

Publication 96 Issue 2
Mar. 1984

Part No
10-65-851

COMMANDO

Operation & Spares manual



LIST OF CONTENTS

SAFETY PRECAUTIONS	Page 3
Introduction	Page 4
FITTING INSTRUCTIONS	
Preparation of Tractor	Page 7
Assembly of frame	Page 9
Shank fitting	Page 12
OPERATION	
Depth control	Page 15
Auxiliary equipment	Page 21
Hydraulic linkage	Page 22
Assister Ram	Page 23
Power drive	Page 24
Turf discs	Page 25
Shin guards	Page 26
SERVICE and MAINTENANCE	Page 27
SPARE PARTS	Page 29

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 emphasize.

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.

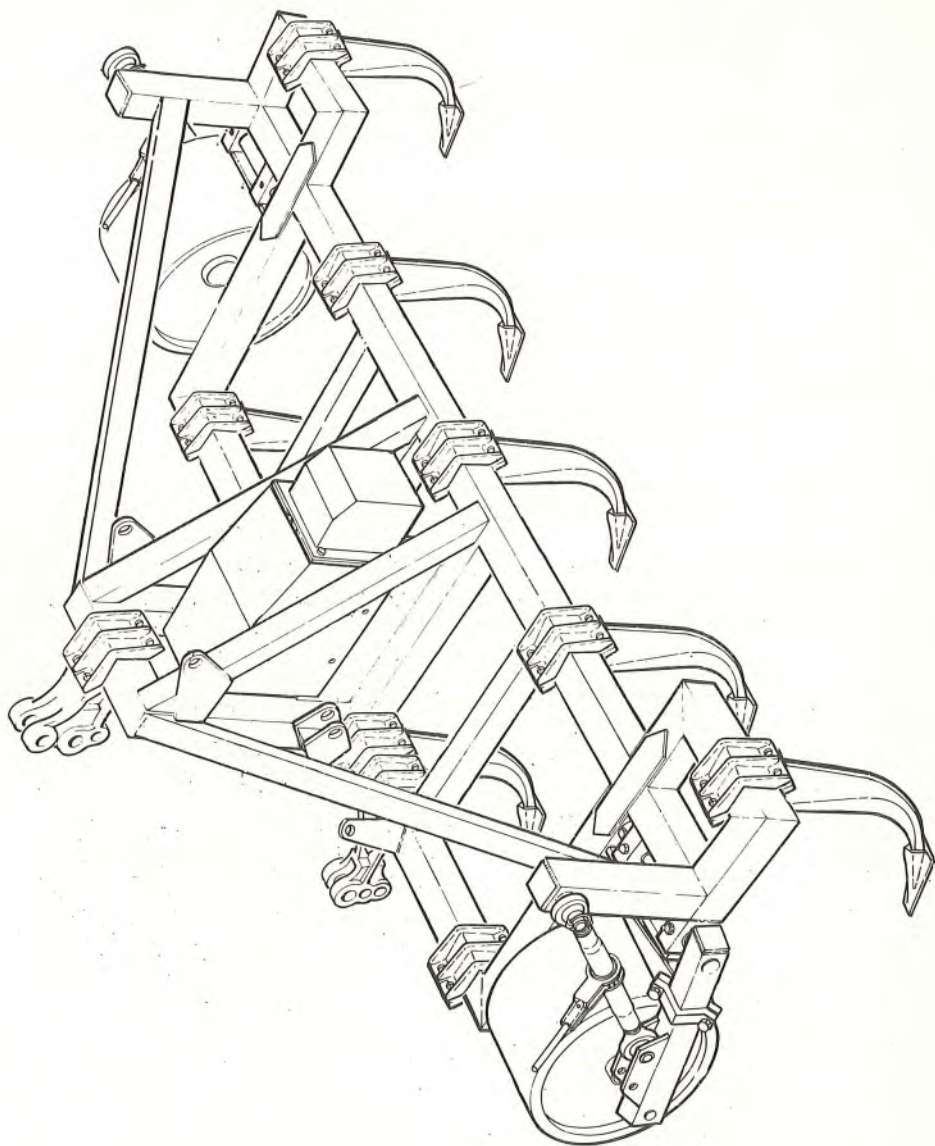
Record the serial number of your machine on this page and always quote this number when ordering spares. Whenever information concerning the machine is requested remember to also state the type of tractor to which it is fitted.

MACHINE SERIAL NUMBER		INSTALLATION DATE:
MODEL DETAILS		
DEALER'S NAME		
DEALER'S 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 purposes must be obtained from the hydraulic component manufacturers.

GENERAL VIEW - Series 2



SAFETY PRECAUTIONS



WARNING

1. Keep all guards in place; they are for your protection.
2. Never allow anybody to ride on the equipment, whether in transport or at work.
3. Do not work under the frame while the machine is suspended on the tractor's hydraulic lift - Use a substantial support.
4. Always ensure that the nuts that hold the shanks to the frame are on the underside.
5. Always wear protective eye shields when striking points.
6. Be alert that, if any help is being given in coupling or unhitching any of the equipment, the assistant is not accidentally trapped.

SECTION 1

1. Introduction

The Commando was developed in the tough and rock hard soil conditions of Australia where the need to break up the toughest hard-pan and aerate the soil was the first objective. The vibrator unit which is driven by the tractor's p.t.o. shaft is rigidly mounted to the frame. Instead of the usual power absorbing forward tearing action normally associated with cultivators, the drag and friction are minimised by the vibratory action in a horizontal plane.

The McConnel Commando is not just another linkage mounted toolbar. It is a multi purpose cultivator available in a number of forms and sizes.

- a) In its simplest form it may be used as a heavy duty cultivator.
- b) With added land wheels for depth control it is suitable for shallow cultivations, scarifying and fallow operations.
- c) An all-purpose cultivation tool with a power driven vibrator unit to give an earth shattering effect when pan-busting or breaking new ground.
- d) With p.t.o. through-drive facility, a power driven implement hydraulically mounted on the rear of the main frame can be utilized in seed-bed preparation, effectively employing a one-pass technique for minimum compaction and rapid preparation.
- e) With ratchet operated depth control but without through-drive facility ground engaging implements such as the Oxford or Flexicoil roller may be mounted. Suitable for clod breaking or for land re-settlement when operating on grass land.
- f) Accessories in the form of choice of cultivator points, shank lengths, turf cutting discs, 540 or 1000 rpm vibrator units, 'long-life' digging points and wear shins for abrasive soils may be supplied to requirements.

2. Frame specifications

Currently there are six sizes of frame available.

	<u>Size</u>	<u>No. of Shanks</u>		<u>Guide to drawbar horse power req.</u>
a	1.25 metre	(2 shank)	Series	from 35 Hp
b	1.6 metre	(5 shank)	I	" 60 Hp
c	2.5 metre	7 shank	Series	" 75 Hp
d	3.0 metre	9 shank	II	" 100 Hp
e	3.7 metre	11 shank		" 120 Hp
f	4.5 metre	13 shank		" 140 Hp

Provision is made for the Series II models only to be equipped with p.t.o. through drive facility, and hydraulic linkage for the independent mounting of an additional implement. On the 4.5 metre frame an additional mounting bracket is available for mounting a second slave ram which can be supplied as an optional extra.

3. Construction

The frame is constructed of high grade RHS steel with both front and rear toolbars integrally welded and reinforced by cross members to make an immensely strong and completely rigid frame.

The combination of the clamp and shank, and the clamp plate permits the rigid attachment of the shank to the toolbar using high tensile steel bolts and nuts. Should an immovable underground obstruction be encountered, as a safety feature, the thread in the nuts strip, allowing the shank to swing back.

4. Vibrator unit

On Series I machines the vibrator is attached to the base plate located in the centre of the frame. It takes its power through a double universal drive shaft from the p.t.o. on the tractor. On early Series I machines only, the drive with spline attaches to a flywheel through 'silent bloc' rubber bushes that also form a flexible drive and assist in keeping the forces of vibration within the frame. On later models the rubber bushes are omitted.

Conversion of the vibrator from 540 r.p.m. to use with a 1000 r.p.m. p.t.o. shaft is by means of bolting an additional weight to the flywheel. A special drive shaft is also required.

On Series II machines all vibrator units are bolted to flange plates on the frame and are provisioned for through drive which is supplied as standard. There are three options of through drive shaft.

- a) 540 r.p.m. 6 spline
- b) 1000 r.p.m. 1 3/8" diameter 21 spline
- c) 1000 r.p.m. 1 3/4" diameter 20 spline

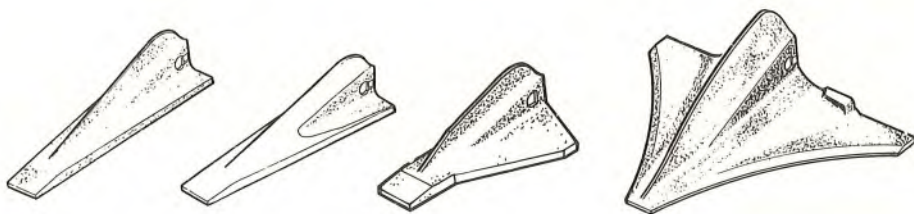
5. Shanks

Two lengths of shank are available; 18" and 24".

The 30" shank may only be mounted on the rear tool bar. A combination of shank lengths may be used for maximum disturbance.

6. Points

A choice of point widths is available for shallow or deep cultivations. In highly abrasive soils special 'long-life' digging points can be supplied. Wear shins can also be fitted to the 18" and 24" shanks to increase their working life.



7. Linkage kit

All series II machine have provision for mounting a linkage kit assembly to which may be attached a wide range of cultivating equipment. Machinery such as spring tines and turbo tillers which rely on high forward speeds for good results may be a little disappointing.

8. Crawler mounting

When installing the machine behind a Track-Marshall, a special top hitch bracket assembly is required; part no. 10-65-422 in place of the existing bracket 10-65-264. The special bracket is bolted to the frame and should point upwards. Use the centre holes in both the top link bracket and draft link bracket to obtain correct geometry of approximately 36" hole centres.

4.5 metre and 3.7 metre frame.

It is intended to mount a 4.5 metre or a 3.7 metre frame behind a Track-Marshall the special top hitch bracket (10 65 422) cannot be used because the integrally welded on draft link lugs would give an incorrect geometry. Instead, use the top hitch bracket 10 65 484 supplied with the 4.5 m frame and mount it to point upwards. Attach to tractor using the lowest draft position and the top most hole in the top hitch bracket.

SECTION 2

FITTING

Preparation of Tractor

1. Tractor Power Requirements

It is impossible to give any hard and fast figures on horsepower requirements as ground conditions can vary enormously. The figures quoted in Section I are advisory only and the removal or addition of one or two shanks might be necessary to obtain the optimum performance from the tractor.

A marked increase in the draft requirement will be necessary under moist conditions when the vibrations are more readily absorbed by the damp soil.

2. Front end Weight

It may be found to advantage to apply front end weight to some smaller and medium powered tractors. The amount of weight necessary can only be determined by local circumstances. It should be borne in mind that any tendency of the tractor to rise on the front end will produce a corresponding lowering of the hitch points and in doing so, the angle of penetration of the shanks is further increased.

3. Tractor Linkage

It is essential that only the correct linkage arms for each particular tractor are used with the Commando. The arms have been properly matched with the horsepower of the tractor and should be more than adequate. Nothing on the Commando offers protection against the failure of unmatched, repaired, badly worn, weak or below category tractor linkage.

Failure of either of the tractor's draft links can cause the tractor to run away from one end of the implement or in the case of the top link, the implement to tip forwards. The result could mean that the P.T.O. shaft assumes an impossible angle which may bend it or tear out the yokes or their bearings. Even the P.T.O. stub shaft in the tractor and the drive spline of the vibrator unit could be damaged.

Under no circumstances should tractors operate in tandem to gain extra traction. It is far more practicable to make two or three passes over the ground with the one tractor while increasing the depth each time.

4. Stabilizers

The implement must be capable of some side-to-side movement in relation to the tractor therefore stabilizer chains or sway bars must be adjusted to allow this. They should however be tightened up to prevent sideways when travelling on the highway. In field operations stabilizer bars which hold the implement rigidly should not be used.

5. Draft Control

Use of draft control is beneficial to traction in reducing wheel slip thereby also reducing tyre wear and saving fuel.

Refer to individual tractors instruction book for detailed guidance on the best location for top link fitting.

For mounting the cultivator on linkage behind crawler tractors, the draft links should be allowed to 'float'. Provision for this is usually made in the hydraulic control valve.

Do not use position control for regulation of depth. This should be done with the aid of depth wheels.

6. Power Take-off Drive

The P.T.O. drive shaft is fitted with snap lock couplings at either end to facilitate assembly. Additionally the P.T.O. shaft is protected against the high stop/start loads by a torque limiter device built into the shaft and mounted adjacent to the tractor on Series I machines.

On Series II machines a slip clutch in the form of friction discs is incorporated within the eccentric flywheel.

Tractor P.T.O. shaft heights can vary between 37 cms to 81 cms (14" - 31") and although the standard drive shaft length supplied will suit the majority of tractors, a careful check should be made to ascertain that in the shortest possible position it must not be 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 hacksaw 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.

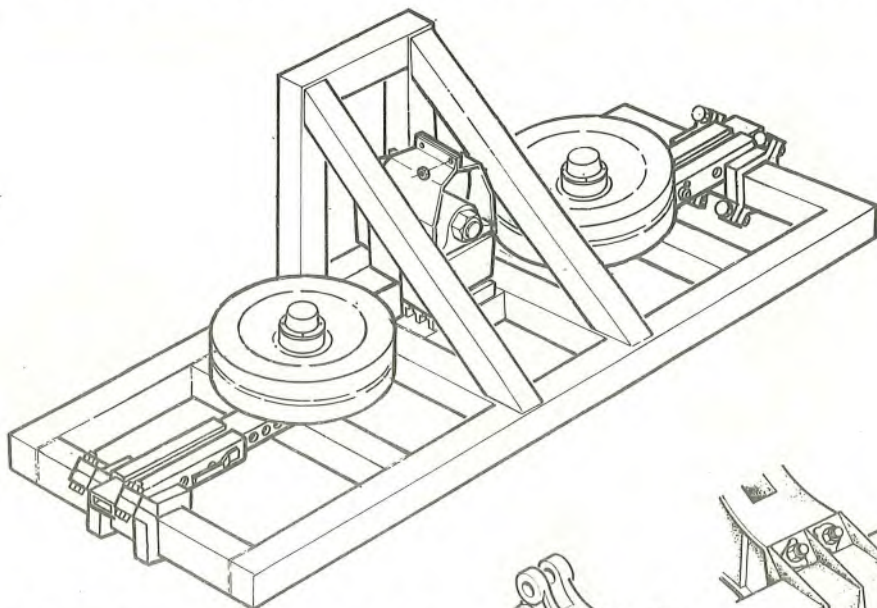
The angle of operation of universal drive shafts has recommended limits. On tractors with low P.T.O. output shafts the angle becomes acute when the implement is lifted to its maximum travel. This should not present a hazard as the P.T.O. drive should be disengaged before lifting the implement clear of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

On tractors with a high P.T.O. shaft position a reverse situation can apply but with more serious consequences. When digging deeply, the P.T.O. drive can assume a condition greater than 6° out of parallel. Where it is essential to reach to this depth, it may be necessary to change to the 24" shanks to avoid damage to the P.T.O. shaft.

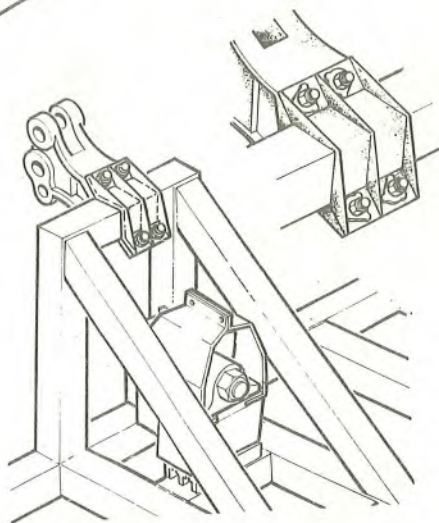
The vibrator unit on Series II machines is bolted to two flange plates. The vibrator can be adjusted vertically by selecting the most suitable holes in the plates which give the minimum deflection of the shaft when in operation. It should be noted that the rear cover plate (item 25, page 38) on the through drive unit can be turned over to increase the adjustment range.

7. Assembly of Implement

Assembly of Series II machines is the same as Series I in most respects, apart from the depth wheel fitting. The Commando is despatched with the vibration unit mounted in position on the frame and the land wheels fixed in the stowage position. The remaining items, shanks, clamps, slippers, linkage attachment brackets, P.T.O. shaft and nuts, bolts etc., are despatched separately.



1. Place the frame, tower up on an even flat surface.
2. Remove the land wheel and carrier assemblies from their stowage
3. Place the top link attachment bracket, with linkage pin holes forward and inclined upwards in the centre of the tower cross-bar. Fasten in position with clamp plate, bolts, washers and the self locking nuts. The washer must always go on the clamp plate. Nuts must be tightened evenly and care taken to ensure there is maximum surface contact between the clamp and frame. Final tightening of the nuts should be diagonally and not exceed 60 ft lbs torque.



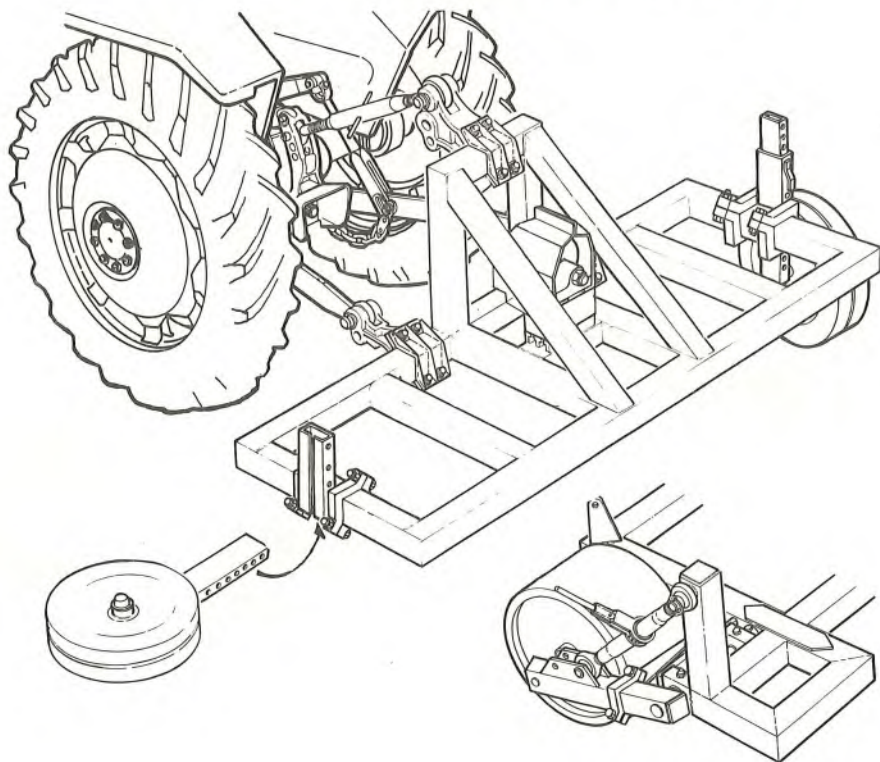
Note: On 4.5 metre frames only, the top link attachment is assembled to the frame without using washers.

Important

On some tractors which have extra long draft links there is a risk of the top link being in only a few threads of engagement when the machine is mounted. Should this be the case, it is permissible to mount the top hitch bracket in an inverted position for greater thread engagement.

4. Raise the front of the frame approximately 5" from the ground. Attach the linkage arm attachment brackets, holes forward and inclined upwards, 5" outside the tower uprights and clamp in position.
5. Attach the frame of the Commando to the tractor's three point linkage with the pins and linch pins provided.

Use the highest hole in bottom hitch bracket unless there is a clearance problem. This is to give adequate top link force for draft control.



6. Depth Wheels

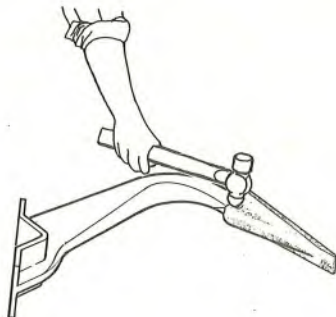
The depth control wheels are clamped in position on the centre of the end cross members of the frame. Usually they are located on the outside of the frame but can if required be placed on the inside when working with the 24" shanks only.

On the Series II the depth wheels are hinge mounted. Adjustment is by means of a handled ratchet.

7. Points

The points must now be assembled on the shanks. It must be decided which point to fit and whether it is to be used fin or plate up. Check that the point socket is empty of rubbish. The point must be tapped firmly onto the shank until the strip of metal between the largest hole and the edge of the point has passed the raised 'pip' cast in the shank.

Earlier shanks have an indentation into which the metal strip behind the hole on the point should be hammered.



If using reasonable force the point will not engage far enough onto the shank foot, it is permissible to grind the corners of the shank until sufficient engagement is obtained. Care should be taken not to overgrind and obtain a loose fit. If too loose a fit, clearance can be taken up by winding a strip of hessian or similar round the foot.

WARNING

As added precaution wear protective eye shields.

When it is necessary to remove the point from the shank, hammering the back of the point will cause the metal strip to ride up the side of the raised pip.

8. Shanks

The shank assemblies must now be fitted. The shank set-up is governed by the work to be done.

It is permissible to use a mixture of both 18" and 24" shanks on the same frame with the longer shanks being attached to the rear toolbar. Normal shank arrangement is to have one more assembly mounted on the rear toolbar than on the front.

Fasten in position with the clamp plate, bolts, washers and nuts. Place the special washers under the bolt head and pass the bolts down through the clamp plate and shank assembly and fit the nuts on the underside. The reason that the nuts are placed on the underside is that in the event of a nut 'shearing', it will be propelled harmlessly towards the ground. Tighten the bolts evenly and take care to ensure that there is maximum surface contact between the clamp plate and frame. The nuts will normally be trapped by casting lugs. Final tightening of the bolts should be diagonally and not exceed 60 ft lbs torque.

CAUTION On no account use double nuts on a longer bolt which would nullify the shear action of the nuts and cause greater damage by breaking the shank or twisting the frame.

