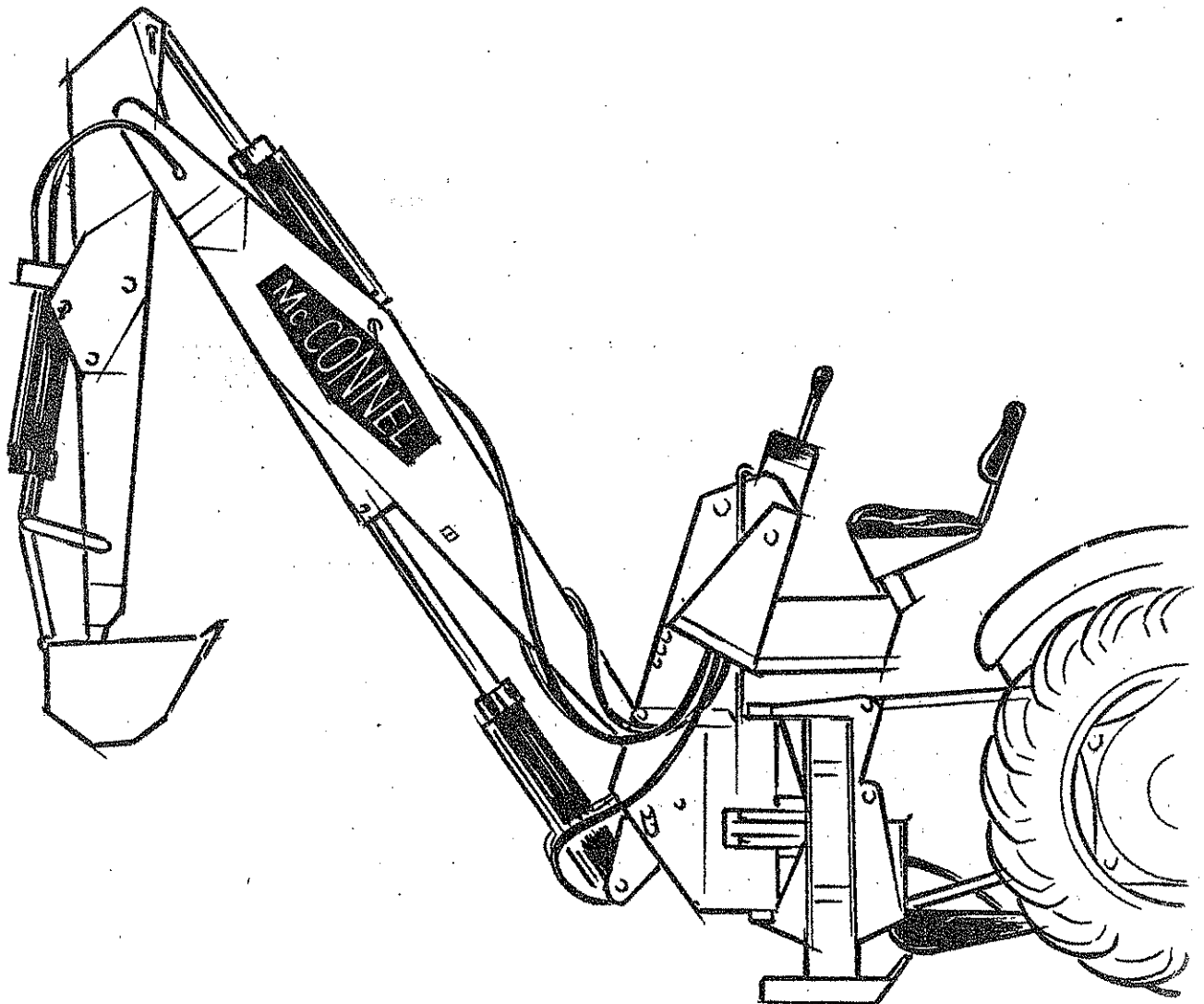


**OPERATION AND
SPARE PARTS MANUAL**

For

**S 12 DOUBLE-D
DIGGER LOADER**



**PUBLICATION 43
APRIL, 1971**

**F. W. McCONNEL LIMITED
TEMESIDE WORKS,
LUDLOW, SHROPSHIRE,
SY 8 1JL
ENGLAND Tel: Ludlow(0584)2345**



UNDER NO CIRCUMSTANCES MUST THE TOP LINK BE ADJUSTED TO GIVE LESS THAN 18IN (45CM) CLEARANCE BETWEEN CAB AND VALVE WHEN RAISED TO FULL EXTENT OF LINKAGE TRAVEL.

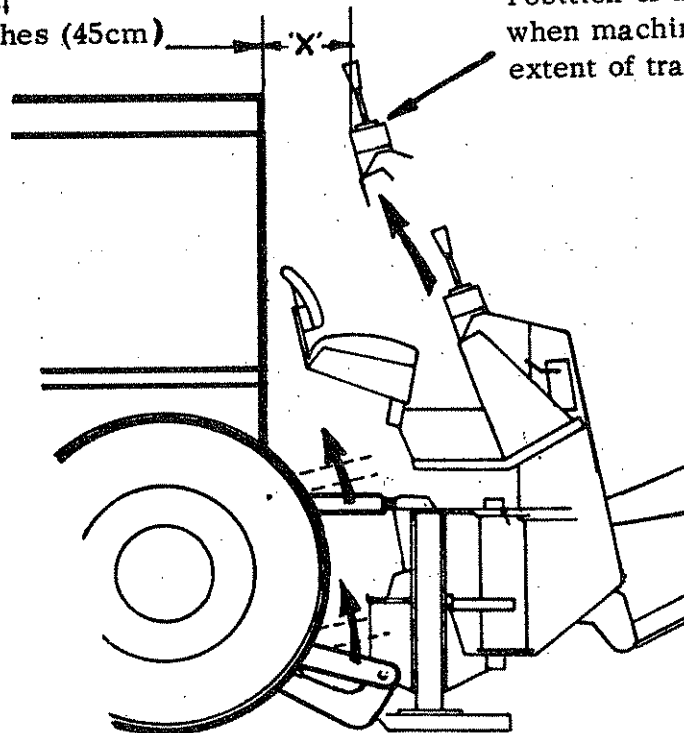
WARNING

Whenever a DD linkage extension kit is fitted to your digger/loader/tractor combination then it is essential to use the long top link supplied with the kit.

Special top links are to be fitted to the upper tractor location AND NOT the dead pin position. e.g. FERGUSON, DEXTA.

Minimum clearance between Cab/Safety Frame is 18 inches (45cm)

Position of hydraulic control valve when machine is raised to full extent of tractor linkage travel.



PAS/12 DD
PAS/14 D
PAS/15 D
(EXPORT MARKETS ONLY)

DIAGRAMMATIC VIEW OF TRACTOR MOUNTED DIGGER/LOADER INDICATING ESSENTIAL MINIMUM CLEARANCE MEASUREMENT PERMITTED FOR SAFE OPERATION

Should you have any further queries please contact
The Service Manager, McConnell Service Department.

F W McConnell Ltd

Temeside Works, Ludlow,
Shropshire, SY8 1JL
England.
telephone: (0584) 3131
cables: McConnell,
Ludlow, England.



McCONNEL DIGGER/LOADER SAFETY PRECAUTIONS

The following instructions apply to:

PAS/12DD

PAS/14D

PAS/15D (EXPORT MARKETS ONLY)

When fitted to tractors with cabs or safety frames to prevent trapping of the operator between the hydraulic control unit (H.C.U. or 2/4S Hy-Fi) and the cab roof.

There is obviously no danger on tractors without cabs, or on tractor/cab combinations where there is sufficient clearance for the operator when the machine is raised to the full extent of the tractor linkage travel.

The following procedure has been agreed with the Ministry of Agriculture, Fisheries and Food Safety Inspectors -

DIAGNOSIS -

First, fit PAS to tractor linkage and adjust top link to bring machine vertical when standing on level ground.

Next, while sitting on tractor driver's seat, lift PAS to full height.

Next, measure the clearance between the control unit casing and the top rear cross-member of the safety cab or frame. This must not be less than 18in (45cm) - see sketch measurement marked X.

If X is less than 18in the machine must not be used with this tractor/cab combination.

Since November 1971, all production Model 'S' machines for UK market have been fitted with Linkage Extension Sets to increase this clearance. If your machine is not so equipped, the correct kit may be obtained from F W McConnel Limited, Temeside Works, Ludlow, Shropshire,

Part No 71-03-400

(Some tractor cabs have removeable roof panels and/or rear cross members, e.g. new David Brown.)

FITTING PAS DD LINKAGE EXTENSION SET (Pt No 71-03-400)

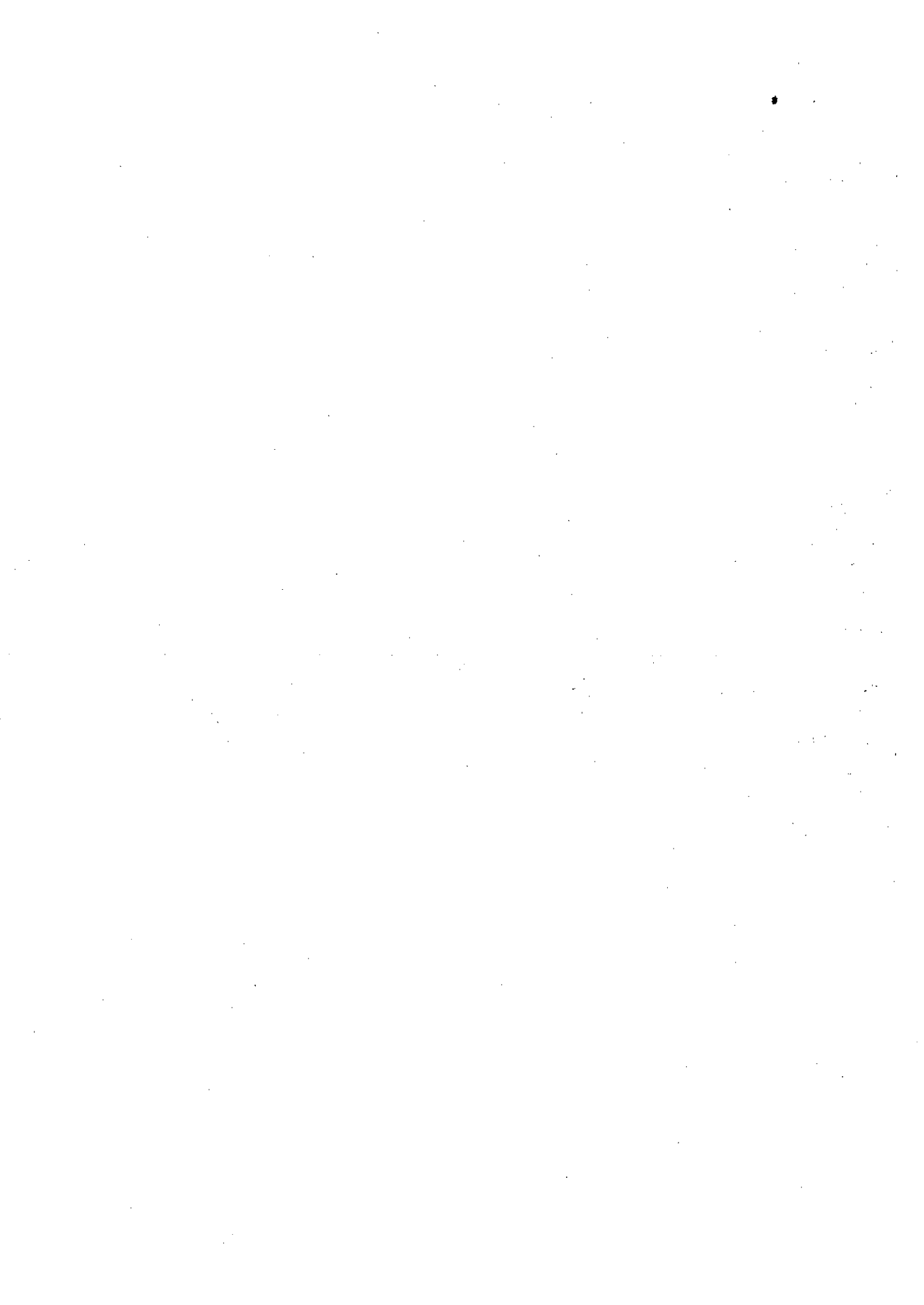
- (a) Remove Linkage Pins and Weight Transfer Arms from PAS frame.
- (b) Fit Extension Frame to side plates of PAS frame using 4 special pins (fitted through linkage pin bosses and side plates of slew ram pivots).
- (c) Fit Linkage Pins and Weight Transfer Arms of Extension Frame.
- (d) Fit 50" long suction hose between P.T.O. pump and Tank Frame (The hose clips may need re-tightening at intervals in work until any permanent set in the hose has been taken up to eliminate air leaks.
- (e) Connect tractor draft links and use the Special Long Top Link supplied to PAS top hitch point and the highest hitch point available on the tractor (The Top Link has Cat I and Cat II ends - if tractor is Cat I use sleeve in CAT II end to fit PAS frame).
- (f) Adjust Top Link to bring PAS vertical when standing on level ground and check clearance between valve and cab roof as shown in diagram.

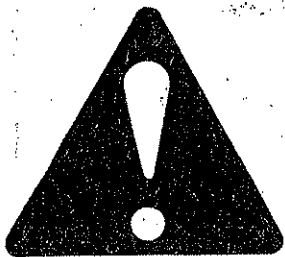
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This manual comprises Fitting, Operating, Maintenance Instructions and an Illustrated Spare Parts List for the McConnel S/12 Double-D Digger/Loader. All machines are assembled and tested prior to despatch and U.K. customers are supplied with 9 gallons of 20W/30 grade oil in the tank. Read this manual before fitting or operating the machine. Whenever any doubt exists contact your dealer or the McConnel Service Department for assistance.

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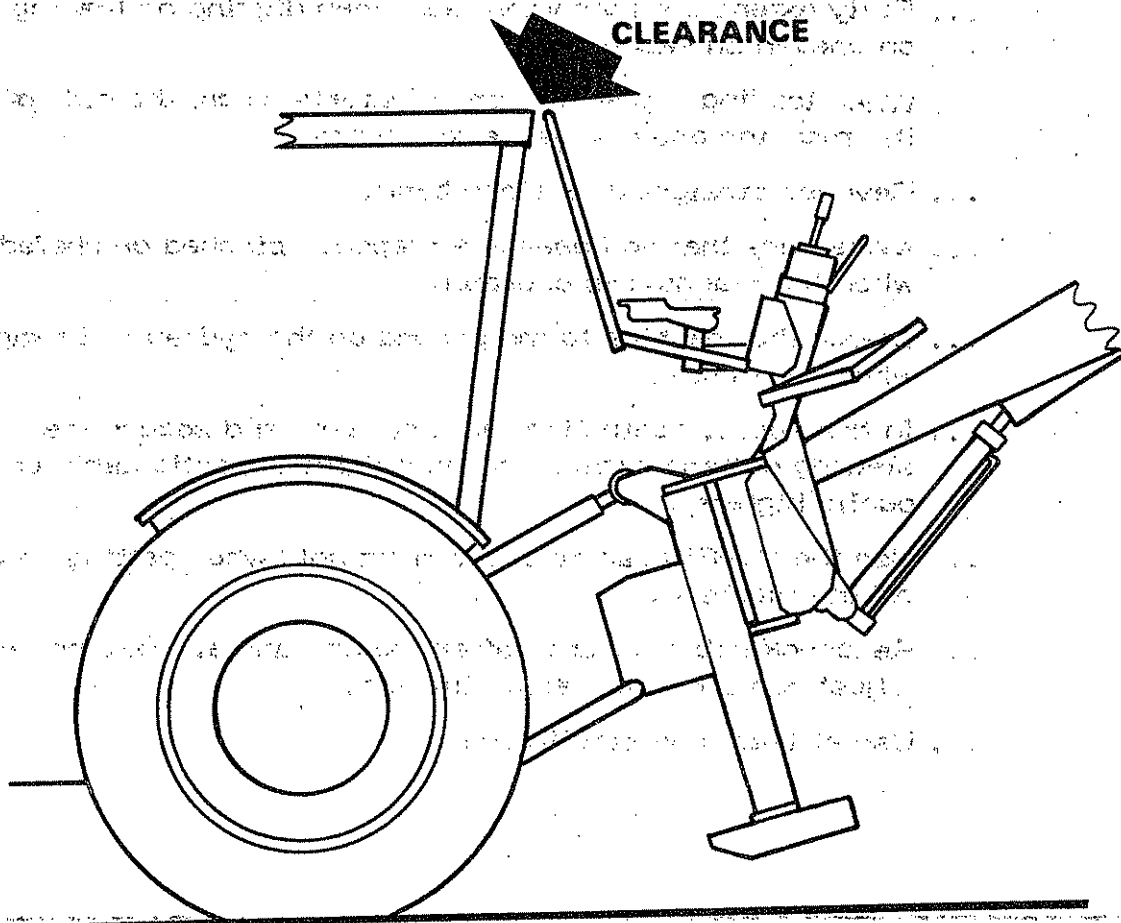




WARNING

**FAILURE TO OBSERVE THE FOLLOWING PRECAUTIONS
COULD RESULT IN A FATAL INJURY TO THE OPERATOR.**

Before attempting to use the machine from the operators seat, fully raise the machine on the tractors hydraulic linkage and check that the cab clearance frame does not foul against the cab roof or rear cross-member of the tractor safety frame.



If after adjustment of the top link, the clearance frame still fouls any part of the tractor cab structure then the machine must not be used on that tractor.

Note: On some models of safety cab the roof section and support can be removed without violating the cab safety certificate. Check with your tractor dealer that this can be done if necessary to obtain clearance.

SAFETY PRECAUTIONS

NEVER

- ... Permit inexperienced personnel to operate machine without supervision.
- ... Lift the machine on the tractor linkage unless the main arm is centralized.
- ... Stand near the digger feet when the machine is raised on the tractor linkage.
- ... Stand under a raised load.
- ... Grasp Hy-fi operating lever when mounting machine.

ALWAYS

- ... Adjust tractor wheel widths for maximum stability and add front end weight as required.
- ... Fully extend the machines legs when digging or loading on uneven surfaces.
- ... When loading if possible grab material from the side of the machine and discharge to the rear.
- ... Reverse straight up a steep bank.
- ... Make sure that no hoses are trapped, pinched or chafed when the machine is operated.
- ... Lower the machine to the ground on the hydraulic linkage when not in use.
- ... In transport, centralize the main arm and secure the slewing column with the transport lock, particularly on public highways.
- ... Use the Hy-Fi grab rail as a hand hold when getting on or off the machine.
- ... Re-check cab clearance after making any alterations or adjustments to the tractor linkage.
- ... Use at least one stabilizer bar.

SAFETY INSTRUCTIONS

Read these instructions before operating the machine. If in doubt, ask your dealer or the McConnell Service Department.

Never stand under a bucket or grab.

Never stand near the digger feet when raised on the 3 point linkage. It might drop suddenly if someone unknowingly moves the Quadrant Lever.

Always engage the transport lock when travelling along the roads.

When loading on uneven ground, use legs fully extended for maximum stability.

When picking up material with the grab, lift from side of tractor and discharge to rear. If you do the opposite, sudden movement of heavy loads when at the side of tractor could cause tipping.

Always check that hoses are not trapped, pinched, stretched or kinked. If you find a hose is rubbing, wind it with insulation tape or suitable alternative.

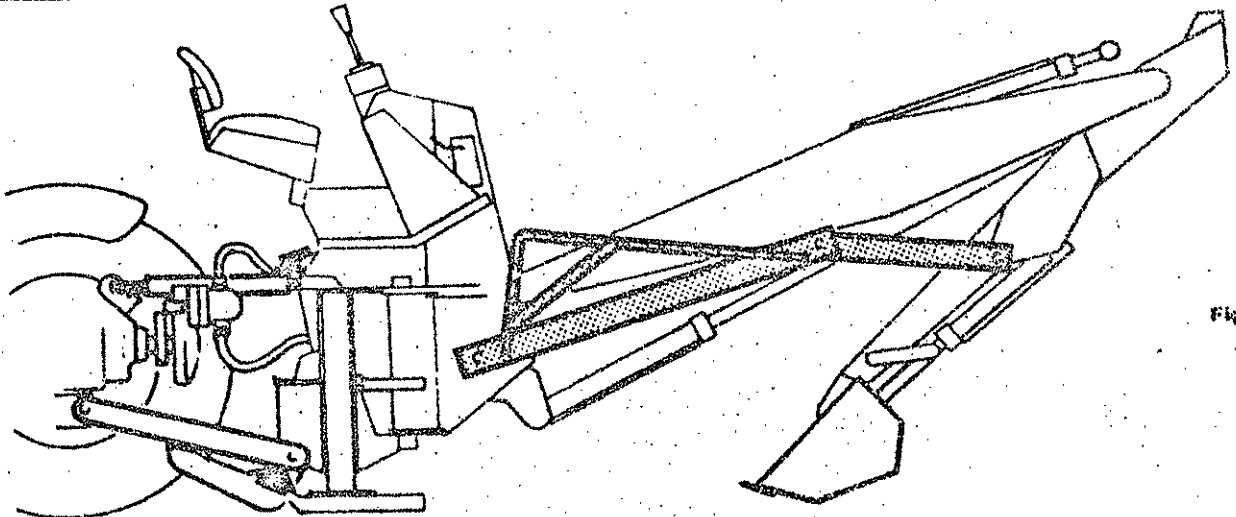


Fig. 1

SECTION I FITTING INSTRUCTIONS

1. Preparation of Tractor

Before fitting to your tractor, inspect for damage in transit and ensure that the oil level appears in the sight tube on front of Main Frame. Top up if necessary, but do not fill above sight tube level.

(a) Top Hitch:— IT IS IMPORTANT to attach the tractor top link to a fixed top hitch point, to lock the draught control rocker, and/or to set the tractor hydraulic controls to "ZERO DRAUGHT" to prevent operation of the draught control mechanism while working.

(b) Linkage Pins:— Cat. 1 pins are fitted. Sleeves for Cat. 11 are supplied in tool box.

(c) Stabilisers:— To prevent side sway, tighten check chains or stops, or fit at least one stabilising bar and adjust to bring machine central.

(d) Drop Links:— To avoid need for frequent adjustment of linkage levelling on uneven ground, set Drop Links (or "Lift Rods") in "FLOAT" position where possible.

(e) Ballast:— On light or short wheelbase tractors, front end ballast is strongly recommended.

2. Fitting Power Arm to Tractor

(a) Cut free all packing wire, set I.W.T. pedal to "TRANSPORT" position and lower Weight Transfer Arms to full extent.

(b) Connect up to tractor three point linkage (Fig. 1) and stabilise.

(c) Fit Pump unit to tractor P.T.O. shaft, ensuring that the locking device is properly engaged, and secure the torque bar and/or chain as shown in Fig. 2. Start tractor, engage P.T.O. drive, and set engine to idling speed.

(d) Disconnect the sling frame (shaded parts in Fig. 1) from the Slewing Column, Main Arm and Dipper, and remove.

(e) Extend the Lift Ram (R.H. knob 'UP') and fit the Rod End Pin (see Fig. 3).

(f) Raise the Main Arm, extend the Reach Ram (L.H. knob 'IN') and fit the Rod End Pin.

(g) Check that all hydraulic hoses have been correctly routed (see Figs. 4 & 5) and that no hose is trapped, pinched, stretched or kinked.

