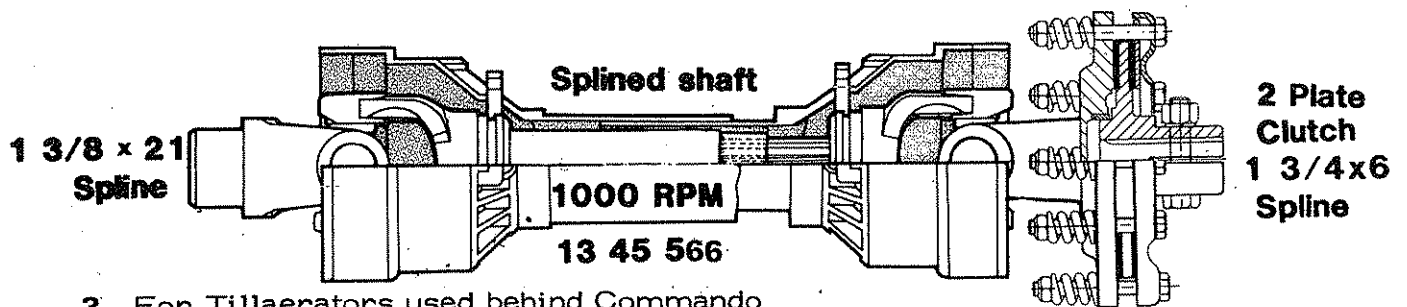
1000 RPM PTO SHAFT / CLUTCH ASSEMBLIES



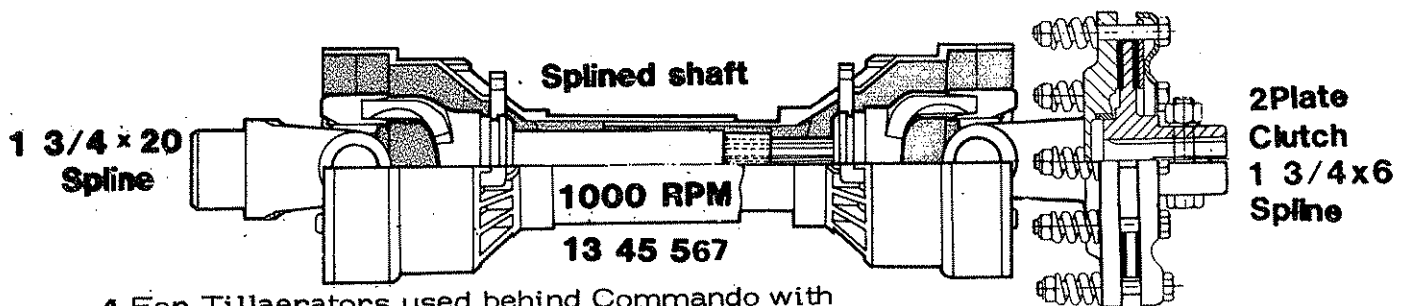
1. For Tillage implements used directly behind tractor with 1000rpm. P.T.O. shafts of 1 3/8 dia.