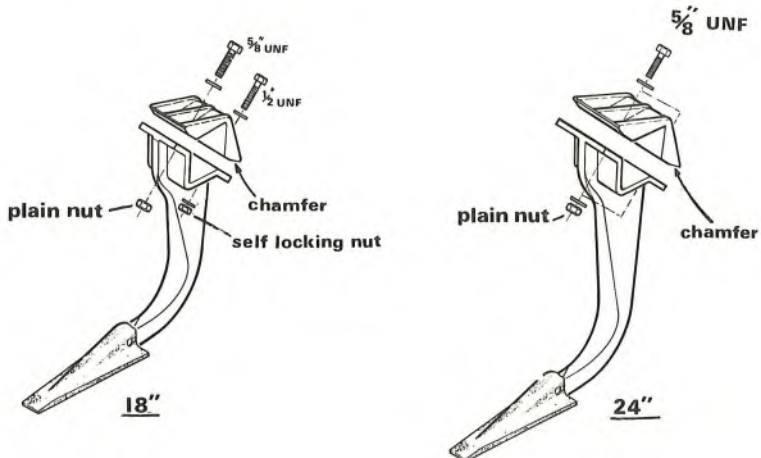
a) 18" (460 mm) shank assembly

Nuts, bolts and washers should be fitted as shown. The 5/8" bolt through the upper and 1/2" bolts through the lower holes. It should be noted that the enlarged clearance hole for the rear or lower holes is to allow distortion of the clamp plate around the toolbar if the nuts shear. The chamfer on the clamp must be directed to the rear as shown.

The flat edges of the washers should be positioned to assist in locating the bolts centrally in the holes.

b) 24" (610 mm) shank assembly

Nuts, bolts and washers should be fitted as shown. The same remarks apply as for the 18" shank. The four bolts are 5/8". Washers should be fitted under the bolt head as well as behind the nut.



SPECIAL NOTE:

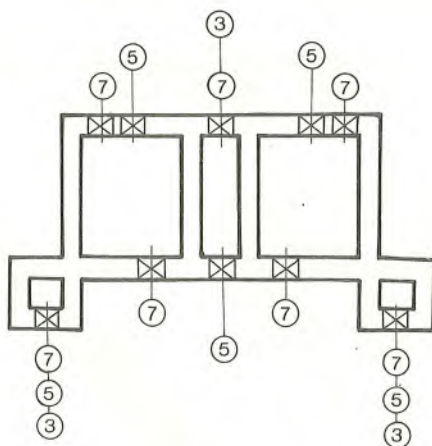
Only use plain nuts on the front of the shank.

SHANK POSITIONS

Series 2

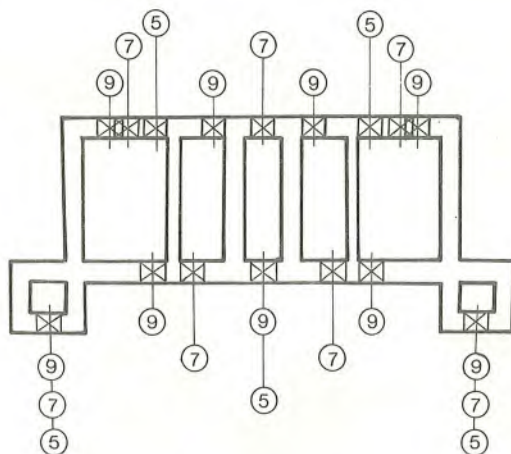
3, 5 or 7 shanks

2.5 metre frame



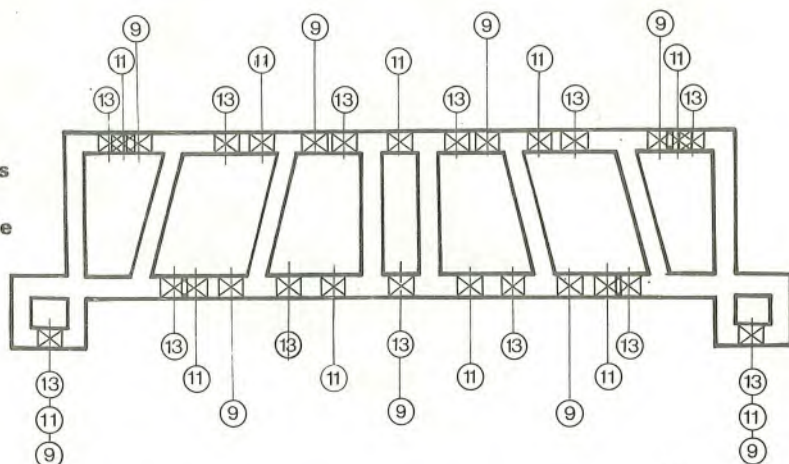
5, 7 or 9 shanks

3 metre frame



9, 11 or 13 shanks

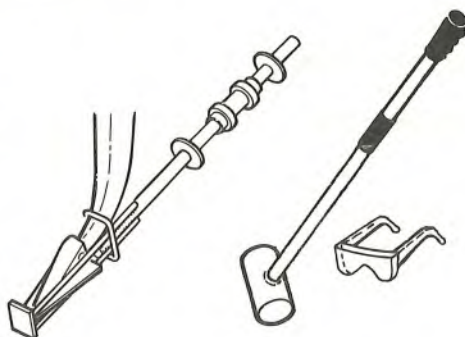
4.5 metre frame



9. Finally, connect up the PTO shaft ensuring that in all positions it fails to 'bottom out' (see para. "Power Take-off Drive").

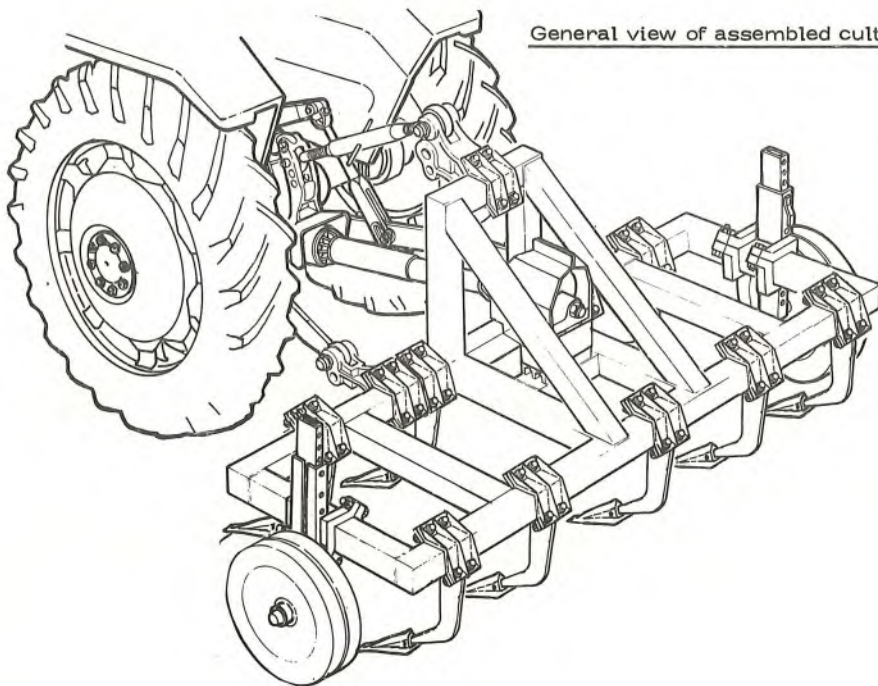
10. Point Fitting tool

This tool can be used for removing or replacing points when the shank is attached to the frame. Method of use is to assemble the point on to the shank and then hook the tool over the lower section of the shank as shown in the diagram and operate the slide hammer to the rear. For removal, the hammer is operated forwards, whilst the bar rests against the back of the points' wings.



Some machines are being despatched with a long handled hammer as an alternative to the point fitting tool. The hammer head is made of mild steel so that there is little likelihood of chipping the hardened steel point when striking it with the hammer. However, as a precaution the eye shields provided with the hammer should be used.

Stand to the rear or to one side of the frame when using the hammer. Do not crouch beneath the frame.



General view of assembled cultivator

SECTION 3

OPERATION

1. Speed

When first putting the Commando into operation, the tractor's forward speed should be limited to less than 3 mph (5 Kph) with the engine speed adjusted to give 540 rpm of the pto shaft. Forward speed can be gradually increased later as experience with the machine is gained.

The points should be on or in the ground before the P.T.O. is engaged and similarly should be disengaged before lifting the points out of the ground. On tractors that share a common drive to both the hydraulic lift and P.T.O. engine speed should be reduced to a minimum and the machine lifted only as far as is necessary.

2) Depth Control

To achieve maximum depth with a lower draft requirement it is possible where necessary to make more than one pass over the ground increasing the depth each time. Alternatively, some shanks can be removed, see page 18.

Calibration marks are cast into the sides of the shanks; centimeters on one side and inches on the other to assist the operator in maintaining more precise depth control. These are approximate calibrations and obviously will vary as the points wear.

In setting the depth, it may be an advantage to pull the points into the earth to the depth required without engaging the P.T.O. drive, the depth wheels can then be lowered to the ground.

In matching the holes on the adjustment pins, select the nearest one, shallower, than the depth required; the normal action of the point is to pull in deeper. The wheels exert a positive, but not heavy pressure to hold the point from penetrating further. Even so, it is sometimes necessary to reset the depth wheels to a shallower notch after the start of digging as the wheels will generally sink into the disturbed earth and increase the depth of penetration.

Depending on which points are selected and how they are used, the Commando can do at least some of the work of a sub-soiler, a chisel plough and a cultivator. Its greatest use is to loosen soil that has been compacted to a higher density than is desirable for optimum crop production. This compaction may be at the surface, deep compaction or as a pan. The latter is a thin impervious layer caused by a plough or other implement smearing the soil whilst working in wet conditions.

3. Point settings

- a) Narrow points - Fin up
This is the normal set up for deep cultivation. The points will lift and shatter the soil structure with low draft and minimum mixing.
- b) Narrow Points - Fin down
This arrangement will give more mixing and surface disturbance than with the fin up. Draft will also be slightly higher.
- c) Wide Points - Fin up
The wide points will break up a bigger area of ground and so can be spaced further apart. This is particularly useful for shallow cultivations. With the fin upwards, mixing and surface disturbance is minimal.
- d) Wide Points - Fin down
This arrangement will give maximum soil mixing and surface disturbance.

Any set up of the Commando working at depths below cultivation (i.e. below 8" or 20 cm) has the great advantage of loosening the soil without mixing or inverting. Clods are not formed or brought to the surface.

4. Working Depth

The depth to which the Commando can best be used depends entirely on the soil type and moisture content. This produces a critical depth below which less soil is loosened and the tractor draught force is considerably greater. Down to the critical depth the breakout pattern is similar to figure 1. Below the critical depth figure 2 applies. This can often be recognised from the surface but is very clearly seen by digging the profile.

If fig. 1 is the pattern produced by the narrow points then fig. 3 is the pattern of the wide points - a much greater loosened area.

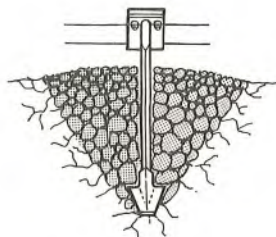


Fig 1

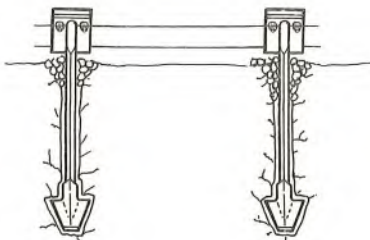


Fig 2

Fig. 4 shows the wide point working below the critical depth. This critical depth with the wide points may be lower than for the narrow points.

The reason for this critical depth is that in for example fig . 3 the soil has been loosened upwards because that is the direction of least resistance. In fig. 4 the resistance to upwards movement is greater and it is easier for the soil to compact sideways than to loosen upwards. The very small amount of loosened soil at the top of the tine is because the loosening has been done by only the width of the shank. The sides of the compacted channel may be smeared and it is obvious that this is a very detrimental condition in which to leave the soil.

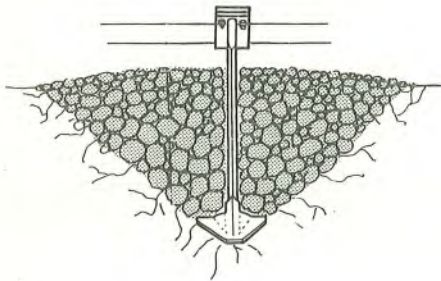


Fig 3

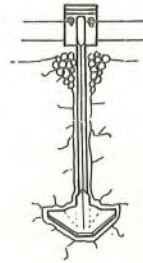


Fig 4

5. Tine Spacings

The tine spacing is related to the working depth for each type of point. With the narrow points the spacing should be 1.2 - 1.5 times the depth. This gives the least draught force and most even surface finish (Fig. 5) with complete break up of the soil profile.

Fig. 6 shows the same tines too far apart giving incomplete break up

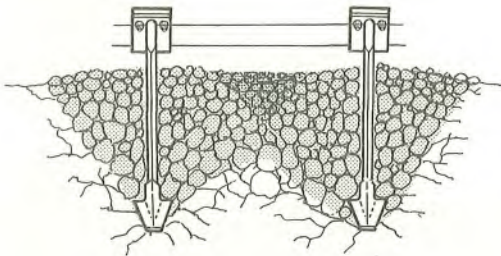


Fig 5

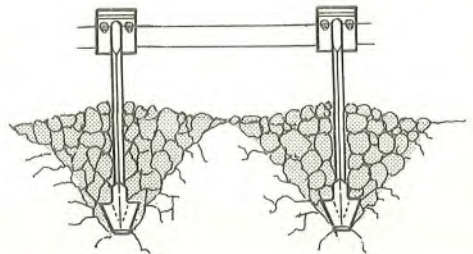


Fig 6

With the wide points the spacing can be 2 - 2.2 times the working depth. (Fig. 7)

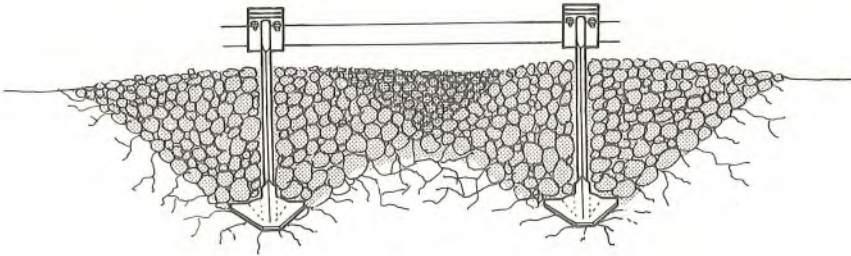


Fig 7

6. Shallow leading tines

Draught force can be reduced and the amount of soil loosened increased by using shallow tines in front of long ones. The 460 mm shanks should be mounted to each side of the 610 mm shank and not directly in front. Fig. 8 shows an ideal set-up.

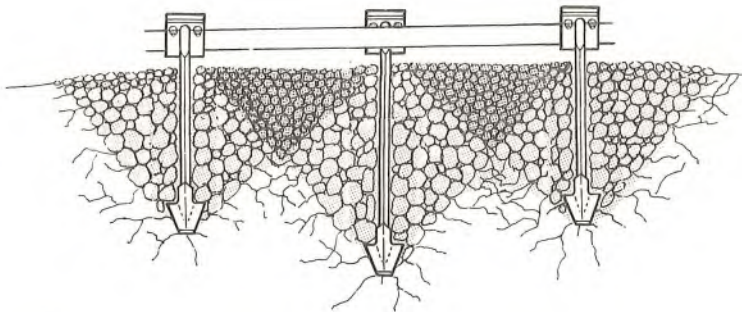
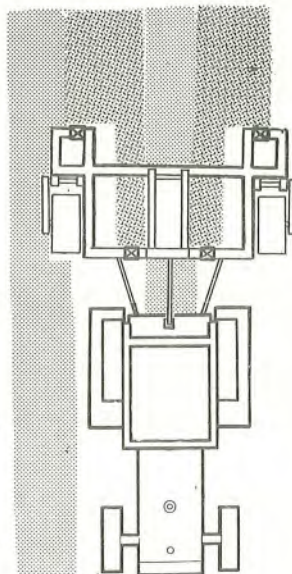
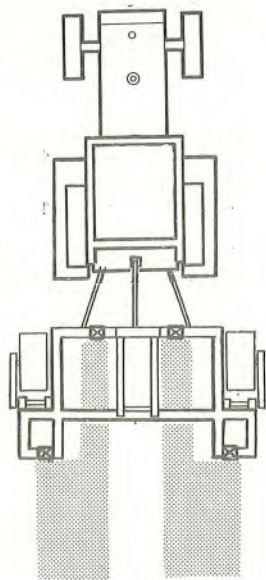


Fig 8

7. Recompaction

Loosened soil is extremely prone to re-compaction by subsequent traffic especially in wet conditions when loosening can be achieved by using wide points and shallow leading tines but any re-compaction will be more severe than the original problem. For this reason it is not a good idea to use two passes in different directions but to try to combine the two in one pass with for example shallow leading tines.

If power is inadequate to cover the full width of the toolbar it is better to remove the shanks in the middle of the frame, which will leave an undisturbed strip of ground in the centre. On the return bout across the field the tractor wheels should be positioned on this unmoved strip to complete the cultivation on a straddle and overlap principle.



8. Underground obstruction

If a point becomes jammed in a root or rock it may sometimes be freed by operating the vibrator slowly, and alternatively attempting to raise and lower the frame. Should this fail, engage reverse gear and with the vibrator unit still operating back-up slightly. This will usually release the shank but a check should be made immediately to ensure that the point has not remained embedded in the obstruction.

9. Fail-Safe

Most types of 'fail-safe' arrangement on farm machinery such as shear bolts, pins, slip clutches etc., are designed to protect the implement in the event of overloading or striking an obstruction. On the Commando however, the 'fail-safe' is designed to protect the tractor. The two top bolts and nuts securing the clamp shanks to the frame are designed to fail if a really solid obstruction is met. It is important that only F.W. McConnel official spares are used for the replacement of bolts and nuts, as they are of special grades specific to the design requirement.

In action the threads of the two upper nuts will shear off, the shank may then twist around the toolbar. To release, the shank should be swung back into its normal position and the upper nuts, bolts and washers replaced.

There is a possibility that the nuts will fail if the bolts are loose, if the hardened steel clip washers are omitted from the top of the clamp plates or if the speed is excessive in rough ground.

It is most important that only the correct nuts and bolts are used, they should be checked regularly and retightened. Only an accurate and tight fit of the clamps on the toolbars provides the ideal transmission of vibration to the points.

On initial start up all nuts and bolts should be checked for tightness after one hour's operation or in the case of very rough ground, after the first fifteen minutes. Nuts should be tightened uniformly and as tight as possible using a normal spanner. Extra leverage should not be used otherwise the thread within the nuts could be weakened and strip.

Auxiliary Equipment

a) Trailed implements

Attachments that can be fitted behind the Commando such as the 'Oxford' roller or 'Flexicoll' do not require hydraulic linkage. The depth control wheels are removed and the ratchet adjusters are used on the trailed implement to control depth.

When coupling the tractor to the Commando use the lowest practicable hitch point. Where possible, turn the mounting bracket over to achieve this. Use the highest possible hitch point for the top link mounting. Forces applied through the top link are reduced when operated in this way, and the risk of top link failure is minimised.

Where it is not possible to obtain the geometry with the tractor's existing top link, a McConnel heavy duty top link assembly part no. 71-15-275 is available. Closed length (pin centres) 800 mm (2ft 7½") open length 1150 mm (3ft 8½"). If there is any doubt of the strength or serviceability of the tractor's top link, then a McConnel top link should be used. Any failure of the top link could result in serious damage to the through-drive assembly.

Operation

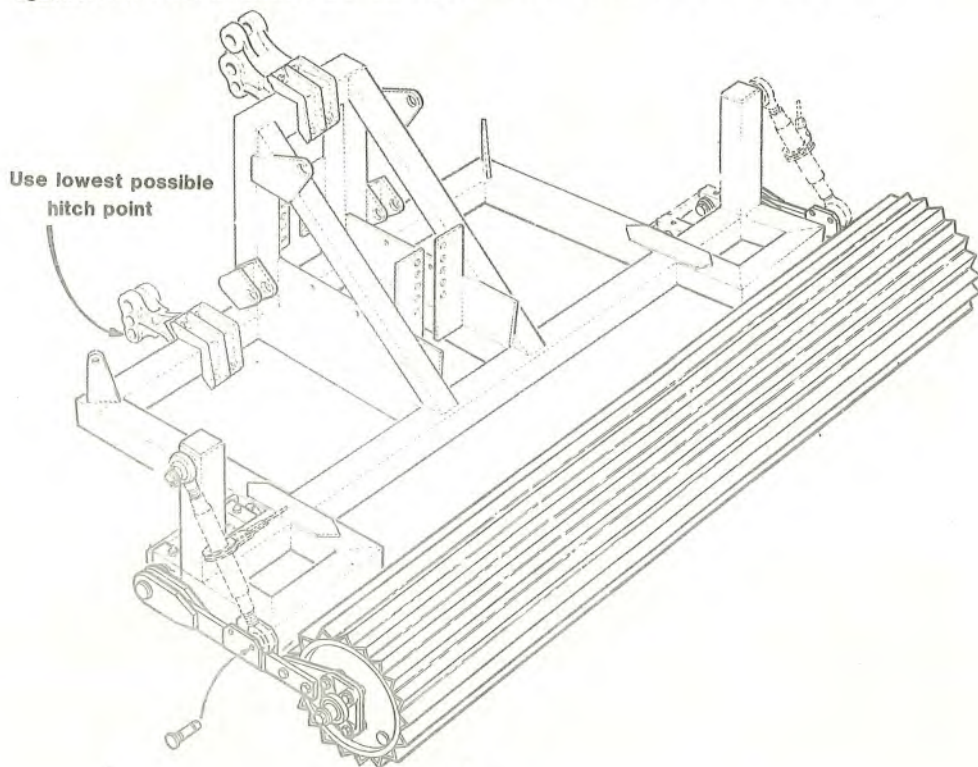
To correctly set the machine for use the roller should be fully raised, the Commando is then drawn forward into the ground. When the points have reached the required depth, the roller is lowered to the ground.

Shear pins

As the roller is mechanically held in position by the ratchet adjusters, no movement relevant to the main frame is possible. When the roller runs over a large rock or stump its action would try to lift the shanks out of the ground. If it fails to do so, the body of the roller would be damaged or bent. To avoid this accidental damage special grooved shear pins are fitted in the lower link ends of the ratchet adjusters. In the event of failure of these shear pins, do not substitute an ordinary bolt or metal rod.

