Standen

SPECTRUM

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CONTENTS

SECTION 1. INSTRUCTION MANUAL

INTRODUCTION

This manual provides the information for the adjustment and maintenance of your Standen Spectrum to help you obtain the best results from the machine. Before putting the machine to work, read the manual through carefully to obtain a full understanding of what the machine should do and how to obtain it.

Adjustments may have to be made singly or in combination according to crop and soil conditions. Allow the machine to settle to a new setting before making more adjustments.

Throughout this manual, the terms 'front', 'rear', 'left hand' (LH) and 'right hand' (RH) are derived from the tractor driver's position facing forward and the normal forward direction of travel of the Spectrum.

This manual provides an illustrated list of spare parts available through Standen agents. Each illustration shows a complete unit or assembly in exploded form.

Standens policy of continual improvement means that components and even complete assemblies are redesigned from time to time. Where possible, the modifications will be shown in the remarks column.

The first printing of each page in the catalogue is identified as Issue 1 at the foot of the page. When a complete unit or assembly has been redesigned, the appropriate pages are revised and issued as Issue 2. File alongside existing pages so that a complete modification history is gradually built up. When using an illustration and parts list, it is essential that both are of the same issue.

Record below details of your machine in the space provided. Always quote the serial number when ordering spare parts.

Date Purchased: .....

Date Started Work: .....

Serial Number: .....

Agent's Name: .....

Agent's Address: .....

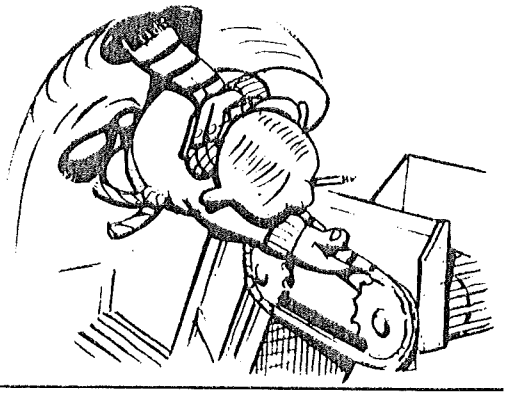
.....

.....

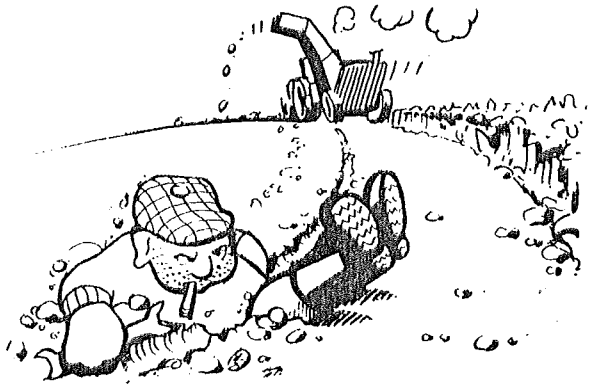
.....

Agent's Tel. Number: .....