(h) Lubricate the machine thoroughly (see Fig. 11 and instructions on Page 6)

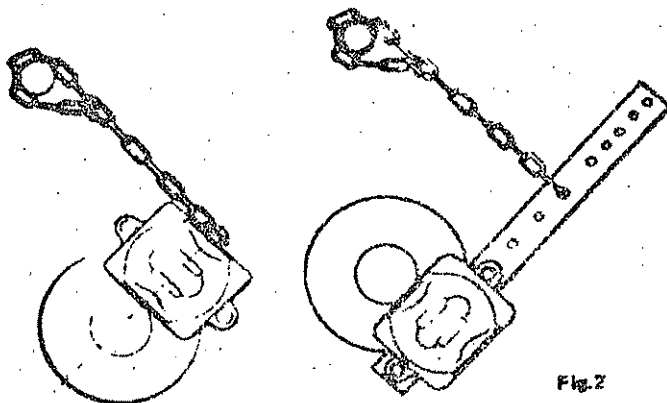


Fig. 2

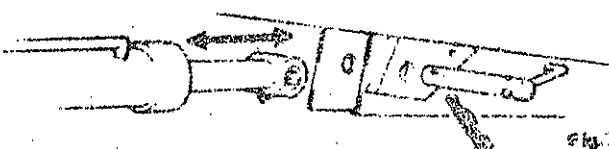


Fig. 3

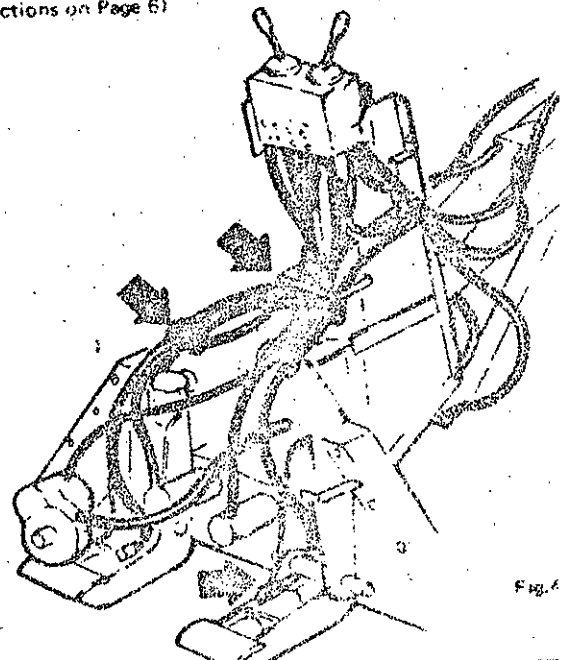
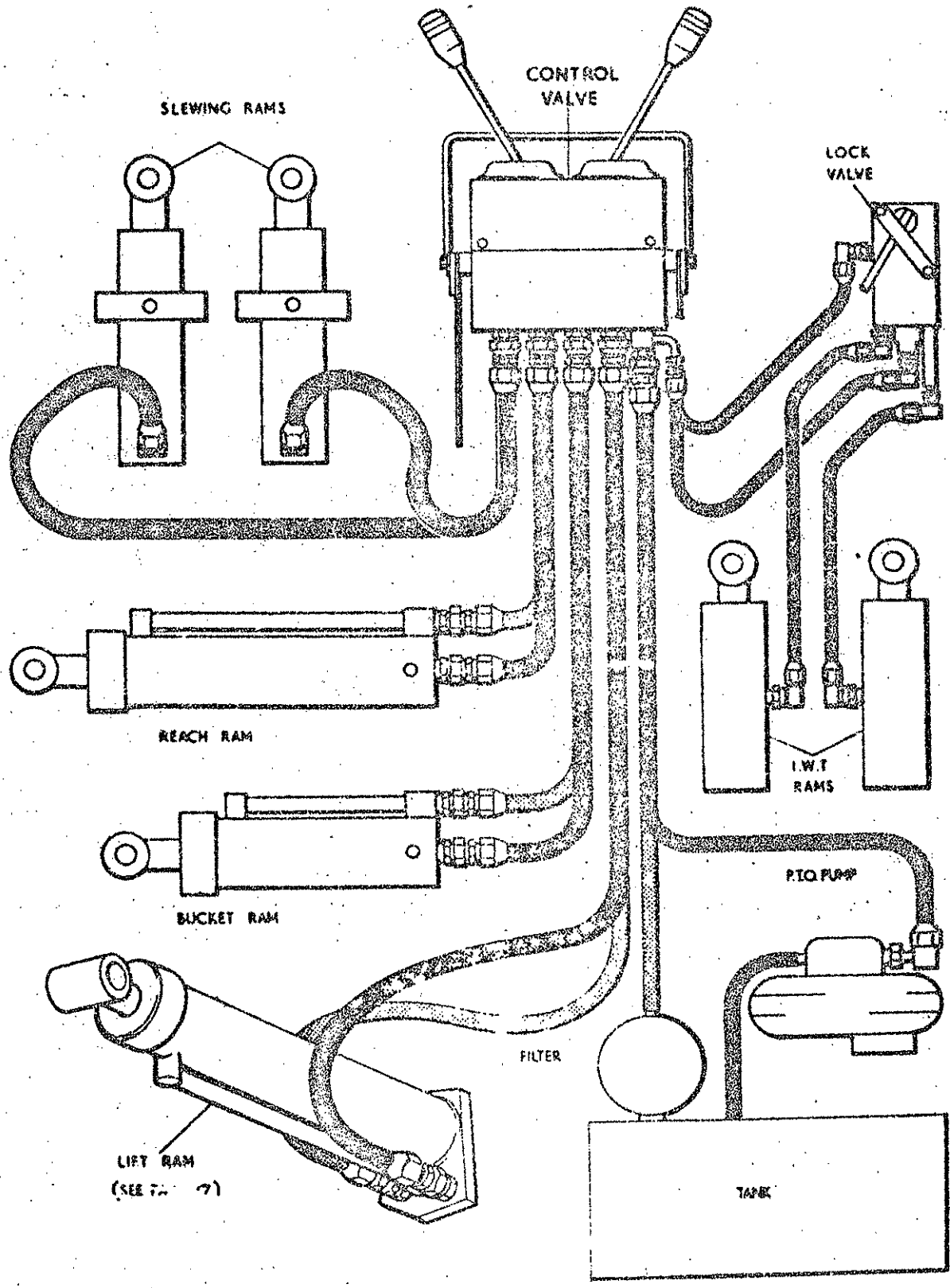


Fig. 4



HYDRAULIC CIRCUIT

Fig. 5

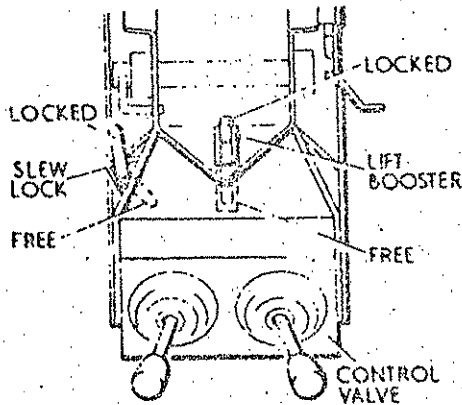


Fig. 6

3. Checking Controls — (see Fig. 6)

NOTE: Do not use excessive force on control levers.
DO NOT USE LEVERS AS HAND HOLDS FOR CLIMBING ON / OFF MACHINE.

(a) Lift Booster

The control may be used to lock the Lift Booster in either the 'MAXIMUM HEIGHT' or 'MAXIMUM DEPTH' position or to free the Lift Booster to give a floating action of the Lift Ram when grading a trench bottom. To adjust, place bucket on ground and set control to 'FREE' position. Operate Lift Ram and use control if required to lock Lift Booster.

NOTE: If No. 14D Loader Arm is used, lock the Lift Booster in 'MAXIMUM HEIGHT' position and fit Safety Pin through Slewling Column to avoid accidental damage to Lift Bar.

(b) Instant Weight Transfer (I.W.T.)
 (see diagram on toolbox lid)

Set Pedal to "WORKING" position and operate Lift Ram. The I.W.T. Arms should lift into engagement with the tractor draught links and pre-load the top link in compression. Check that operation of the Pedal in either direction releases the pressure from the I.W.T. Rams.

NOTE: Before raising the machine on the tractor linkage for transport, the I.W.T. Pedal must be set in the "TRANSPORT" position to lock the I.W.T. Rams out of action.

(c) Hydraulic Control Unit (H.C.U.)
 (see coloured arrows on H.C.U. cover).

The 24S Hy-Fi valve fitted to the "Double D" locates all rams safely unless the pump is working. The arm can only be lowered under power, but the machine is safe when the tractor and will not collapse or topple over should the levers be moved by accident.

WARNING: If any lever operates the wrong ram or fails to operate a ram at all, STOP AT ONCE and check the hose connections against the circuit diagram (Fig. 5). If the correct ram is operated in the wrong direction, check over the connections at the ram.

Check operation as follows:

- (i) R.H. Lever 'UP' to lift Main Arm to full extent. Leave up.
- (ii) L.H. Lever 'OUT' to extend Dipper Arm to full extent, then 'IN' to full extent and 'OUT' again. Leave fully extended.
- (iii) R.H. Lever 'CLOSE' to close bucket fully, then 'OPEN' fully. Leave closed.
- (iv) Set Slew Lock in 'FREE' position. (See Fig. 6)
- (v) L.H. Lever 'LEFT' & 'RIGHT' through full 180° slew travel several times. Leave arm control.
- (vi) R.H. Lever 'DOWN' to lower Main Arm and press Bucket hard onto ground, and check that I.W.T. Rams prevent machine lifting clear of ground.

4. Tractor Linkage

WARNING: THE MACHINE SHOULD ONLY BE LIFTED ON TRACTOR LINKAGE WITH ARM IN CENTRAL POSITION

Raise the Main Arm, close bucket and bring right slew to centre position and engage Slew Lock. Tip seat rearwards if necessary to clear tractor cab roof. Set I.W.T. pedal to "TRANSPORT" position, and operate tractor's "Position Control" Lever to raise machine for transport. Ensure that Hoses, P.T.O. pump, etc., are not endangered by operation of three point linkage, and that check chains and/or stabilisers effectively prevent sideways in raised position.

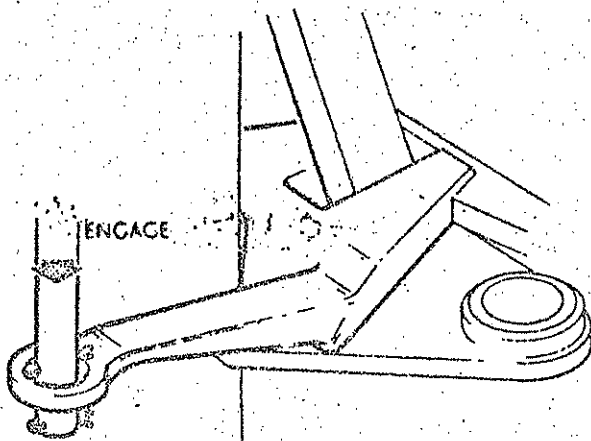
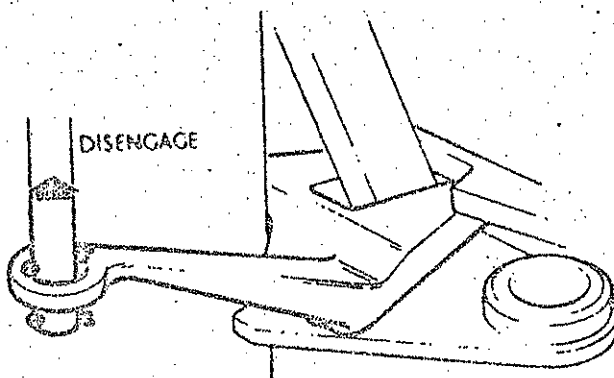


Fig. 7



5. Transporting

When travelling on public roads, check that the Slew Lock is properly engaged, (see Fig.7) and that on tractors with independent P.T.O. and hydraulics the P.T.O. drive is disengaged. Ensure that there is sufficient weight on the front wheels for safe steering uphill.

6. Operating

Before operating ensure that the machine is serviced — see SECTION 2.

(a) Adjustable Legs

Leg setting can be altered to give maximum digging depth, loading height, or reach over wire. After any alteration, adjust top link to bring machine vertical. For all "Slew Loading" operations, set the feet to maximum width for increased stability. For trenching across slopes, or other work with unequal leg settings, adjust the tractor linkage levelling to avoid excessive load on drop links.

(b) Skid Feet (see Fig.8)

Each foot may be turned through 120° to prevent backsliding when trenching, or set "fore and aft" to allow machine to be "Trilled" over minor irregularities without lifting. This is particularly effective on soft ground, or when climbing steep slopes. In very adverse conditions, lengthen the top link slightly to give more "lift" to the feet, and use tractor hydraulic lift to give required weight transfer for best traction.

DO NOT ATTEMPT TO REVERSE TRACTOR WITH MACHINE ON GROUND.

(c) Digging/Loading

IT IS IMPORTANT TO PREVENT OPERATION OF THE TRACTOR "DRAUGHT CONTROL" MECHANISM WHILE WORKING. Position machine on site and proceed:—

- (i) On all tractors, lower machine to ground, leave "Position Control" lever right down, and select "ZERO" or "MINIMUM" Draught.
- (ii) DO NOT "ISOLATE" THE LINKAGE, as this prevents correct operation of the I.W.T. mechanism.
- (iii) Engage P.T.O. drive and adjust engine speed as required.

THE POWER YOU WASTE OVERHEATS THE OIL.

If you drive a car on full throttle, using the brake to control your speed THEY GET HOT! So will your oil if you use excessive engine speed for your rate of work. An efficient operator will adjust engine speed down to 300 r.p.m. at the P.T.O. without losing output on precise work like trenching, and only open up when he can use the power without overheating.

(iv) Set I.W.T. Pedal to "WORKING" position, free Slew Lock, and use "Double Joysticks" to operate machine. Whatever hydraulic pressure is used to work the machine is fed to the I.W.T. Rams, and locked in to prevent the machine lifting or tilting while in work (up to the limit of the tractor weight).

(v) The force used to move a control lever has no effect on the power of the ram it controls. When a ram "stalls" at end of stroke or against an obstruction, the H.C.U. Relief Valve will operate. Persistent "blowing" of the Relief Valve will cause overheating, with risk of damage to the Pump, Valve and Ram Seals. Obstructions should be cleared by taking smaller bites and working round the obstacle to loosen it, rather than by brute force.

(d) Pushing Forward

To re-position tractor and machine between ditch or trench sections, dig Bucket toes into ground behind machine, depress I.W.T. Pedal fully, and operate Lift, Reach and Bucket Rams to push tractor along. Then release the I.W.T. Pedal and continue digging.

When depressed, the I.W.T. Pedal releases pressure from the I.W.T. Rams and allows the machine to lift clear of the ground independent of the tractor while pushing, and thus avoid any tendency to "dig in" the front wheels.

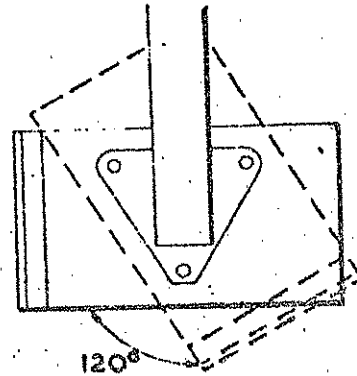
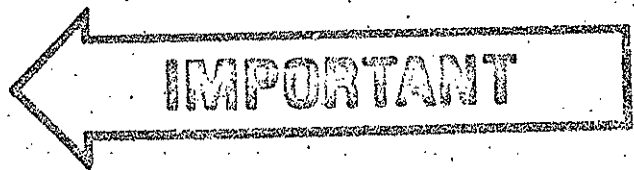


Fig.8



(e) High/Low Arm Change

The Main Arm has alternative pivot positions on the Slewling Column. Change from 'LOW' to 'HIGH' position by following the letter sequence below in Fig.9.

- (a) With Reach Ram extended 4" - 6", open Bucket and dig into ground to act as an anchor. Lock Lift Booster in "MAX. HEIGHT" position. N.B:- If Extra Long Arm is fitted, the Lift Ram must be fitted to the upper pair of holes in the Lift Booster.
- (b) Drive out Main Arm Pivot Pin.
- (c) Extend the Lift Ram to clear the Slewling Column, then, by operation of the Reach and Lift Rams, set the Main Arm into the 'HIGH' pivot position and refit the Pivot Pin.
- (d) Drive out the Lift Ram Base End Pivot Pin, shorten the ram, and refit the pin in either of the three pairs of holes on the Slewling Column.

To change from "HIGH" to "LOW", reverse the above instructions, i.e. shift ram first and arm second.

(f) Changing Buckets (See Page 20)

The standard machine is supplied with a Dipper Arm Lower Half with widespread Bucket Pivots secured by spring dowels (see fig.10). To change Buckets proceed as follows:

- (i) Remove Bucket Pivot Pins and close the ram centres to avoid damage to the piston rod.
- (ii) Drive out spring dowels and Bucket Pivots
- (iii) Refit in reverse order to above.
- (iv) Grease thoroughly before using.

NOTE: (i) For trenching operations a shorter Dipper Arm Lower Half is fitted to give more power at the bucket, and this has a single, narrow, boss end. For fitting instructions, see Parts List, Page 21

(ii) When a Pick Tine is fitted, the Ejector Latch (Pt. No. 70-12-039) is not required and must be removed, complete with pins, from the Dipper Arm.

7. Accessories

(a) Fitting instructions are included in the Parts List section for the following accessories:

- (i) Special Purpose Buckets and Grabs.
- (ii) Turt Discs -- Straight and Sheep Drain.
- (iii) Scraper Blade.
- (iv) Swivel Knuckle for fitting Grabs to No. 12D Dipper Arm.
- (v) Dipper Arm Extra Long.

(b) Fitting and Operating Instructions for the following attachments are supplied as applicable:-

- (i) Bucket Mower.
- (ii) No. 14D Slow Loader Arm.
- (iii) All-weather Cab.

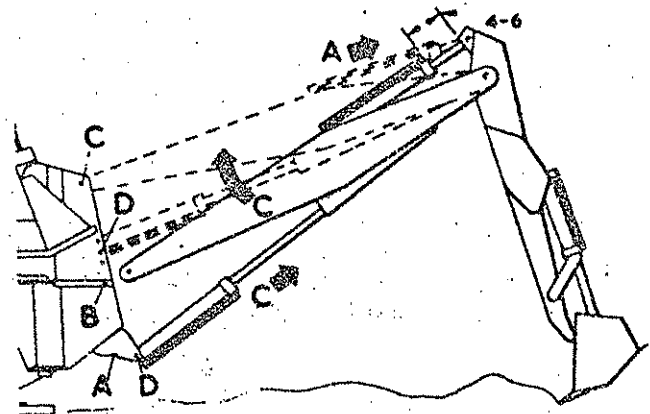


Fig.9

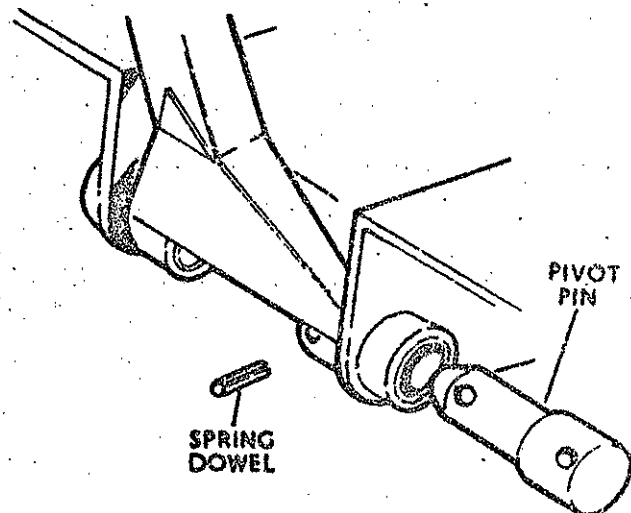


Fig.10

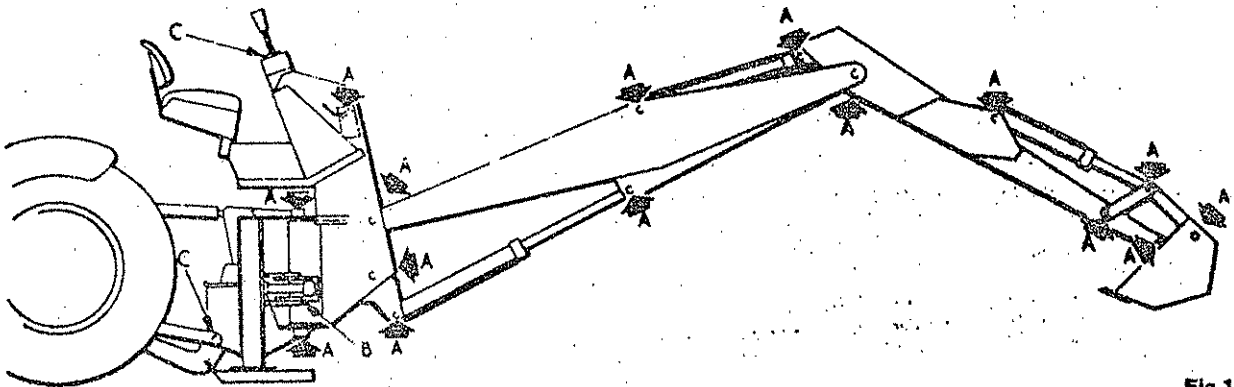


Fig.11

SECTION 2 MAINTENANCE

8. Lubrication (see Fig. 11)

- (a) Grease daily before use all grease nipples indicated by arrows on chart.
- (b) Oil twice daily during operation all Slew Ram and Slew Link Pivots.
- (c) Oil once weekly during operation I.W.T. Arm and Rocker Pivots and H.C.U. Lever Pivots.

9. Filter (see Spares List, Page 30 for details)

The Filter is mounted on the front of the Tank Frame above the Sight Tube, and should be cleaned daily during the first week's working, and weekly thereafter. Remove the Spring Cotter, turn the plug through 90° and pull out, remove filter element and replace plug to minimise the oil loss. Clean filter element by washing thoroughly in paraffin and/or blowing through with air, and replace CLOSED END FIRST in the filter body. Lock with Spring Cotter.

10. Hydraulic Control Unit, Instant Weight Transfer Valve and Pump.

THESE UNITS MUST NOT BE STRIPPED OR ADJUSTED UNLESS BY DIRECT AUTHORISATION FROM SERVICE MANAGER, F.W. McCONNEL LTD., LUDLOW.

- (a) The complete units are adjusted and tested at our Works before despatch.
- (b) Should there be any internal failure or malfunction which cannot be cured by use of Fault Finding Chart, a SERVICE UNIT should be obtained from our Works. (Quote Serial No. of faulty unit on application). On receipt of the Service Unit, the COMPLETE faulty unit must be returned to our Works, using the Service Unit Packing Case, for inspection and repair before any Warranty Claim can be dealt with.
- (c) Certain items only of the Control Valve Unit may be obtained and fitted by the user. (See Parts List on Page 17).

11. Flexible Hoses

- (a) Always replace one hose at a time to avoid risk of wrong connections.
- (b) Where the hose is connected to a screwed-in nipple or union, use a second spanner on the flats of the union to prevent breaking both seals.
- (c) Ensure that both halves of all connections are clean and free from scores. If possible, wash them in clean paraffin etc., before making the joint.
- (d) NEVER USE JOINTING COMPOUND ON THE THREADED JOINTS.
- (e) Ensure that full movement of the machine will not endanger the hoses.