Ballast

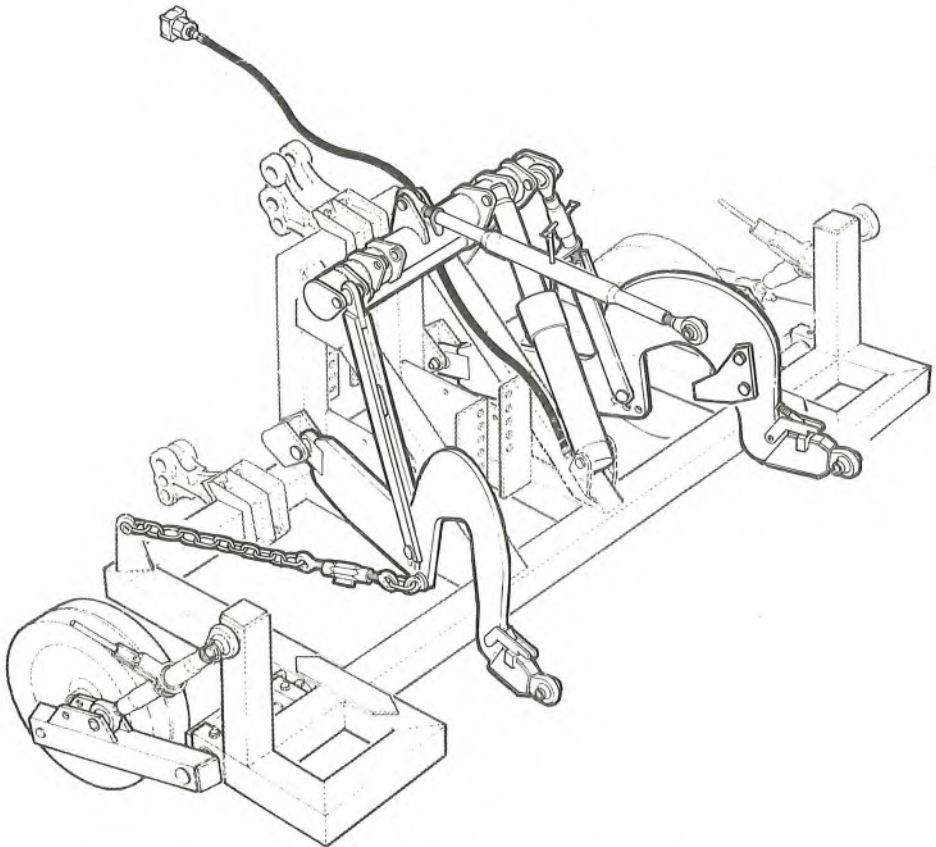
If extra weight is required when using the roller, water ballast can be added. Precaution against frost should be taken, either storing in a frost free building or draining the roller.



b) Hydraulic linkage

To enable an implement being worked in conjunction with the Commando, to be controlled independently, a hydraulic linkage has been designed to accommodate almost any Cat. II three point linkage implement. Using a single acting ram, the linkage is powered by an external services supply from the tractor. Stabilizer chains are supplied as standard and optional Cat. I or II top link ends supplied as required.

Linkage kits supplied prior to January 1984 have draft links that are equipped with a latch which when raised allows the link end to be manipulated for easier mounting of the implement. The latch re-engages to lock the link when the tractor is reversed.



Linkage kits supplied after January 1984 have draft links that are equipped with quick release ball hitches and linkage drop stops.

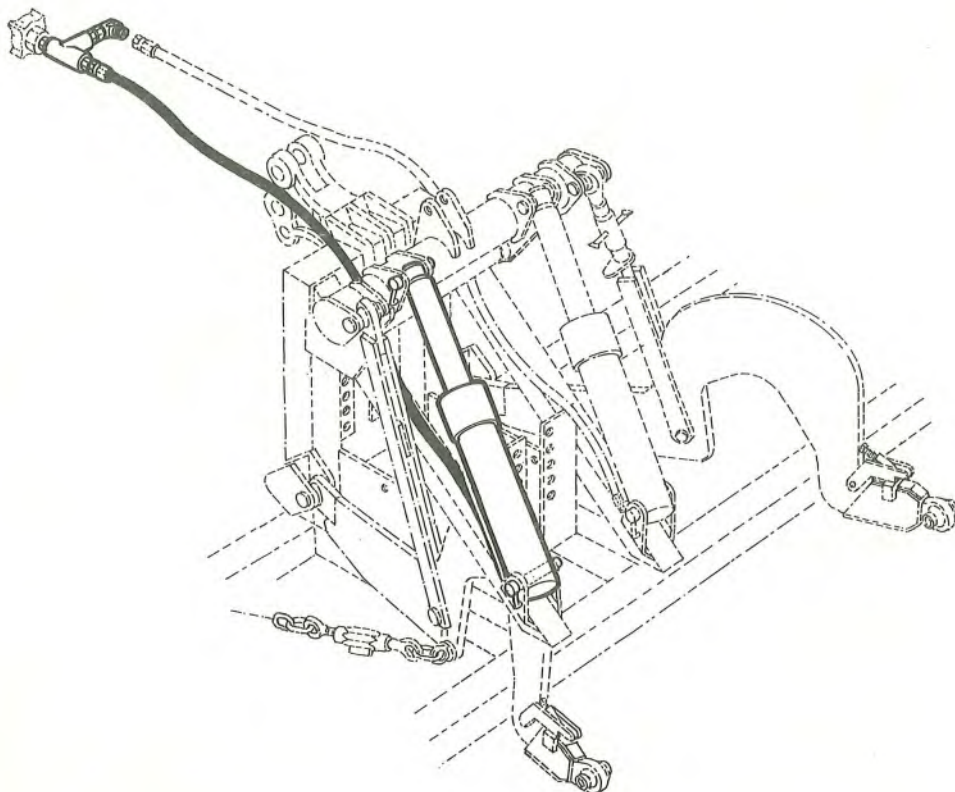
The drop stops bolt on to the inside face of the draft link and by inverting, give two fixed height working positions for the link ends. It is also advantageous as the combination can be lifted at the end of the row using just the tractor's linkage without altering the existing alignment of the P.T.O. shaft.

For hitching the implement or for operating without stops the top bolt can be loosened, the bottom one removed and the stop pivoted down and out of the way. The bottom bolt is replaced which then acts as a latch to prevent the stop swinging back into a 'foul' position.

c) Hydraulic lift assister ram (optional)

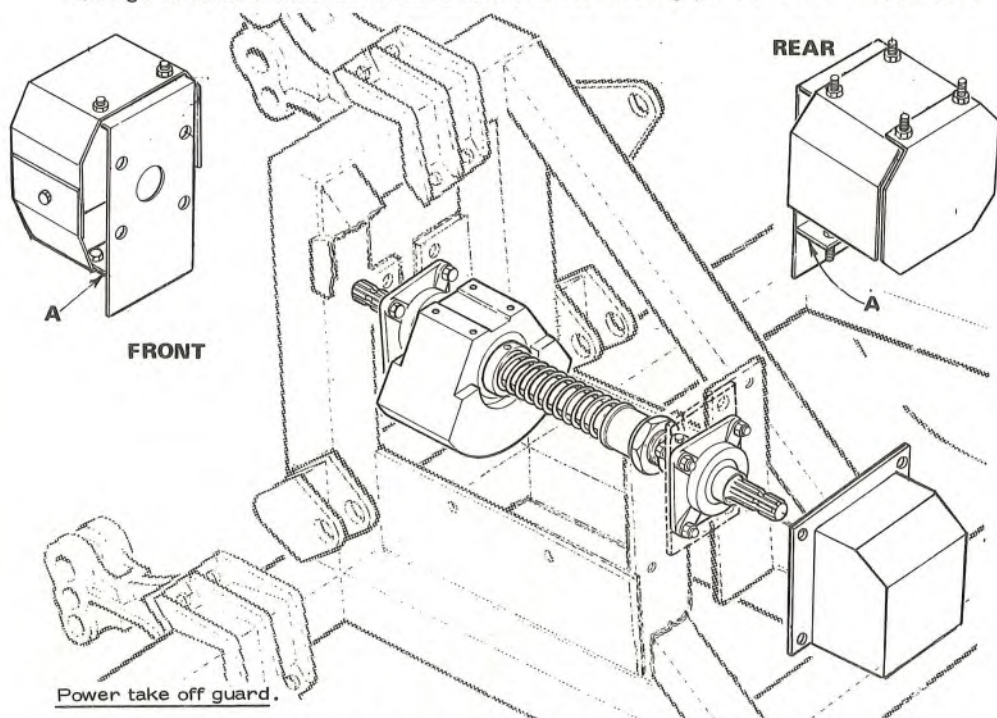
On the 4.5 metre frame only, additional lugs are welded to accommodate an assister ram when an extra heavy implement is to be mounted. The extra hydraulic hose required is junctioned into the initial supply with a 'Tee' piece.

It should be noted that all linkage rocker shafts are provisioned for accepting the rod end of an extra ram leaving it for the customer to weld additional lugs to the frame if it is envisaged that a very heavy implement is to be attached to any of the alternative frames.



d) Power-driven implements

Great care should be taken when using a power driven implement behind the Commando that the implement's drive shaft is not subjected to acute angles when in motion. The tractor's p.t.o. shaft must be disengaged before lifting the unit on the linkage. To accommodate a variation in shaft operating heights for different implements the whole of the through-drive assembly can be raised or lowered by means of a range of adjustment holes on the vertical mounting plates. Caution should also be exercised that the implement's drive shaft does not 'bottom out' when raised to its maximum on the linkage (See Section II Para. 6 "Power take-off drive".) Also check the full range of operation of the linkage to ensure that the drive shaft does not foul any part of either implement.



At all times when an auxilliary implement is not in use the stub shaft guard should be secured in position.

When operating auxilliary equipment the following applies.

Commandos Pre 1984

The stub shaft guard is removed and replaced by the cone guard supplied with the linkage kit.

Commandos from Jan. 1984

The rear section of the stub shaft guard is removed. As shown the guard is suitable for the central and top mounting positions of the through drive shaft. For the lower position the guard mounting plate is inverted and the top guard assembled on secondary flange 'A' provided. Remember these guards are a legal requirement and no account should the commando be used on its own or in a combination without the relevant guards securely in position.

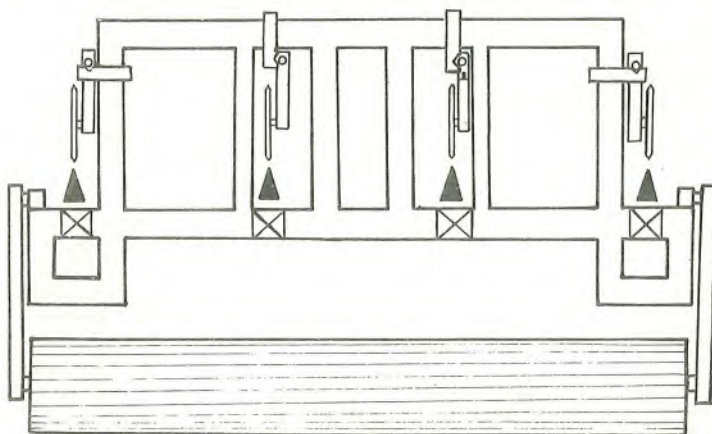
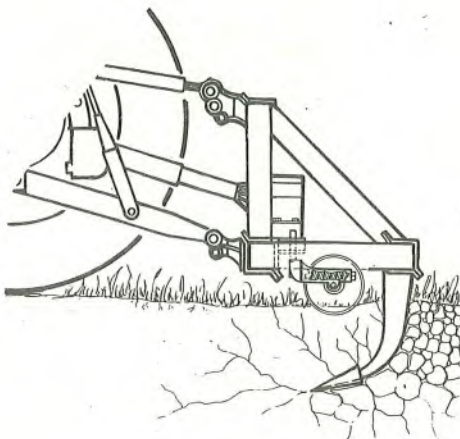
Illustration Note.

Shown is pre 1984 through drive. Machines after January 1984 will have a shorter through drive shaft with a shorter spring and the rear bearing and bearing backing block inboard of the through drive mounting plate.

A revised stub shaft guard to accommodate new P.T.O. regulations will be supplied as spares and original equipment. See insets.

11. Turf discs

Spring loaded turf discs which are supplied as an option are available, when it is desired to create a minimal surface disturbance in pasture land. The normal application is to mount the discs on the front toolbar in a position where they will slice the turf immediately in front of the following shank.

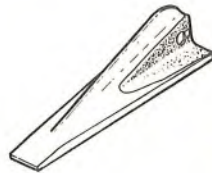


Turf discs are normally used with a roller. It is not possible to use the outermost disc mounting position with wheels installed. A typical arrangement of four discs and shanks on a 3 metre frame is shown above. Up to six discs and shanks can be used on a 4.5 metre frame.

In some circumstances it is possible to fit a disc in the centre, but in this position clearance beneath the frame is limited, so that the maximum working depth would be reduced.

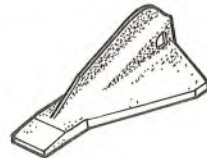
12. 'Long-Life' points

Abrasive soils, i.e., those that contain a high proportion of flint or sharp sand, reduce the working life of the points and shanks. An armour coated point has been developed to effectively increase the operational life by two to three times. Long-life points, though more expensive than the standard type can show a real cost saving in these conditions.



13. Power Point

These are an alternative to either the standard or long life digging point. The extra metal used in the casting together with the shorter point which resists breaking when coming into contact with an obstacle gives this point a working life similar to the long life while the winged design provides a greater lift to the ground coupled with a more complete shattering of the soil profile. This can be beneficial when either working shallow where, with ordinary points the soil disturbance areas would not otherwise overlap or by enabling the operator to reduce the number of shanks whilst maintaining the same coverage.



14. Shin guards

Used for the same reason as the long-life points, shin guards can be strapped to the leading edge of the shank. They are easily fitted or removed after releasing the point and removing the nut and bolt that secures them at the top of the shank.



CAUTION

The shanks are made from an extremely tough abrasive resistant steel and are subjected to a special heat treatment during manufacture. Do not attempt to hard face or otherwise weld the shank which would destroy these properties. Owners are reminded that no warranty can be entertained on shanks that show evidence of welding.

Shin guards which can be supplied as an option are made of a special hard steel which will readily accept hard-face welding reinforcement.

SECTION 4

1. Service and Maintenance

Maintenance of the Commando is limited to annually cleaning and re-packing the wheel bearings with grease, regularly checking the points for security and the clamp bolts for tightness.

2. Power take-off shaft

The pto drive shaft should be regularly examined to ensure that it is in good condition together with the guards. The universal joints should be greased daily and the grease point on the hub of the torque overload device should be greased sparingly (one shot weekly).

The two halves of the plastic guard should be checked daily to ensure that they can spin freely on the shaft. The nylon slip rings which support the guard on the drive shaft should be lightly greased at weekly intervals. Alternatively, the rings can be oiled daily through an access hole in the cover.

To gain access to the slip ring, rotate the white plastic slot head fastener one half turn with a coin to separate the guard from the collar.

The telescopic drive shaft should be similarly separated and grease applied to the internal shaft at approximately 20 hour intervals. Periodically the shafts should be cleaned off and re-lubricated if contamination with dust becomes severe. Failing to observe this precaution could lead to telescopic seizure with resulting damage to the vibrator unit.

3. Vibrator Unit

There are three types of vibrator unit currently in service.

- a) Rubber bushed type Fitted to the Series I Commando only. The rubber bushes should be frequently checked to ensure that they are in good condition. The ball bearings within the vibrator should be washed out and repacked with fresh grease annually. Stripping the vibrator unit may be more readily understood if reference is made to the exploded view on page 40.

b) Roller bearing type

Again this type is fitted to the Series I Commando only. The rubber bushes have been deleted and taper roller bearings are used. Servicing consists of annually stripping down the unit to wash out and repack the bearings.

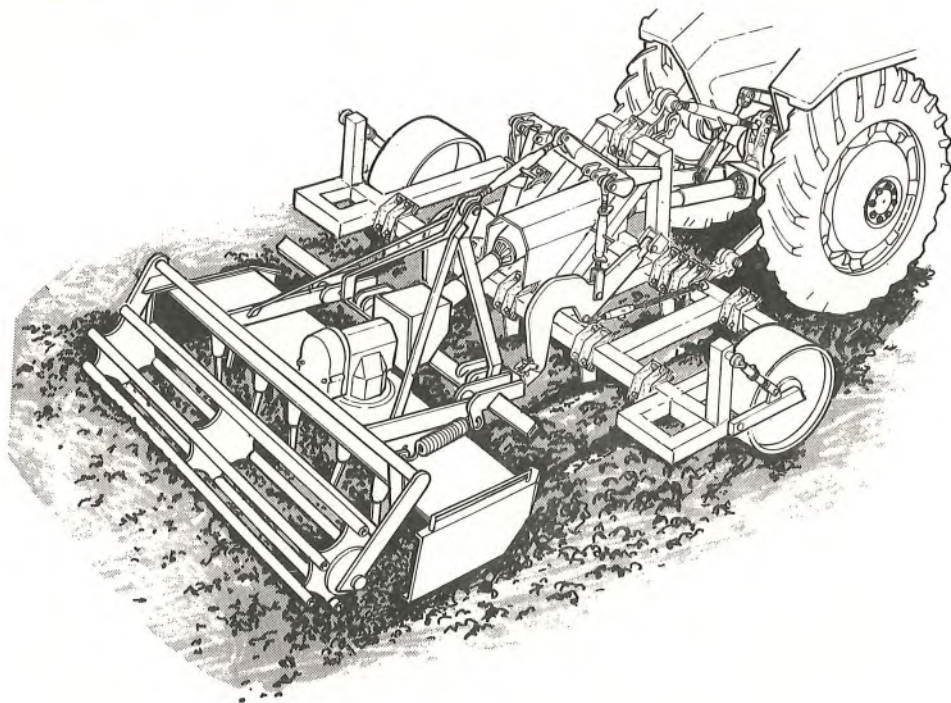
After removal of the vibrator from the frame, release the drive coupling from the front end and remove the hexagon set screw in the centre of the weight. The shaft may then be tapped out to the rear. It is not necessary to disturb the large 1½" hexagon lock nut. When re-assembling, the cavity within the weight should be half filled with grease and the setscrew tightened down sufficiently to eliminate all end-float on the shaft without applying pre-load to the bearings. Secure the setscrew with the tab washer.

- c) Through drive type This unit is used on all Series II machines. The vibrator weight is carried by a shaft mounted in self-aligning sealed ball bearings at each end. The bearings are housed in cast blocks in which the grease fitting is located. Grease passes into an annulus machined in the block from where it is forced into the bearing through a hole in the periphery of the outer race.

CAUTION: It is of the greatest importance that these bearings are greased very sparingly. Excessive grease will blow out the seals and allow dust and dirt to enter the bearing and damage it. Once per season, a single stroke from a small push type domestic grease gun should be sufficient.

The vibrator weight is mounted on the shaft and allowed limited movement by compression of a spring against friction discs. Neither the bushes on which the weight rotates or the friction discs at either end should be lubricated. The tension applied on the friction discs is about right when the spring has been compressed to a length of $5\frac{3}{4}$ " (140 mm) for pre 1984 machines and $2\frac{7}{8}$ " (70mm) for 1984 onwards.

CAUTION: Regularly check the tightness of the through drive mounting bolts. Any movement can elongate the bolt holes and damage the bearing blocks. Tighten to a torque of 200 foot-pounds (275 Newton metres).



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.

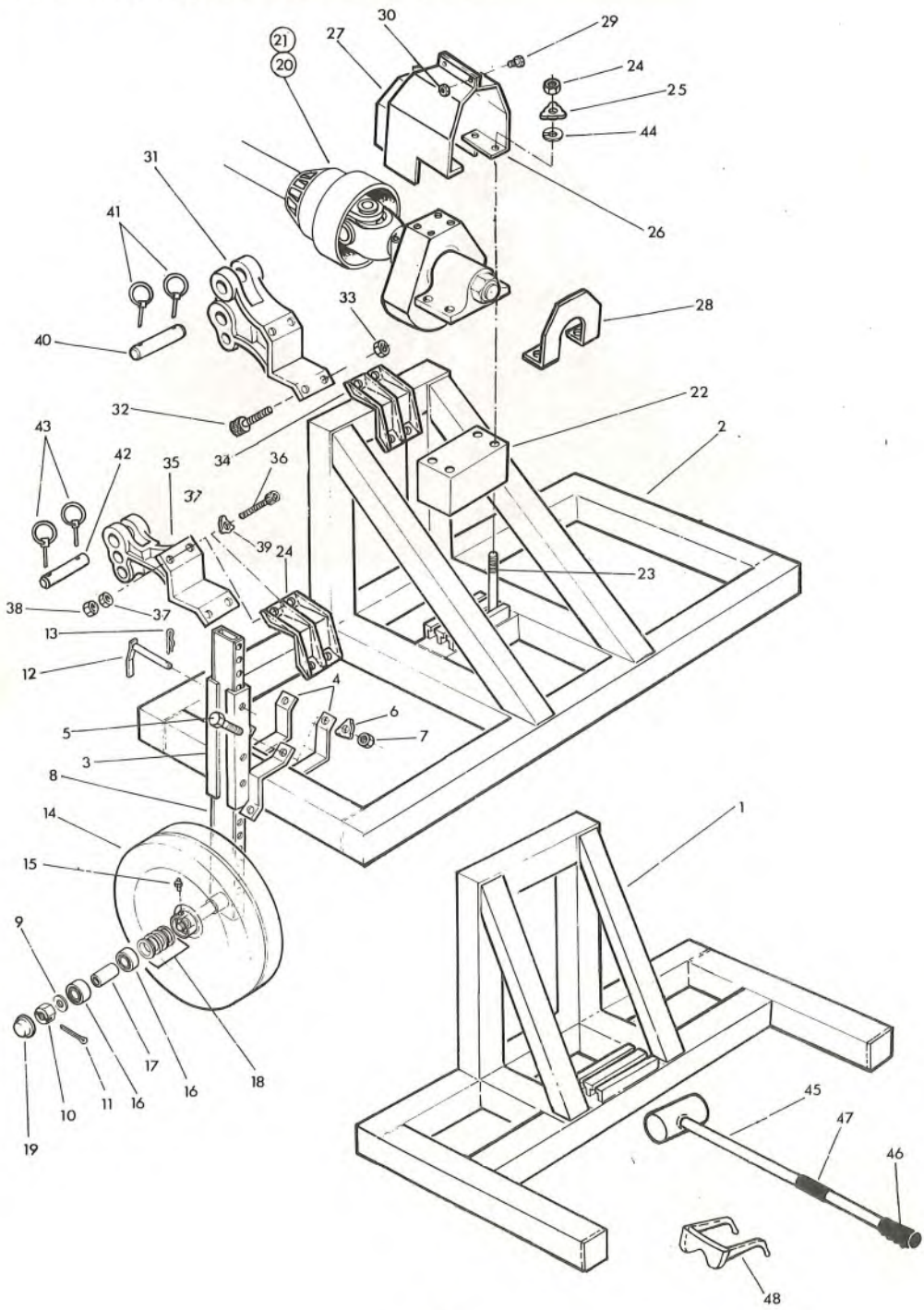
Always quote machine type and serial number as well as the part number.