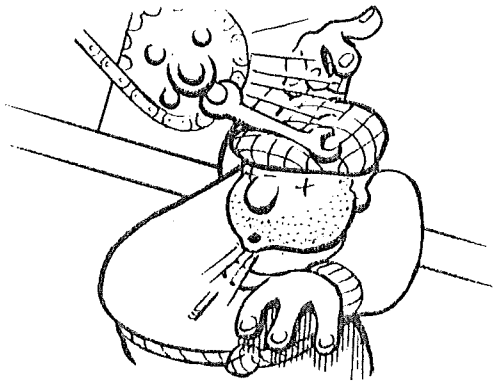
Safety Precautions



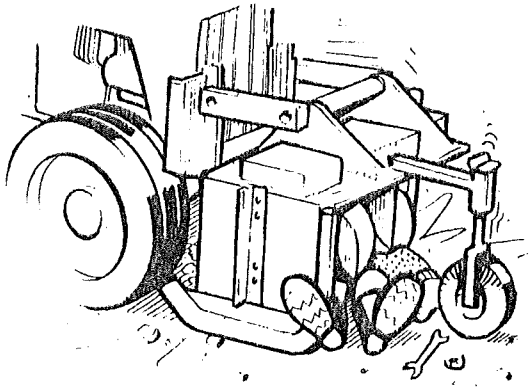
NEVER Operate the machine with any of the safety guards removed, remember they are fitted for two reasons - to keep dirt out, and more important to protect you and others from the various working parts. So, make sure they are always kept in good condition and they are fitted correctly when the machine is in work.



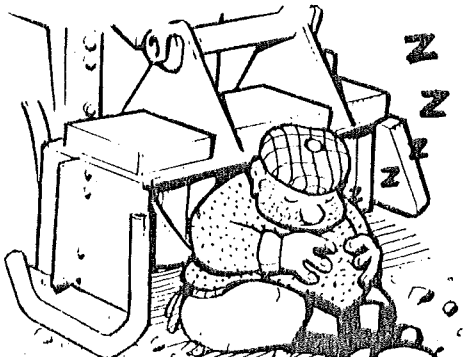
NEVER Attempt to adjust or clean any part of the machine with the tractor power take-off in motion and always stop the tractor engine.



NEVER Fit drive chains or drive belts while the drive sprockets or drive pulleys are in motion.

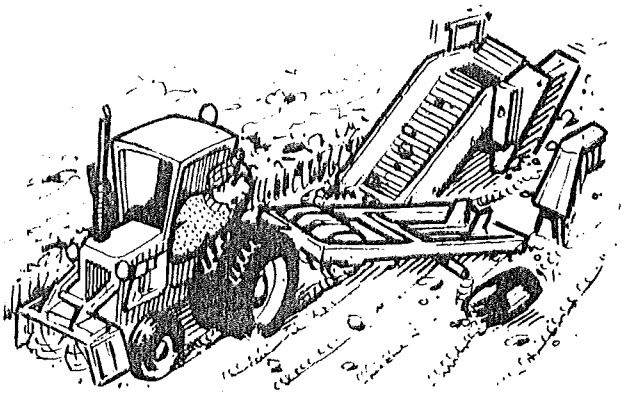


NEVER Work under the machine when it is in a raised position on the tractor hydraulic lift linkage.

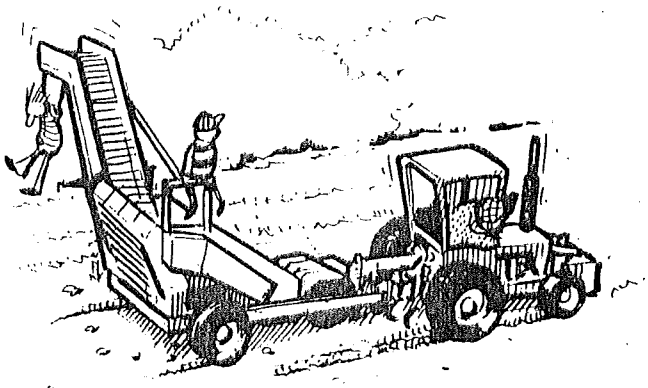


NEVER Set the machinery in motion before ensuring that every one in the vicinity is aware of your intention.

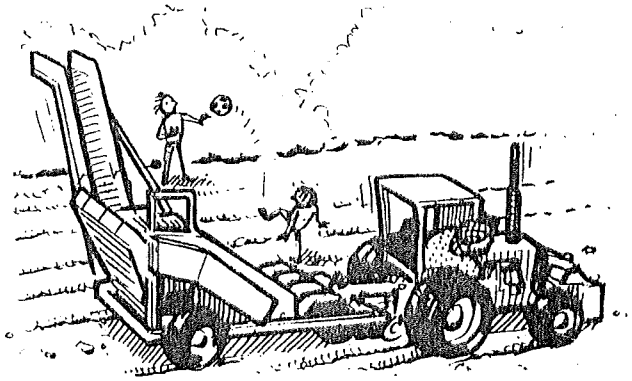
NEVER Operate the machine in a state of disrepair.