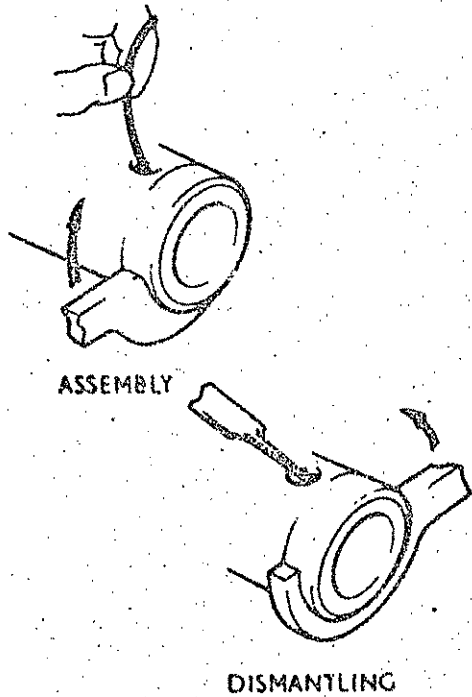


Fig.12

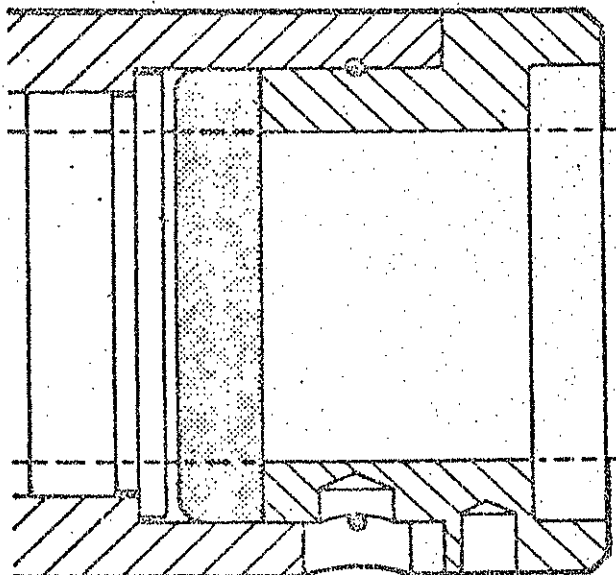


Fig.13

12. Replacing Ram Seals – General Notes

- (a) Wherever possible, remove ram from machine or strip and re assemble on a CLEAN bench.
- (b) Wash dirt off components with paraffin only. Lay out on clean paper to dry.
- (c) Where a vice is used, grip the ram cylinder by the base plug only and piston rods by the rod end only.
- (d) Inspect all piston rods for damage. Even very small dents or scores can wear a groove in a seal which will then leak.

DO NOT ATTEMPT TO REMOVE MARKS WITH FILE OR EMERY CLOTH. USE A VERY FINE OIL STONE.

(e) NEVER USE JOINTING COMPOUND TO cure a suspected leak, particularly on threaded parts.

13. Slew Ram and I.W.T. Ram Seals

- (a) Remove Slew Ram from machine as follows:
 - (i) Remove Rod End pin and union from bottom end.
 - (ii) Drive out roll pin and extract top ram pin by about 1/4".
 - (iii) Slide Ram out rearwards through frame.
- (b) Grip ram cylinder in vice and fit 'C' spanner. Head Bush as shown. Lever up straight end of Locking wire and rotate Head Bush one turn to force wire out (Fig. 12).
- (c) Withdraw Ram Rod and inspect for damage.
- (d) Withdraw Head Bush and extract Gland Seal and bronze liner for inspection. Examine Piston Rod Wire for signs of wear, and if at all suspect, replace by a new one.
- (e) To re-assemble, insert bronze liner and fit in Gland Seal ROUND END INWARDS. (Fig. 13). Head Bush loosely in position, insert Piston Rod and push right home. Fit 'C' spanner to Head Bush and turn until the hooked end of the Locking Wire can engage in the recess as shown. Rotate Head Bush through one turn to draw Locking Wire right home into grooves.

14. Lift, Reach or Bucket Ram Seals

- (a) Unscrew Gland Nut and withdraw Rod/Piston Gland Assembly from Cylinder.
- (b) Grip end faces of Rod End in vice. Remove Locking Wire from Nut and unscrew. Remove Nut and Piston (both halves) complete with Seals.
- (c) Inspect all seals for damage due to scores in cylinder barrel etc. Renew or replace seals as required.
- (d) Ensure that the Piston is assembled to the frame correctly. Tighten and lock securely on with S/Wire.
- (e) Insert Piston into Cylinder. Push home the Gland Housing and tighten the Gland Nut securely.

15. Replacement of Worn Parts

An illustrated list of all available spares will be found in the Parts List section commencing on Page 11

16. Ram, Arm and Bucket Pivot Pins and Bushes

Check all pivot pins and bushes periodically for signs of wear and replace as necessary. Fit correct spares. Use wrong or incorrectly locked pins will cause rapid wear of expensive parts.

17. King Pin, Bushes and Thrust Washer

(N.B. It is recommended that King Pin removal and replacement is handled by your dealer.)

Drive out pivot pins and remove in following order:—

- (a) Lift Ram, Main Arm, Slew Ram (Rod Ends only), Seat and Footboard.
- (b) Lift H.C.U. clear and disconnect all hoses from H.C.U. & I.W.T. valve.
- (c) Drive out spring dowel, remove King Pin and Slewing Column.
- (d) Check ends of King Pin, Bushes in Main Frame and Thrust Washers for wear and replace as necessary.
- (e) Refit Slewing Column and King Pin and check vertical alignment of Slew Rams and Links. IT IS IMPORTANT TO CORRECT ALIGNMENT by adding or removing additional thrust washers. (At least one $\frac{1}{8}$ " thick bronze or synthetic thrust washer must be used, steel shims $\frac{1}{16}$ " thick are available for accurate alignment).
- (f) Re-connect all hoses (See Figs 4 & 5). Refit H.C.U., Footboard, Seat, Arm and Lift Ram.
- (g) Lubricate thoroughly before use.

18. Bump Stops

THESE ARE IMPORTANT. Use of machine with ineffective bump stops can result in damage to slew mechanism or Main Arm. Replace as soon as the rubbers show signs of breaking up.

19. Bucket Tines

- (a) Keep these straight and sharp for good penetration in heavy soils.
- (b) Remove bent tines before attempting to straighten.
- (c) Make sure the two special bolts securing each tine are kept tight.

20. Storing out of season

No stand is needed as the machine is perfectly stable with its bucket or grab on the ground. For long term storage, fully open the bucket and extend the dipper, place bucket on ground, free lift booster and shorten lift ram as far as possible. Coat exposed Lift, Slew and I.W.T. ram rods with grease.

NOTE: A bucket, like a ploughshare, will work better when clean and polished through use. Coat exposed metal parts with anti-rust compound.

CHECK FOR WORN OR DAMAGED PARTS AND ORDER SPARES WHEN 'LAYING UP' to save delays when next required.

SPARE PARTS
For
S 12 DOUBLE-D
DIGGER LOADER

Always order spare parts from your dealer or stockist quoting the part number, machine type and serial number.

INTERPRETATION OF SPARE PARTS LIST

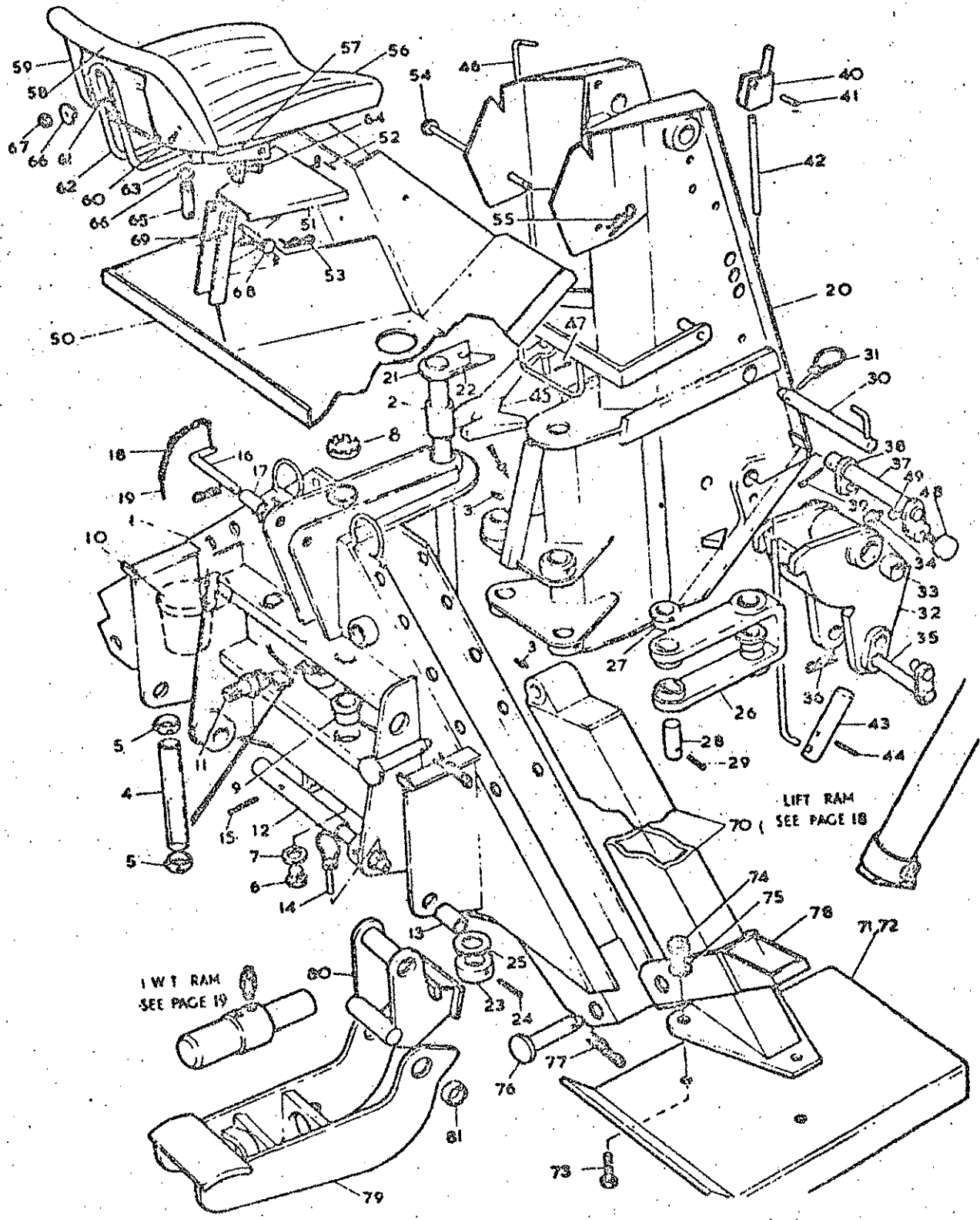
All machine parts, including accessories, are catalogued by a list of part numbers together with a description and an illustrated parts breakdown.

To ascertain that you are quoting the correct part number, locate the required item on the illustration, noting the illustration reference number. The illustration reference numbers are listed in numerical order and cross refer to the component part number, description and quantity fitted.

Many spares are supplied as Assemblies or 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 FRAME



SECTION 3 FAULT FINDING

21. Possible faults are given in Table I, with reference letters to their possible causes and remedies given in Tables II and III.

Table I (Type of Failure)	Table II (Reference)	Table III (Reference)
Failure to operate at all	a.b.c.d.e.f.g.	a.h.
Lack of power	a.b.d.f.j.k.p.q.	b.c.f.j.k.q.
Sluggish operation	a.b.d.f.g.j.k.p.q.	b.c.j.k.n.o.q.
Jerky or irregular operation	a.b.d.e.f.h.i.	b.c.f.g.
Incorrect response to Control Levers	a.b.e.	c.d.
Failure to operate Slew Rams	c.d.e.f.j.k.q.	d.e.j.o.q.
Failure to operate Lift Ram	c.d.e.f.j.k.q.	f.j.k.o.q.
Failure to operate Reach Ram	c.d.e.f.j.k.q.	j.k.o.q.
Failure to operate Bucket Ram	c.d.e.f.j.k.q.	j.k.o.q.
Failure to operate I.W.T. Rams	c.d.e.f.i.j.q.	c.g.h.j.
Lifting or tilting of machine while working	c.d.r.h.j.	c.e.g.h.o.p.
Inability to "Push Forward"	a.b.d.e.f.j.k.p.q.	c.f.g.h.j.k.p.
Failure to lift machine for transport	e.f.	c.g.h.l.
Excessive heating of oil	a.b.f.g.h.p.q.	j.k.l.m.o.q.
Repeated blowing of H.C.U. Relief Valve	e.f.g.i.q.	j.m.o.q.
Air in hydraulic system	a.b.d.o.p.	m.
Excessive loss of oil	b.c.d.j.l.	j.
Sticking Control Levers	i.m.o.	
Failure to hold selected position	a.b.c.d.h.i.j.k.	f.g.j.k.
"Backsliding" while trenching		c.e.f.g.h.p.
Repeated hose failures	e.o.	c.g.h.m.o.
Rapid wear of Ram Seals	l.o.	c.j.k.o.
Rapid wear of Pump Seals	l.o.	l.m.o.
Tractor Relief of Valve blowing		c.g.h.i.
Damage to pump	a.b.f.g.i.o.	b.l.m.o.
Rapid clogging of Filter	i.j.k.l.p.	j.

Table II (Hydraulic System Faults)

Cause	Remedy
a. Oil level too low.	Check sight tube and top up.
b. Leaking Suction Connection.	Check Hoses, Clips, Unions. Tighten or replace if necessary.
c. Burst Hose.	Replace. If repeated see TABLE I and SECTION 2
d. Loose connection.	Check and tighten.
e. Hoses wrongly connected.	See Figs. 4 & 5. Check ALL hoses.
f. Blocked hose.	Remove suspect hose. Check by blowing through BOTH WAYS. Replace.
g. Incorrect grade of oil.	Use Tractor Universal (Multigrade) Oil, S.A.E.20W/30 grade or similar.
h. Air in system.	See TABLE I.
i. Dirt in system.	Check and clean Filter. Drain Tank, flush out and refill.
j. Leaking Ram Gland Seals.	Refer to SECTION 2. If repeated, see TABLE I.
k. Leaking Ram Piston Seals.	Refer to SECTION 2. If repeated, see TABLE I.
l. Leaking Pump Seals.	Refer to SECTION 2. If repeated see TABLE I.
m. Seized Lever Pivots.	Remove "gaiters" from H.C.U. cover and oil lever pivots.
n. Hoses wrongly located.	See fig. 4, SAFETY INSTRUCTIONS and SECTION 2.
o. Overheating of oil.	See TABLE I.
p. Damage to Pump.	Refer to SECTION 2. For cause see Table I.
q. System Pressure too low	Refer to SECTION 2.

Table III (Faults in Operation)

Cause	Remedy
a. Pump drive not engaged.	Check proper fitting of pump on P.T.O. shaft. Engage P.T.O. clutch.
b. Tractor engine governor faulty.	See SECTION 2.
c. I.W.T. P. in wrong position.	See SECTION 1, Paras 3 and 6.
d. Slew Lock engaged.	See fig. 6.
e. Machine not level.	See SECTION 1, Para 6(a).
f. Incorrect use of Lift Booster Control.	See fig. 6 & SECTION 1, Para 3(a).
g. Tractor Draught Control Interference.	See SECTION 1, Para 1.
h. Tractor controls set incorrectly.	See SECTION 1, Para 6.
i. Inefficient Tractor Hydraulics.	Check against maker's specification.
j. Bent or damaged Ram Piston Rod.	Inspect and replace.
k. Scored Cylinder Barrel.	Inspect and replace.
l. P.T.O. Pump incorrectly fitted.	See Fig. 2 & SECTION 1, Para 2.
m. Engine Speed too high.	See Para. 6(c) (iii).
n. Engine Speed too low.	See Para. 6(c) (iii).
o. Overloading of machine.	See Para. 6(e).
p. Incorrect setting of Skid Feet.	See Para. 6(b).
q. Seized Bearing.	Strip, clean, replace & LUBRICATE.

22. Checking System Pressure

Correct relief valve setting is 2,200 – 2,300 p.s.i. (168 Kg./cm²) with oil water.
Check as follows. –

- (a) Connect pressure gauge in place of either I.W.T. Ram.
- (b) Set I.W.T. Pedal to "WORKING" position and run pump at 300 r.p.m.
- (c) Close Bucket fully and note pressure obtained when ram reaches end of stroke.
N.B. Set I.W.T. Pedal to "TRANSPORT" position before disconnecting gauge.

23. Low Pressure Check

Proceed as follows: –

- (a) Stop engine, remove seat and footboard, and disconnect RETURN hose from Tank
- (b) Insert Return hose through tank filler to observe rate of return flow.
- (c) Run Pump at 300 r.p.m. of P.T.O. shaft and close Bucket to full extent.
- (d) OBSERVE RATE OF RETURN FLOW while operating R.H. lever to "CLOSE" at

24. Flow and Engine Speed Faults.

- (a) If Return Flow rate does not change when lever is operated
The reason for the loss of pressure is in the H.C.U. – Refer to SECTION 2.
- (b) If Engine speed decreases when lever is operated
The tractor engine governor should be serviced and adjusted to maker's specification.
- (c) If Engine speed remains steady, but return flow rate decreases or stops when
The reason for the loss of power is in the P.T.O. Pump or Tractor Hydraulic system. Re