2. For Tillage implements used directly behind tractor with 1000rpm. P.T.O. shafts of 1 3/4 dia.

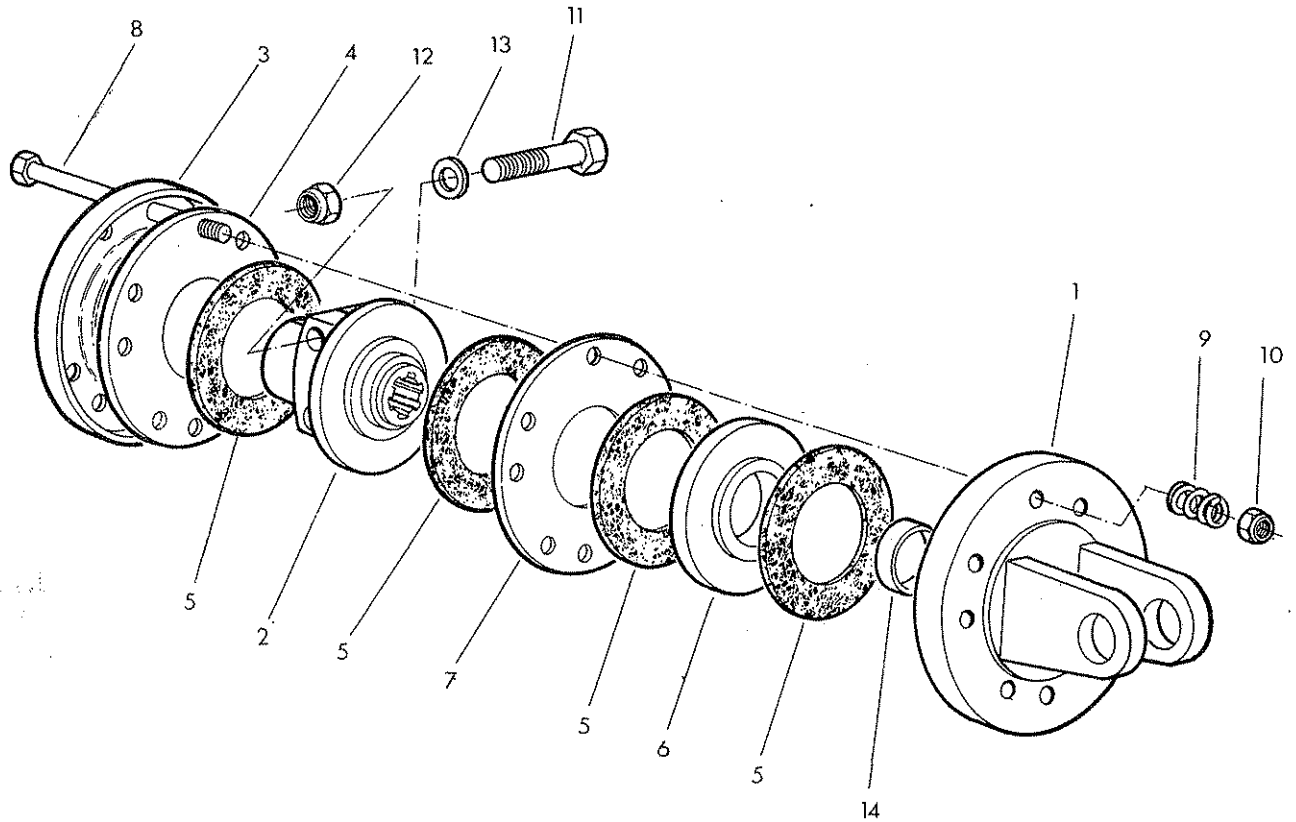


3. For Tillage implements used behind Commando with 1000rpm. through drive shafts of 1 3/8 dia.



4 For Tillage implements used behind Commando with 1000rpm. through drive shaft of 1 3/4 dia.

FRICION CLUTCH FOR 540 RPM PTO SHAFTS



Ref	Part No.	Qty.	Description
	13 45 530		PTO SHAFT/CLUTCH ASSEMBLY For tillage tractors behind tractors with 540 RPM P.T.O.
	13 45 533		PTO SHAFT/CLUTCH ASSEMBLY For tillage tractors behind commandos with 540 RPM PTO

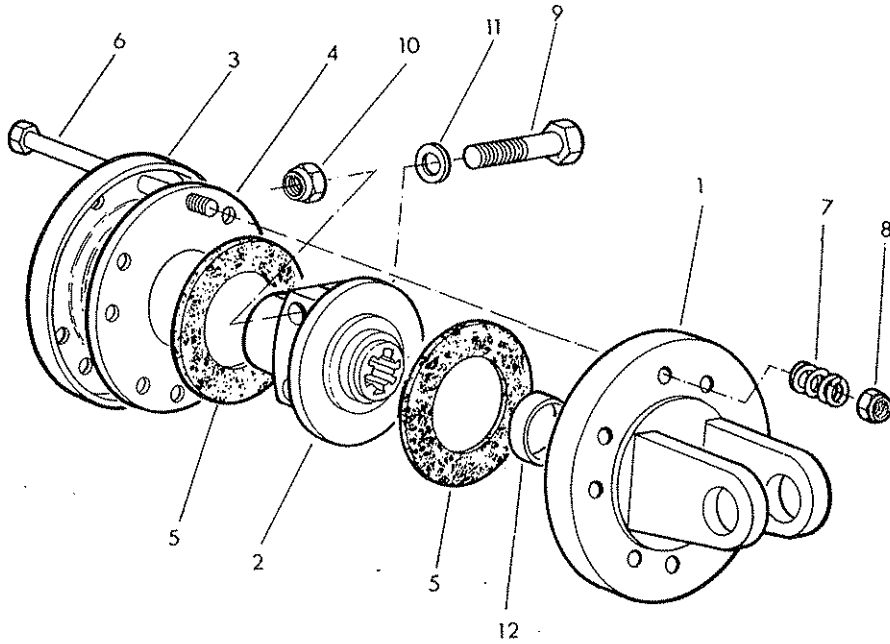
The following items are common to both 540 RPM shafts.