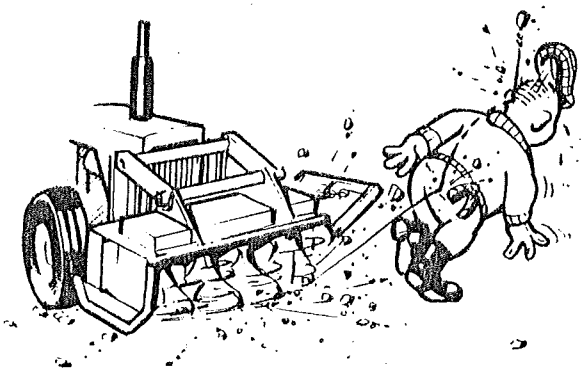
NEVER Allow any one especially children to ride on the machine.



NEVER Allow children to be in the vicinity where machines are working.



NEVER Stand near the discharge end of the topper while machine is running.



The above list of precautions is not exhaustive. All machinery is potentially dangerous and great care must be exercised by the operator(s) at all times.

Standen Engineering Limited will not accept liability for damage or injury caused by their products except when such liability is specifically imposed by English Statute.

SECTION 1

INSTRUCTION MANUAL

INSTALLATION

The Standen Spectrum can either be built as a three row or four row sugar beet harvester. Both machines are designed to lift, clean and load the beet into a trailer running alongside the harvester.

Check that the nuts, bolts and sprockets keys are tight, especially before starting off a new machine and during the first day or two of work.

Do not raise the machines to its fullest height with the P.T.O. engaged as serious damage could result to the P.T.O. shaft.

Do not reverse or turn unless the machine is in the raised position. Pay particular attention to the lubrication and maintenance of the machine.

Pay particular attention to the safety precautions; they are written as a warning to protect you and others.

TRACTOR WHEEL SETTING

Both front and rear tractor wheels must be set to straddle the rows of beet. For example, if the crop is grown at 20" (50.8 cms) the distance measured between the tractor tyre centres must be 60" (152.4 cms). This will then ensure that the wheels run in a centre line between the rows of beet. The instructions for adjusting the tractor wheels are given in the tractor manufacturers handbook.

SAFETY FIRST

When carrying out wheel adjustments take care to place the jack on firm ground under a solid part of the tractor. Before removing the wheel, place stout support under the tractor frame in case the jack should become dislodged.

TURBO TOPPER

The Turbo Topper is designed to removed the leaf from the beet by the use of rotating cutters prior to the beet being topped by the scalper etc.

Four rotary cutters are used and the loose leaf is thrown from one cutter to the other and finally out to the side.

Check that the nuts and bolts and keys are tight, also the grub screws in the bearings, especially when starting off a new machine and during the first day or two of work.

Do not reverse the machines or turn at the end of a row unless the machines is in a raised position.

Pay particular attention to the safety precautions printed in this manual.

FITTING THE TURBO TOPPER

The Turbo Topper is mounted to the front of the tractor supported by mounting brackets fitted to the tractor. It is fully floating on pivoting linkage, and raised and lowered by a hydraulic ram (item 3, fig 1) the ram being fed and operated by hydraulic hose from the tractor external control lever.

There are various types of tractor mounting brackets available to suit individual tractors and they should be fitted by bolting to the existing holes in the tractor chassis with the bolts provided in the kit.

With the tractor mounting brackets and the mounting frame assembly (item 1, fig 1) in position on the tractor, and with the hydraulic ram (item 3, fig 1) connected to the harvester hydraulics (see figure 7) the quick hitch system can be used.