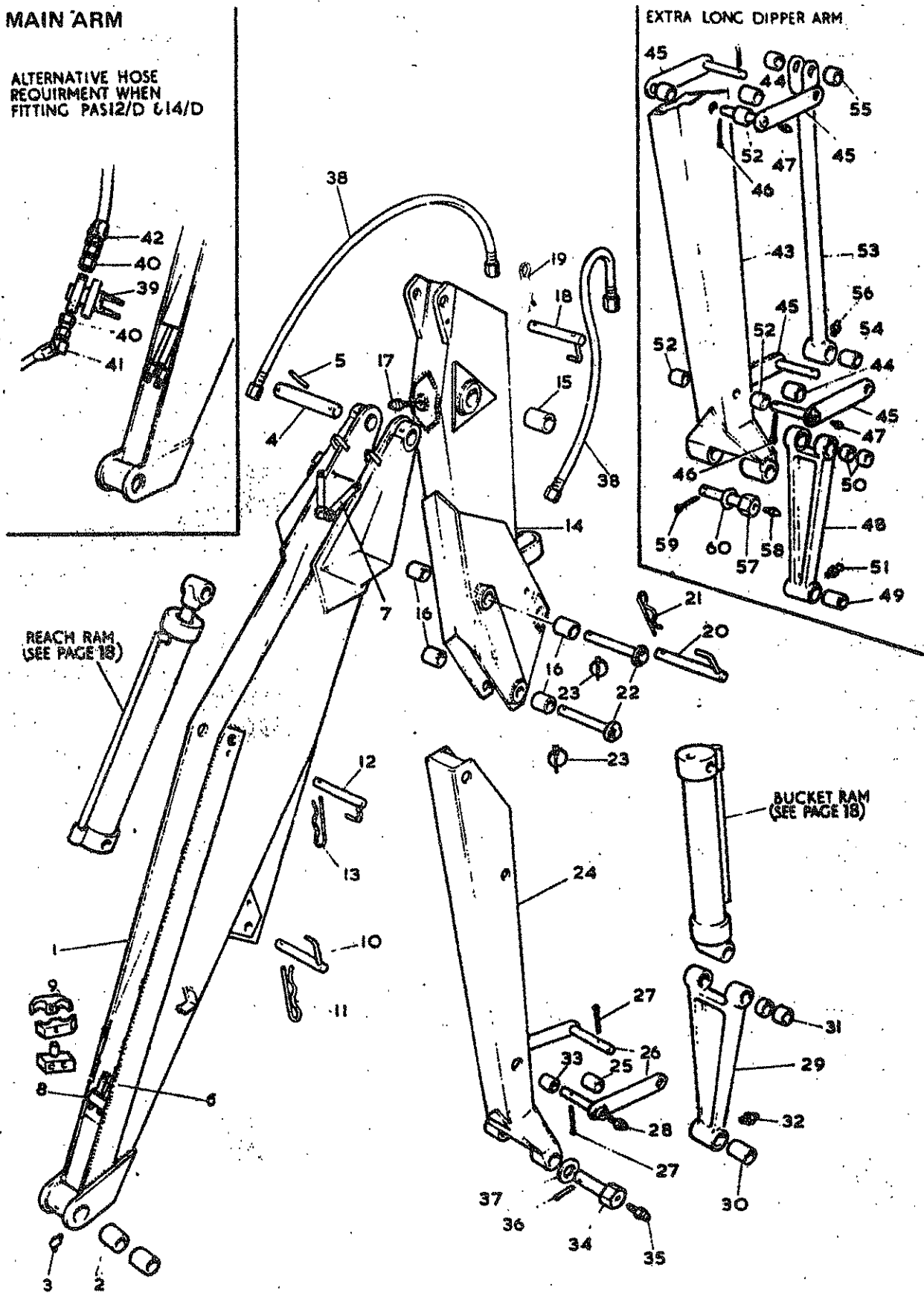
MAIN FRAME

Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
	71-03-350	1	P.A.S. 12 DOUBLE 'D' MAIN FRAME ASSEMBLY	60	03-11-031	7	.. 3/8" x 1/2" dia. UNF Setscrew
1	71-03-306	1	.. Main Frame c/w Bushes etc.	61	03-11-146	2	.. 1 1/2" x 3/8" dia. UNF Setscrew
2	71-03-084	2	.. King Pin Bush	62	71-03-064	1	.. Back Rest Support
3	09-01-121	2	.. Greaser	63	71-03-276	1	.. Seat Bracket c/w Setscrew
4	85-05-007	1	.. Oil Sight Tube	64	03-11-166	1	.. 2" x 3/8" dia. UNF Setscrew
5	09-04-106	2	.. Hose Clips	65	71-03-065	1	.. Clamp
6	60-01-124	1	.. Drain Plug c/w Washer	66	71-03-086	2	.. Cone Clamp
7	86-54-104	1	.. Washer	67	01-41-006	2	.. 7/8" UNF Aeronut
8	71-03-089	1	.. Filler Cap	68	71-01-085	1	.. Pivot Pin c/w Spring Cotter
9	71-02-173	4	.. Slew Link Bush	69	04-31-106	1	.. Spring Cotter
10	Filter Assy.	1		71-03-270	2	.. SLEW RAM ASSEMBLY	
11	71-03-072	1	.. Supply Connector	71-03-300	1	.. LONG STROKE LIFT RAM ASSEMBLY	
12	71-03-018	2	.. Linkage Pin c/w Sleeve etc.	71-03-257	1	.. ADJUSTABLE LEGS & LIGHT FEET ASSEMBLY, Comprising:-	
13	14-67-096	2	.. Sleeve Cat. II	70	71-01-272	2	.. Adjustable Legs
14	04-31-217	2	.. Lynch Pin	71	71-03-258	1	.. L.H. Skid Foot c/w Bolts, Nuts & Washers
15	04-22-632	2	.. 2" x 3/8" dia. Spring Dowel	72	71-03-259	1	.. R.H. Skid Foot c/w Bolts, Nuts & Washers
16	14-67-049	1	.. Top Hitch Pin c/w Sleeve and Chain	73	02-16-126	6	.. 1 1/2" x 3/8" UNC Bolts
17	14-67-063	1	.. Sleeve only	74	01-16-006	6	.. 3/8" UNC Nuts
18	09-02-108	1	.. Attachment Chain c/w Split Pin	75	01-00-206	6	.. 3/8" Spring Washer
19	05-03-083	2	.. 1" x 1/8" Split Pin	76	71-01-042	4	.. Leg Hinge Pin c/w Spring Cotter
20	71-03-264	1	.. Slewing Column	77	04-31-105	4	.. Spring Cotter
21	71-03-034	1	.. King Pin c/w Collar etc.	78	71-03-265	2	.. INSTANT WEIGHT TRANSFER LIFT ARM ASSEMBLY COMPLETE, Comprising:-
22	71-03-035	1	.. Locking Tail	79	71-03-266	2	.. Lift Arm
23	71-03-036	1	.. Collar	80	71-03-067	2	.. Reaction Bracket
24	04-22-632	1	.. 2" x 3/8" dia. Spring Dowel	81	60-12-032	4	.. Bush
25	80-01-136	1	.. Thrust Washer	71-03-267	2	.. I.W.T. RAM ASSEMBLY	
26	71-02-172	2	.. Slew Link c/w Bushes	80-09-251	1	.. VALVE CHEST ASSEMBLY c/w HOSES & I.W.T. EQUIPMENT	
27	71-02-173	8	.. Slew Link Bush				
28	71-02-174	4	.. Slew Link Pivot Pin c/w Spring Dowel				
29	04-22-528	4	.. 1 1/2" x 3/16" dia. Spring Dowel				
30	71-03-037	1	.. Main Arm Pivot Pin c/w Lynch Pin				
31	04-31-217	1	.. Lynch Pin				
32	71-03-256	1	.. Lift Booster c/w Bushes & Greaser				
33	60-12-032	2	.. Steel Bush				
34	09-01-121	1	.. Greaser				
35	71-03-038	1	.. Lift Ram Base Pivot Pin c/w Spring Cotter				
36	04-31-105	1	.. Spring Cotter				
37	71-03-039	1	.. Lift Booster Pin c/w Tail & Split Pin				
38	71-03-040	1	.. Tail				
39	05-03-165	1	.. 2" x 3/16" Split Pin				
40	71-03-041	1	.. Lift Booster Operating Lever c/w Spring Dowel				
41	04-21-720	1	.. 1 1/2" x 7/32" dia. Spring Dowel				
42	71-03-042	1	.. Lift Booster Operating Rod				
43	71-03-043	1	.. Lift Booster Plunger c/w Spring Dowel				
44	04-22-528	1	.. 1 1/2" x 3/16" Spring Dowel				
45	71-03-044	1	.. Transport Lock				
46	71-03-045	1	.. Transport Lock Operating Rod c/w Split Pins				
47	05-03-095	2	.. 1 1/8" x 3/16" Split Pin				
48	71-03-046	2	.. Slewing Buffer c/w Nut				
49	01-43-003	2	.. 3/8" BSF Aero Nut				
50	71-03-260	1	.. Rear Control Mounting Assembly c/w Lid & Pin, comprising:-				
51	71-03-053	1	.. Lid c/w Spring Dowel				
52	04-20-820	1	.. 1 1/2" x 1/8" Spring Dowel				
53	04-31-105	1	.. Spring Cotter				
54	71-03-054	1	.. Pin c/w Spring Cotter				
55	04-31-106	1	.. Spring Cotter				
	71-03-273	1	.. Seat assembly c/w pin, comprising:-				
56	71-03-274	1	.. Seat Pan - Upholstered				
57	71-03-286	1	.. Seat Pan - Outer				
58	71-03-275	1	.. Back Rest - Upholstered				
59	71-03-287	1	.. Back Rest - Outer				

MAIN ARM

ALTERNATIVE HOSE
REQUIREMENT WHEN
FITTING PAS12/D 614/D

EXTRA LONG DIPPER ARM



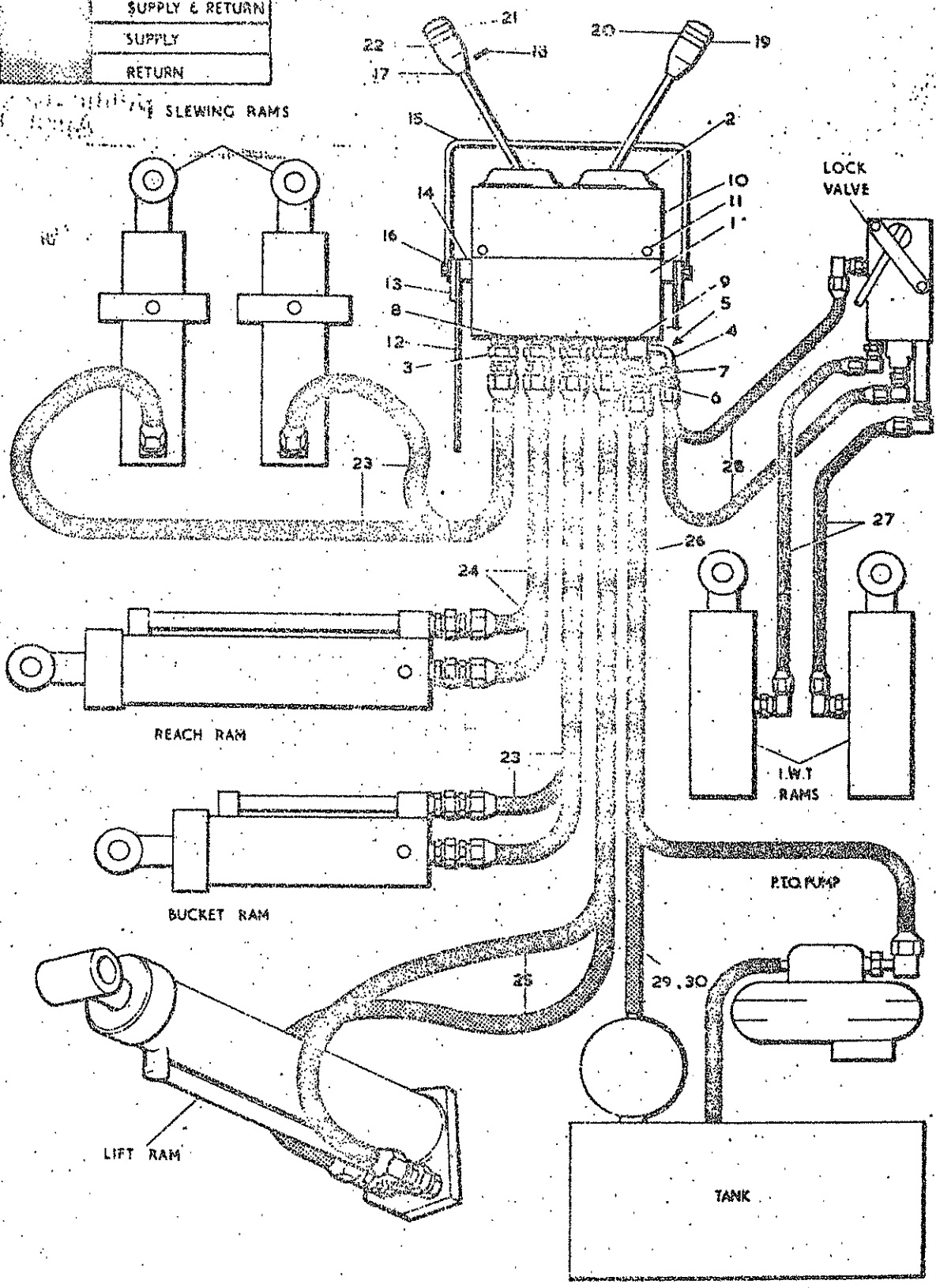
MAIN ARM

Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
				49	71-05-050	1	.. Steel Bush
				50	70-12-037	4	.. Steel Bush
	72-13-262		12D MAIN ARM DITCHER TRENCHER ASSEMBLY, Comprising:-	51	09-01-121	1	.. Greaser
				52	71-05-089	6	.. Sleeve
	72-13-263	1	MAIN ARM ASSEMBLY, Comprising:-	53	72-12-267	1	.. Slave Link (Long) c/w Bushes & Greaser
1	72-12-264	1	.. Main Arm c/w Bushes & Greaser	54	71-05-050	1	.. Steel Bush
2	71-01-134	2	.. Steel Bush	55	70-12-037	2	.. Steel Bush
3	09-01-124	1	.. Greaser	56	09-01-121	1	.. Greaser
4	71-05-031	1	.. Reach Arm Pivot Pin c/w Spring Dowel	57	71-05-074	2	.. Bucket Pivot Pin c/w Greaser & Spring Dowel
5	04-22-632	2	.. 2" x 7/8" dia. Spring Dowel	58	09-01-121	1	.. Greaser
6	72-13-001	2	.. Rigid Pipe	59	04-22-628	2	.. 1 1/2" x 3/8" dia. Spring Dowel
7	72-13-002	2	.. 45° J.I.C. Union - Rigid Pipe	60	72-12-006	2	.. Bucket Washer
8	72-13-003	2	.. Union J.I.C. - Rigid Pipe				
9	72-12-017	1	.. Hose Bracket Assy complete, comprising				
	72-12-020	1	.. Hose Bracket				
	60-12-026	2	.. Pipe Clamp				
	01-61-003	1	.. 3/8" UNF Aero Nut				
10	71-05-051	1	.. Rod End Pin c/w Spring Cotter				
11	04-31-105	1	.. Spring Cotter				
12	72-12-019	1	.. Ram Base Pin c/w Spring Cotter				
13	04-31-105	1	.. Spring Cotter				
	72-12-266		DIPPER ARM ASSEMBLY - UPPER, Comprising:-				
14	72-12-267	1	.. Dipper Arm Upper, c/w Bushes & Greaser				
15	71-01-134	2	.. Steel Bush				
16	70-12-037	4	.. Joint Pin Bush				
17	09-01-124	1	.. Grease Nipple				
18	71-05-051	1	.. Rod End Pin c/w Spring Cotter				
19	04-31-105	1	.. Spring Cotter				
20	71-05-033	1	.. Ram Base End Pin c/w Spring Cotter				
21	04-31-105	1	.. Spring Cotter				
22	71-05-032	2	.. Arm Joint Pin c/w Spring Cotter				
23	04-31-105	2	.. Spring Cotter				
	72-12-257		DIPPER ARM ASSEMBLY - LOWER HALF WIDE, Comprising:-				
24	71-05-311	1	.. Ditcher Arm c/w Bushes				
25	70-12-037	2	.. Bush				
26	71-05-088	2	.. Radius Arm Pin c/w Split Pin & Greaser				
27	05-03-165	2	.. Split Pin				
28	09-01-121	2	.. Greaser				
29	71-05-315	1	.. Slave Link c/w Bushes & Greaser				
30	71-05-050	1	.. Steel Bush				
31	70-12-037	4	.. Steel Bush				
32	09-01-121	1	.. Greaser				
33	71-05-089	2	.. Sleeve				
* 34	71-05-074	2	.. Bucket Pivot Pin c/w Greaser & Spring Dowel				
35	09-01-121	2	.. Greaser				
36	04-22-628	2	.. 1 1/2" x 3/8" dia. Spring Dowel				
37	72-12-006	2	.. Bucket Washer				
38	85-11-328	2	.. Flexible Hose J.I.C. 32" Long				
	71-03-301	1	REACH RAM Complete				
	71-03-302	1	BUCKET RAM Complete				
REQUIREMENTS FOR FITTING PAS12/D/14D:-							
39	72-12-017	1	Hose Bracket replaced by:-				
40	72-13-003	4	Hose Bracket				
			Rigid pipe J.I.C. end fitting				
	85-11-878		Standard Reach Ram Hose from H.C.U. replaced by:-				
41	85-41-498	2	Flexible Hose J.I.C. 49" Long				
42	85-11-328	2	Flexible Hose J.I.C. 32" Long				
	72-12-264		DIPPER ARM ASSEMBLY LOWER HALF WIDE (EXTRA LONG) Comprising:-				
43	72-12-265	1	.. DIPPER ARM (EXTRA LONG) c/w Bushes				
44	70-12-037	4	.. Bush				
45	71-05-088	4	.. Radius Arm Pin c/w Split Pin & Greaser				
46	05-03-165	4	.. Split Pin				
47	09-01-121	4	.. Greaser				
48	71-05-315	1	.. Slave Link c/w Bushes & Greaser				

* See SERVICE INFORMATION SHEET No. 160/April '69

HYDRAULIC CIRCUIT

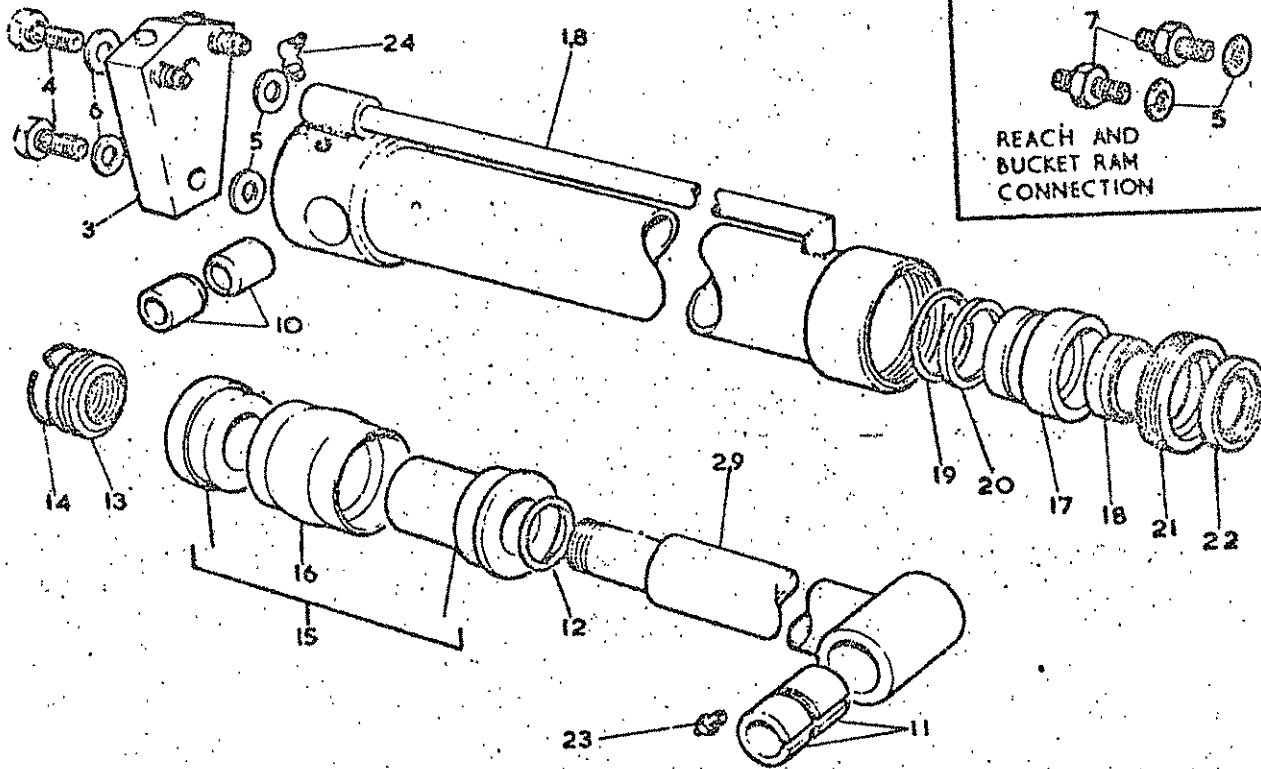
	SUPPLY & RETURN
	SUPPLY
	RETURN



HYDRAULIC CIRCUIT

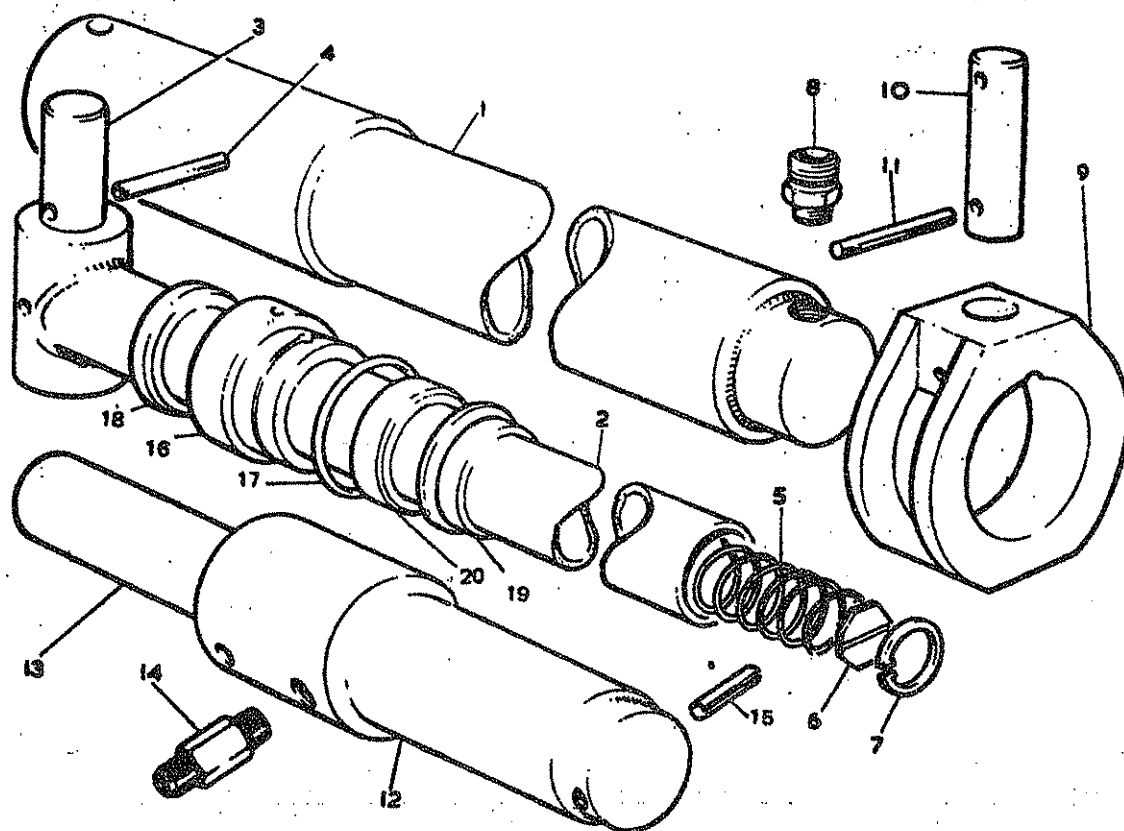
Ref. No.	Part No.	Qty.	Description
	80-09-251		ASSEMBLY OF 2-4S HY-FI H.C.U. c/w HOSES
1	81-14-401	1	Comprising:- 2-4S "HY-FI" H.C.U. ASSEMBLY
2	81-14-028	2	.. Lever Bolt
3	71-03-062	8	.. J.I.C. Union
4	81-14-065	1	.. Banjo
5	81-14-066	1	.. Banjo
6	81-14-067	1	.. Banjo Bolt
7	81-14-068	1	.. Banjo Bolt
8	86-50-103	10	.. 7/8" B.S.P. Bonded Seal
9	86-50-218	2	.. 1 1/8" dia. Bonded Seal
10	81-14-255	1	.. Cover c/w screws
11	81-14-057	4	.. Screws
12	80-09-002	2	.. Mounting Plate
13	80-09-003	2	.. Location Wedge
14	80-09-004	4	.. Spacer
15	80-09-006	1	.. Mounting Handle
16	03-12-123	4	.. 1 1/2" x 3/8" Unc. Hex. S/Screw
17	81-14-063	2	.. Knob c/w S/Dowel
18	04-20-812	2	.. Spring Dowel
19	81-14-060	1	.. Ring (Yellow)
20	81-14-051	1	.. Ring (Green)
21	81-14-062	1	.. Ring (Red)
22	81-14-053	1	.. Ring (Black)
23	85-41-498	4	.. Flexible Hose 49" Long for Slew and Bucket Line
24	85-11-878	2	.. Flexible Hose 87" Long for Reach Ram
25	85-11-608	2	.. Flexible Hose 60" Long for Lift Ram
26	85-31-808	1	.. Flexible Hose 80" Long for Supply
27	85-74-666	2	.. Flexible Hose 66" Long for I.W.T.
28	85-34-186	2	.. Flexible Hose 18" Long for I.W.T.
29	85-95-037	1	.. Rubber Return Hose 37" Long
30	09-04-204	2	.. Hose Clip
31	81-16-250	1	.. Lock Valve

IFT, REACH & BUCKET RAMS



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
	71-03-300	1	LONG STROKE LIFT RAM COMPLETE, Comprising:	THE FOLLOWING PARTS ARE COMMON TO ALL THREE RAMS.			
	71-03-303	1	RAM ASSEMBLY, Comprising:	11	71-05-050	3	.. Bush - Rod End
1	71-03-304	1	.. Ram Cylinder	12	86-00-119	3	.. 'O' Ring for Piston Rod
2	71-01-095	1	.. Ram Rod c/w Bush, 'O' Ring, Nut & Greaser	13	71-01-096	3	.. Piston Nut c/w Locking Ring
3	71-03-305	1	.. Lift Ram Base Connection Assy. c/w Banjo Bolts & Seals	14	71-01-152	3	.. Locking Ring
4	71-01-079	2	.. Banjo Bolt	15	71-01-097	3	.. Piston Assembly c/w Seal
5	86-50-103	2	.. 3/8" BSP Bonded Seal	16	86-35-131	3	.. Piston Seal
6	86-50-104	2	.. 1/2" BSP Bonded Seal	17	71-01-099	3	.. Gland Housing c/w Seal & 'O' Ring
	71-03-301	1	LONG STROKE REACH RAM COMPLETE, Comprising:	18	86-22-127	3	.. Gland Seal
	71-03-303	1	RAM ASSEMBLY, Comprising:	19	86-00-304	3	.. 'O' Ring
1	71-03-304	1	.. Ram Cylinder	20	86-09-304	3	.. Anti Extrusion Ring
2	71-01-095	1	.. Ram Rod c/w Bush, 'O' Ring, Nut & Greaser	21	71-01-100	3	.. Gland Nut c/w Wiper
5	86-50-103	2	.. 3/8" BSP Bonded Seal	22	86-40-328	3	.. Piston Rod Wiper
7	71-03-062	2	J.I.C. Union	23	09 01-121	3	.. Greaser (Straight)
	71-03-302	1	LONG STROKE BUCKET RAM COMPLETE, Comprising:	24	09-01-124	3	.. Greaser (Angular)
	72-12-271	1	RAM ASSEMBLY, Comprising:				
8	72-12-272	1	.. Ram Cylinder				
9	72-12-004	1	.. Ram Rod c/w Bush, 'O' Ring & Nut				
10	71 01-158	2	.. Sleeve				
5	86-50-103	2	.. 3/8" BSP Bonded Seal				
7	71-03-062	2	J.I.C. Union				