1	13 45 425	1	.Flanged yoke
2	13 45 095	1	.Clutch Hub
3	13 45 091	1	.Pressure plate
4	13 45 093	1	.Inner plate
5	13 45 096	4	.Clutch lining plate
6	13 45 097	1	.Intermediate plate support
7	13 45 092	1	.Inner plate
8	92 13 205	8	.Bolt M10 x 100
* 9	13 45 103	8	.Spring.
10	91 43 005	8	.Self locking nut
11	92 00 010	2	.Special bolt M14 x 80
12	91 00 018	2	.Hexagon nut M14
13	91 00 019	2	.Spring washer \varnothing 14
14	13 45 099	1	.Slip Ring.

* Assembly Note.

For operating torque the clutch springs should be compressed to a length of 2.6 mm.

FRICITION CLUTCH FOR 1000 RPM PTO SHAFTS



Ref	Part No.	Qty	Description
	13 45 564		P.T.O. SHAFT CLUTCH ASSEMBLY For tillage tractors with toolbar behind tractors with 1000 rpm P.T.O. shaft 1 3/8" dia.
	13 45 565		P.T.O. SHAFT CLUTCH ASSEMBLY For Tillage tractors with toolbar behind tractors with 1000 rpm P.T.O. Shaft 1 3/4" dia.
	13 45 566		P.T.O. SHAFT CLUTCH ASSEMBLY For Tillage tractors behind commando with 1000 rpm, through drive 1 3/8" dia.
	13 45 567		P.T.O. SHAFT CLUTCH ASSEMBLY For Tillage tractors behind Commando with 1000 rpm through drives 1 3/4" dia.