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

THE DOT SYSTEM

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

1-25 & 1-6 METRE FRAME ASSEMBLIES(Series 1)



Ref	Part No	Qty	Description
-----	---------	-----	-------------

FRAMES AND FITTINGS SERIES I COMMANDO

1	10 65 340	1	1.25 METRE (2 shank frame)
2	10 65 331	1	1.6 METRE (5 shank frame)

The following items are used in conjunction with both frames

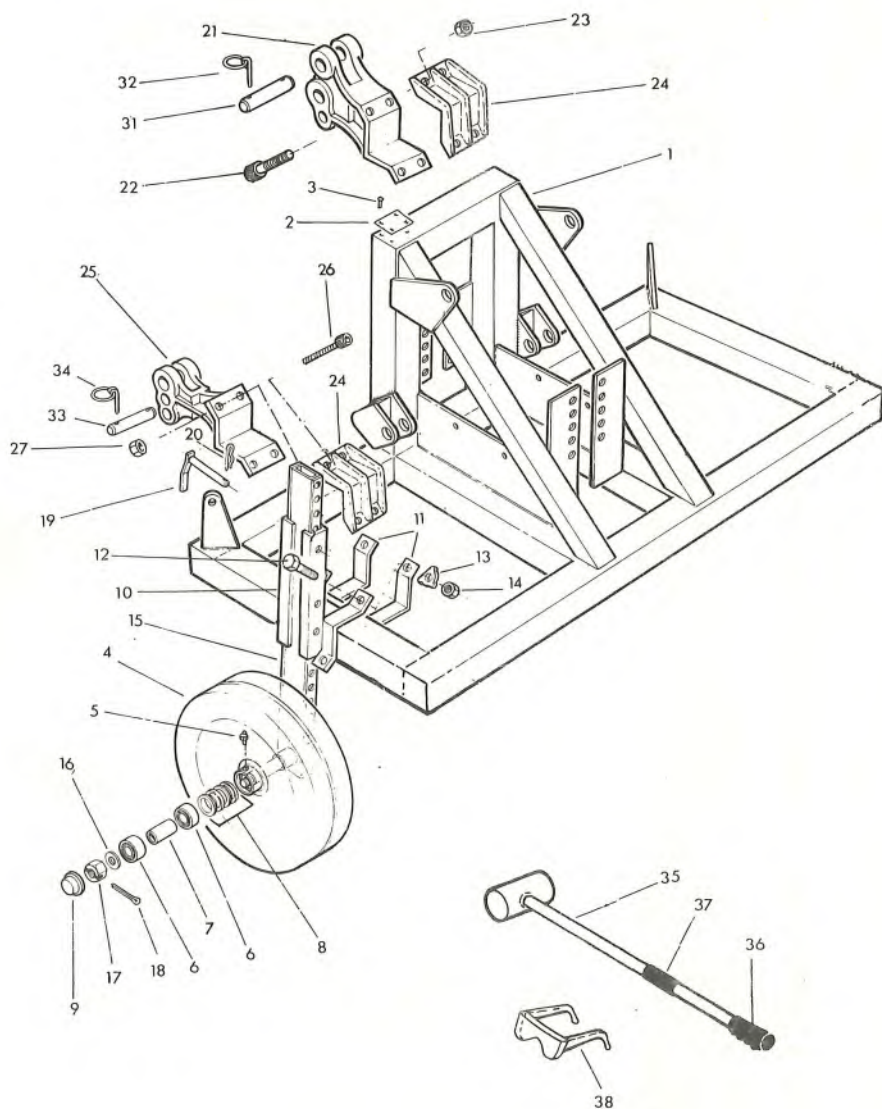
	10 65 337	1	.LAND WHEEL KIT compr:-
3	10 65 293	2	..Leg channel
4	10 65 030	4	..Leg clamp
5	02 00 009	8	..Special bolt 5/8" UNF x 3" long
6	10 65 013	8	..Special washer 5/8" dia.
7	01 41 006	8	..Clevelok nut 5/8" UNF
8	10 65 291	2	..Wheel support c/w stub axle
9	01 00 107	1	...Plain washer
10	01 81 007	1	...Slotted nut 3/4 UNF
11	05 03 125	1	...Split pin
12	10 65 033	2	..Leg pin c/w spring cotter
13	04 31 105	1	...Spring cotter
	10 65 308	2	..Land wheel assembly
14	10 65 309	1	..Wheel c/w greaser
15	10 65 037	1	...Greaser M6
16	06 03 230	2	...Bearing 30 x 62 x 16
17	10 65 034	1	...Bearing spacer
18	10 65 035	1	...Seal assembly
19	10 65 036	1	...Hub cap
* 20	10 65 401	1	.1000 RPM Vibrator unit c/w P.T.O. shaft (see page40)
* 21	10 65 400	1	.540 RPM Vibrator unit c/w P.T.O. shaft (see page40)
22	10 65 259	1	.Vibrator mounting block
23	02 00 011	4	.Vibrator mounting bolt 5/8" UNF x 5" long
24	10 65 292	2	.Hitch bracket clamp
25	10 65 013	8	.Special washer 5/8" dia.
26	10 65 271	1	.Vibrator guard R. Hand half
27	10 65 272	1	.Vibrator guard L. Hand half
28	10 65 326	1	.Vibrator guard rear
29	03 11 041	3	.Setscrew 1/4" UNF x 1/2" long
30	01 41 001	3	.Aeronut 1/4" UNF
31	10 65 584	1	.Top hitch bracket c/w screw, nuts etc
32	02 00 012	4	..Bolt 3/4 UNF x 2 1/4" long.
33	01 41 007	4	..Nut 3/4" UNF self locking
34	10 65 276	1	.Clamp - top hitch bracket.
35	10 65 480	2	.Lower Hitch bracket c/w screws, nuts etc
36	92 00 009	4	..Capscrew - socket headed M16 x 70
37	91 43 007	4	..Self locking nut M16
38	91 13 007	4	..Plain nut M16
39	10 65 077	4	..Special washer 5/8 dia.
40	10 65 027	1	.Top link hitch pin Cat. II c/w linch pins.
41	04 31 217	2	..Linch pins.
42	10 65 020	2	.Draft link hitch pin Cat. II c/w linch pin
43	04 31 217	2	..Linch pin
44	01 00 206	4	..Spring washer 5/8 " dia.
45	10 65 518	1	.Hammer c/w grips.
46	10 65 173	1	..Grip - moulded
47	10 65 129	1	..Grip - plain
48	10 65 246	1	..Safety glasses.

* Alternative vibrator assemblies and drive shafts are:-

10 65 325	1	.Vibrator unit 1000 RPM	} See Page 41
10 65 330	1	.Drive shaft 1000 RPM	
10 65 324	1	.Vibrator unit 540 RPM	
10 65 285	1	.Drive shaft 540 RPM	

1.0 METRE FRAME ASSEMBLY (Series 2)

2.0 METRE FRAME ASSEMBLY (Series 2)

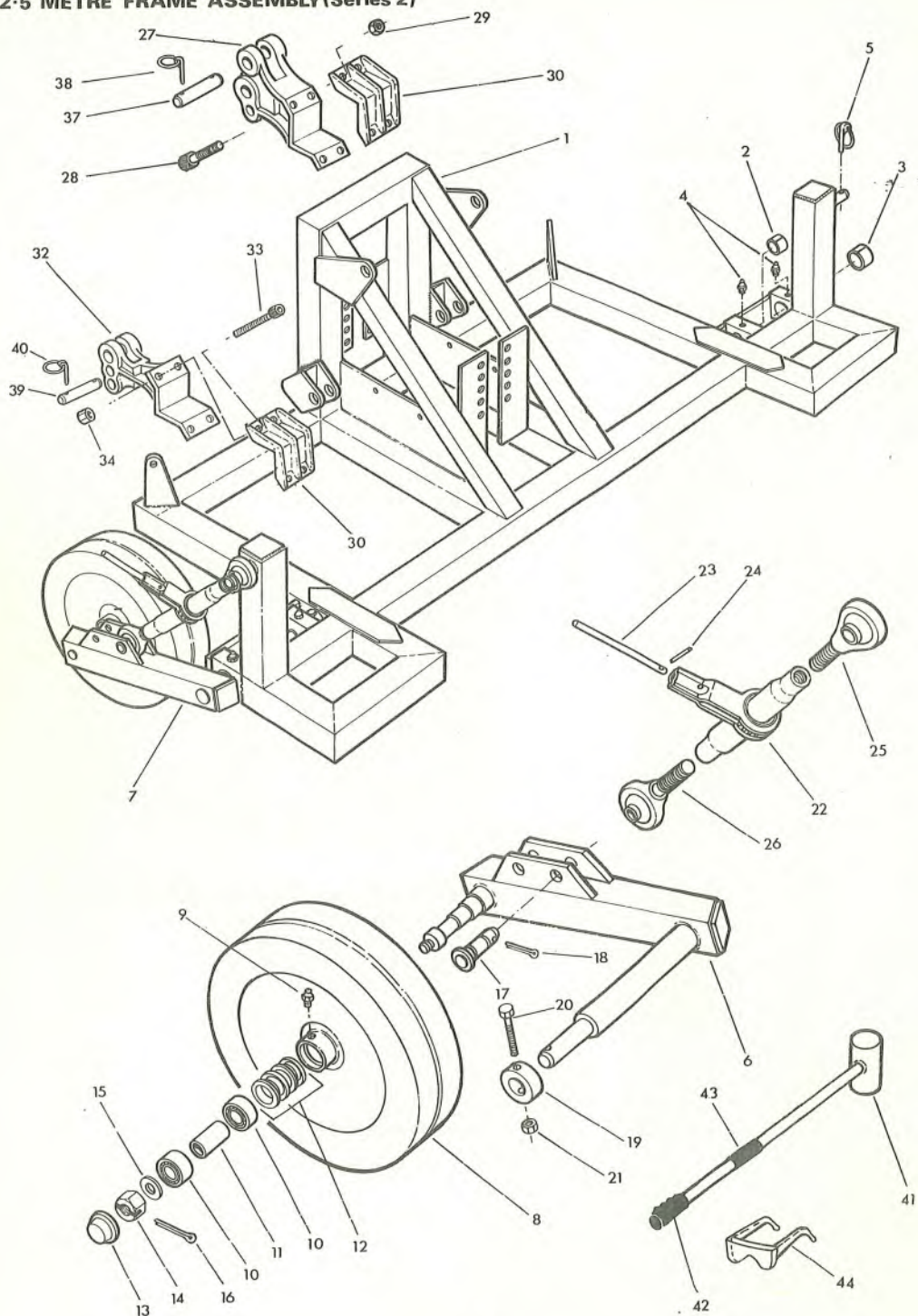


Ref	Part No.	Qty	Description
1	10 65 688	1	2.0 METRE FRAME ASSY SERIES II
	10 65 689		.Frame
1	10 65 682	1	1.6 METRE FRAME ASSY. SERIES II
	10 65 683		.Frame.

The remaining items are common to both frame assemblies.

2	13 35 246	1	..Serial plate
3	28 00 020	4	..Rivet 1/8" dia.
	10 65 337	1	.Wheel kit compr:-
	10 65 308	2	..Wheel assembly compr:-
4	10 65 309	1	...Wheel c/w greaser
5	10 65 037	1	...Greaser M6
6	06 03 230	2	...Bearing 30 x 62 x 16
7	10 65 034	1	...Bearing spacer
8	10 65 035	1	...Seal assembly
9	10 65 036	1	...Hub cap.
10	10 65 293	2	..Leg channel
11	10 65 030	4	..Leg clamp
12	02 00 009	8	..Special bolt 5/8 UNF x 3" long.
13	10 65 013	8	..Special washer
14	01 41 006	8	..Self locking nut 5/8" UNF
15	10 65 291	2	..Wheel support c/w stub axle
16	01 00 107	1	...Plain washer
17	01 81 007	1	...Slotted nut 3/4" UNF
18	05 03 125	1	...Split pin
19	10 65 033	2	..Leg pin c/w spring cotter
20	04 31 105	1	...Spring cotter
21	10 65 584	1	..Top hitch bracket c/w screws & nuts.
22	02 00 012	4	...Bolt 3/4" UNF x 2 1/4" long.
23	01 41 007	4	...Self locking nut 3/4" UNF
24	10 65 276	3	..Clamp
25	10 65 686	2	..Bottom hitch bracket c/w screw & nuts
26	02 00 012	4	...Bolt 3/4" UNF x 2 1/4" long
27	01 41 007	4	...Self locking nut 3/4" UNF
31	10 65 027	1	..Top link pin c/w linch pin
32	04 31 217	2	...Linch pin
33	10 65 020	2	..Draft link pin c/w linch pin
34	04 31 217	2	...Linch pin
35	10 65 518	1	..Hammer c/w grips
36	10 65 173	1	...Grip - moulded
37	10 65 129	1	...Grip - plain
38	10 65 246	1	..Safety glasses

2.5 METRE FRAME ASSEMBLY (Series 2)



Ref	Part No	Qty	Description
	10 65 436		2.5 METRE FRAME ASSEMBLY SERIES II
1	10 65 476	1	..Frame c/w bushes, greasers etc.
2	72 13 023	2	..Bush
3	10 65 181	2	..Bush
4	09 01 121	4	..Greaser 1/8 BSP - St
5	04 31 217	2	..Linch pin
6	10 65 432	1	..Land wheel kit compr:-
	10 65 489	1	..Land wheel assy. R. Hand
	10 65 487	1	...Wheel arm R. Hand
	10 65 490	1	..Land wheel assembly L. Hand - shown assembled
7	10 65 488	1	...Wheel arm L. Hand

Items 7 to 12 inclusive are common to both land wheel assemblies

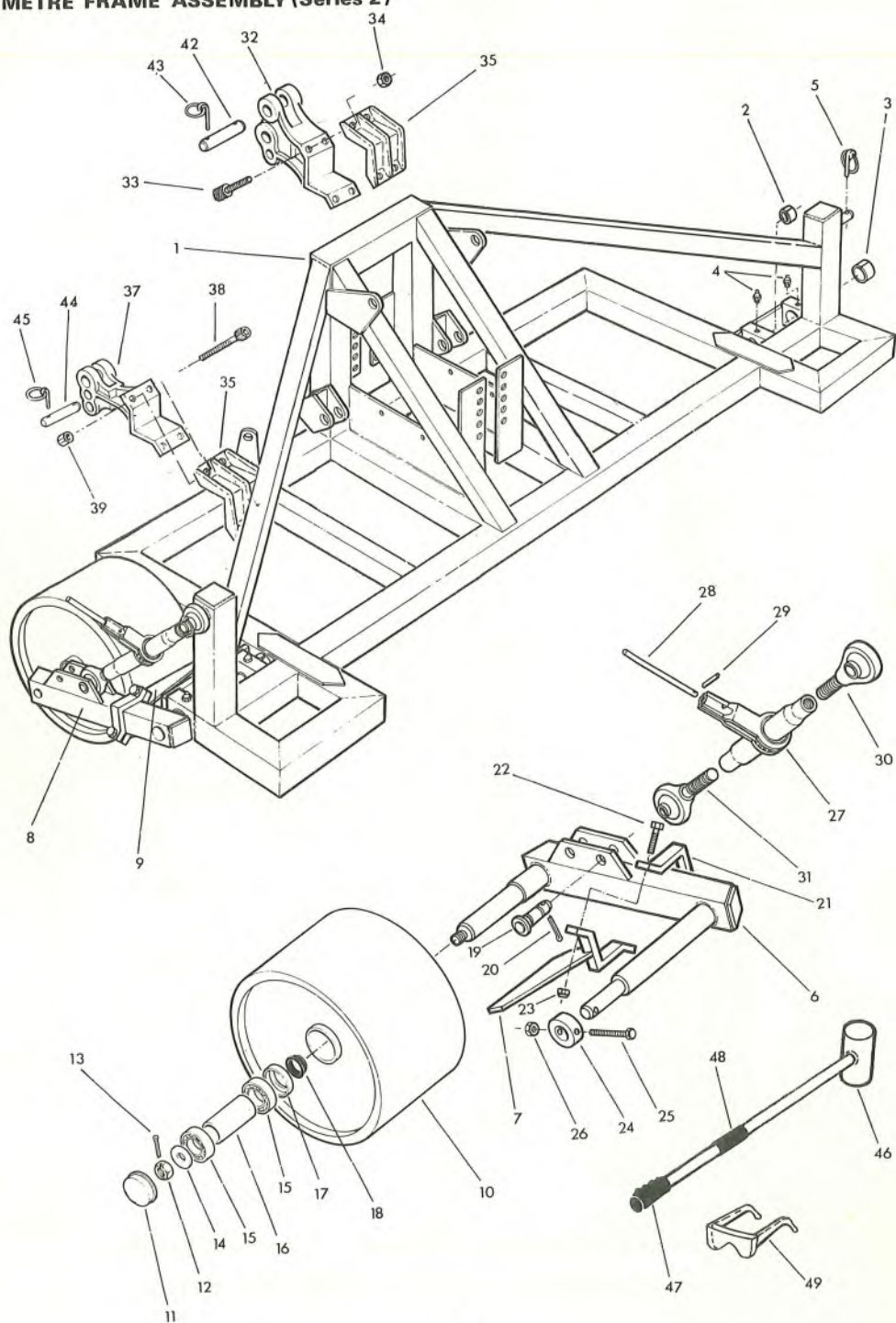
	10 65 308	1	...Land wheel compr:-
8	10 65 309	1	...Wheel c/w greaser
9	10 65 037	1	Greaser M5
10	06 03 230	2	...Bearing 30 x 62 x 16
11	10 65 034	1	...Bearing spacer
12	10 65 035	1	...Seal assembly
13	10 65 036	1	...Hub cap
14	01 81 007	1	...Castellated nut 3/4" UNF
15	01 00 107	1	...Plain washer 3/4" dia
16	05 03 125	1	...Split pin 3/16" dia x 1 1/2" long
17	10 65 212	1	...Shear pin c/w split pin
18	05 03 104		...Split pin 5/32" dia x 1 1/4" long
19	10 65 211	1	...Pivot axle lock ring
20	92 13 145	1	...Bolt M10 x 70
21	91 43 005	1	...'Clevelok nut M10
	10 65 481	2	..Ratchet link assembly
	10 65 188	1	..Tube Ratchet c/w handle
22	10 65 216	1	...Ratchet
23	71 15 217	1	..Handle c/w spring dowel
24	04 21 820	1	...Spring dowel 1/4" dia x 1 1/4" long
25	10 65 189	1	..Ball end Cat 3
26	10 65 190	1	..Ball end Cat I
27	10 65 584	1	..Top hitch bracket c/w screw, nuts etc.
28	02 00 012	4	..Bolt 3/4" UNF x 2 1/4" long.
29	01 41 007	4	..Self locking nut 3/4" UNF
30	10 65 276	3	..Clamp
32	10 65 686	2	..Lower hitch bracket c/w screw nuts
33	02 00 012	4	..Bolt 3/4" UNF x 2 1/4" long
34	01 41 007	4	..Self locking nut 3/4" UNF
37	10 65 027	1	..Top link hitch pin Cat II c/w linch pins
38	04 31 217	2	..Linch pin
39	10 65 020	2	..Draft link hitch pin Cat II c/w linch pins
40	04 31 217	2	..Linch pin
41	10 65 518	1	..Hammer c/w grips
42	10 65 173	1	..Grip - moulded
43	10 65 129	1	..Grip - plain
44	10 65 246	1	..Safety glasses

SPARES NOTE

- From December 1982 land wheel kit 10 65 432 will be replaced by land wheel kit 10 65 431.

For spare parts and drawings for 10 65 431, see page 36 & 37 items 6 - 26 inclusive.