SLEW & I.W.T. RAMS

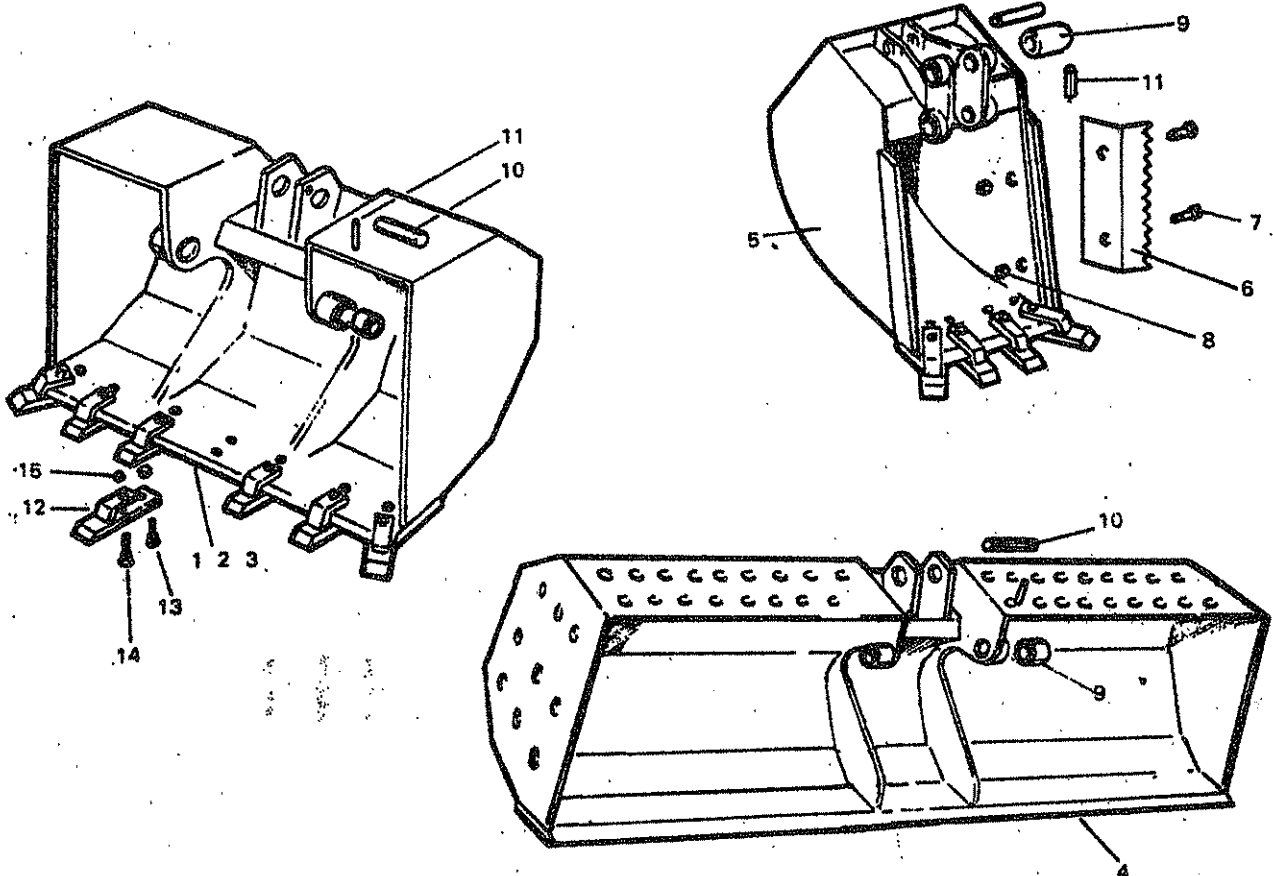


Ref. No.	Part No.	Qty.	Description
	71-03-270	2	SLEW RAM COMPLETE, Comprising:-
1	71-03-271	2	. Slew Ram Cylinder
2	71-03-272	2	. Slew Ram Rod c/w Pivot Pins & Cushions, etc.
3	71-02-176	2	.. Rod Pivot Pin c/w Spring Dowel
4	04-22-528	2	... 1 1/2" x 5/16" Spring Dowel
5	71-05-019	2	.. Spring
6	71-05-020	2	.. Cushion Plate
7	04-17-119	2	.. Spring Fastener
8	71-03-061	2	. Double Male Union
9	71-02-507	2	. Slew Ram Trunnion c/w Pivot Pin
10	71-02-177	4	.. Pivot Pin c/w Spring Dowel
11	04-22-528	4	... 1 1/2" x 5/16" dia. Spring Dowel
	71-03-267	2	I.W.T. RAM COMPLETE, Comprising:-
12	71-03-268	2	. Ram Cylinder Barrel
13	71-03-058	2	. Ram Rod
14	71-03-063	2	. J.I.C. Union
15	04-21-824	2	. 1 1/2" x 4" dia. Spring Dowel

THE FOLLOWING PARTS ARE COMMON TO BOTH RAMS:-

16	71-01-029	2	. Ram Head Bush c/w Locking Wire
17	71-01-030	2	.. Locking Wire
18	86-40-230	2	. Piston Rod Wiper
19	71-01-031	2	. Ram Insert
20	86-12-132	2	. Gland Seal

DEEP PROFILE DIGGING (HEAVY DUTY), WEED AND DITCH CLEANING BUCKETS

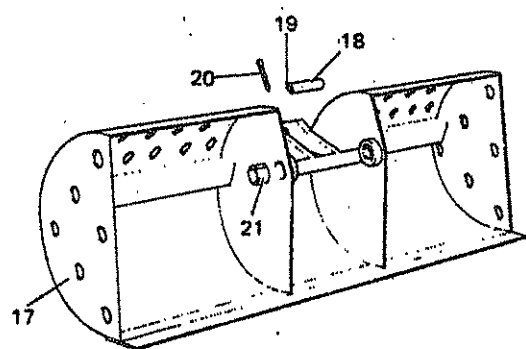
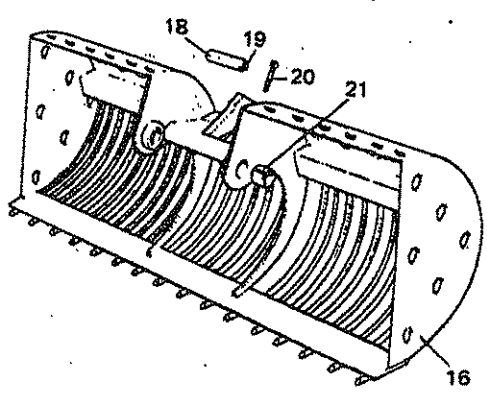


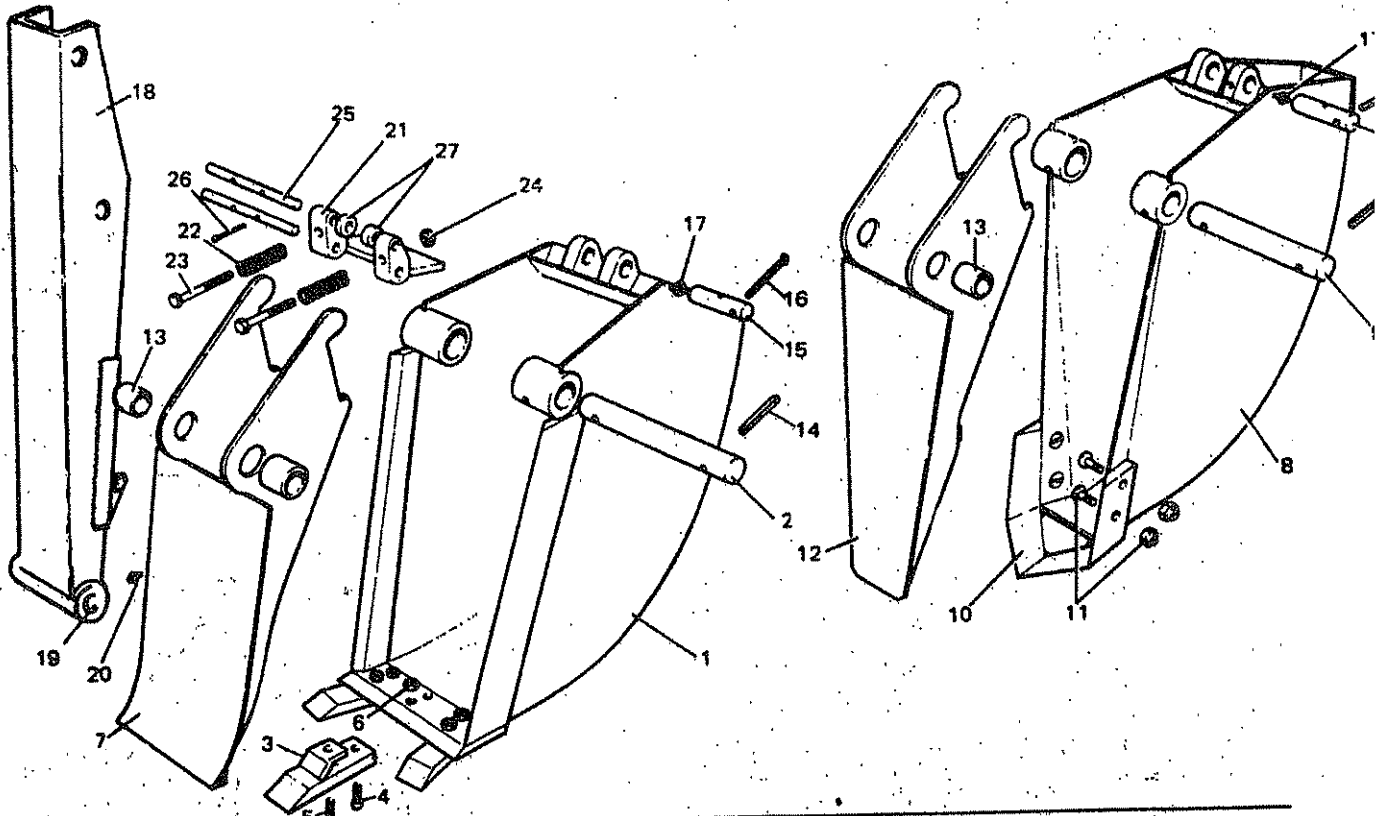
Ref. No.	Part No.	Qty.	Description
1	72-13-271	1	24" (Heavy Duty) Bucket complete,
2	72-13-272	1	30" (Heavy Duty) Bucket complete,
3	72-12-280	1	36" (Heavy Duty) Bucket complete,
4	72-13-279	1	60" (Light Ditch) Bucket complete,
5	72-13-288	1	18"/20" (Heavy Duty) Bucket complete,
			(Optional extra).
6	72-12-072	2	Side Lip Extension c/w Bolts and Nuts
7	02-11-134	4	... 1 5/8" x 7/16" UNF Hex. Bolt c/w Nut
8	01-41-044	4	... 7/16" UNF Aeronut

Ref. No.	Part No.	Qty.	Description			
THE FOLLOWING ARE VARIABLE QUANTITIES OF TINES AND BOLTS REQUIRED FOR EACH BUCKET						
		24"	30"	36"	18/20"	
12	60-12-073	6	8	9	4	Bucket 7/16" c/w Bolts and Nuts
13	60-12-034	6	8	9	4	... Tine Bolt (Short) c/w Nut
14	60-12-074	6	8	9	4	... Tine Bolt (Long) c/w Nut
15	01-12-004	12	16	18	8	... 7/16" UNC Nut
16	70-12-286	1	48" WEED BUCKET ASSEMBLY			
17	70-12-278	1	48" DITCH CLEANING BUCKET ASSY.			
18	60-12-061	1	Rod Pivot Pin c/w Splitpin			
19	09-01-021	1	... Grass Nipple			
20	05-03-246	1	... 3" x 1/4" dia. Splitpin			
21	60-12-032	2	Bucket Pivot Bush			

THE FOLLOWING PARTS ARE COMMON TO ALL DEEP PROFILE BUCKETS

9	72-13-023	2	Bucket Pivot Bush
10	72-13-021	1	Rod Pivot Pin
11	04-22-824	1	1 1/4" x 1/4" dia. Spring Dowel





Ref. No.	Part No.	Qty.	Description
1	70-12-290	1	11" TRENCHER BUCKET ASSEMBLY COMPLETE, comprising:-
2	70-12-061	1	.. 11" Bucket Pivot Pin c/w Spring Dowels
3	60-12-073	3	.. Bucket Tine c/w Tine Bolts & Nuts
4	60-12-074	3	.. Tine Bolt
5	60-12-034	3	.. Tine Bolt long
6	01-12-004	6	.. Plain Nut, UNC 7/16"
7	70-12-294	1	.. Ejector Plate
	70-12-072	2	.. Cheek Plate c/w Bolts & Nuts. (Optional extra as 18"/20")
8	70-12-258	1	5 1/2" TRENCHER BUCKET ASSEMBLY COMPLETE, comprising:-
9	70-12-036	1	.. 5 1/2" Bucket Pivot Pin c/w Spring Dowels
10	70-12-263	1	.. 5 1/2" Vee Shoe c/w Bolts & Nuts
11	70-12-030	4	.. Shoe Bolts & Nuts
12	70-12-261	1	.. Ejector Plate

Ref. No.	Part No.	Qty.	Description
THESE PARTS ARE COMMON TO BOTH ASSEMBLIES			
13	60-12-032	2	.. Bucket Pivot Bush
14	04-22-632	2	.. Spring Dowels
15	60-12-025	1	.. Rod Pivot Pin c/w Splitpin & Greaser
16	05-03-206	1	.. Splitpin, 2 1/4" x 1/4"
17	09-01-121	1	.. Greaser
18	71-05-321	1	DIPPER ARM LOWER HALF (NARROW) c/w BUSHES
19	60-12-032	2	.. Bucket Pivot Bush
20	09-01-124	1	.. Greaser
	70-12-040	1	EJECTOR LATCH ASSEMBLY, comprising:-
21	70-12-039	1	.. Ejector Latch
22	60-00-110	2	.. Spring
23	02-11-183	2	.. Bolt, UNF 2 1/4" x 7/8"
24	01-61-003	2	.. Nut - Nyloc, UNF 7/8"
25	70-12-041	2	.. Latch Pivot Pin c/w Splitpins
26	05-03-085	4	.. Splitpin, 1" x 7/16"
27	72-12-016	2	.. Ejector Roller

FITTING INSTRUCTIONS

TRENCHER BUCKETS

The following instructions apply to all Buckets etc. which fit the Dipper Arm Lower Half (Narrow) and use the common Ejector Latch mechanism.

Changing Dipper Arm Lower Half:-

- (a) Drive out Bucket Ram Pivot Pin and close Ram down to avoid damage to Rod.
- (b) Remove Dipper Arm Lower Half complete with Bucket, Slave Link, etc., leaving Bucket Ram in position on Dipper Arm Upper Half.
- (c) Fit Dipper Arm Lower Half (Narrow) complete with Bucket and secure with both Joint Pins and Spring Cotters.

Changing Bucket on Dipper Lower Half (Narrow):-

- (a) Drive out Bucket Ram Pivot Pin and close Ram down to avoid damage to Rod.
- (b) Drive out both Spring Dowels and remove Bucket Pivot Pin. (Early Bucket Pivot Pins were retained by headed pins and Split Pins. These may be replaced by Spring Dowels if desired). Remove Bucket, leaving Ram and Ejector Latch in position on Dipper Arm.

(c) Fit required. Bucket to Dipper Arm Lower Half with correct Bucket Pivot Pin and secure with both Spring Dowels through sideplate bosses.

IMPORTANT:- To avoid damage to the Bucket, BOTH Spring Dowels MUST be fitted.

(d) Adjust the stroke of the Bucket Ram, insert the Rod Pivot Pin (15) and secure with Split Pin (16).

Fitting Ejector Latch:-

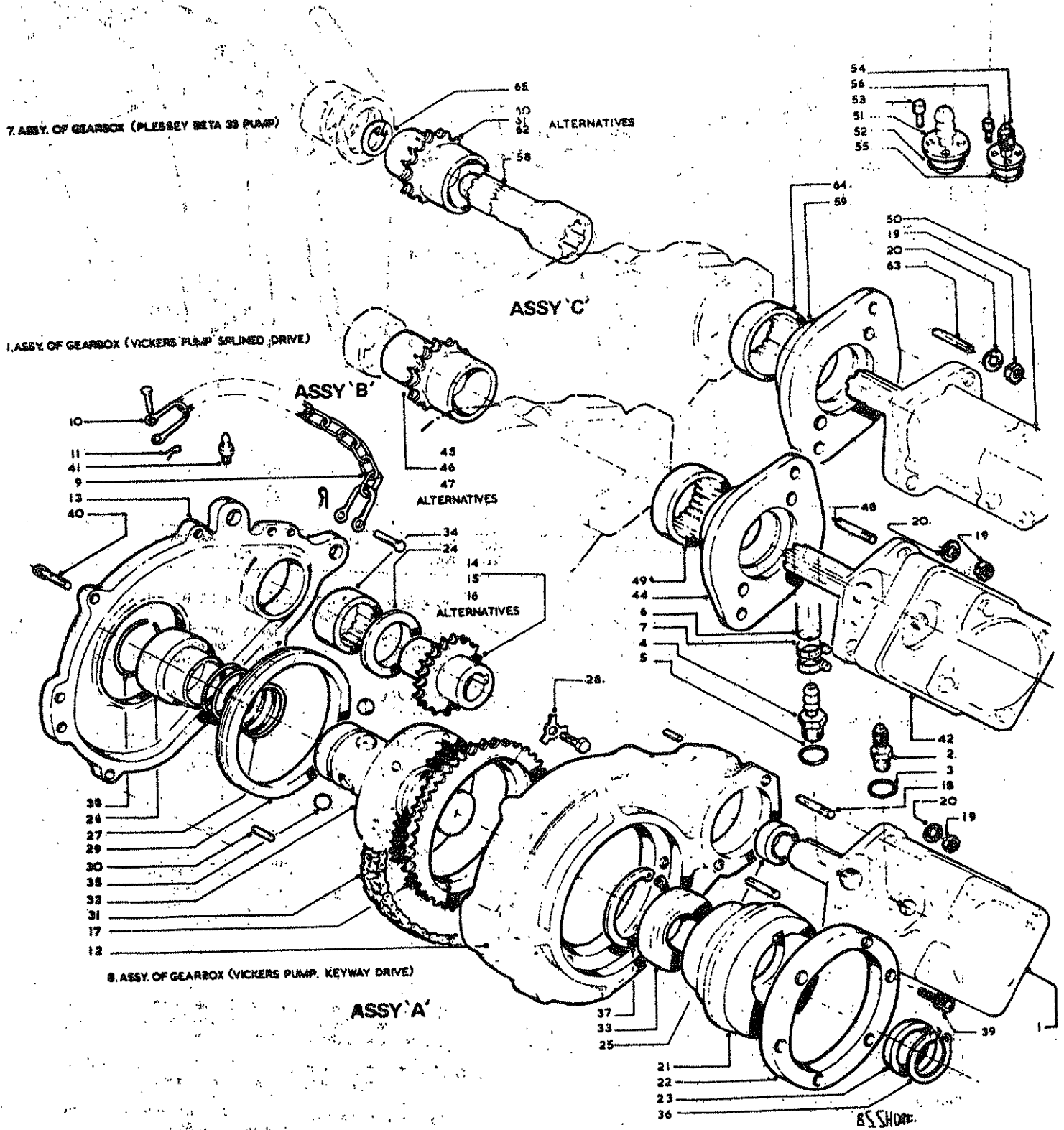
The Lower Latch Pivot Pin (25) must be fitted through the lugs on the Dipper Arm. The Ejector Rollers (27) are fitted to the Upper Latch Pivot Pin. Both Pins must be retained with two Split Pins (26).

IMPORTANT:- The Latch Spring Retaining Bolts (23) must always be fitted with the heads exposed for engagement with the Ejector side plates.

The Latch Springs (22) should be just unloaded when the Latch is disengaged.

GREASE THOROUGHLY BEFORE USE.

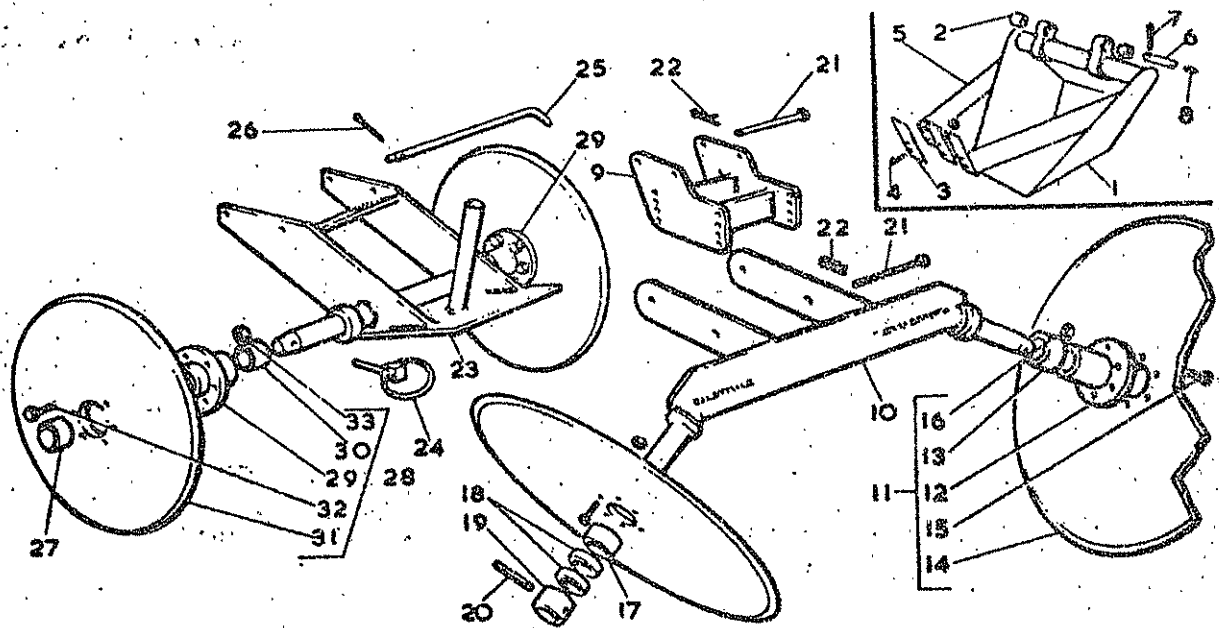
P.T.O. PUMP AND GEARBOX



P.T.O. PUMP AND GEARBOX

Ref. No.	Part No.	Qty	Description	Ref. No.	Part No.	Qty	Description
ASSY 'A'				ASSY 'B'			
	80-12-260	1	GEAR BOX & PUMP ASSEMBLY (VICKERS PUMP, KEY-WAY DRIVE) comprising:-	80-12-262	1	GEARBOX & PUMP ASSEMBLY, (VICKERS PUMP, SPLINE DRIVE) comprising:-	
1	82-01-300	1	.. Vickers Pump (Key-way Drive)	42	82-01-301	1	.. Vickers Pump (Spline Drive)
2	82-06-018	1	.. Outlet Connection	43	71-03-321	1	.. Gearbox Assy (Spline Drive), comprising items as Main List with following alterations:-
3	88-00-603	1	.. 'O' Ring for Outlet				.. Adaptor Spline (Additional)
4	81-06-018	1	.. Inlet Connection	44	80-13-006	1	.. Sprocket 11T) Replaces Item
5	88-00-412	1	.. 'O' Ring for Inlet	45	80-12-008	1	.. Sprocket 13T) 14, 15 & 16
6	85-00-842	1	.. Suction Hose c/w Clips	46	80-12-007	1	.. Sprocket 15T)
7	09-04-106	4	.. Hose Clip	47	80-12-008	2	.. Stud (Replaces Item 18)
8	71-03-320	1	.. Gearbox Assy. (Key-way Drive)	48	09-00-004	1	.. Bearing (Needle Roller) Additional
9	09-02-330	1	.. Heavy Chain	49			Pump Spacer, Item 26 not required
10	00-00-087	2	.. Shackles c/w Spring Cotter				
11	04-31-104	2	.. Spring Cotter	ASSY 'C'			
12	80-12-260	1	.. Case	80-13-250	1	GEARBOX AND PUMP ASSEMBLY, (PLESSEY META 33 SPLINE DRIVE)	
13	80-12-261	1	.. Cover	50	82-01-360	1	.. Plessey Meta 33 Pump (Spline Drive)
14	80-12-001	1	.. Sprocket, 11T)	51	80-13-012	1	.. Inlet Connection
15	80-12-002	1	.. Sprocket, 13T) Alternatives	52	88-00-401	1	.. 'O' Ring for Inlet
16	80-12-003	1	.. Sprocket, 15T)	53	03-42-082	4	.. 1/2" x 3/8" UNC Cap Head Screw
17	80-12-004	1	.. Sprocket	54	80-13-013	1	.. Outlet Connection
18	80-12-008	2	.. Stud	55	88-00-112	1	.. 'O' Ring for Outlet
19	01-11-004	2	.. 1/2" UNF Nut	56	03-42-081	4	.. 1/2" x 3/8" UNC Cap Head Screw
20	01-00-204	2	.. Spring Washer	57	71-03-322	1	.. Gearbox Assy (Plessey Pump), comprising items as Main List with following alterations:-
21	80-12-010	1	.. Eccentric Sleeve	58	80-13-001	1	.. Adaptor Spline (Additional)
22	80-12-011	1	.. Locking Ring	59	80-13-008	1	.. Adaptor Spline (Additional)
23	80-12-012	1	.. Bearing Spacer	60	80-12-006	1	.. Sprocket, 11T) Replaces Item
24	80-12-013	1	.. Sprocket Spacer	61	80-12-008	1	.. Sprocket, 13T) 14, 15 & 16
25	80-12-014	1	.. Pump Spacer	62	80-12-007	1	.. Sprocket, 15T)
26	80-12-015	1	.. Ball Retainer	63	80-13-006	2	.. Stud (Replaces Item 18)
27	80-12-016	1	.. Ball Retainer Spring	64	09-00-004	1	.. Bearing (Needle Roller)
28	80-12-017	6	.. Tab Washer	65	04-11-110	1	.. Circlip
29	80-12-018	1	.. 'V' Ring Oil Seal				
30	80-12-019	2	.. 1/2" x 3/8" dia. Dowel				
31	80-12-020	1	.. Chain				
32	80-12-352	1	.. Take Off Shaft				
33	08-03-836	1	.. Bearing (Ball)				
34	08-00-006	1	.. Bearing (Needle Roller)				
35	09-06-116	3	.. Ball, 1/2" dia.				
36	04-01-122	1	.. Circlip				
37	04-11-272	1	.. Circlip				
38	04-06-134	1	.. Circlip				
39	03-42-082	6	.. 1/2" x 3/8" UNC Cap Head Screw				
40	03-42-082	13	.. 1" x 3/8" UNC Cap Head Screw				
41	02-01-111	1	.. Groove Nipple, 1/2" BSF				