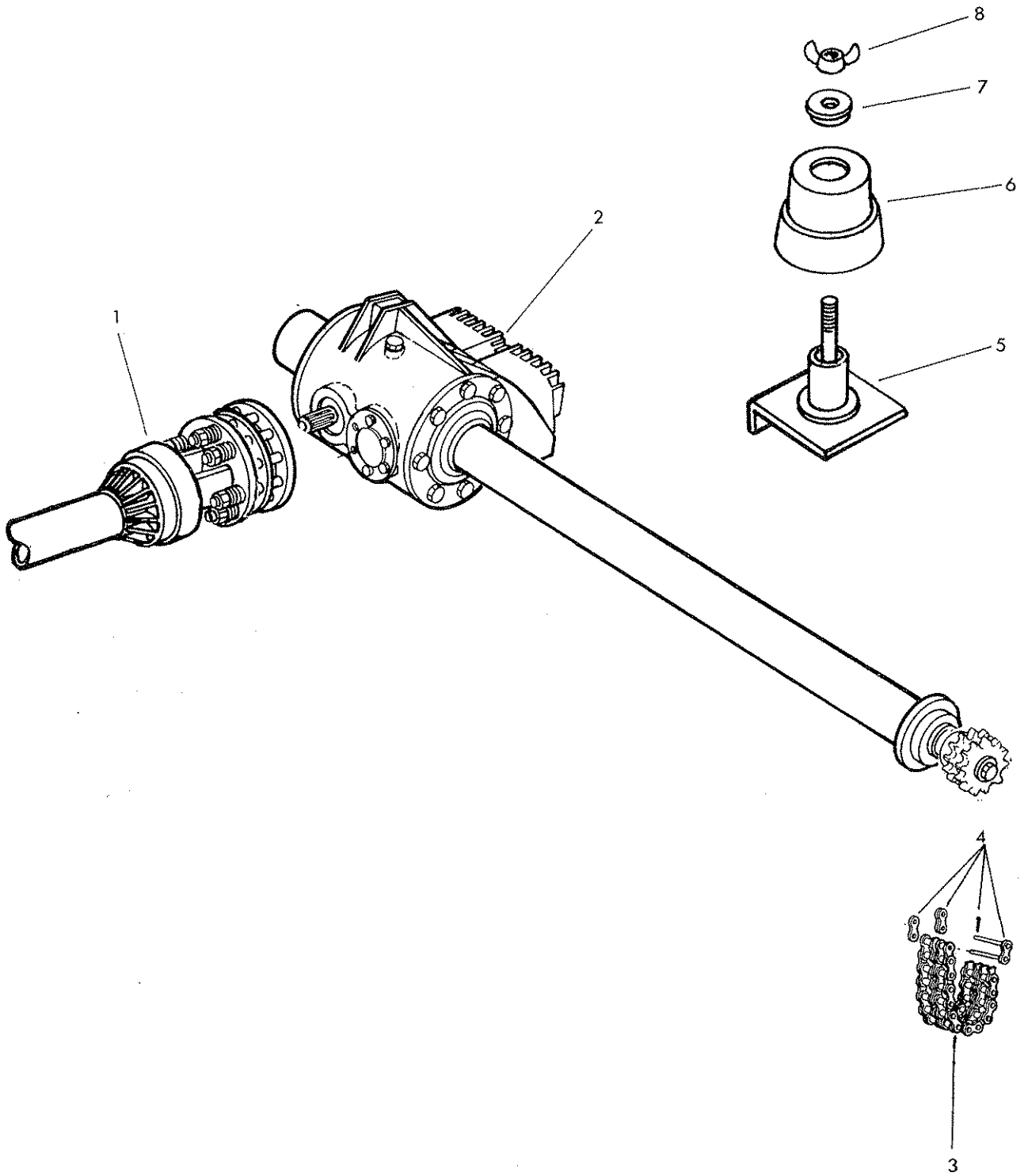
The following items are common to all the above P.T.O. shafts.

1	13 45 425	1	.Flanged yoke.
2	13 45 574	1	.Clutch hub
3	13 45 091	1	.Pressure plate
4	13 45 093	1	.Inner plate
5	13 45 096	2	.Clutch lining plate
6	92 13 190	8	. Bolt M10 x 85
* 7	13 45 103	8	.Spring
8	91 43 005	8	.Self locking nut M10
9	92 13 146	2	.Bolt M12 x 70
10	91 13 006	2	.Hexagon nut M12
11	91 00 206	2	.Spring washer.
12	13 45 099	1	.Slip ring.

* Assembly Note.

For correct operating torque the clutch springs should be compressed to a length of 26mm.

540 r.p.m. - 1000 r.p.m. CONVERSION KIT



Kits to convert 540 rpm Tillaerators to machines that will operate at 1000rpm.

The following four kits are available .

Ref	Part No.	Qty.	Description
	13 45 580		1000 rpm. CONVERSION KIT FOR Tillaerators with toolbar behind tractor with 1 3/8 dia. P.T.O. shaft.
	13 45 581		1000RPM CONVERSION KIT FOR Tillaerators with toolbar behind tractors with 1 3/4 dia. P.T.O. shaft.
	13 45 582		1000 RPM CONVERSION KIT FOR Tillaerators behind Commandos with 1 3/8 dia. through drive
	13 45 583		1000RPM CONVERSION KIT FOR Tillaerators behind commandos with 1 3/4 dia. through drive.

The above kit assemblies comprise the following items.

1		1	.PTO shaft (see page 37 for correct specification)
2	13 45 575	1	.1000RPM gearbox assembly (see page 34)
3	13 45 149	1	.Rotor drive chain 45 pitches c/w connecting link
4	13 45 107	1	..Connecting link
	13 45 576	1	.Gear storage box assembly compr:
5	13 45 577	1	..Box base.
6	14 69 001	1	..Gear cover
7	13 45 152	1	..Locating washer .
8	01 91 003	1	..Wingnut 3/8"UNF



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