3 METRE FRAME ASSEMBLY (Series 2)



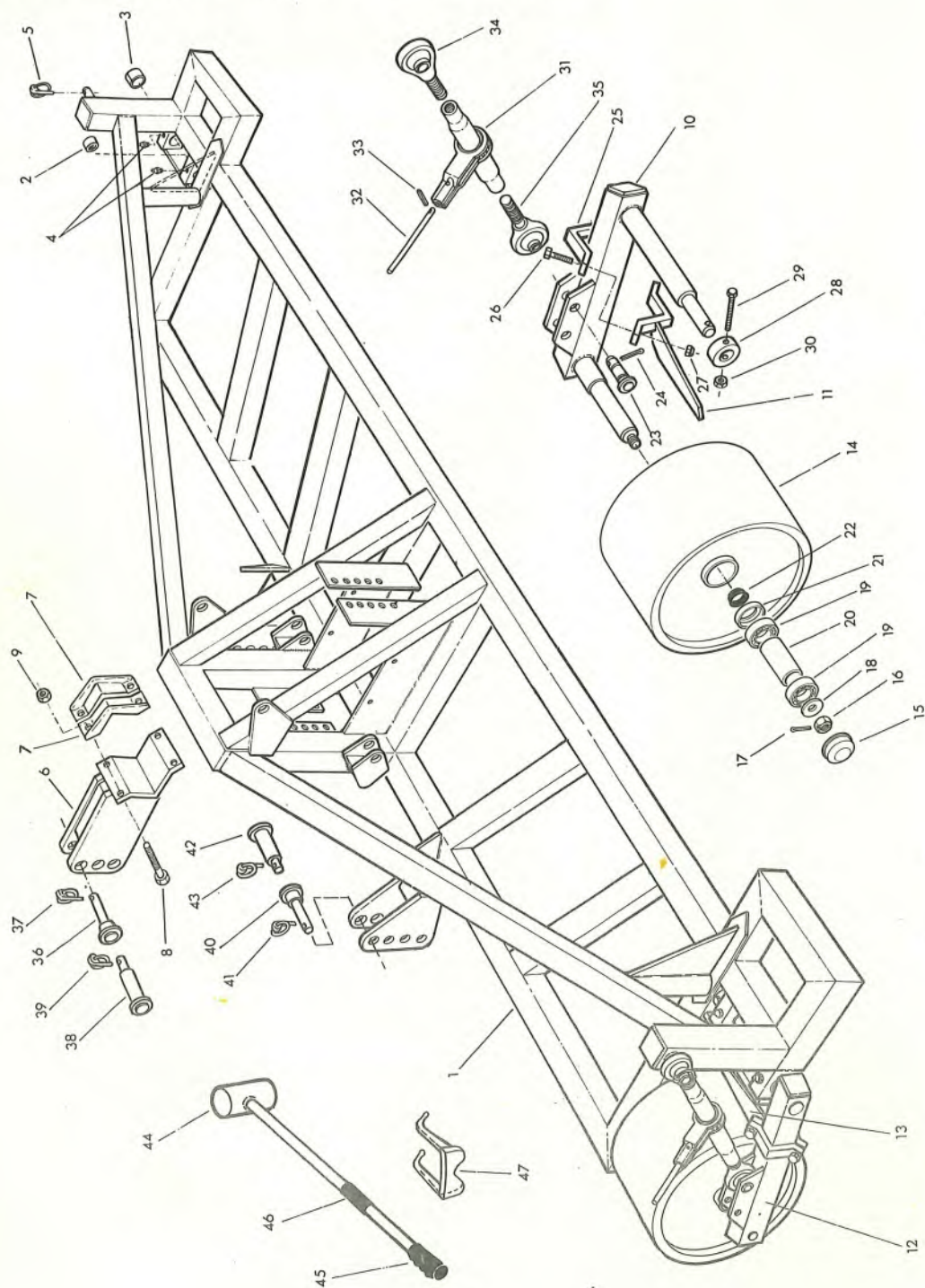
Ref	Part No	Qty	Description
	10 65 437		3 METRE FRAME ASSEMBLY SERIES II
1	10 65 477	1	..Frame c/w bushes, greasers etc
2	72 13 023	2	..Bush
3	10 65 181	2	..Bush
4	09 01 121	4	..Greaser 1/8" BSP - St
5	04 31 217	2	...Linch pin
	10 65 431	1	..Land wheel kit compr:-
	10 65 505	1	..Land wheel assembly R. Hand
6	10 65 501	1	..Wheel arm R. Hand
7	10 65 503	1	..Wheel scraper R. Hand
	10 65 506	1	..Land wheel assembly L. Hand (Shown assembled)
8	10 65 502	1	..Wheel arm L. Hand
9	10 65 504	1	..Wheel scraper

Items 10 to 26 incl. are common to both land wheel assemblies

10	10 65 496	1	..Wheel
11	10 65 215	1	..Hub cap
12	01 72 009	1	..Slotted nut 1" UNC
13	05 03 125	1	..Split pin 3/16" dia x 1½" long
14	10 65 225	1	..Wheel clamp washer
15	06 00 055	2	..Wheel bearing
16	10 65 224	1	..Bearing spacer
17	10 65 226	1	..Seal cap
18	86 29 143	1	..Seal
19	10 65 212	1	..Shear pin c/w split pin
20	05 03 104	1	...Split pin 5/32 dia x 1¼" long
21	10 65 030	1	..Wheel scraper clamp
22	02 00 009	2	..Bolt 5/8" UNF x 3" long
23	01 41 006	2	..'Clevelok' nut 5/8" UNF
24	10 65 211	1	..Pivot axle lock ring
25	92 13 145	1	..Bolt M10 x 70
26	91 43 005	1	.. 'Clevelok' nut M10
	10 65 481	2	..Ratchet link assembly
	10 65 188	1	..Tube Ratchet c/w handle
27	10 65 216	1	...Ratchet 1065188
28	71 15 217	1	...Handle c/w spring dowel
29	04 21 820	1	Spring dowel ¼" dia x 1¼" long
30	10 65 189	1	..Ball end Cat 3
31	10 65 190	1	..Ball end Cat 1
32	10 65 584	1	..Top hitch bracket c/w screw, nuts etc.
33	02 00 012	4	..Bolt ¾ UNF x 2¼" long.
34	01 41 007	4	..Self locking nut ¾ UNF
35	10 65 276	3	..Clamp
37	10 65 686	2	..Lower hitch bracket c/w screws nuts
38	02 00 012	4	..Bolt ¾ UNF x 2¼" long
39	01 41 007	4	..Self locking nut ¾ UNF
42	10 65 027	1	..Top link hitch pin Cat II c/w linch pins
43	04 31 217	2	..Linch pin
44	10 65 020	2	..Draft link hitch pin Cat II c/w linch pin
45	04 31 217	2	..Linch pin
46	10 65 518	1	..Hammer c/w grips
47	10 65 173	1	..Grip - moulded
48	10 65 129	1	..Grip - plain
49	10 65 425	1	..Safety glasses

246

3·7 METRE & 4·5 METRE FRAME ASSEMBLIES (Series 2)



Ref	Part No.	Qty	Description
1	10 65 438		4.5 METRE FRAME ASSEMBLY SERIES II
	10 65 478		.Frame c/w top hitch bushes greasers etc
	10 65 550		3.7 FRAME ASSEMBLY SERIES II
	10 65 552	1	.Frame c/w top hitch, bushes, greasers etc (not illustrated)

Items 2 to 47 inclusive are common to both 3.7 and 4.5M series II frame assys.

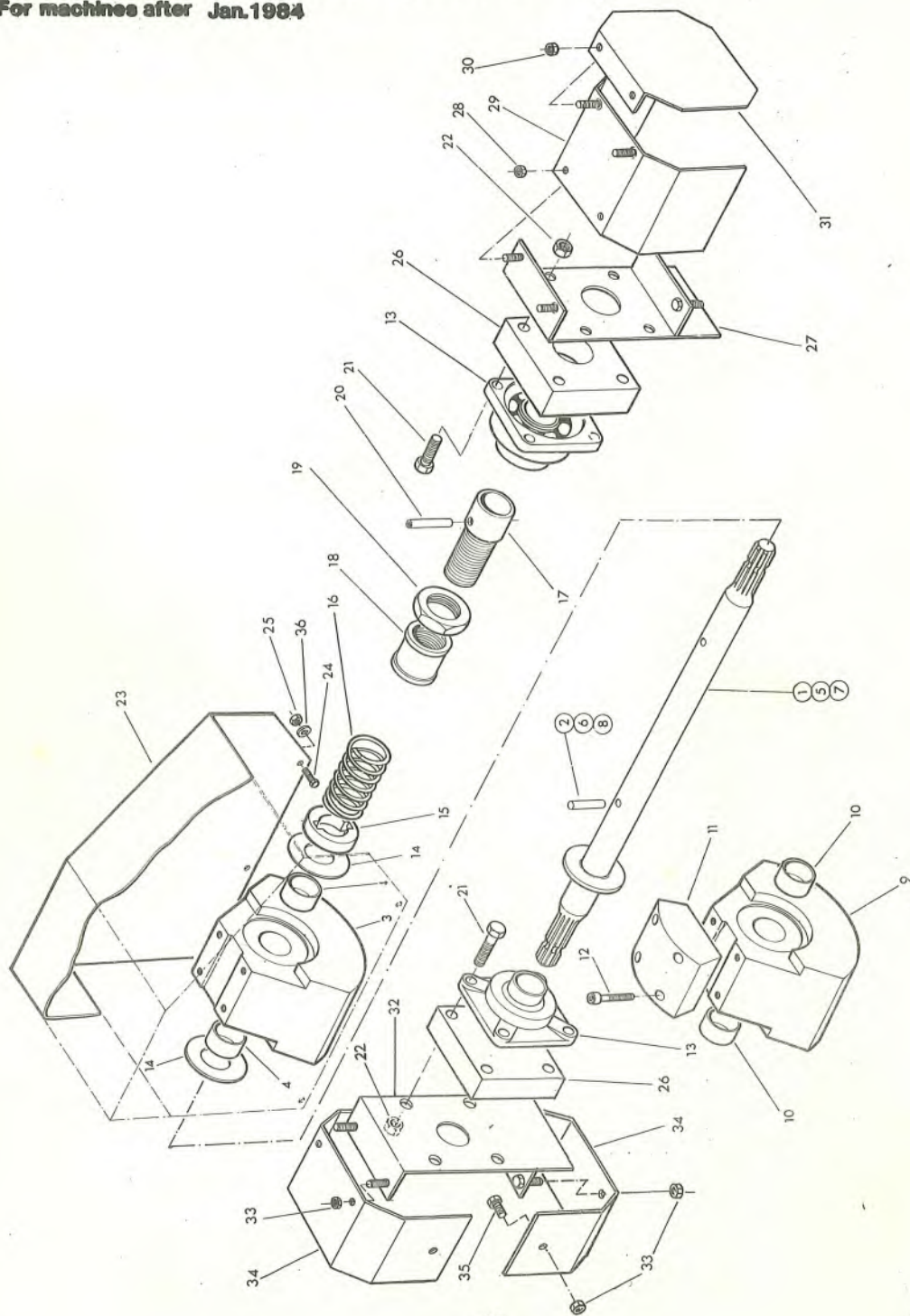
2	72 13 023	2	..Bush
3	10 65 181	2	..Bush
4	09 01 121	4	..Greaser 1/8" BSP - St
5	04 31 217	2	..Linch pin
6	10 65 484	1	..Top hitch bracket.
7	10 66 046	2	..Top hitch bracket clamp
8	02 00 024	4	..Bolt $\frac{3}{4}$ UNF x 4" long
9	01 41 007	4	..Clevelok nut $\frac{3}{4}$ " UNF
	10 65 431	1	..Land wheel kit compr:-
	10 65 505	1	..Land wheel assembly R.Hand.
10	10 65 501	1	..Wheel arm R. Hand.
11	10 65 403	1	..Wheel scraper R. Hand
	10 65 506	1	..Land wheel assembly L.Hand (shown assembled)
12	10 65 502	1	..Wheel arm L.Hand
13	10 65 504	1	..Wheel scraper L.Hand

Items 14 to 30 inclusive are common to both land wheel assemblies.

14	10 65 496	1	...Wheel
15	10 65 215	1	...Hub cap
16	01 72 009	1	...Slotted nut 1" UNC
17	05 03 125	1	...Split pin 3/16" dia x 1 $\frac{1}{2}$ " long
18	10 65 225	1	...Wheel clamp washer
19	06 00 055	2	...Wheel bearing.
20	10 65 224	1	...Bearing spacer
21	10 65 226	1	...Seal cap
22	86 29-143	1	...Seal
23	10 65 212	1	...Shear pin c/w split pin
24	05 03 104	1	...Split pin 5/32" dia x 1 $\frac{1}{4}$ " long
25	10 65 030	1	...Wheel scraper clamp
26	02 00 009	2	...Bolt 5/8" UNF x 3" long.
27	01 41 006	2	...'Clevelok' nut 5/8" UNF
28	10 65 211	1	...Pivot axle lock ring.
29	92 13 145	1	...Bolt M10 x 70
30	91 43 005	1	...'Clevelok' nut M10
	10 65 481	2	..Ratchet link assembly
	10 65 188	1	..Tube Ratchet c/w handle
31	10 65 216	1	...Ratchet
32	71 15 217	1	...Handle c/w spring dowel.
33	04 21 820	1	...Spring dowel $\frac{1}{4}$ " dia x 1 $\frac{1}{4}$ " long
34	10 65 189	1	..Ball end Cat. 3
35	10 65 190	1	..Ball end Cat. 1
36	10 65 196	1	..Top link pin Cat. II c/w linch pin
37	04 31 217	1	..Linch pin
38	10 65 197	1	..Top link pin Cat. 3 c/w linch pin
39	04 31 217	1	..Linch pin
40	10 65 198	2	..Draft link pin Cat. II c/w linch pin
41	04 31 217	1	..Linch pin
42	10 65 199	2	..Draft link pin Cat. 3 c/w linch pins
43	04 31 217	1	..Linch pin
44	10 65 518	1	..Hammer c/w grips
45	10 65 173	1	..Grip - moulded
46	10 65 129	1	..Grip - plain
47	10 65 426	1	..Safety glasses.

SHORT THROUGH DRIVE SHAFT ASSEMBLY (Series 2)

For machines after Jan. 1984



Ref	Part No.	Qty	Description
-----	----------	-----	-------------

THROUGH DRIVE ASSEMBLIES FOR SERIES II COMMANDO

	10 65 606		THROUGH DRIVE ASSEMBLY 540 RPM
1	10 65 585	1	..Through drive shaft c/w pin
2	10 65 136	1	..Drive pin
3	10 65 455	1	..Flywheel c/w bushes
4	60 00 160	2	..Bush
	10 65 665	1	..P.T.O. shaft assy. not illustrated
	10 65 607		THROUGH DRIVE ASSEMBLY 1000RPM 1 3/8 dia.
5	10 65 586	1	..Through drive shaft c/w pin
6	10 65 136	1	..Drive pin
	10 65 666	1	..P.T.O Shaft assy not illustrated
	10 65 608		THROUGH DRIVE ASSEMBLY 1000 RPM 1 3/8 dia.
7	10 65 587	1	..Through drive shaft c/w pin
8	10 65 136	1	..Drive pin
	10 65 667	1	..P.T.O. shaft assembly - not illustrated.

EARLY SHAFT
1065358

Items 9 - 12 incl. are common to both 1000 RPM through drives.

9	10 65 456	1	..Flywheel c/w bushes, counter weight and set screws
10	60 00 160	2	..Bush
11	10 65 457	1	..Counterweight.
12	02 42 183	4	..Socket head capscrew 3/8 UNC x 2 1/4" long

The following items are common to all through drive assemblies.

13	06 00 054	2	..Flange bearing.
14	10 65 135	2	..Clutch disc.
15	10 66 050	1	..Drive collar
16	10 66 015	1	..Spring
17	10 66 014	1	..Sleeve
18	10 65 144	1	..Socket 2" BSP
19	10 65 147	1	..Locknut 2" BSP
20	04 46 165	1	..Spring dowel ϕ 10 x 65
21	02 11 226	8	..Bolt 5/8 UNF x 2 1/4" long
22	01 41 006	8	..Cleveland' nut 5/8" UNF
23	10 65 466	1	..Top guard.
24	03 11 063	6	..Setscrew 3/8 UNF x 3/4" long.
25	01 41 003	6	..Self locking nut 3/8 UNF
26	10 65 532	2	..Bearing backing plate.
	10 65 628	1	..Rear guard assembly compr:
27	10 66 026	1	..Mounting plate c/w nuts.
28	01 41 003	2	..Self locking nuts 3/8" UNF
29	10 65 626	1	..Top guard c/w nuts.
30	01 41 003	2	..Self locking nuts 3/8 UNF
31	10 66 027	1	..End plate
	10 65 465	1	..Front guard assembly compr:
32	10 66 026	1	..Mounting plate
33	01 41 003	6	..Self locking nuts 3/8 UNF
34	10 65 626	2	..Top guard
35	03 11 063	2	..Bolt. 3/4 ins long x 3/8" UNF
36	01 00 103	6	..Plain washer 3/8" dia.

CONVERSION KIT FROM 540 RPM to 1000RPM 1 3/8 x 21 spline.

	10 65 609		CONVERSION KIT compr:
	10 65 666		..P.T.O shaft assembly (not illustrated)
5	10 65 586		..Through drive shaft c/w drive pin
6	10 65 136		..Drive pin
11	10 65 457		..Counterweight.
12	02 42 183		..Socket head capscrew 3/8 UNC x 2 1/4" long

* Assemble collar, item 15, with the machined face in contact with the clutch friction disc, item 14.

■ Bearing flange bolts to be tightened to 200lbs/Ft (271Nm)

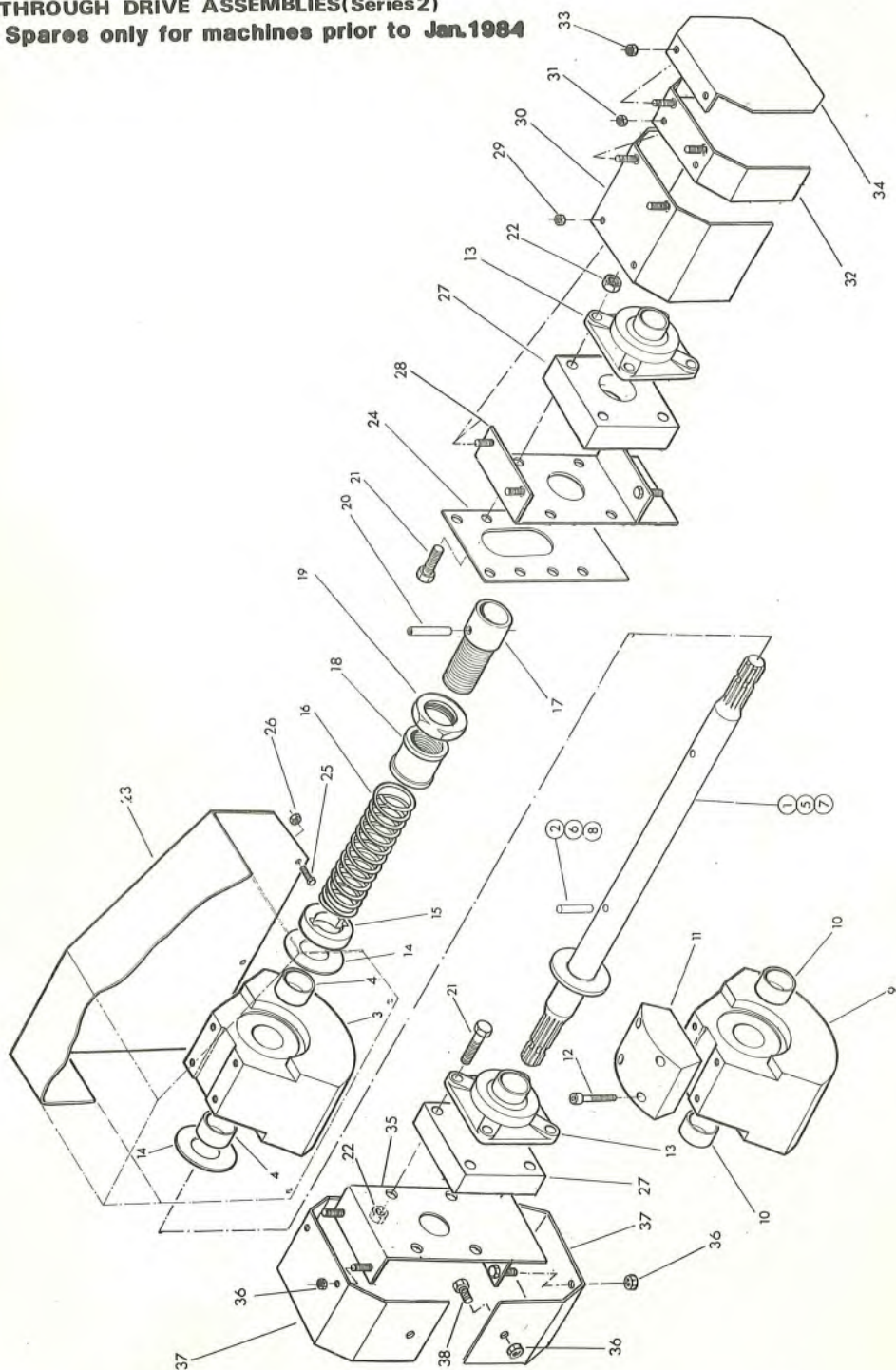
⊙ Assemble machined face of bearing backing plate, item 32 in contact with the bearing flange item 13.

+ Peen holes in item 17, sleeve, to retain roll pin securely.

□ T0-65-145 Before May 1984

P.T.O GAUDD 1065546

THROUGH DRIVE ASSEMBLIES (Series 2)
Spares only for machines prior to Jan. 1984



Ref	Part No	Qty	Description
THROUGH DRIVE ASSEMBLIES FOR SERIES II COMMANDO			
	10 65 433		THROUGH DRIVE ASSEMBLY 540 RPM
1	10 65 458	1	..Through drive shaft c/w pin
2	10 65 136	1	..Drive pin
3	10 65 455	1	..Flywheel c/w bushes
4	60 00 160	2	..Bush
⑤	10 65 665	1	..P.T.O. shaft assy. not illustrated
	10 65 434		THROUGH DRIVE ASSEMBLY 1000 RPM 1 3/8 dia.
5	10 65 459	1	..Through drive shaft c/w pin
6	10 65 136	1	..Drive pin
⑤	10 65 666	1	..P.T.O. Shaft assy not illustrated
	10 65 453		THROUGH DRIVE ASSEMBLY 1000 RPM 1 3/8" dia.
7	10 65 460	1	..Through drive shaft c/w pin
8	10 65 136	1	..Drive pin
⑤	10 65 667	1	..P.T.O. shaft assembly - not illustrated
Items 9 to 12 incl. are common to both 1000 RPM through drives			
9	10 65 456	1	..Flywheel c/w bushes, counter weight & set screws
10	60 00 160	2	..Bush
11	10 65 457	1	..Counterweight
12	02 42 183	4	..Socket head capscrew 3/8 UNC x 2 1/4" long
The following items are common to all through drive assemblies			
13	06 00 054	2	..Flange bearing
14	10 65 135	2	..Clutch disc
15	10 65 145	1	..Drive collar
16	60 05 013	1	..Spring
17	10 65 143	1	..Sleeve
18	10 65 144	1	..Socket 2" BSP
19	10 65 147	1	..Locknut 2" BSP
* 20	04 46 165	1	..Spring dowel Ø 10 x 65
* 21	02 11 206	8	..Bolt 5/8 UNF x 2 1/2" long
22	01 41 006	8	.. 'Clevelock' nut 5/8" UNF
23	10 65 466	1	..Top guard.
24	10 65 148	1	..Rear cover plate
25	03 11 063	6	..Setscrew 3/8 UNF x 3/4" long
26	01 41 003	6	..Self locking nut 3/8 UNF
27	10 65 532	2	..Bearing backing plate
⑤	10 65 467	1	..Rear guard assembly compr.
28	10 66 026	1	..Mounting plate c/w nuts.
29	01 41 003	2	...Self locking nuts 3/8" UNF
30	10 65 626	1	..Top guard c/w nuts.
31	01 41 003	2	...Self locking nuts 3/8 UNF
32	10 65 627	1	..Top extension c/w nuts.
33	01 41 003	2	...Self locking nuts 3/8" UNF
34	10 66 027	1	..End Plate
⑤	10 65 465	1	..Front guard assembly compr.
35	10 66 026	1	..Mounting plate c/w nuts.
36	01 41 003	6	..Self locking nuts 3/8 UNF
37	10 65 626	1	..Top guard c/w nuts.
38	03 11 063	2	..Setscrew 3/4" long 3/8 UNF
OPTIONAL EXTRA FOR SERIES II THROUGH DRIVE			
CONVERSION KIT FROM 540 RPM to 1000 RPM 1 3/8 x 21 spline			
	10 65 435		CONVERSION KIT compr:-
⑤	10 65 666		..P.T.O. shaft assembly (not illustrated)
5	10 65 459		..Through drive shaft c/w drive pin
6	10 65 136		..Drive pin
11	10 65 457		..Counterweight
12	02 42 183		..Socket head capscrew 3/8" UNC x 2 1/4" long

* Part numbers for through drive assemblies previous to mid-September 1982 were identical to the above with the following exceptions.