SHEEP DRAIN BUCKET & DISC & TURF DISC



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
	71-03-282	1	SHEEP DRAIN BUCKET & DISC ASSEMBLY, Comprising:-	16	01-61-003	6	... Wedglock Nut, 3/8" UNF
	70-12-297	1	SHEEP DRAIN BUCKET COMPLETE, Comprising:-	17	71-01-093	2	... Axle Collar
1	70-12-288	1	... Bucket, Welded Assembly	18	71-01-146	4	... Spacing Collar
2	60-12-032	2	... Bucket Pivot Bush	19	71-01-147	2	... Loose Retaining Collar c/w Spring Dowel
3	60-12-033	3	... Bucket Tine, c/w Bolts & Nuts	20	04-22-732	2	... 2" x 7/16" dia. Spring Dowel
4	60-12-034	6	... Tine Bolt, c/w Nut	21	71-03-083	4	... Securing Pin c/w Spring Cotter
5	01-12-004	6	... Nut 7/16" UNC	22	04-31-105	4	... Spring Cotter
6	60-12-025	1	... Rod Pivot Pin c/w Splitpin & Greaser		71-03-280	1	TURF DISC ASSEMBLY COMPLETE, Comprising:-
7	05-03-166	1	... Splitpin 2" x 1/4"	23	71-03-281	1	... Mounting Bracket c/w Lynch Pin
8	09-01-121	1	... Greaser	24	04-31-217	2	... Lynch Pin
	71-03-283	1	SHEEP DRAIN DISC ASSEMBLY COMPLETE, Comprising:-	25	71-03-083	2	... Securing Pin c/w Spring Cotter
9	71-03-284	1	... Mounting Bracket	26	04-31-105	2	... Spring Cotter
10	71-03-285	1	... Axle, Welded Assembly	27	71-01-093	2	... Axle Collar
11	71-01-144	2	... Disc Coupler Assembly, 24" Complete, Comprising:-	28	71-01-092	2	... 15" Disc Coupler Assembly, Comprising:-
12	71-01-090	2	... Coupler Hub c/w Bushes	29	71-01-090	2	... Coupler Hub c/w Bushes
13	60-12-032	4	... Bush	30	60-12-032	4	... Bush
14	71-01-145	2	... 24" Coupler Disc	31	71-01-089	2	... 15" Coupler Disc
15	02-11-083	6	... Bolt 1" x 3/8" UNF	32	02-11-083	6	... Bolt 1" x 3/8" UNF
				33	01-61-003	6	... Wedglock Nut 3/8" UNF

SHEEP DRAIN BUCKET & DISC & TURF DISC

FITTING INSTRUCTIONS

SHEEP DRAIN BUCKET

Fit the Bucket to the Dipper arm lower half, and to the bucket ram slave link, as described in Parts list. Secure the pivot pins with Split Pins.

SHEEP DRAIN DISCS & TURF DISCS

Fit Disc Mounting Bracket (9 or 23) to bracket at base of Main Frame with locking pins (21 or 25) and secure with Spring Cotter (22 or 26).

ADJUSTMENTS

SHEEP DRAIN DISCS

The height and width of the disc setting must be adjusted to cut in line with the bucket sides at the depth of trench required.

To adjust width:

- (a) Drive out the spring dowel (20) from one or both ends of the disc axle and remove the loose retaining collar (19).
- (b) One $\frac{1}{2}$ " (17) and two $\frac{3}{8}$ " (18) spacing collars are fitted on each end of the axle. By varying or reversing the order of assembly of the spacing collars and the disc bosses, a wide range of disc widths can be obtained.
- (c) Replace all loose spacers and secure with spring dowels through the drilled collars.

To adjust height:

- (d) Four pairs of holes are drilled in the disc mounting bracket. Take out the locking pins, and move the disc axle to the higher or lower pair of holes as required.
- (e) Replace the locking pins, securing with spring cotters.

TURF DISCS

- (a) Remove lynch pin from one or both axle ends.
- (b) A $\frac{1}{2}$ " spacing collar (27) is fitted on each axle. By varying or reversing the order of assembly of the spacing collars and the disc bosses, a range of disc widths can be obtained.
- (c) Replace discs and collars in required order and refit lynch pins (24).

NOTE: The working depth can only be controlled by adjusting the PAS legs and feet. Set PAS legs to keep disc axle just clear of ground surface.

TRANSPORT

SHEEP DRAIN DISCS

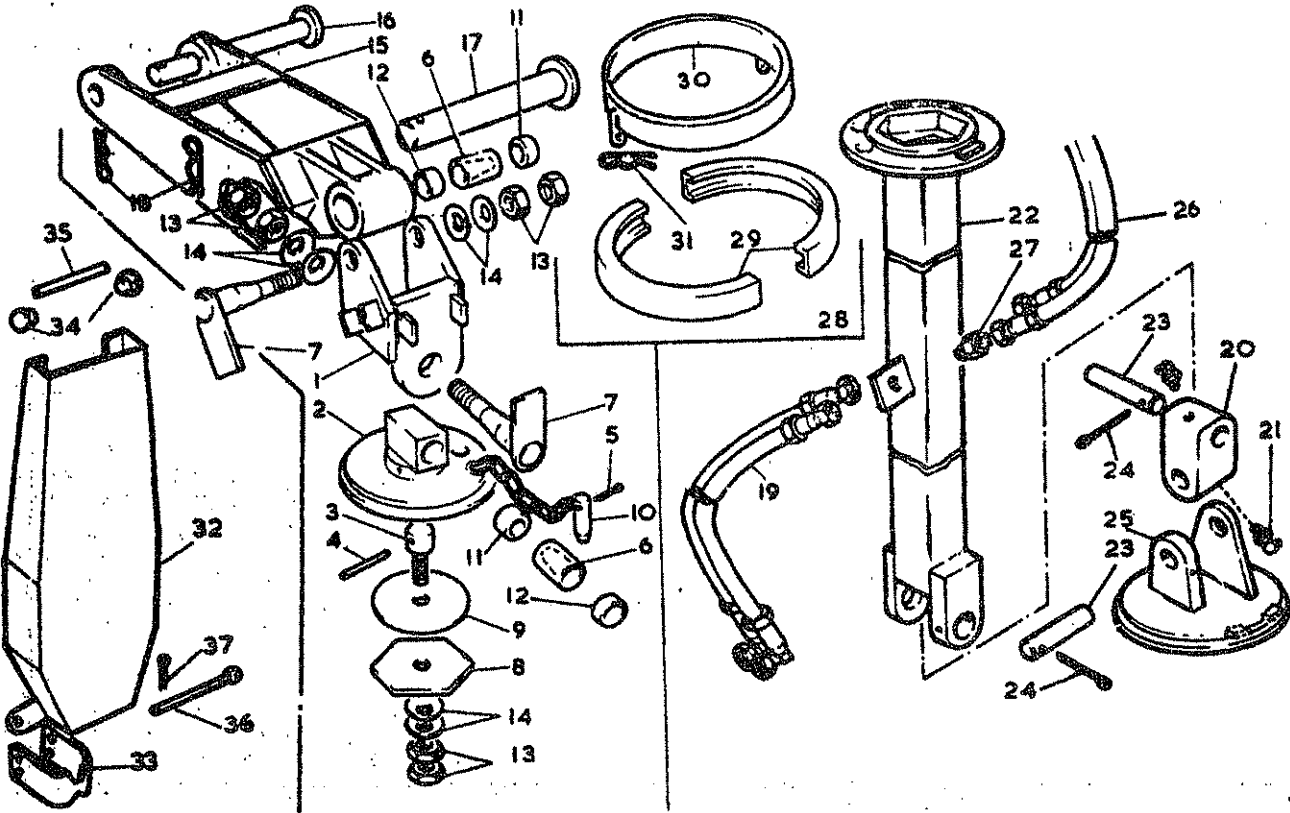
To raise and lock the discs clear of the ground for transport:

- (a) Remove the rear locking pin.
- (b) Swing the disc axle assembly upwards, and place the locking pin in the top pair of holes and the axle assembly. Secure with spring cotter.

TURF DISCS

- (a) Remove both lynch pins, discs and spacing collars.
- (b) Stow the discs on the tube on top of the disc bracket and secure with one lynch pin.
- (c) Fit both spacing collars on one axle and secure with the other lynch pin.

INVERSION TO GRAB



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
	72-13-280		12D CONVERSION TO GRAB ASSEMBLY, Comprising:-		72-14-276	1	3 FT. GRAB EXTENSION COMPLETE.
	71-05-302	1	GRAB SUSPENSION SWIVEL ASSEMBLY, Comprising:-		72-14-275	1	2 FT. GRAB EXTENSION COMPLETE.
1	71-05-303	1	.. Universal Jaw	20	70-14-050	1	.. Knuckle, c/w Grease Nipple
2	71-05-324	1	.. Swivel Plate c/w Pins	21	09-01-123	2	.. Grease Nipple, Right Angled
3	71-05-075	1	.. Pin	22	70-14-284	1	.. Grab Extension Piece (3 ft.)
4	04-22-532	1	... Spring Dowel 2" x 1/16" dia.		70-14-285	1	.. Grab Extension Piece (2 ft.)
5	05-03-083	1	... Split Pin 1" x 1/8" dia.	23	70-14-054	2	.. Swivel Pin c/w Split Pin
6	71-05-071	2	.. Friction Sleeve	24	05-03-206	2	.. Splitpin
7	71-05-072	2	.. Swivel Pin	25	70-14-051	1	.. Swivel Jaw
8	71-05-077	1	.. Damping Plate	26	85-11-588	2	.. Flexible Hose 58" Long
9	70-14-026	1	.. Friction Disc	THE FOLLOWING ITEMS ARE COMMON TO BOTH ASSEMBLIES:-			
10	71-05-076	1	.. Locating Pin	27	72-13-004	2	.. 1/2" J.I.C. Double Male Union
11	71-05-070	2	.. Steel Bush	28	71-05-325	1	.. Split Clamp & Shroud Assembly, Comprising:-
12	70-12-037	2	.. Spring Steel Bush	29	71-05-326	2	.. Split Clamp
13	01-31-006	6	.. Locknut 3/8" U.N.F.	30	71-05-078	1	.. Shroud
14	70-14-027	6	.. Spring Disc	31	04-31-105	2	.. Spring Cotter
15	72-13-261	1	.. Adaptor Knuckle	GUARD ASSEMBLY			
16	72-13-010	1	.. Pin c/w Spring Cotter	32	71-02-298	1	LIFT RAM GUARD ASSEMBLY
17	72-13-011	1	.. Pin c/w Spring Cotter	33	71-03-297	1	.. Lift Ram Guard
18	04-31-106	2	.. Spring Cotter	34	71-03-210	1	.. Ram Hood
19	85-31-588	2	.. Flexible Hose 59" Long	35	71-03-211	2	.. Roller
				36	71-03-212	1	.. Roller Spindle
				37	05-03-083	1	.. 1" x 1/8" dia. Splitpin

CONVERSION TO GRAB

If machine is fitted with ditching arm only, a shorter, trenching, arm will be required, refer to Page 21. When trenching arm is in place proceed with conversion as follows:—

- (a) Fit the Adaptor Knuckle (15) over the Dipper Arm Boss and secure by the special pin (17) through the outer holes.
- (b) Fit other end of Adaptor Knuckle with existing joint pin (16) through inner holes on Dipper Arm.

FITTING THE GRAB

- (a) Fit the Bucket Ram to the Grab as shown in the correct Grab Appendix.
- (b) Place the Grab under the Drop Arm in such a position that the hoses point AWAY from the Main Arm.
- (c) Lift the Locking Ring Shroud (29), releasing the two Split Clamp Rings (28).
- (d) Offer the two plates of the Swivel and Grab together and assemble both halves of the Clamp Ring.
- (e) Secure by containing the Split Rings with the Locking Ring Shroud.

FITTING THE HOSES

- (a) Fit the 59" lengths of hose to the Grab Ram as shown in the correct Grab Appendix.
- (b) Lead the hoses over the top of the Dipper Arm. DO NOT leave the hoses trailing loosely or they will tangle in the Grab.
- (c) Connect the 59" lengths to the existing Bucket Ram Hoses, using the Double Male Connections.
Note:— The 59" lengths are not long enough to reach the rigid pipe connections on the Main Arm.

ADJUSTMENT

- (a) To control the violent swing of the Grab when slewing, both suspension pivots are fitted with conical Friction Sleeves (6) adjusted by $\frac{1}{2}$ " Locknuts. NEVER TIGHTEN FRICTION SLEEVES SOLID. Always back Lock Nuts off half a turn to prevent jamming. With both Friction Sleeves slackened, the Grab may be swung into a vertical face, such as a steep clamp too high to be worked from the top.
- (b) The freedom of rotation is controlled by a damping device at the bottom of the swivel. If Adjustment is required remove Grab and slacken or tighten Nuts as necessary.
- (c) Should a fixed position be required, the Grab can be indexed and located in any one of four positions by means of a Locating Pin (10). For free rotation the Locating Pin must be left hanging by its safety chain.

MAINTENANCE

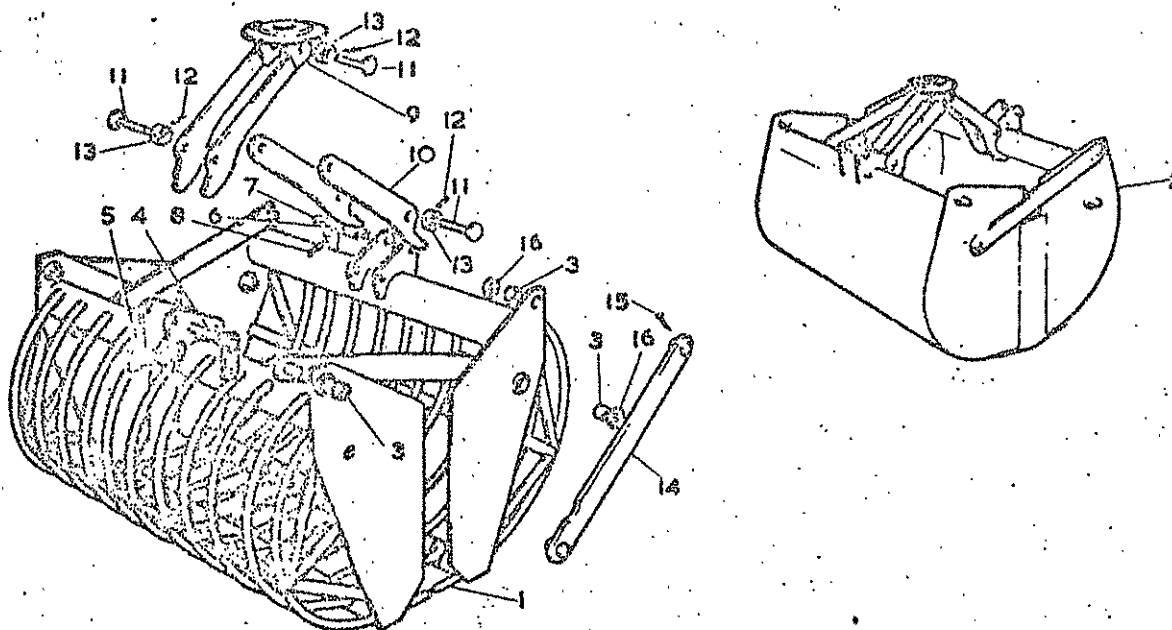
Correct re-assembly of Swivel Damper Assembly is important for full efficiency of operation and the following point should also be noted:—

KEEP FRICTION DISC AND SLEEVES FREE OF OIL OR GREASE. Discs which have become "glazed" in use may be cleaned with degreasing fluid or Diesel fuel. DO NOT USE PARAFFIN OR T.V.O.

Re-assemble as follows —

- (a) Bushes and Friction Disc must be fitted the correct way and in the order shown to the Extension Arm and to indexing hole on Swivel Plate.
- (b) Fit Universal Jaw (1) over boss end of Adaptor Knuckle WITH OFFSET OF JAW OUTWARD FROM EXTENSION ARM.
- (c) Fit Swivel Pin (7), two Spring Discs (14) (hollow side inwards) and two Locknuts (13).
- (d) Fit Swivel Plate (2) to Universal Jaw (Note relative position of indexing hole on plate).
- (e) Fit Swivel Pin, two Spring Discs, (hollow side inwards) and two Locknuts.
- (f) Fit Friction Disc (8), Damping Plate (8), two Spring Discs (hollow side inwards) and two Locknuts.
- (g) Tighten all Locknuts to suit.

BULK GRAB, BEET GR. B & LINER



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
1	70-14-268	1	BEET GRAB COMPLETE, Comprising:-	7	09-01-121	1	Greaser
	70-14-269	2	Beet Grab Halves c/w Bushes	8	04-31-105	1	Spring Cotter
2	70-14-277	1	BULK GRAB COMPLETE, Comprising:-	9	70-14-288	1	Suspension Frame
	70-14-278	2	Bulk Grab Halves c/w Bushes	10	70-14-072	2	Suspension Link
				11	70-14-044	3	Suspension Link Pin c/w Collar & Spring Dowel
	THE FOLLOWING PARTS ARE COMMON TO BOTH GRABS:-			12	70-14-074	3	Collar
3	70-14-039	8	Bush	13	04-21-624	3	Spring Dowel
4	70-14-042	1	Ram Pin - Base End, c/w Spring Cotter	14	70-14-041	4	Cross Link c/w Splitpins & Washers
5	04-31-105	1	Spring Cotter	15	05-03-125	8	Splitpin 1/4" x 3/16"
6	70-14-043	1	Ram Pin - Rod End, c/w Greaser & Spring Cotter	16	70-14-048	8	Special Washer

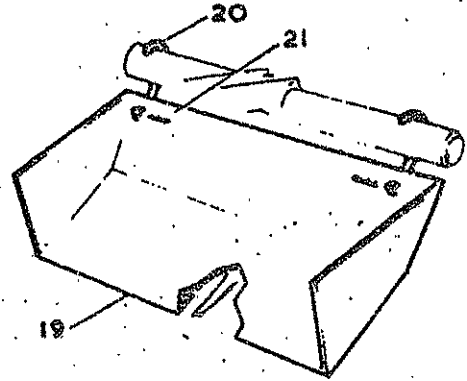
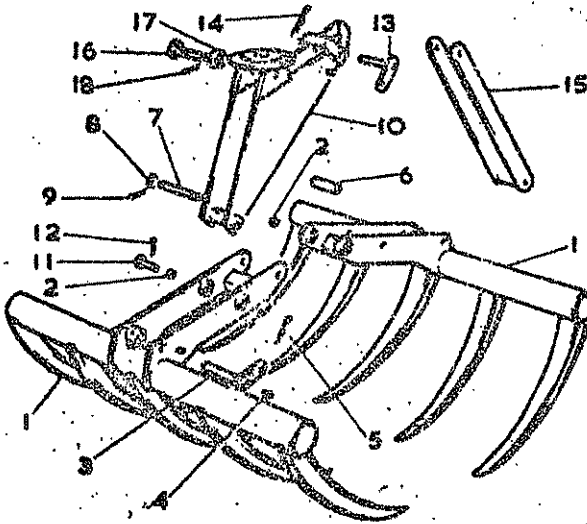
FITTING INSTRUCTIONS

BULK & BEET GRABS

The stops in the Grab Suspension will prevent the 59" hose connections being damaged by contact with the boom. To ensure correct assembly, follow the letter sequence as follows:-

- Fit the base end of the Ram to the Suspension Frame (9) bracket on Grab.
- The rigid pipe gland end connection must be on top of the Ram cylinder.
- Slacken both 59" hose straight end connections to Boom.
- Connect the 90° end fitting of nearside 59" hose to base end of Ram.
- Connect the 90° end fitting of offside 59" hose to gland end of Ram.
- Set both 90° fittings to lead hoses upwards from the Ram and tighten securely.
- Re-tighten straight connections to Boom.

SILAGE MANURE GRAB AND TINE PLATES



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
	70-14-263	1	SILAGE & MANURE GRAB COMPLETE, comprising:-	12	05-03-145	4	.. Splitpin, 1 1/4" x 3/16"
1	70-14-264	2	.. Tine Bar c/w Bushes	13	70-14-033	1	.. Ram Pin, Base End c/w Spring Cotter
2	70-14-028	8	.. Bush - Tine Bar	14	04-31-105	1	.. Spring Cotter
3	70-14-034	1	.. Ram Rod End Pin c/w Greaser & Spring Cotter	15	70-14-030	1	.. Link
4	09-01-121	1	.. Greaser	16	70-14-044	1	.. Link Pin c/w Collar & Spring Dowel
5	04-31-105	1	.. Spring Cotter	17	70-14-074	1	.. Collar
6	70-14-031	1	.. Distance Piece	18	04-21-624	1	.. Spring Dowel
7	70-14-032	1	.. Joint Pin c/w Washers & Splitpin	19	70-14-287	2	TINE PLATE COMPLETE, comprising:-
8	01-00-108	2	.. 7/8" Washer	20	70-14-071	4	.. Attachment Hook c/w Spring Cotter
9	05-03-145	2	.. Splitpin, 1 1/4" x 3/16"	21	04-31-105	4	.. Spring Cotter
10	70-14-297	1	.. Ram Frame				
11	70-14-036	4	.. Pivot Pin c/w Splitpin				

FITTING INSTRUCTIONS

SILAGE/MANURE GRAB AND TINE PLATES

The stops on the Ram Frame prevent the 59" hose connections being damaged by contact with the Boom, and incorrect fitting of the Ram.

For Spares purposes, both Tine Bars of the Grab are identical and carry bosses for the Ram Rod End Pin, of which only one pair is used.

To ensure correct assembly, follow the key letter sequence as follows:-

- (a) Remove grey painted packing strip from side of Frame and replace both split pins. Fit Grab to Suspension Swivel with Split Clamps and secure both halves with outer Shroud. (ITEMS 28 & 29. Page 26).
- (b) Fit the base end of the Bucket Ram to the upper corner of the Ram Frame (10) with the rigid pipe on the underside of the Ram cylinder.

- (c) Slacken both 59" hose straight end connection to Boom.
- (d) Connect the 90° end fitting of nearside 59" hose to base end of Ram.
- (e) Connect the 90° end fitting of offside 59" hose to gland end of Ram.
- (f) Set both 90° fittings to lead hoses downward from the Ram and tighten securely.
- (g) Re-tighten straight connection to Boom.
- (h) Adjust stroke of Ram and secure Rod End to Tine Bar (1).

TINE PLATES - (Optional Extra Equipment)
 To assist final cleaning up of yards, a pair of Tine Plates may be fitted inside the tine points as shown. These are also useful for sludge clearing, handling 24 gallons at one scoop.

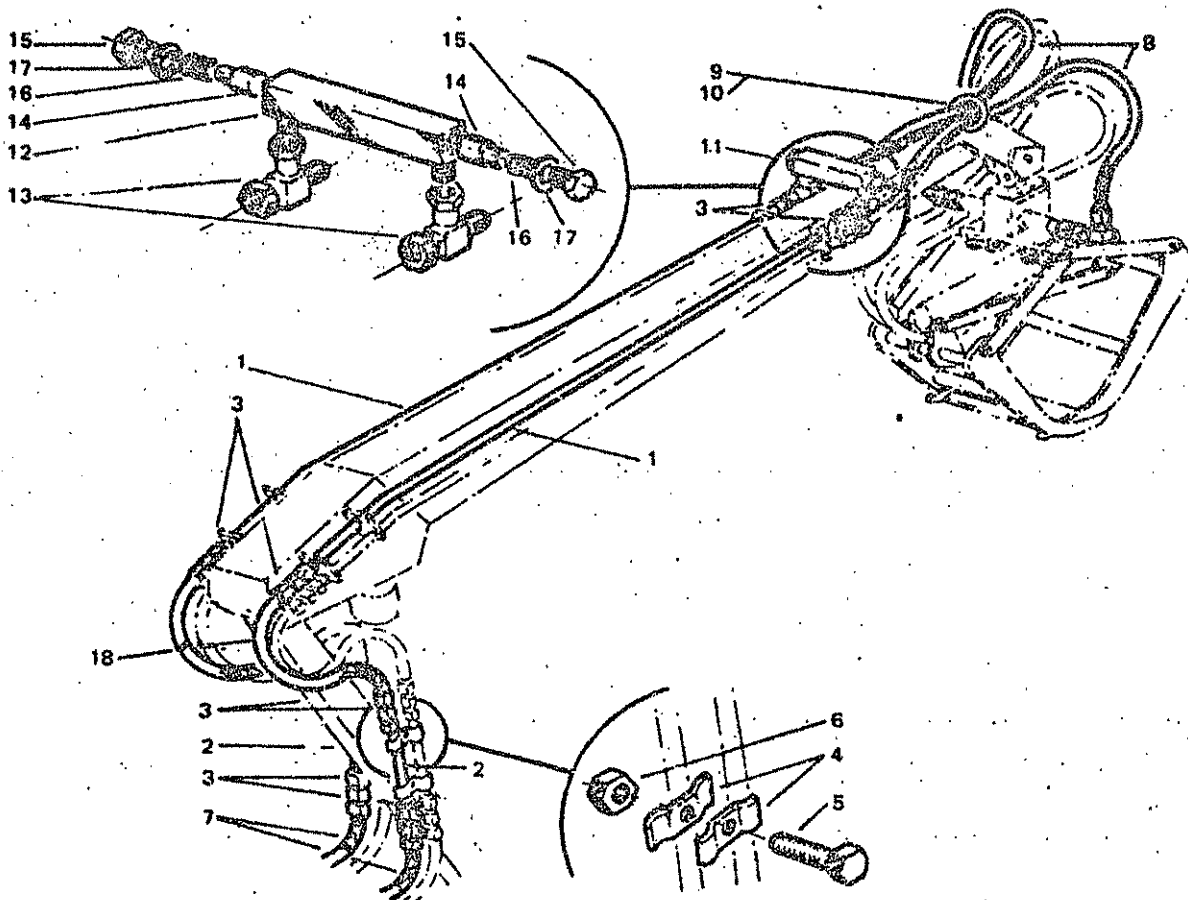
TIMBER GRAB

- (1) When fitting the grab swivel assembly to the boom, it is important that the universal jaw is assembled over the boss end of the boom with offset of jaw outboard.
- (2) The grab when assembled to loader should have the base end of the ram with its hoses pointing outward away from the machine so that the built-in stops prevent damage to hoses. The short 45" hoses provided are assembled with the straight end connected to the cross port relief valve block on the end of boom with the other end of hoses coupled to the actuator. The 80" long hose is coupled to the lower rigid pipe by its straight connector, and the other end to the base of grab ram.
- (3) The use of a grab rotator increases the risk of damage to hoses. It is very important to check the full movement of

the grab and rotator before use to prevent this. The run of the hoses can be adjusted by slacking the end fittings and turning them to eliminate locked in twist. All four hoses must be routed through the special hose guide at the boom end.

MAINTENANCE

Check regularly that all nuts are tight and pivot points are oiled. For maintenance instructions of swivel damper assembly see page 12. Should the grab rotator become slower in its movement or fail to operate in any one direction, check the restrictor holes in the tee piece of the cross port relief valve for signs of any blockage. NOTE: THIS RESTRICTION HOLE MUST NOT BE INCREASED IN SIZE.

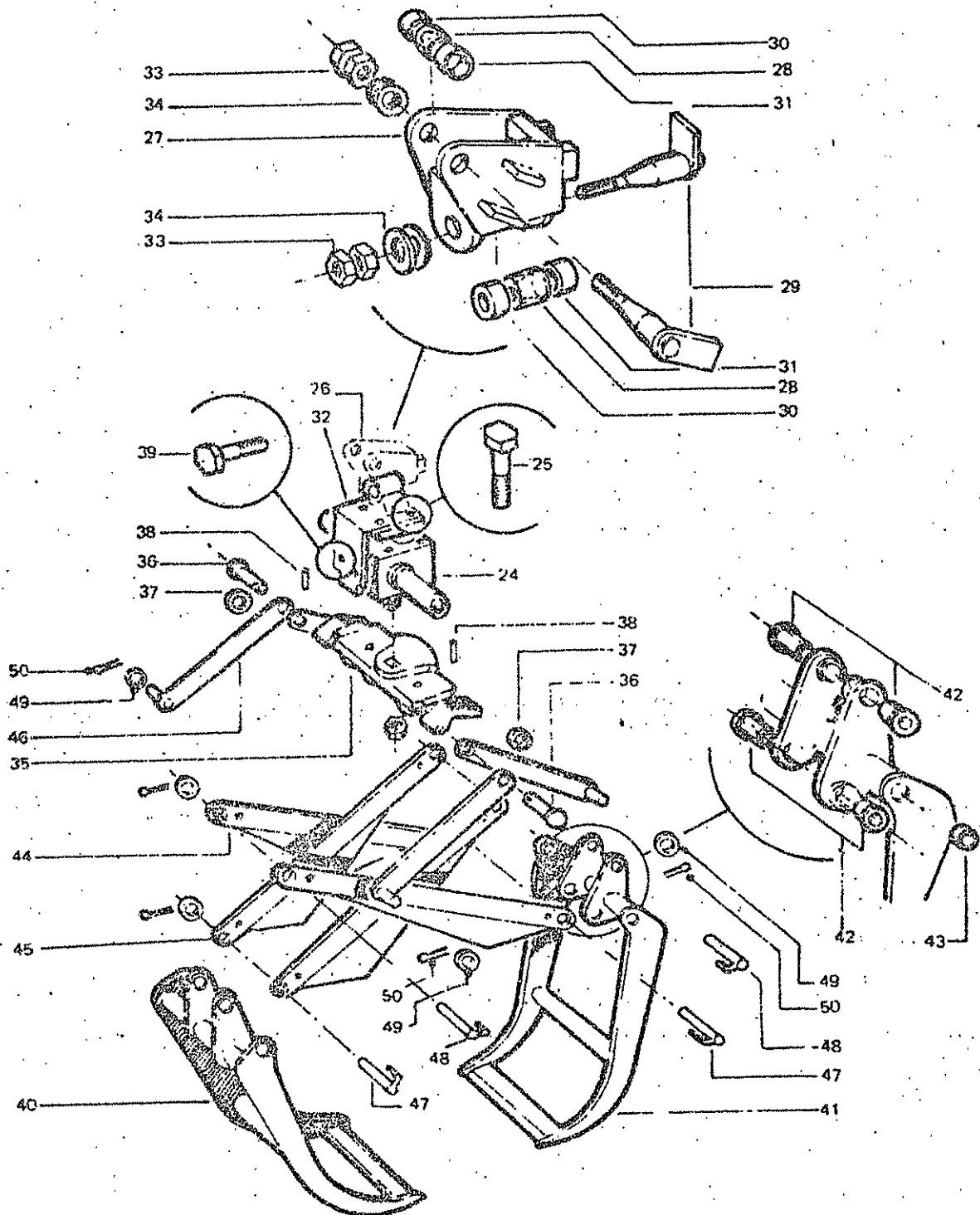


72-14-260 Timber grab c/w with additional 14D fittings. To order please quote number.

Ref. No.	Part No.	Qty.	Description
1	72-13-001	2	Rigid Pipe Main Boom
2	70-14-008	2	Rigid Pipe Tension Link
3	72-13-003	8	End Fitting J.I.C.
4	60-12-026	8	Pipe Clamp Halves
5	02-11-163	4	2 x 3/8" UNF Hex Bolt
6	01-61-003	4	3/8" UNF Nuts
7	85-41-498	2	Flexible Hose 49" long
8	85-31-458	2	Flexible Hose 45" long
9	72-14-030	1	Hose Guide c/w Spring Cotter
10	04-31-105	1	Spring Cotter
11	72-14-052	1	Cross Port Relief Valve Assy
12	72-14-053	1	Valve Body

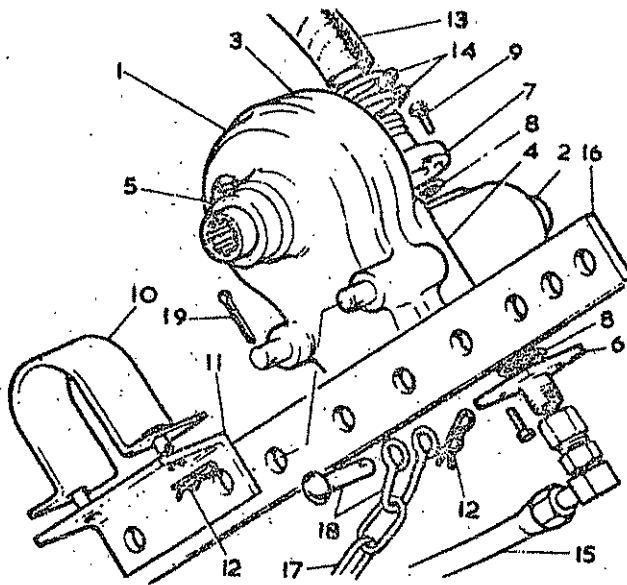
Ref. No.	Part No.	Qty.	Description
13	72-14-054	2	.. Tee Piece
14	81-14-102	2	.. Relief Valve Cartridge (1500 psi)
15	81-14-026	2	.. Plug
16	81-14-026	2	.. Spring
17	86-50-104	2	.. 1/2" Bonded Seal
18	85-11-328	2	.. Flexible Hose 32" long
19	85-31-808	2	.. Flexible Hose 80" long
20	72-14-271	1	.. Hose Guide Loop
21	72-14-270	1	.. Heavy Duty Lift Ram Guard c/w Pin & Lynch Pin
22	71-03-037	1	.. Pin
23	04-31-217	1	.. Lynch Pin

ACTUATOR, GRAB, AND SWIVEL PARTS



Ref. No.	Part No.	Qty.	Description	Ref. No.	Part No.	Qty.	Description
24	72-14-261	1	Grab Actuator Assy. Complete	37	72-14-028	2	Spacer
25	02-11-145	4	1.3/4" x 1/2" UNF Hex Bolt	38	04-22-532	2	2" x 5/16" Spring Dowel
26	72-14-026	1	Timber Grab Swivel Assy.	39	02-11-085	2	1" x 1/2" UNF Hex Bolt
27	71-05-303	1	Universal Jaw	40	72-14-264	1	Grab Arm c/w Bushes
28	71-05-071	2	Friction Sleeve	41	72-14-265	1	Grab Arm c/w Bushes
29	71-05-072	2	Swivel Pin	42	71-02-173	8	Bush
30	71-05-070	2	Steel Bush	43	70-12-037	4	Bush
31	70-12-037	2	Steel Bush	44	72-14-021	2	Crossover Link
32	72-14-269	1	Damper Mounting Plate & Stop	45	72-14-304	1	Crossover Link Double
33	01-31-008	4	Locknut	46	72-14-023	4	Suspension Link
34	70-14-027	4	Spring Disc	47	72-14-019	2	Pin c/w Washers & Split Pin
35	72-14-263	1	Swivel Plate c/w Washer & Pins	48	72-14-020	2	Pin c/w Washer & Split Pin
36	72-14-024	2	Pivot Pins	49	70-14-048	4	1" Washer
				50	05-03-165	4	2" x 3/16" Split Pin

P.T.O. PUMP & FILTER



Ref. No.	Part No.	Qty.	Description
	80-10-250		PUMP & FITTINGS ASSEMBLY COMPLETE, Comprising:-
1	82-01-630	1	.. P.T.O. GEAR PUMP ASSEMBLY
2	82-01-626	1	.. Pump Shaft Seal
3	82-01-627	1	.. Large Flange Gasket
4	82-01-628	1	.. Small Gasket
5	82-01-100	1	.. Splined Coupling (Plunger)
6	80-05-016	1	.. Pressure Connection (J.I.C) c/w 'O' Ring & Setscrews
7	80-05-009	1	.. Suction Connection c/w 'O' Ring & Setscrews
8	86-00-405	2	.. 'O' Ring for 80-05-016 and 80-05-009
9	03-12-082	8	.. 1" x 5/16" UNC Setscrew
10	80-05-005	1	.. Guard for Pump Coupling
11	80-05-006	1	.. Guard Mounting Bracket
12	04-31-105	2	.. Spring Cotter
13	85-00-842	1	.. Suction Hose c/w Clips
14	09-04-106	4	.. Hose Clips
15	85-31-808	1	.. Flexible Hose 80" long, Supply
	80-05-001	1	.. Torque Bar & Chain complete, Comprising:-
16	80-05-002	1	.. Torque Bar
17	09-02-312	1	.. Chain
18	60-00-087	1	.. Shackle Assembly
19	05-03-063	1	.. 3/4" x 1/8" Splitpin
	84-01-251	1	.. FILTER ASSEMBLY COMPLETE, Comprising:-
20	84-01-001	1	.. Filter Body
21	84-01-002	1	.. Bayonet End Cap
22	84-01-003	1	.. Compression Spring
23	84-01-004	1	.. Filter Element
24	84-01-005	1	.. Stop
25	86-00-121	1	.. 'O' Ring
26	04-31-105	1	.. Spring Cotter
27	72-13-003	1	.. M & F - J.I.C. Union
28	71-03-061	1	.. Double Male J.I.C. Union

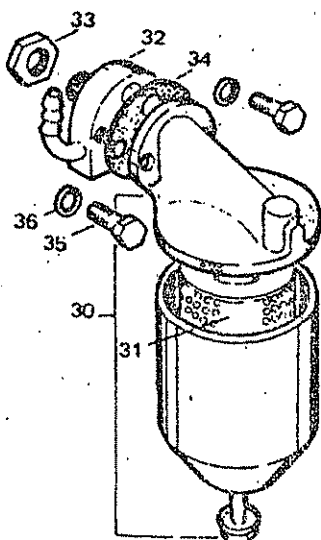
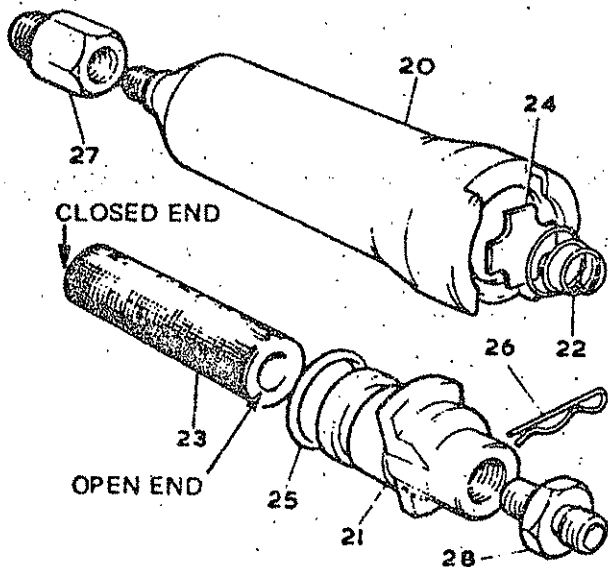
* With Filter Assembly 84-01-251 use
85-31-388 Hose HCU to Filter
85-71-428 Hose Filter to Pump

FITTED TO MACHINES
PRE SERIAL NUMBER 05AD40

Ref. No.	Part No.	Qty.	Description
	84-01-251	1	.. FILTER ASSEMBLY complete comprising:-
20	84-01-001	1	.. Filter Body
21	84-01-002	1	.. Bayonet End Cap
22	84-01-003	1	.. Compression Spring
23	84-01-004	1	.. Filter Element
24	84-01-005	1	.. Stop
25	86-00-121	1	.. 'O' Ring
26	04-31-105	1	.. Spring Cotter
27	72-13-003	1	.. M & F J.I.C. Union
28	71-03-061	1	.. Double Male J.I.C. Union

FITTED TO MACHINES
POST SERIAL NUMBER 05AD40

29	71-03-290	1	.. FILTER ASSEMBLY, complete, comprising:-
30	71-03-291	1	.. Filter Assy. c/w Element
31	71-03-102	1	.. Filter Element
32	71-03-292	1	.. Filter Mounting Plate c/w Locknut
33	71-03-104	1	.. Locknut
34	71-03-100	1	.. Gasket
35	03-11-104	2	.. 1/4" x 7/16" UNF Setscrew
36	01-00-204	2	.. 7/16" Spring Washer



14D SLEW LOADER

**FITTING SEPARATE No. 14D SLEW
 LOADER TO POWER ARM WHEN 12D
 ARM IS ALREADY FITTED**

1. Disconnect the hoses from the base end of Reach Ram on the 12D Arm, also from the end of the rigid pipes on Bucket Line.
2. Remove 12D Main Arm complete with Dipper Arm and Bucket from machine.
3. If 87" long hoses, Part No. 85-11-978 (Reach Ram Hose) is fitted to H.C.U., this should be replaced by 49" long hoses, with straight ends connected to H.C.U. It is advisable temporarily to plug the ends of open hoses, or to join them together, to prevent loss of oil during assembly operation. *Note:* In some instances when it is known that the 14D is to be subsequently used, the shorter hose is fitted at the factory.
4. (see Fig. 1)
 The 14D Slew Loader is packed for despatch on the stand required for fitting, removal and storage. Cut free all packing wire and follow the key letter sequences as shown:
 - A. Remove packing strip.
 - B. Fit Grab to swivel with split clamp.
 - C. Secure with locking ring shroud.
 - D. Fit Green (Band) Ram to Grab (See appropriate Grab Fitting Instructions).
 - E. Connect both Grab hoses.
5. (see Fig. 2)
 - A. Remove Stand pin and packing strip.
 - B. Lift Slew Loader about 12".
 - C. Refit pin through upper hole in stand.
 - D. Lock with spring cotter.
 - E. The packing strip is not required again.
6.
 - A. Back Power Arm up to Slew Loader.
 - B. Adjust stand to line up.
 - C. Fit Lift Ram rod end to Rocker outer hole (not hole encircled in red).
 - D. Transfer Lift Ram base end from Lift Booster to stand hooks using existing fixing pin.
 - E. Use Lift Ram to lift Slew Loader on stand.
 - F. Ensure Lift Hoses pass either side of column.
 - G. Fit and lock Armhead pin through main pivot hole of Rocker Arm.
7.
 - A. Lock Lift Booster in high position and fit safety pin through hole in column.
WARNING: The 14D Loader must only be used with the Lift Booster in the High position. Failure to do so could result in damage to the Lift Ram.
 - B. Replace Lift Ram in Lift Booster and make secure.
8.
 - A. Fit Red (Band) Reach Ram to tension link.
 - B. Connect Reach Ram hose 49" long to base of Ram.
 - C. Fit rod end of ram to Boom.
 - D. Connect H.C.U. Bucket Ram hoses to rigid pipes on tension link.
 - E. Raise Arm and remove stand.
9. **TO GAIN ADDITIONAL HEIGHT FOR LOADING**
 Extra height can be obtained for loading by locating the Lift Ram Rod End in the hole encircled in red on the Rocker Arm (see 6C)
WARNING: The High Lift Position should be used with care. Grab Swivel Nuts should be tightened hard, as violent swing of the grab might result in damage to main boom or grab.
10. **LUBRICATION**
 Before operating machine and regularly while working, lubricate thoroughly at least once daily all greaser points on the Armhead, together with points covered in Para. 42 on the main Power Arm.