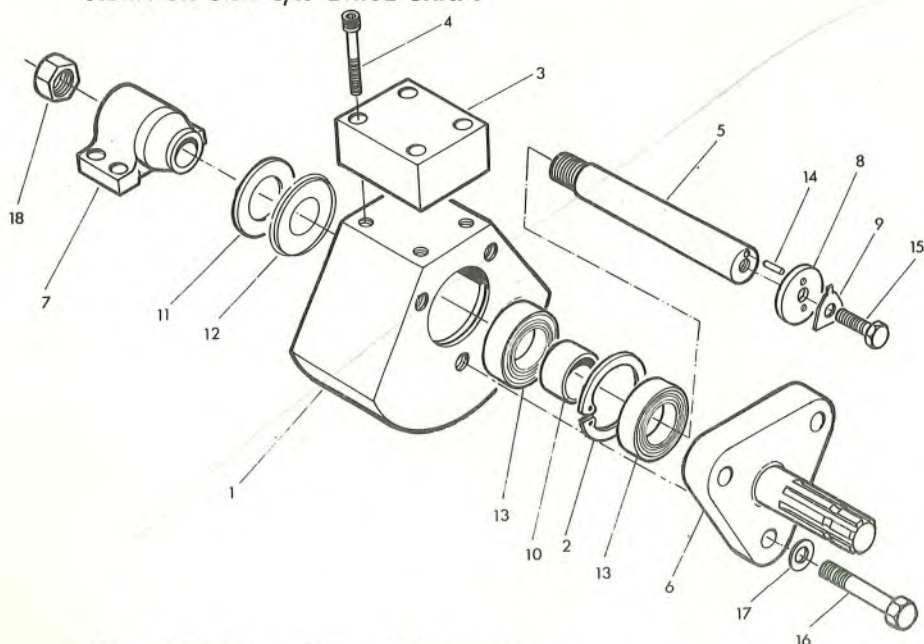
Item 20 Spring dowel Ø 10 x 65 was 02 11 263 Bolt 3/8 UNF x 3 1/4" long c/w nut 01 43 003 self locking nut 3/8 UNF.
Item 21 Bolt 02 11 206 5/8 UNF x 2 1/2" long was 02 11 146 5/8 UNF x 1 3/4" long.
Item 32 deleted.

If spring dowel 04 46 165 is used the edges of the hole must be peened to retain the spring dowel.

⑤ Spares Note.

New P.T.O shaft safety regulations incorporating stronger, larger guards has resulted in redesigning the through drive front and rear guards. The new guards are interchangeable and will be supplied as spares for both new and old P.T.O. shaft specifications.

VIBRATOR UNIT c/w DRIVE SHAFT

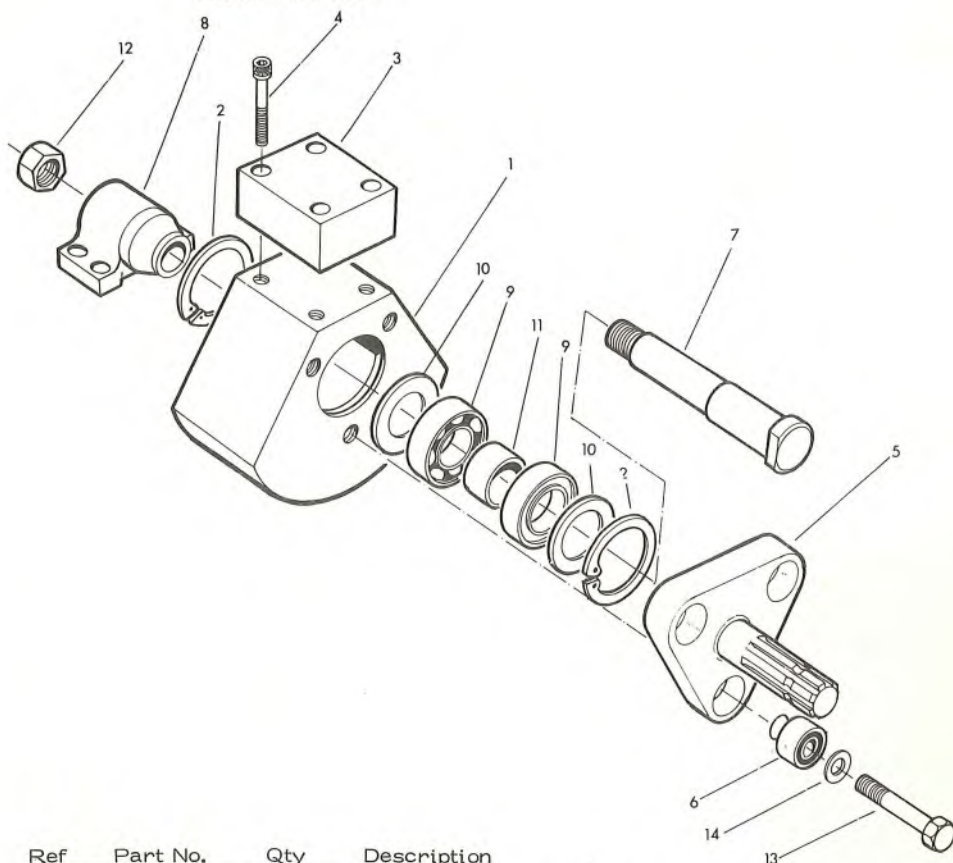


Ref	Part No.	Qty	Description
	10 65 400		SHAKAERATOR UNIT 540 RPM c/w DRIVE SHAFT.
	10 65 343	1	..Drive shaft assembly (not illustrated)
	10 65 402	1	..Vibration unit 540 rpm
1	10 65 405	1	..Flywheel c/w circlip
2	10 65 012	1	...Circlip
	10 65 401		SHAKAERATOR UNIT 1000 RPM c/w DRIVE SHAFT
	10 65 330	1	..Drive shaft assembly (not illustrated)
	10 65 403	1	..Vibration unit 1000 rpm
1	10 65 406	1	..Flywheel c/w counterweight and circlip
2	10 65 012	1	...Circlip
3	10 65 060	1	...Counterweight
4	02 42 183	4	...Cap screw

The following items are common to both vibration units :-

5	10 65 404	1	..Main shaft
6	10 65 407	1	..Drive coupling
7	10 65 258	1	..Mounting bracket
8	10 65 072	1	..Thrust plate
9	10 65 070	1	..Tab washer
10	10 65 071	1	..Spacer
11	10 65 064	1	..Bearing shield
12	10 65 069	1	..Bearing seal
13	06 00 044	2	..Bearing
14	04 21 612	1	..Spring dowel 3/16" x 3/4" long
15	03 11 127	1	..Hexagon set screw 3/4" UNF x 1.1/2" long
16	02 00 013	3	..Hexagon longlok bolt 7/16" UNC x 2.1/4" long
17	01 00 104	3	..Plain washer
18	01 61 013	1	..Self locking hexagon nut 1.1/2" UNF

VIBRATION UNIT

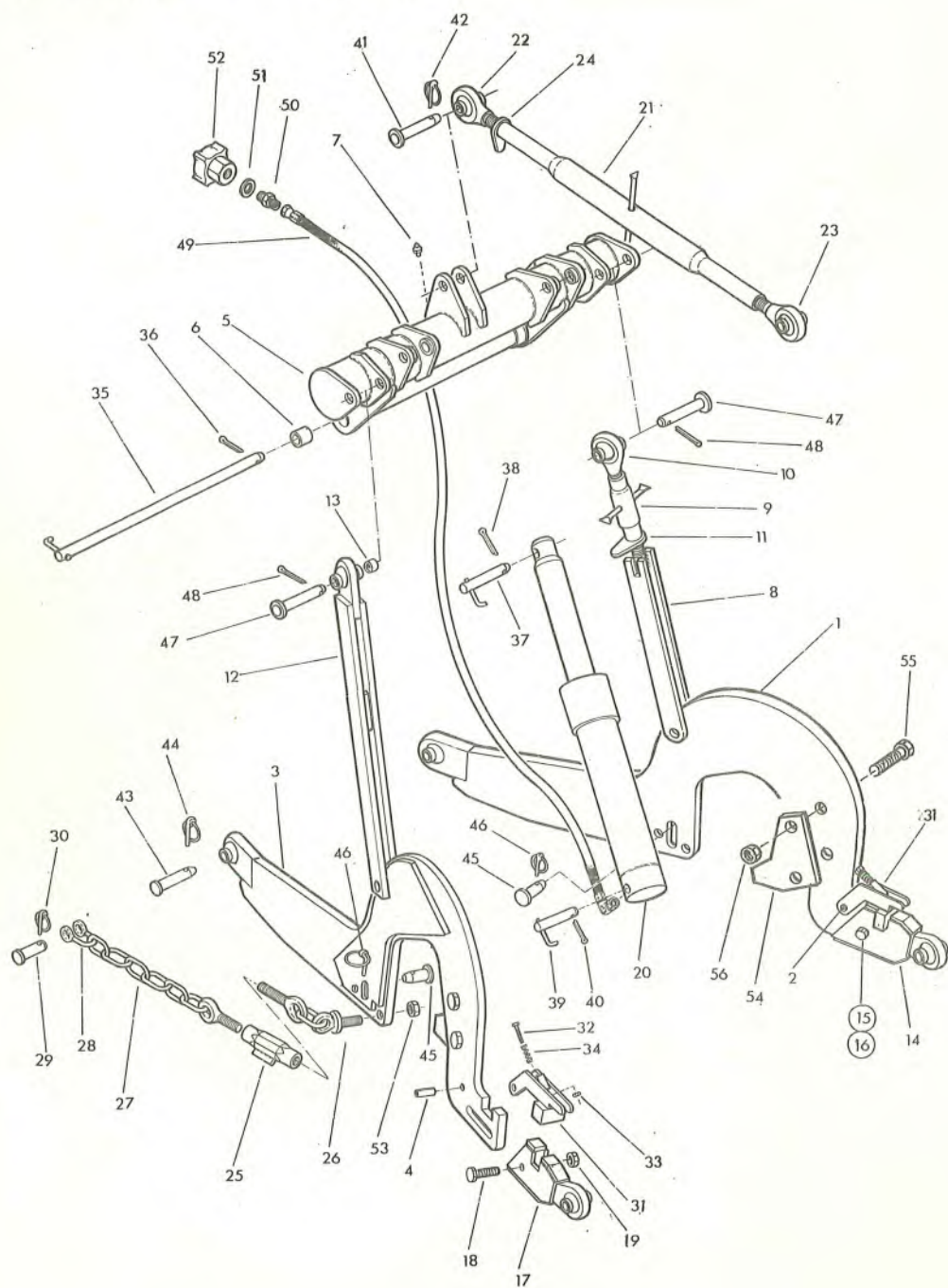


Ref	Part No.	Qty	Description
	10 65 324		SHAKAERATOR VIBRATION UNIT 540 rpm
1	10 65 320	1	.Flywheel c/w circlips
2	10 65 012	2	..Internal circlip
	10 65 325		SHAKAERATOR VIBRATION UNIT 1000 rpm
1	10 65 321	1	.Flywheel c/w counterweight and circlips
2	10 65 012	2	..Internal circlip
3	10 65 060	1	..Counterweight
4	02 42 183	4	..Capscrew 3/8" UNC x 2¼" long
	10 65 330	1	..Drive shaft assembly (not illustrated)

The following items are common to both Shakaerator units :-

5	10 65 323	1	.Drive coupling c/w bushes
6	10 65 061	3	..Bush
7	10 65 322	1	.Main shaft
8	10 65 258	1	.Mounting bracket
9	06 00 040	2	.Bearing
10	10 65 064	2	.Bearing shield
11	10 65 063	1	.Bearing spacer
12	01 61 013	1	.Self-locking hexagon nut 1½" UNF
13	02 00 013	3	.Bolt 7/16" UNC x 2¼" long
14	01 00 104	3	.Plain washer

LINKAGE KIT ASSEMBLY (Series 2)

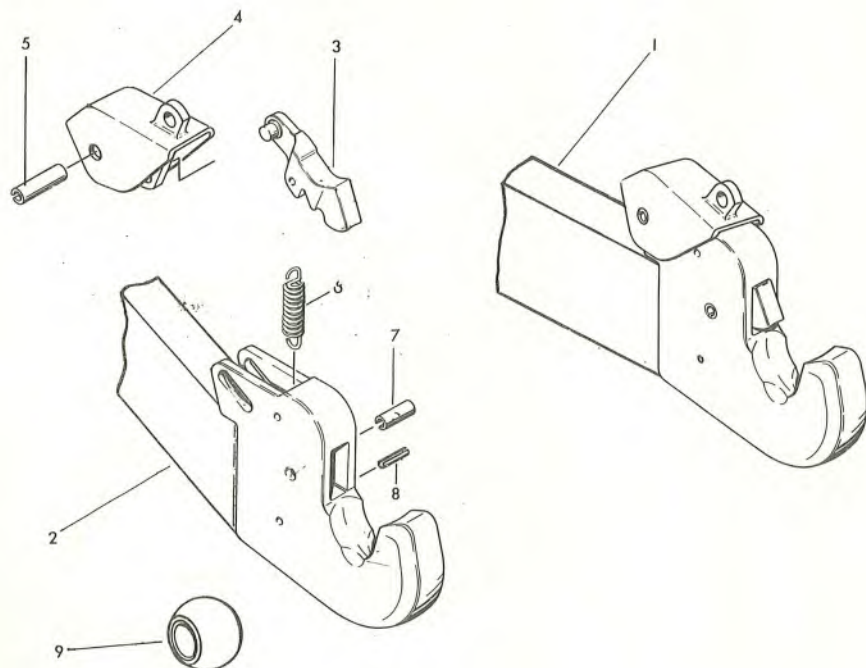


Ref	Part No	Qty	Description
	10 65 440		LINKAGE KIT ASSEMBLY SERIES II
* 1	10 65 469	1	.Draft link c/w spirol pin R. Hand
2	04 42 824	1	..Spirol pin 1/2" dia x 1 1/2" long
* 3	10 65 470	1	.Draft link c/w spirol pin L. Hand
4	04 42 824	1	..Spirol pin 1/2" dia. x 1 1/2" long
5	10 65 468	1	.Linkage rocker c/w bushes & greaser
6	72 13 023	2	..Bush
7	09 01 121	1	..Greaser 1/8 BSP
	10 65 163	1	.Adjustable drop link assembly
8	10 65 160	1	..Drop link fork
9	10 65 137	1	..Centre tube
10	10 65 154	1	..Ball end
11	71 15 153	1	..Locking collar
12	10 65 473	1	.Fixed drop link assembly c/w bush
13	71 15 048	1	..Bush
14	10 65 474	1	.Link socket c/w setscrews & bolt R. Hand
15	93 13 106	1	..Setscrew M12 x 50
16	91 43 006	1	..Hexagon nut M12
17	10 65 475	1	.Link socket c/w setscrew bolt L. Hand
18	93 13 106	1	..Setscrew M12 x 50
19	91 43 006	1	..Hexagon nut M12
20	10 65 462	1	.Linkage ram assembly see page
	71 15 275	1	.Top link assembly compr:-
21	71 02 217	1	..Top link tube
22	71 15 204	1	..Cat. II end L. Hand (rocker)
* 23	71 02 218	1	..Cat II end R. Hand (Implement)
24	71 02 214	1	..Locking collar
	10 65 461	2	.Check cahin assembly compr:-
25	10 65 220 *	1	..Adjusting tube
26	10 65 221	1	..Tube end L. Hand c/w link & mounting eye
27	10 65 219	1	..Tube end R. Hand c/w chain
28	10 65 218	1	..Shackle
29	10 65 217	1	..Shackle pin
30	04 31 217	1	..Linch pin
31	10 64 167	2	.Draft link latch assembly c/w bolt, nut & spring
32	02 11 243	1	..Bolt 3/8 UNF x 3" long
33	01 41 003	1	.. 'Clevelok' nut 3/8" UNF
34	60 01 155	1	..Spring
35	10 65 155	1	.Rocker link pin c/w split pin
36	05 03 206	1	..Split pin 1/4" dia x 2 1/2" long
37	71 09 071	1	.Ram rod pin c/w split pin
38	05 03 126	1	..Split pin 1/4" dia x 1 1/2" long
39	10 65 157	1	.Ram base pin c/w split pin
40	95 01 406	1	..Split pin Ø5 x 40
41	71 15 046	1	.Top hitch pin c/w linch pin
42	04 31 217	1	..Linch pin
43	10 65 159	1	.Draft link pin c/w linch pin
44	04 31 217	1	..Linch pin
45	10 65 158	2	.Drop link pin lower c/w linch pin
46	04 31 217	1	..Linch pin
47	~~95 01 406~~	2	.Drop link pin upper c/w linch pin 1065946
48	04 31 217	1	..Split pin
49	85 31 313	1	.Hose 3/8" BSP St-F, 90° F 110" long
50	60 00 113	1	.Union 3/8" BSP M-M
51	86 50 103	1	.Bonded seal 3/8" BSP
52	85 90 023	1	.Self seal coupling - Female half
53	01 41 007	2	. 'Clevelok' nut 3/4" UNF
54	10 65 619	2	. Stop plate
55	02 00 012	2	. Bolt 3/4" UNF x 2 1/4" long
56	01 41 007	2	. Self locking nut 3/4 UNF
*	10 65 040		..Alternative Cat. I ball end

* Original equipment and spares note

From January 1984 the draft links will have quick release ball hitches. See Page 46 for revised parts list.

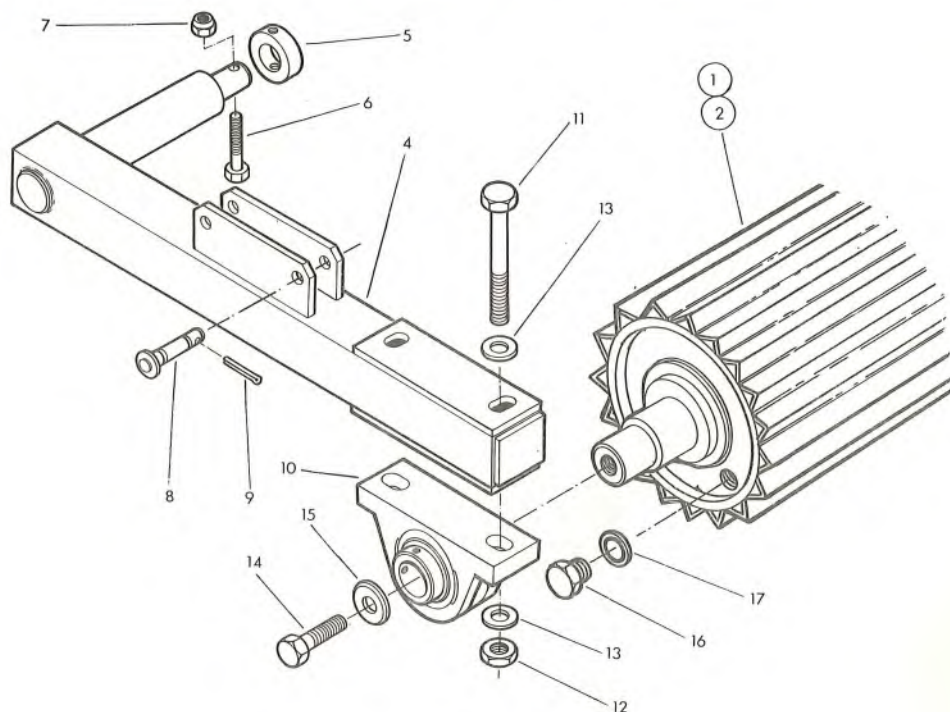
LINKAGE KIT Supplied after January 1984



The parts list for the linkage kit assembly with quick release ball hitches, introduced in January 1984 is as Page 45 with the following exceptions. Items 1,2,3,4, 14 to 19 inclusive and 31 to 34 inclusive are deleted and replaced by:-

Ref	Part No.	Qty	Description
	10 65 440		LINKAGE KIT ASSEMBLY
1	10 65 616	1	.Draft link R. Hand c/w latch , pawl etc.
2	10 65 617	1	.Draft link L. Hand c/w latch , pawl, etc.
The following items are common to both draft link assemblies.			
3	10 66 034	1	..Lock pawl.
4	10 66 035	1	..Latch c/w roll pin
5	04 46 332	1	...Roll pin special $\varnothing 13 \times 32$
6	10 66 036	1	..Spring.
7	04 46 332	1	..Roll pin - special $\varnothing 13 \times 32$
8	04 25 628	1	..Roll pin $\varnothing 6 \times 28$
9	10 66 032	2	.Cat $\varnothing 1$ ball.

3.7 METRE & 4.5 METRE OXFORD ROLLER ASSEMBLIES Series 2

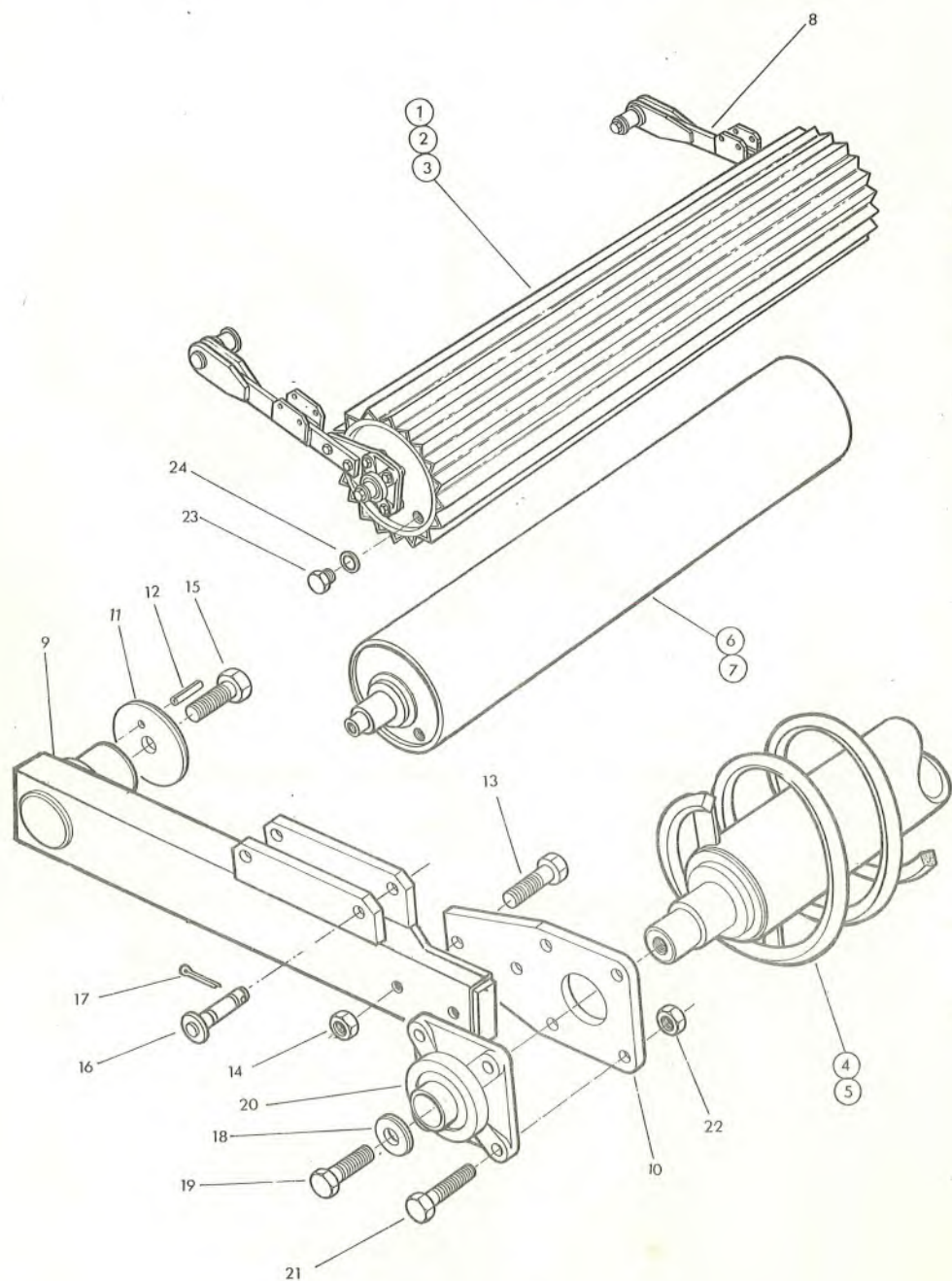


Ref	Part No.	Qty	Description
1	10 65 610		3.7 Metre H.D. Oxford Roller.
	10 65 612	1	.Roller
	10 65 611		4.5 Metre H.D. Oxford Roller.
2	10 65 613	1	.Roller

The following items are common to both Oxford roller assemblies.

3	10 65 589	1	.Draft Link R.Hand (not illustrated)
4	10 65 588	1	.Draft Link L.Hand
5	10 65 211	2	.Pivot axle lock ring.
6	92 13 145	2	.Bolt M10 x 70
7	91 43 005	2	.Self locking nut M10
8	10 65 212	2	.Shear pin c/w split pin
9	05 03 104	1	..Split pin 5/32" dia. x 1¼" long
10	06 00 066	2	.Bearing
11	02 11 607	4	.Bolt 3/4" UNF x 7½" long.
12	01 41 007	4	.Self locking nut 3/4" UNF
13	01 00 107	8	.Plain washer 3/4" dia.
14	03 11 127	2	.Setscrew 3/4 UNF x 1½" long
15	10 66 021	2	.Special washer 3/4" dia.
16	85 81 159	1	.Blank plug 1" BSP
17	86 50 108	1	.Bonded seal 1" BSP.

ROLLER ASSEMBLIES (Series 2) 2.5 METRE, 3.0 METRE & 4.5 METRE



Ref	Part No.	Qty	Description
ROLLERS FOR SERIES II COMMANDO			
	10 65 445		.2.5 METRE OXFORD ROLLER
1	10 65 454		.Roller
	10 65 446		3 METRE OXFORD ROLLER
2	10 65 451		.Roller
*	10 65 447		4.5METRE OXFORD ROLLER
3	10 65 452		.Roller
	10 65 448		2.5METRE FLEXICOIL ROLLER
4	10 65 427		.Roller
	10 65 449		3 METRE FLEXICOIL ROLLER
5	10 65 498		.Roller
	10 65 622		2.5METRE SMOOTH ROLLER
6	10 65 601		.Roller
	10 65 623		3.0 METRE SMOOTH ROLLER
7	10 65 602		.Roller

The following items are common to all Oxford roller and Smooth roller assemblies.

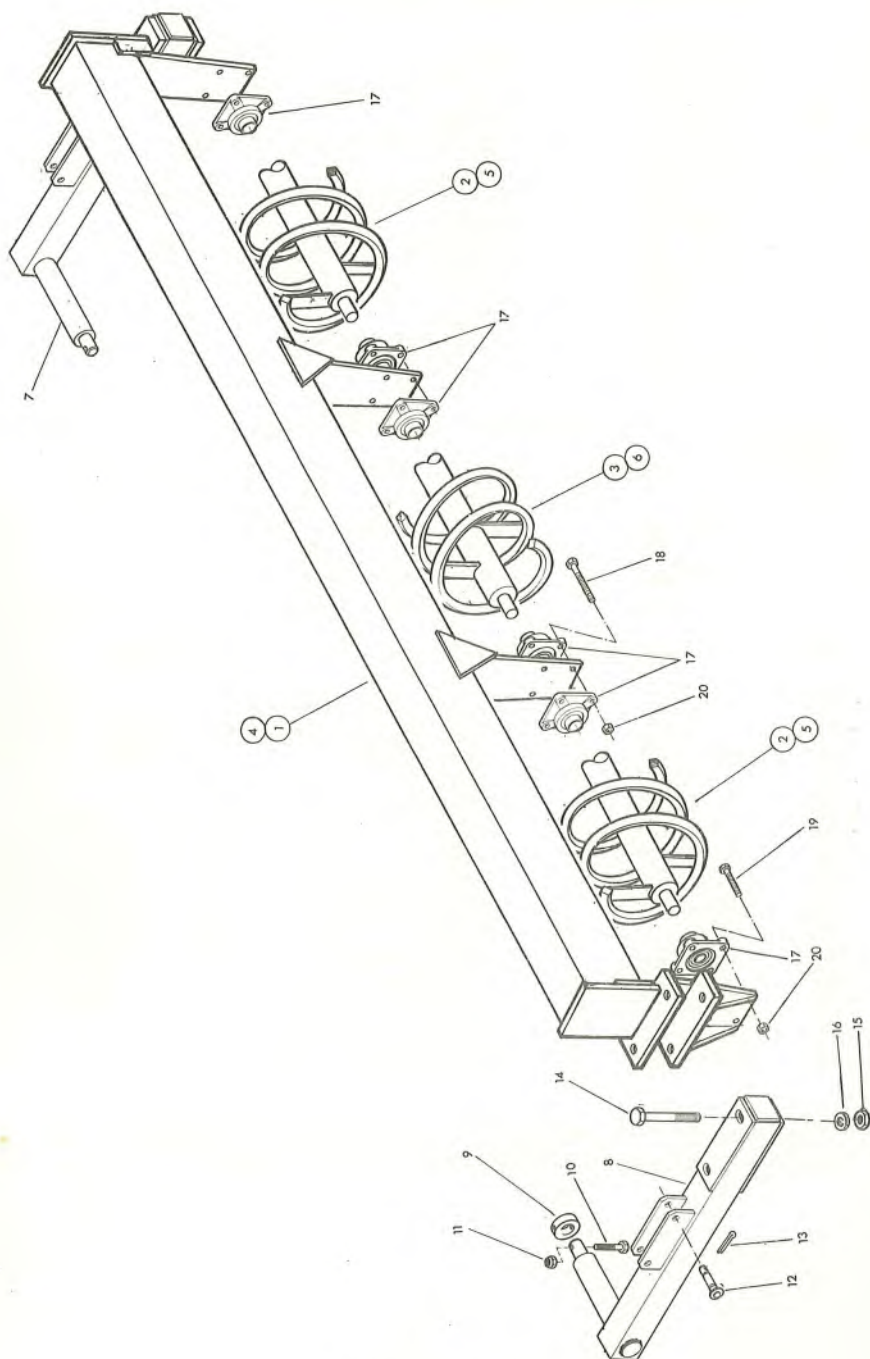
Items 8 - 22 inclusive are common to all flexicoil roller assemblies.

	10 65 492	1	.Draft link assy. R.Hand.
8	10 65 494	1	..Draft link R.Hand.
	10 65 493	1	.Draft link assembly L.Hand.
9	10 65 495	1	..Draft link L. Hand

Items 10 - 17 inclusive are common to both draft link assemblies.

• 10	10 65 491	1	..Roller mounting plate
• 11	10 65 214	1	..Special washer c/w spring dowel.
12	04 22 516	1	...Spring dowel 5/16" dia. x 1" long
• 13	02 11 246	2	..5/8UNF x 3"
• 14	01 41 006	2	..'Clevelok' nut 5/8 UNF
• 15	03 11 127	1	..Setscrew 3/4" UN F x 1 1/2" long
• 16	10 65 212	1	..Shear pin c/w split pin
17	05 03 104	1	...Split pin 5/32" dia. x 1 1/4" long
18	10 65 134	2	.Special washer
19	03 11 127	2	.Setscrew 3/4" UNF x 1 1/2" long
20	06 00 062	2	.Flanged bearing.
21	02 11 166	8	.Bolt 5/8UNF x 2" long
22	01 41 006	8	..'Clevelok' nut 5/8 UNF
23	85 81 159	2	.Blank plug 1" BSP
24	86 50 108	2	.Bonded seal 1" BSP

* Spares only for machines prior to Jan.1984. Machines after that date are fitted with Heavy duty 4.5metre rollers (See Page 47)

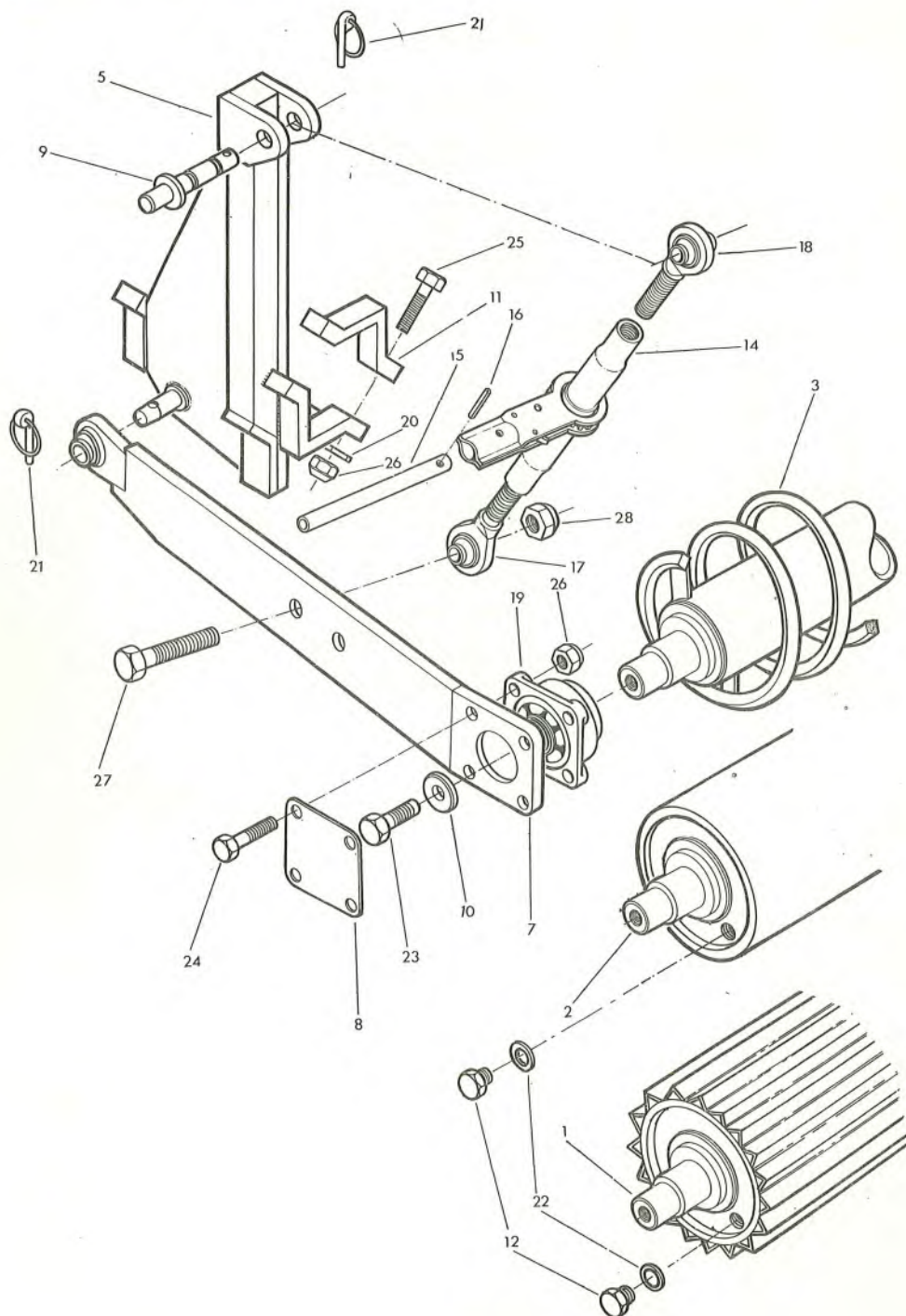


Ref	Part No.	Qty	Description
	10 65 661		3.7 METRE FLEXICOIL ROLLER ASSEMBLY
1	10 65 662	1	.Roller Frame
2	10 65 669	2	.Roller outer section
3	10 65 668	1	.Roller centre section
	10 65 671		4.5 METRE FLEXICOIL ROLLER ASSEMBLY
4	10 65 672	1	.Roller frame.
5	10 65 680	2	.Roller outer section
6	10 65 679	1	.Roller centre section

The following items are common to both flexicoil roller assemblies.

7	10 65 589	1	.Draft Link R. Hand - not illustrated.
8	10 65 588	1	.Draft Link L. Hand
9	10 65 211	2	.Pivot axle lock ring.
10	92 13 145	2	.Bolt M10 x 70
11	91 43 005	2	.Self locking nut M10
12	10 65 212	2	.Shear pin c/w split pin
13	05 03 104	1	..Split pin 5/32" dia x 1¼" long.
14	02 11 607	4	.Bolt ¾" UNF x 7½" long.
15	01 41 007	4	.Self locking nut ¾" UNF
16	01 31 007	8	.Plain nut ¾ UNF
17	06 00 062	6	.Flange bearing.
18	02 11 226	8	.Bolt 5/8 UNF x 2¾" long.
19	02 11 166	8	.Bolt 5/8UNF x 2" long.
20	01 41 006	16	.Self locking nuts 5/8 UNF

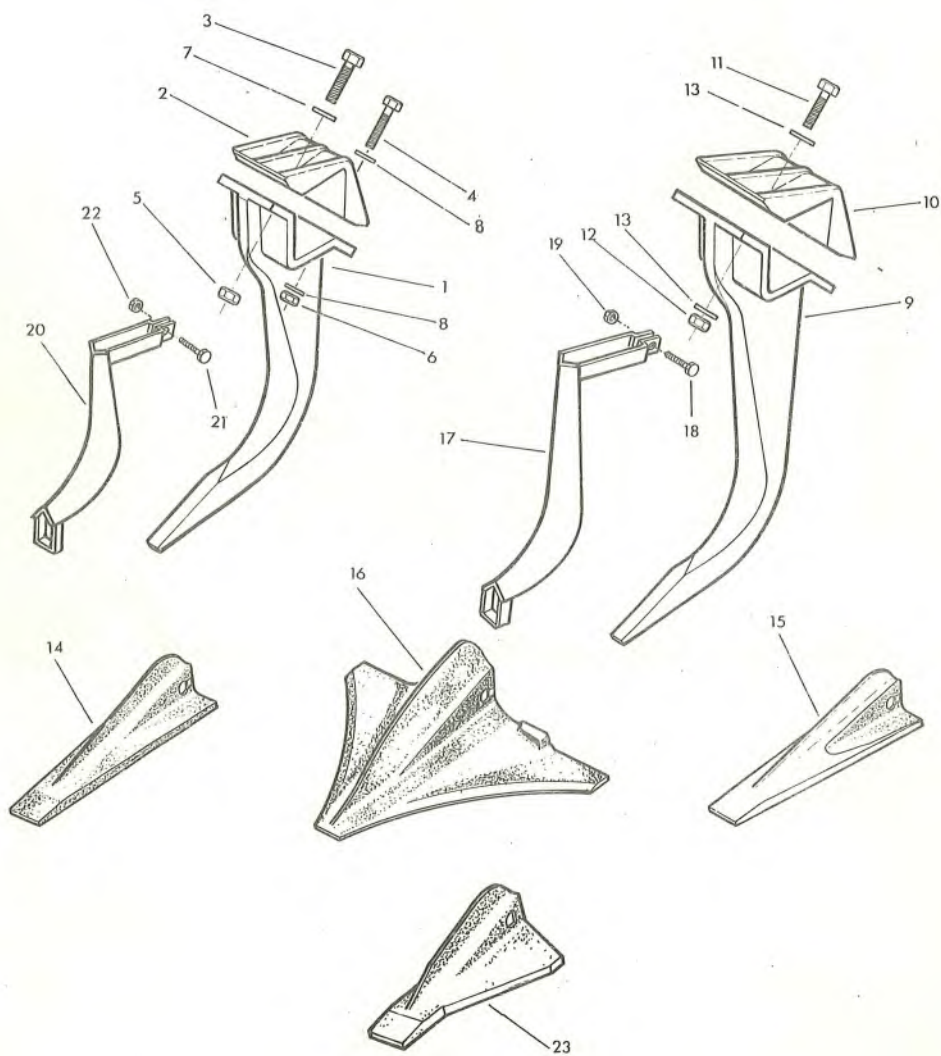
5 SHANK SERIES 1 ROLLER ASSEMBLIES



Ref	Part No.	Qty	Description
			5 SHANK ROLLER ASSEMBLIES.
1	10 65 537	1	.Oxford Roller.
2	10 65 600	1	.Smooth Roller.
3	10 65 555	1	.Flexicoil Roller.
The above rollers are used in conjunction with the following roller carrying kit.			
	10 65 599		.Roller carrying kit compr:-
4	10 65 597	1	..Carrier bracket R.Hand (not illustrated)
5	10 65 596	1	..Carrier bracket L.Hand.
6	10 65 577	1	..Roller arm R.Hand (not illustrated)
7	10 65 578	1	..Roller arm L.Hand
8	10 65 128	2	..Bearing shield
9	10 65 124	2	..Link pin
10	10 65 134	2	..Special washer.
11	10 65 030	4	..Clamp
* 12	85 81 159	2	..Blank plug 1"BSP
	10 65 576	2	..Ratchet link assembly compr:-
13	10 65 188	1	...Tube ratchet c/w handle
14	10 65 216	1	Ratchet
15	71 15 217	1	Handle c/w spring dowel.
16	04 21 820	1	Spring dowel. ¼" dia x 1¼" long.
17	71 15 204	1	...Link end L.Hand Cat II
18	71 02 218	1	...Link end R.Hand Cat II
19	06 00 062	2	..Flange bearing
20	10 65 013	8	..Special friction washer.
21	04 31 217	4	..Linch pin
* 22	86 50 108	2	..Bonded seal.
23	03 11 127	2	..Setscrew ¾" UNF x 1½" long.
24	02 11 186	8	..Bolt 5/8 UNF x 2¼ long.
25	02 00 009	8	..Special bolt 5/8UNF x 3" long.
26	01 41 006	16	..Self locking nut 5/8UNF
27	02 11 289	2	..Bolt 1" UNF x 3½long.
28	01 41 009	2	..Self locking nut 1" UNF

* When Flexicoil roller is used items 12 and 22 are discarded.