11. **SITE ADJUSTMENTS**
WARNING: To gain maximum stability for loading adjustable legs must be extended fully.
12. **CHANGING GRAB**
 All Grabs use the same Ram and Hoses. To avoid breaking hydraulic connections:
 - (a) Open Grab and set on ground.
 - (b) Remove Ram from Grab.
 - (c) Lift Locking Ring Shroud, remove split rings and change Grab.
 - (d) Refit Ram to new Grab as detailed in the correct Grab Appendix.
13. **GRAB SWIVEL**
 For maintenance, Operating Instructions, Spare Parts List, see Pages 25 & 26 of Main Double-D Instruction Book.
14. **REMOVAL & STORAGE OF SLEW LOADER**
 - (a) Shorten Reach and extend Lift Ram. Fit stand through socket on compression link and secure with pin through socket.
 - (b) Extend Reach Ram to suit, to be able to open Grab, and set on ground.
 - (c) Drive out Reach Ram Rod Pin and close Ram down.

WARNING: IT IS DANGEROUS to raise or lower Slew Loader on stand with Reach Ram in place and preventing movement of Reach Linkage.
 (d) Set Stand on ground, realize pin (through Top holes in stand pillar and adjust for level.
 (e) Remove Lift Ram from Lift Booster and fit Ram to hooks on stand.
 (f) Disconnect Reach and Grab Ram Hoses from Reach Ram and Rigid Pipes on Tension Link. (Mark off ends of hoses to prevent loss of oil).
 (g) Take weight of Slew Loader on stand with Lift Ram and drive out Armhead pivot pin.
 (h) Swing Rocker Arm clear of steering column and close Lift Ram right down.

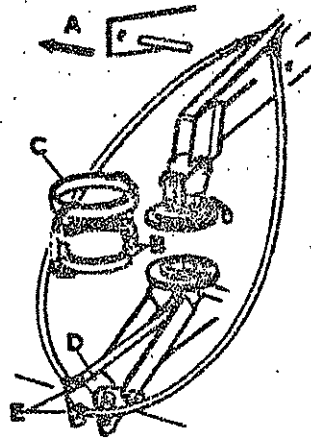


Fig. 1

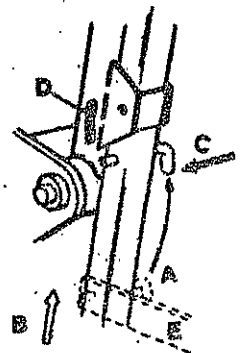
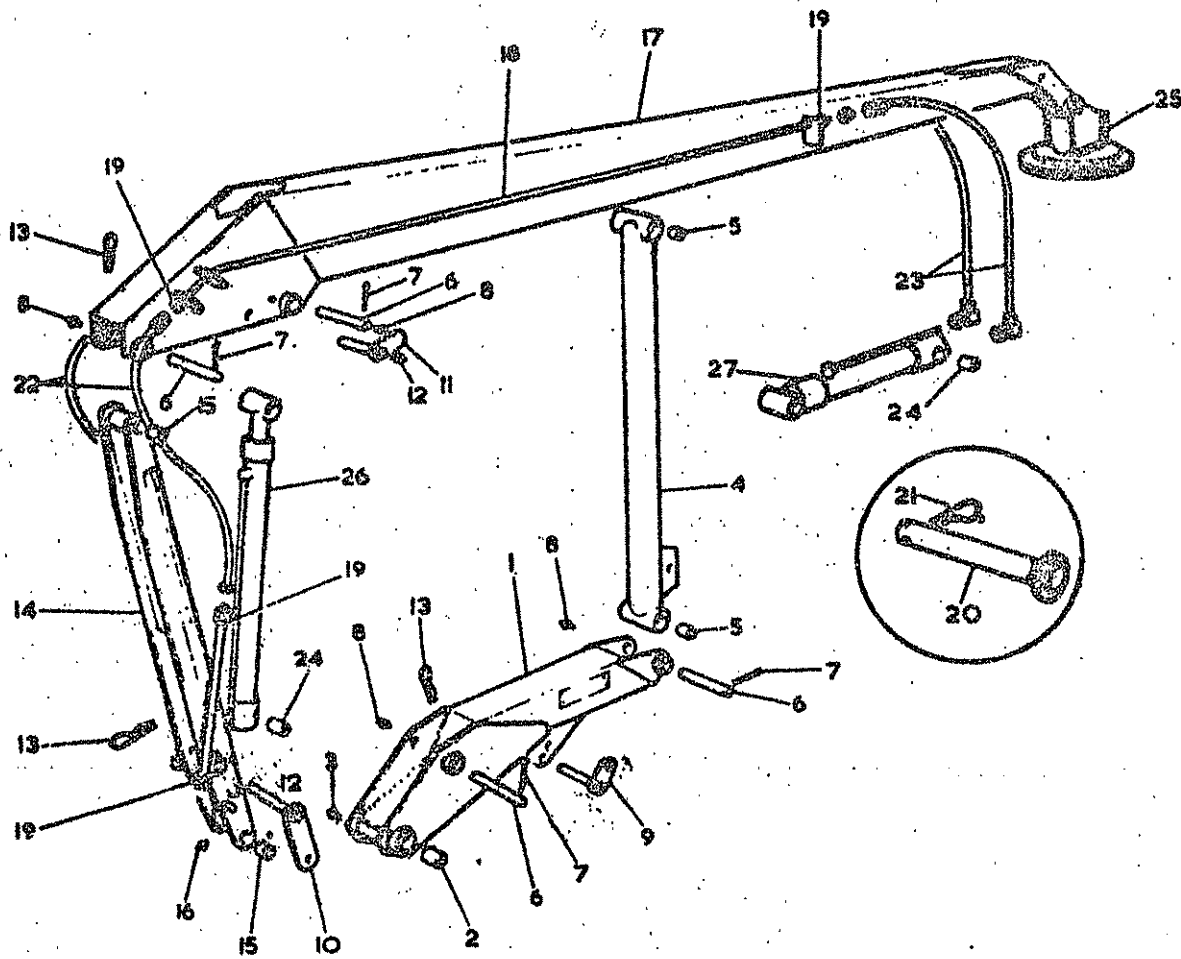


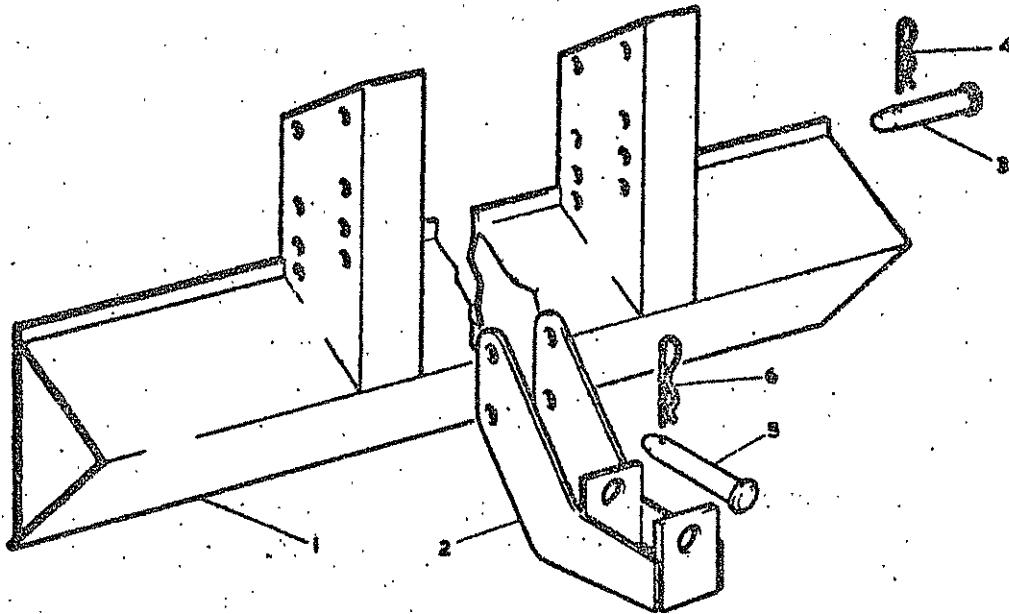
Fig. 2

BLEW LOADER



Part No.	Qty	Description	Ref. No.	Part No.	Qty.	Description
72-14-250	1	LOADER ARM ASSEMBLY COMPLETE, Comprising:-	15	68-03-010	4	.. Bush
72-14-251	1	.. Rocker Arm c/w Bushes and Greaser	16	09-01-121	1	.. Greaser
71-01-134	2	.. Bush	17	70-14-300	1	.. Main Boom c/w Pipes
09-01-121	1	.. Greaser	18	72-13-001	2	.. Rigid Pipes
70-14-253	1	.. Compression Link c/w Bushes	19	72-13-003	8	.. Pipe End Fittings (JIC)
68-03-010	4	.. Bush	20	72-14-008	1	.. Safety Pin c/w Spring Cotter for Double 'D' Slewing Column
70-14-018	4	.. Link Pin c/w Split Pin and Greaser	21	04-31-105	1	.. Spring Cotter
06-03-168	4	.. Split Pin 2" x 1/4"	22	85-11-328	2	.. Flexible Hose 32" Long
09-01-121	4	.. Greaser	23	85-31-598	2	.. Flexible Hose 59" Long
72-14-001	1	.. Lift Ram Rod Pin c/w Spring Cotter	24	71-01-158	4	.. Bush - Base End Loader Ram (Reach & Bucket)
70-14-015	1	.. Ram Base Pin c/w Spring Cotter	25	71-05-302	1	GRAB SUSPENSION SWIVEL ASSEMBLY - See Separate List
70-14-018	1	.. Reach Ram Rod Pin c/w Greaser & Spring Cotter	26	71-03-301	1	REACH RAM COMPLETE - See RAM SPARES LIST
09-01-121	1	.. Greaser	27	71-03-302	1	BUCKET RAM COMPLETE - See RAM SPARES LIST
04-31-105	3	.. Spring Cotter				
70-14-254	1	.. Tension Link c/w Bushes & Greaser				

SCRAPER BLADE



Ref. No.	Part No.	Qty.	Description
	71-03-080	1	SCRAPER BLADE ASSEMBLY, Comprising:-
1	71-01-288	1	Scraper Blade
2	71-03-279	2	Mounting Bracket c/w Pins
3	71-03-081	2	Scraper Blade Mounting Pin c/w Spring Cotter
4	04-31-105	2	Spring Cotter
5	71-03-082	2	Scraper Blade Leg Pin c/w Spring Cotter
6	04-31-103	2	Spring Cotter

FITTING INSTRUCTIONS

SCRAPER BLADE

- (a) Replace standard leg strap pins on PAS frame with special leg pins (71-03-082).
- (b) Fit the scraper blade to the leg pins, securing with pivot pins (3) and Spring Cotters (4).

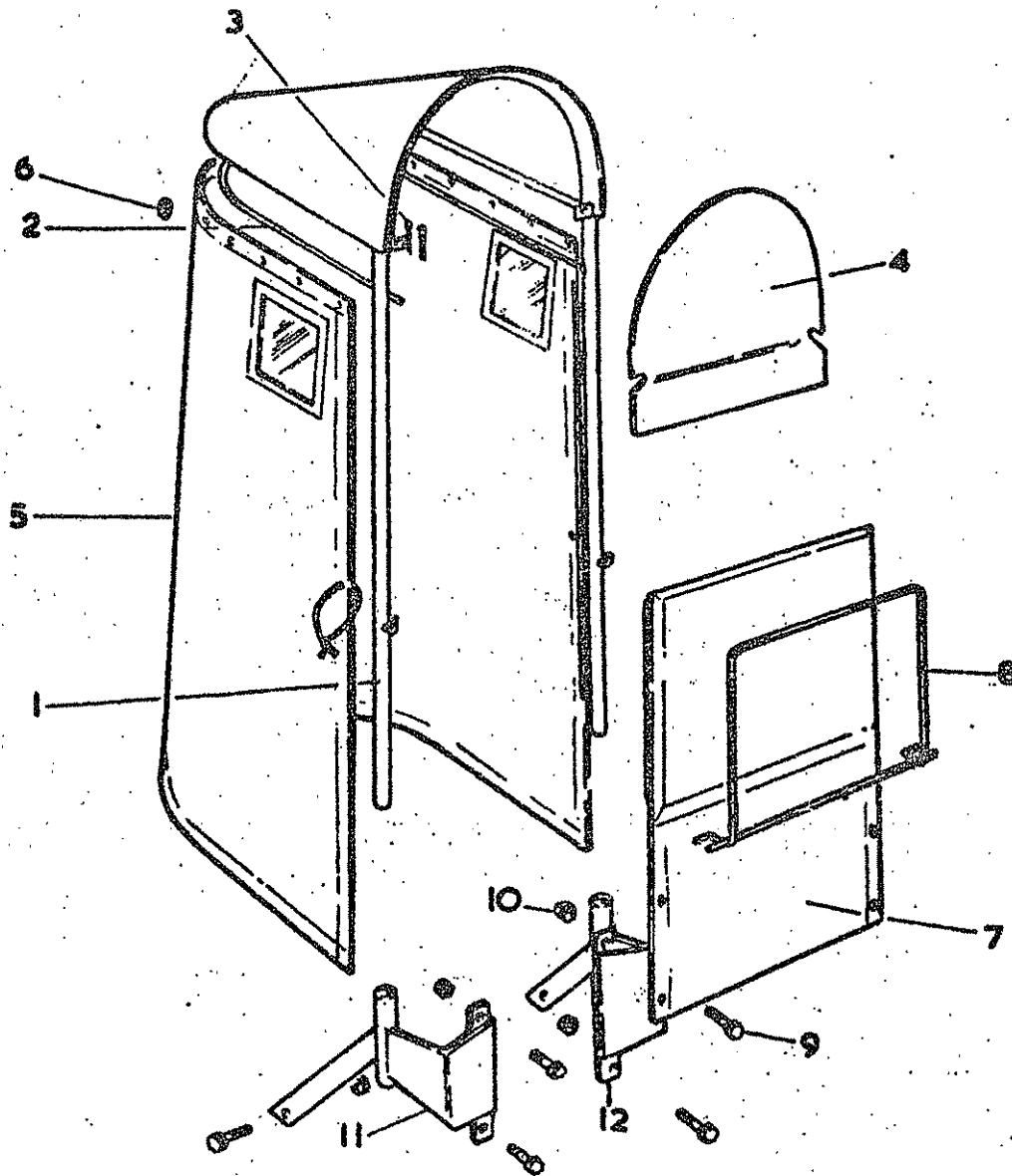
ADJUSTING BLADE HEIGHT

The scraper blade should just clear the ground when it is resting on the PAS skid feet. Two rows of spaced pairs of holes are drilled in the scraper blade supporting frame for height adjustment.

OPERATING

The scraper blade is operated by reversing the tractor towards the material to be scraped, controlling the height of the blade by raising or lowering the whole PAS frame.

CONTROL CAB ASSEMBLY



QTY.	Part No.	Qty	Description
	71-03-296	1	CONTROL CAB ASSEMBLY, complete, comprising:--
1	71-03-293	1	. Cab Welded Assy.
2	71-01-107	1	. Curtain Rail c/w Splitpins
3	05-03-082	4	. Splitpin 1" x 3/16"
1	71-01-103	1	. Front Shield
1	71-01-106	1	. Cab Curtain c/w Rings
3	71-01-111	16	. Curtain Rings
7	71-01-109	1	. Front Apron
1	71-01-110	1	. Front Apron Frame
3	02-11-038	6	. Bolt, 1" x 3/8" UNF
3	01.61.003	6	. Nut, 3/8" UNF 'Wedaloc'
1	71-03-294	1	. Mounting Bracket L.H.
2	71-03-295	1	. Mounting Bracket R.H.

CONTROL CAB ASSEMBLY AND FITTING

FITTING CAB

1. Fit attachment brackets to Double-D using the bolts and nuts supplied. (See Fig. 1).
2. Fit ends of cab welded frame assembly into ends of attachment brackets. Push well in.
3. Remove the two splitpins from the end of the curtain rail and pull the rail out of the support clips. Fit the curtain rings onto the rail, spacing equally - i.e. eight rings on each side. Replace the curtain rail in the support brackets and fit the outer split pin on each end of the curtain rail. (See Fig. 2).

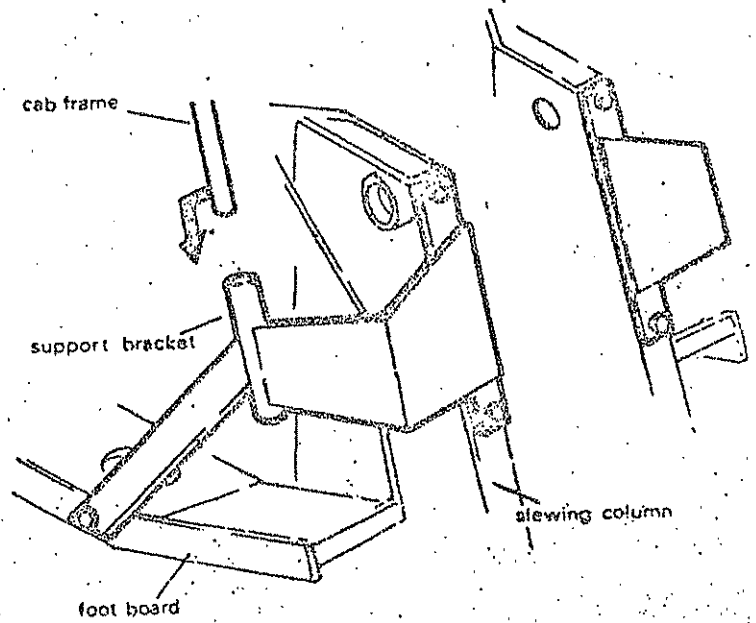


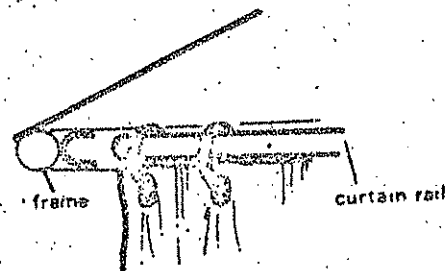
Fig. 1.

FITTING THE FRONT SHIELD

4. Fit the shield so that the notches cut in its edges engage on the curtain rail. Push the shield forward and fit the inner pair of splitpins to the ends of the curtain rail.

NOTE: The shield is made with a bend in it and this should face inwards or the shield will rattle during working (See Fig. 3).

5. Fit the front apron frame inside the pocket of the apron and fit the apron complete. Secure apron to cab frame with the cord provided. Eyelets are provided in the side curtains to take a loop or cord which can be hooked over the apron brackets to keep the curtains closed. (See Fig. 4).



View at rear of cab

Fig. 2.

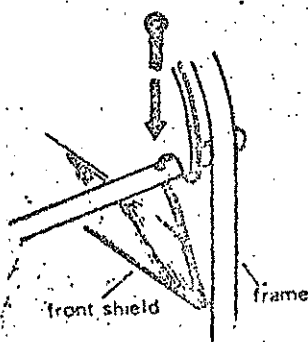


Fig. 3.

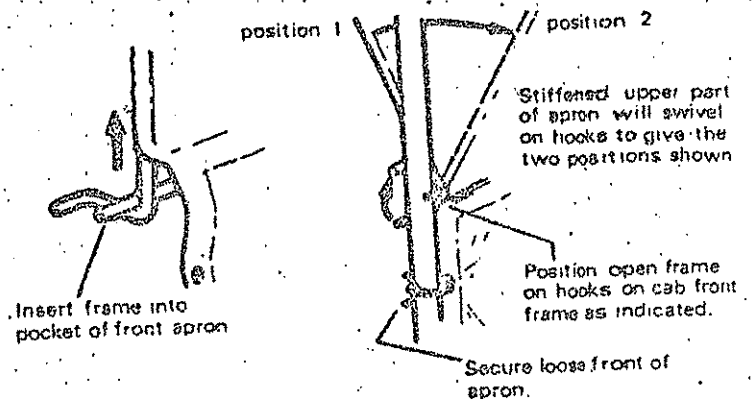
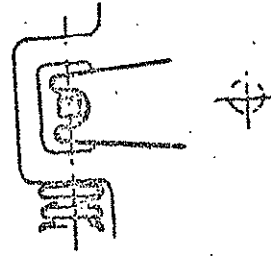


Fig. 4.

TRACTOR TOP HITCH AND DRAFT LINKS

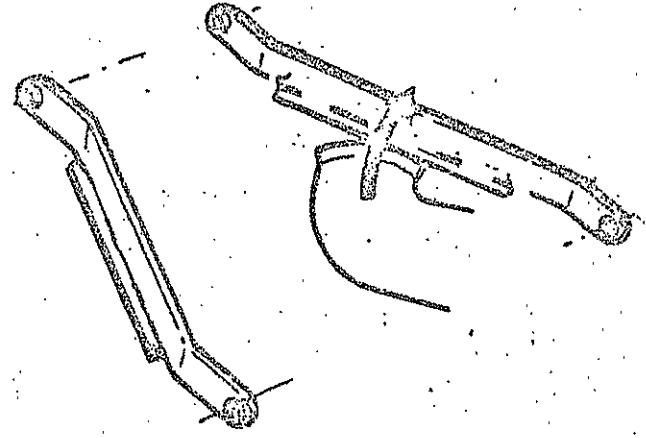
International Harvester 414/434 and 275/276 Tractors with Vari-touch Control.

McCormick top link bracket, part number 71-03-090, must be used when 5/12 Double-D and 5/14D machines are mounted on these tractors. It is also strongly recommended for use with 5/12 Super-C and 5/14 machines. The tractor top link rocker should be removed and the top link and bracket fitted to the the rocker pivot pin. The use of this bracket prevents the constant reaction from the top link operating the draft control mechanism and blowing the relief valve. It is essential that the bracket is correctly fitted with the fork ends engaged in the top of the draft control spring, to prevent loss of spring adjustment.



LOWER DRAFT LINKS

Users of light/medium powered tractors or older model tractors on which the linkage may be worn, are advised to reinforce the lower draft-links by welding a length of steel bar (12" long x 1 1/2" wide x 1/4" thick, minimum dimensional) to the bottom edge of each link, over its centre part. This will provide a 'face' for the instant weight transfer come to bear against when the machine is in use.



SPECIAL NOTE

For other tractors not covered in these instructions it should be possible to avoid any accidental operation of the draft control system by selecting 'zero' or 'minimum draft' on the control quadrant, and using 'position control' to raise or lower the machine for transport.

Ford 4000, Super Major, International Harvester 523 Tractors

Draft control rockers must be locked by fitting a second pin through the rocker pivot lugs; then use standard tractor top link.

Ford 5000 Tractors

The lowest hole in the draft control rocker MUST be used for fitting the standard tractor top link.

David Brown Tractors

The draft control sensing cable should be detached from the top link or top hitch point. Tie loose end of cable to tractor.

B.M.C. 4/55, 3/45, Leyland 354 and 454 Tractors

The McCormick mounting bracket, part number 68-02-267, must be used and fitted as the following instructions. -

- (a) Fit the bent ends of the tie rods through the holes indicated. Secure loosely with nuts and washers on the underside. Ensure that full thickness of nut is engaged on screwthread.
- (b) Fit the mounting bracket lugs over the top ends of the tie rods and position the bracket over the draft control rocker.
- (c) Fit the short pins, part number 68-02-087, through the boxes on the mounting bracket and top holes of the draft control rocker. Secure with splitpins.
- (d) Fit the top link, part number 68-02-096, through the bottom holes of the mounting bracket, rocker and standard tractor top link. Secure with spring cotter
- (e) Fit washers and nuts to the top ends of the rods and tighten securely. Ensure that both rods are tightened evenly. THIS IS MOST IMPORTANT.
- (f) Leave tractor draft control lever in the 'minimum draft' position.
- (g) Both tie rods must be slackened before removing top link pin. When re-fitting, position the pin first before tightening the tie rods.