SHANKS, POINTS & SHINS



Ref	Part No	Qty	Description
-----	---------	-----	-------------

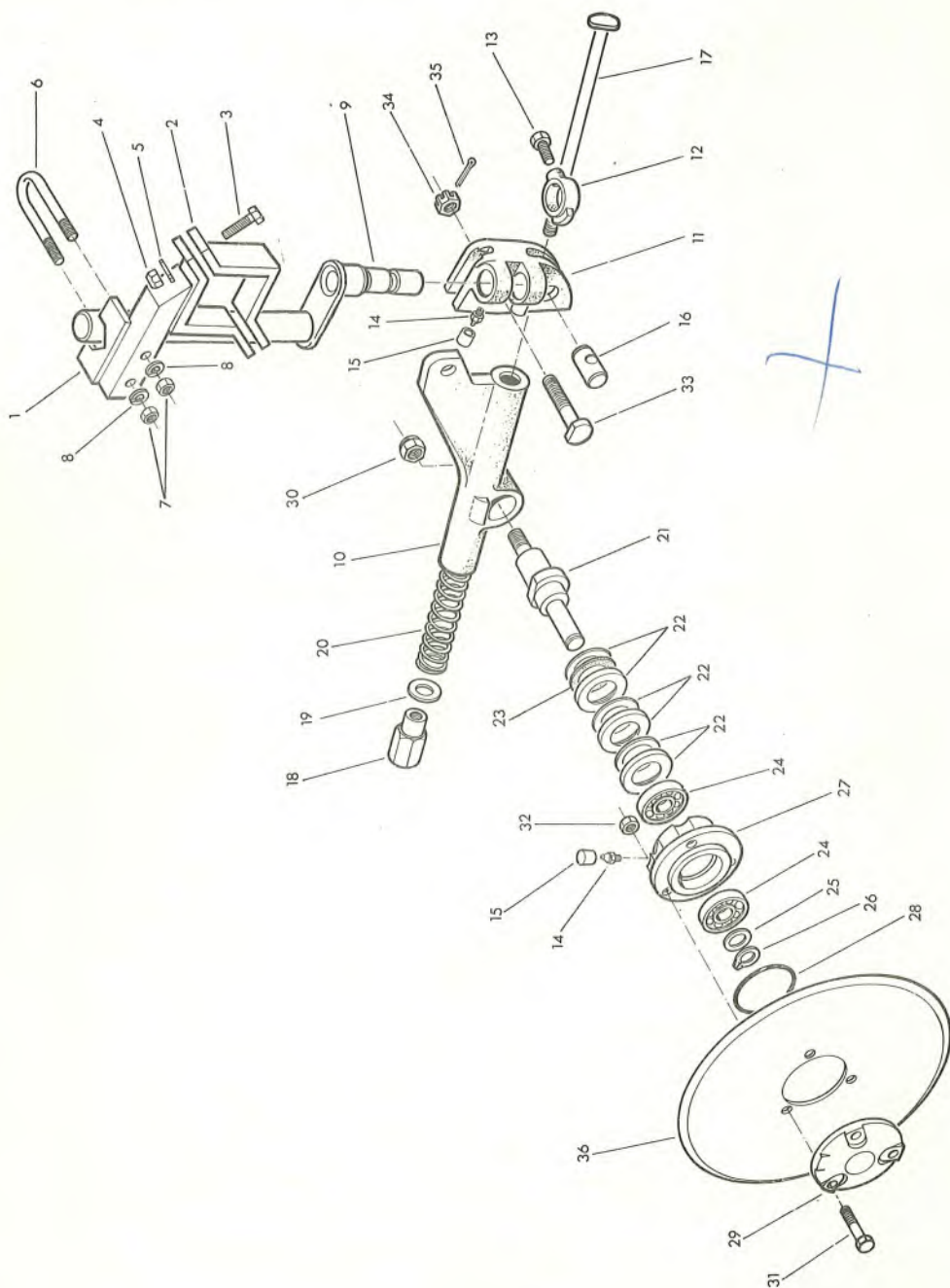
SHANK, POINTS AND SHINS FOR SERIES I AND II COMMANDOS

	10 65 328		18" SHANK ASSEMBLY
1	10 65 255	1	.Shank
2	10 65 292	1	.Shank clamp
3	02 00 010	2	.Bolt 5/8" UNF x 2¼" long
4	02 00 019	2	.Bolt ½" UNF x 2¼" long
5	01 11 006	2	.Hexagon nut, 5/8" UNF
6	01 41 005	2	.'Clevelok' nut ½" UNF
7	10 65 077	2	.Special washer 5/8" dia.
8	10 65 078	4	.Special washer ½" dia.
	10 65 327		24" SHANK ASSEMBLY
9	10 65 275	1	.Shank
10	10 65 276	1	.Shank clamp
11	02 00 020	4	.Bolt 5/8" UNF x 2½" long
12	01 11 006	4	.Hexagon nut 5/8" UNF
13	10 65 077	8	.Special washer 5/8" dia.
14	10 65 274	1	DIGGING POINT
15	10 65 430	1	DIGGING POINT (long life)
16	10 65 257		CULTIVATOR POINT

OPTIONAL EXTRAS

17	10 65 429	1	WEAR SHIN (for 24" shanks) c/W nut & bolt
18	93 13 064	1	.Setscrew M8 x30
19	91 43 004	1	.'Clevelok' nut M8
20	10 65 426	~	WEAR SHIN (for 18" shanks) c/w nut & setscrew
21	93 13 064	1	.Setscrew M8 x 30
22	91 43 004	1	.'Clevelok' nut M8
23	10 65 605		POWER POINT

GRASSLAND DISC ASSEMBLY



Ref	Part No.	Qty	Description
	10 65 346		GRASS DISC ASSEMBLY
1	10 65 420	1	.Carrier bracket
2	10 65 030	1	.Carrier clamp
3	02 00 009	2	.Special bolt 5/8" UNF x 3" long
4	01 41 006	2	. 'Clevelok' nut 5/8 UNF
5	10 65 013	2	.Special washer 5/8" dia
6	10 65 122	1	. 'U' Bolt 5/8" UNF
7	01 41 006	2	. 'Clevelok' nut 5/8" UNF
8	01 00 206	2	.Spring washer 5/8" dia
9	10 65 421	1	.Disc carrier shaft
	10 65 348	1	.Breakaway and stub axle assembly
10	16 95 001/125	1	..Trailing arm
11	16 95 001/124	1	..Shaft bearing
12	16 95 00Q/676	1	.. Stop
13	93 13 067	1	..Setscrew M16x30
14	09 01 121	3	..Grease nipple 1/8" BSP straight
15	16 67 419/900	3	..Nipple cover
16	16 95 0013128	1	..Pin
17	16 95 0013125	1	..Spring Tensioner bolt
18	16 95 001/132	1	..Spring Tensioner nut
19	16 54 060/326	1	..Spring Seat washer
20	16 95 001/133	1	..Spring
21	16 95 001/208	1	..Stub axle
22	16 82 357/006	3	..Sealing ring - pair
* 23	16 82 364/520	1	..Felt washer
24	06 00 049	2	..Bearing - 6205
25	16 91 101/290	1	..Ring
26	04 01 225	1	..External circlip Ø 25
27	16 95 001/186	1	.. Bearing housing
28	87 00 738	1	.. "O" ring
29	16 95 001/187	1	..Bearing cover plate
30	01 42 007	1	..Clevelok nut
31	92 13 085	3	..Bolt M10 x 40
32	91 43 005	3	.. 'Clevelok' nut M10
33	16 95 001/039	1	..Special pivot bolt M16
34	91 73 007	1	..Castellated nut M16
35	05 03 104	1	..Split pin 5/32 Ø x 1¼" long
36	10 65 347	1	.Grass disc

*

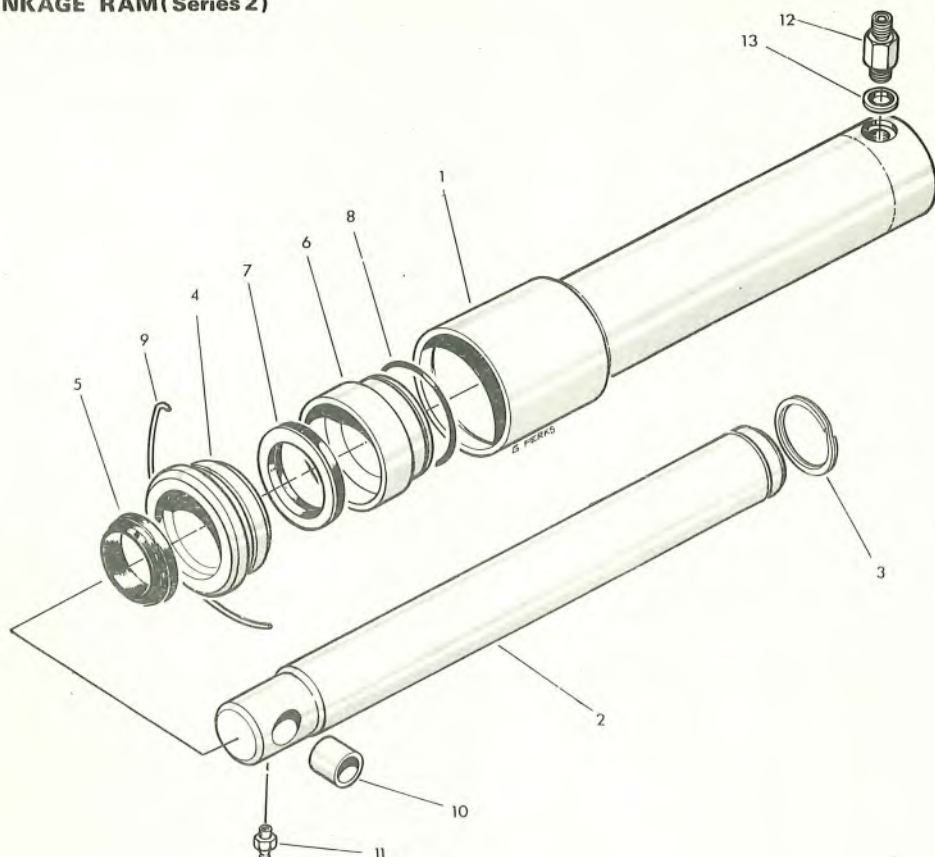
Assembly note

The felt washer is assembled between the two halves of the sealing ring that is fitted first on to the shoulder of the stub axle.

SPARES NOTE

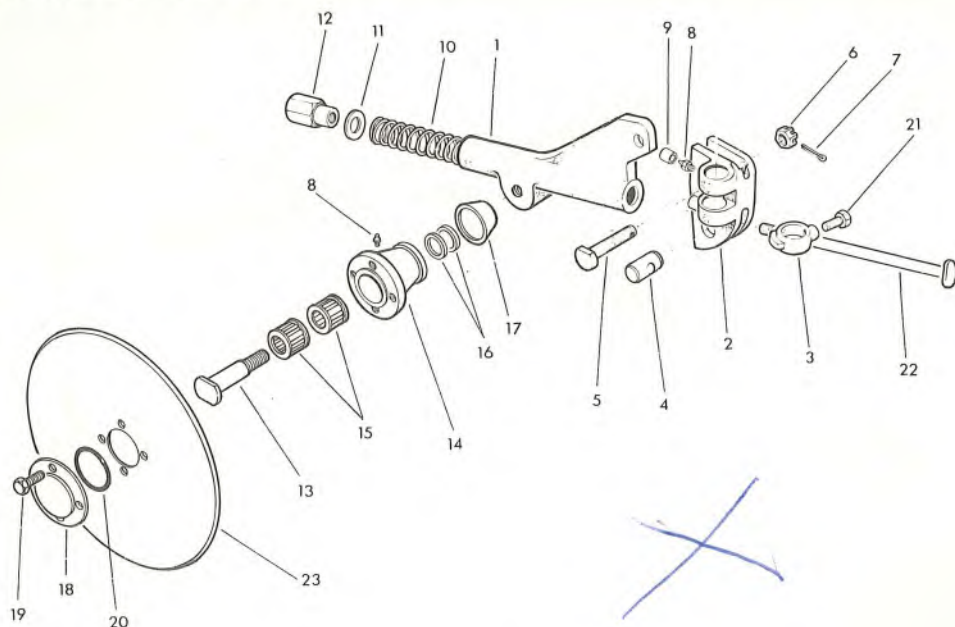
From Machine Serial Nos. 16.YS.55, 16.CK.21, 16.CL.46 and 15.CM.72 the Breakaway and Stub axle assembly 10.65.348 has been replaced by 10.65.549 and the grass disc part No. 10.65.347 is replaced by 10.65.542. See Page 59 for Spares list.

LINKAGE RAM(Series 2)



Ref	Part No	Qty	Description
	10 65 462		LINKAGE LIFT RAM ASSEMBLY (Series II linkage)
1	10 65 463		.Ram barrel
2	10 65 464		.Ram rod c/w spiro ox
3	04 03 260		..Spirobox ring
4	71 09 032		.Gland retainer c/w wiper
5	86 29 130		..Wiper ring
6	71 09 033		.Gland housing c/w seals
7	86 15 001		..Seal
8	86 00 312		.. 'O' ring
9	71 09 034		.Locking wire
10	71 05 050		.Bush
11	09 01 121		.Greaser 1/8 BSP - St
12	10 66 028		.Union 3/8" BSP M-M restrictor
13	86 50 103		.Bonded seal 3/8 BSP

GRASSLAND DISC ASSEMBLY



Ref	Part No.	Qty.	Description
-----	----------	------	-------------

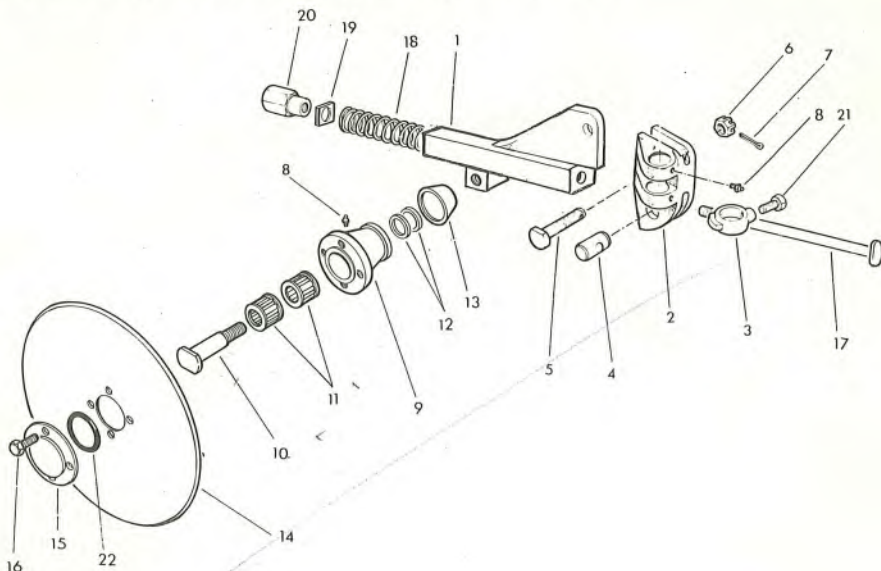
10 65 547

GRASS DISC ASSEMBLY

The parts list for this assembly is identical with the grass disc assembly 10 65 346 on Page 54 with the following exceptions.

	10 65 549	1	..Breakaway and stub axle assembly
1	95 00 51 13	1	..Trailing arm.
2	95 00 11 24	1	..Shaft bearing.
3	95 00 06 76	1	..Stop
4	95 00 11 28	1	..Pin
5	95 00 10 39	1	..Special pivot bolt M16
6	91 73 007	1	..Castellated nut M16
7	05 03 104	1	..Split pin 5/32" dia. x 1¼" long.
8	09 01 121	3	..Grease nipple 1/8 BSP - straight.
9	67 41 99 00	3	.. Nipple cover
10	95 00 11 33	1	..Spring.
11	54 06 03 26	1	..Spring seat washer.
12	95 00 11 32	1	..Spring tensioner nut.
13	95 08 58 55	1	..Spindle.
14	95 08 09 67	1	..Spindle bearing housing.
15	95 07 55 45	2	..Bearing (Needle roller)
16	82 36 45 30	2	..Seal
17	95 08 09 59	1	..Dust cover.
18	95 08 09 66	1	..Clamp plate
19	41 17 40 90	4	..Setscrew M10
20	82 36 76 45	1	.. 'O' ring.
21	93 13 067	1	..Setscrew M16 x 30
22	95 00 11 31	1	..Spring tensioner bolt.
23	10 65 542	1	..Disc.

GRASSLAND DISC ASSEMBLY From September 1984

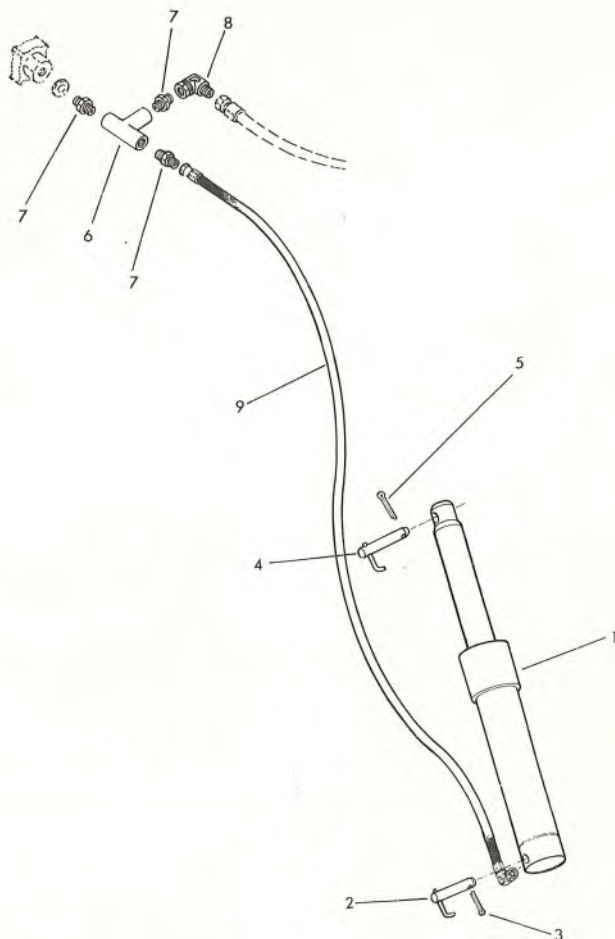


Ref	Part No.	Qty	Description
	10 65 676		GRASS DISC ASSEMBLY

The parts list for this assembly is identical with the grass disc assembly 10 65 346 on page 54 with the following exceptions.

1	10 65 674	1	.Trailing arm.
2	10 66 054	1	.Shaft bearing.
3	10 66 073	1	.Stop boss
4	10 66 059	1	.Retainer pin
5	10 66 062	1	.Special bot M16
6	91 73 007	1	.Castellated nut M16
7	05 03 104	1	.Split pin
8	09 01 121	3	.Greaser 1/8"BSP - straight.
9	10 65 673	1	.Hub
10	10 66 057	1	.Spindle
11	06 00 068	2	.Needle roller bearing.
12	86 29 142	2	.Seal
13	10 66 061	1	.Bearing housing dust cover
14	10 65 542	1	.Grass disc.
15	10 65 675	1	.Clamp plate
16	93 13 045	4	.Set screw M10 x 20
17	10 66 058	1	.Spring tensioner bolt.
18	10 66 063	1	.Spring.
19	10 66 072	1	.Square washer
20	10 66 060	1	.Spring tensioner nut.
21	93 13 067	1	.Setscrew M16 x 30
22	87 00 738	1	.O' ring.

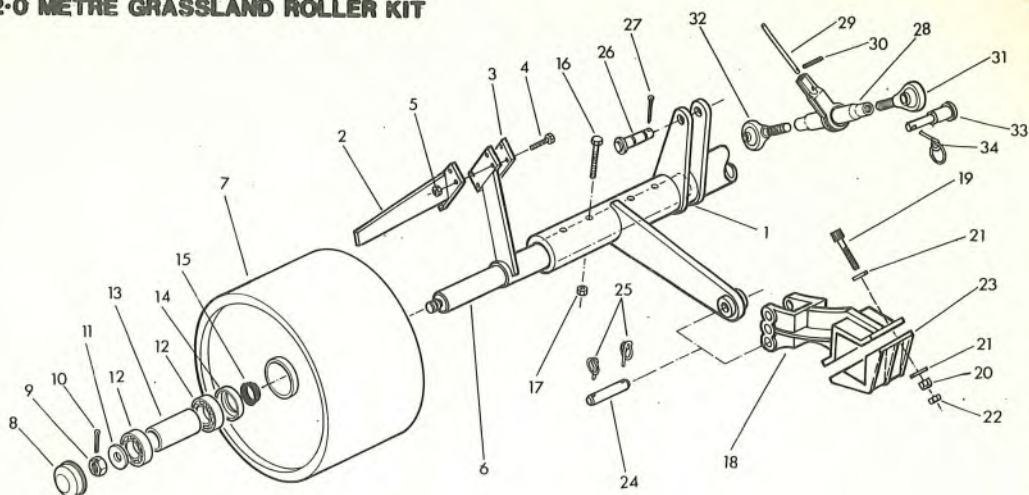
LINKAGE ASSISTER RAM KIT (Series 2)



Ref	Part No.	Qty	Description
OPTIONAL EXTRA FOR SERIES II LINKAGE			
	10 65 439		ASSISTER LIFT RAM KIT
1	10 65 462	1	.Linkage ram (see page 50)
2	10 65 157	1	.Ram base pin c/w split pin
3	95 01 406	1	..Split pin Ø 5 x 40
4	71 09 071	1	.Ram rod pin c/w split pin
5	05 03 126	1	..Split pin 1/4" ida x 1 1/2" long
	10 65 240	1	.Tee assembly
* 6	85 81 073	1	..Tee piece
* 7	80 05 007	3	..Union 3/8" BSP 3/8 BSPT M-M
8	85 81 117	1	.90° Elbow 3/8 BSP M-F
9	85 31 313	1	.Hose 3/8" BSP St-F 90°- F x110" long

* Items 7 and 8 assembled using PermaBond 'A121' sealant

2.0 METRE GRASSLAND ROLLER KIT



Ref	Part No.	Qty	Description
1	10 65 697		2.0 Metre ROLLER KIT
	10 65 698	1	..Roller axle
	10 65 703	1	..Wheel and axle L.Hand compr:- (not illus)
	10 66 081	1	..Scraper assembly L.Hand (not illus)
	10 65 701	1	...Scraper (not illus)
	10 66 079	1	...Clamp plate
	92 13 075	4	...Bolt M10 x 35
	91 43 005	4	...Self locking nut M10
	10 65 702	1	..Wheel and axle R.Hand compr:-
	10 66 080	1	..Scraper assembly R.Hand
2	10 65 700	1	...Scraper R.Hand
3	10 66 079	1	...Clamp plate
4	92 13 075	4	...Bolt M10 x 35
5	91 43 005	4	...Self locking nut M10

Items to inclusive are common to both wheel and axles.

6	10 66 084	1	..Axle
7	10 65 496	1	..Wheel
8	10 65 215	1	..Hub cap
9	01 72 009	1	..Slotted nut 1" UNC
10	05 03 125	1	...Split pin 3/16" dia x 1½" long
11	10 65 225	1	..Wheel clamp washer
12	06 00 055	2	..Wheel bearing
13	10 65 224	1	..Bearing spacer
14	10 65 226	1	..Seal cap
15	86 29 143	1	..Seal
16	92 13 205	1	..Bolt M10 x 100
17	91 43 005	1	..Self locking nut M10
18	10 65 480	2	..Hitch bracket c/w screws & nuts
19	92 00 009	4	..Capscrew - socket headed M16 x 70
20	91 43 007	4	..Self locking nut M16
21	10 65 077	4	..Special washer 5/8" dia
22	91 13 007	4	..Plain nut M16
23	10 65 292	2	..Hitch clamp
24	10 65 020	2	..Hitch pin c/w linch pin
25	04 31 217	2	..Linch pin
26	10 65 212	1	..Shear pin c/w split pin
27	05 03 104	1	..Split pin 5/32" dia x 1¼" long
	10 65 481	1	..Ratchet link assy compr:-
	10 65 188	1	..Tube ratchet c/w handle.
28	10 65 216	1	...Ratchet
29	71 15 217	1	..Handle c/w spring dowel,
30	04 21 820	1	...Spring dowel ½" dia x 1¼" long
31	10 65 189	1	..Ball end - Cat 3
32	10 65 190	1	..Ball end - Cat 1
33	10 66 085	11	..Pin c/w linch pin
34	04 31 217	1	..Linch pin



Registered office: Temeside Works
Ludlow, Shropshire, SY8 1JL England
registered number 305192 England
telephone: Ludlow 3131 (std 0584)
telex: 35313
cables: Powerarm Ludlow