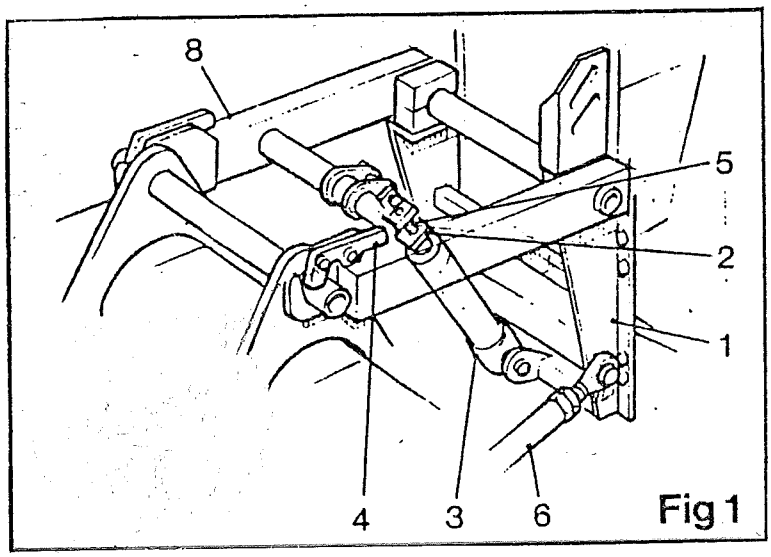


Fig 1

TO PICK-UP THE TOPPER

1. Lift the ram stop (item 2, fig 1) clear of the hydraulic ram (item 3, fig 1).
2. Drive the tractor forward and locate the hooks on the lift arm (item 8, fig 1) around the lift bar on the topper. Ensure that the lift bar is fully located in the hooks before any attempt is made to lift the topper.
3. Lift the topper by actuating the hydraulic ram (item 3, fig 1). Ensure that the latch (item 4, fig 1) has positioned itself over the topper lift bar as shown in fig. 1.
4. Fit the stabiliser links (item 6, fig 1) between the mounting frame (item 1, fig 1) and the topper. When the topper is in work the front should be lower than the rear. To achieve this, turn the stabiliser clockwise or anti-clockwise.
5. Couple the hydraulic motor to the hydraulic system of the harvester via the diverter valve. (For adjustments on the diverter valve, see Turbo Topper Drives).

TO UNHITCH THE TOPPER

1. Disconnect the hydraulic motor from the diverter valve.
2. Remove the stabiliser links (item 6, fig 1).
3. Reposition the latch (item 4, fig 1).
4. Lower the topper to the ground. When the Topper has touched the ground continue to lower the lift arms (item 8, fig 1) and slowly reverse the tractor until the topper is free of the lift arms.

SETTING-UP THE TURBO TOPPER

The Turbo Topper is a unit designed to cut the leaf from the beet by means of the rotating cutters (item 1, fig 2) prior to the beet being topped.

The tops are transferred from one rotor to the other and then out of the side by means of the rotating speed of the rotors. The suction of the spiral fins welded round the rotors lifts any loose leaf and trash, leaving a clean path for the lifter.

The cutting width of each individual rotor (item 1, fig 2) is 17" (43 cms). The overall cutting width of all four rotors is 74" (187 cms). Row widths of from 16" (48 cms) to 21" (56 cms) can be obtained.

The amount of tops removed from the beet by the rotors is determined by the size of the crown that can be removed by the scalpers etc. As a guide to the amount of top to remove, prior to scalping, set the depth of cut of the rotor knives to just top the highest beet.

The depth of cut is determined by the depth wheel (item 1, fig 3) fitted at the front of the unit. To adjust the depth wheel, loosen the retaining screws in the depth wheel stop clamps (item 2, fig 3) and lift or lower the wheel according to the amount of topping required. Stop brackets (item 2, fig 1) fitted to the hydraulic ram are there to reduce the amount of float, should the depth wheel sink into the ground when travelling over undulating ground or soft soil patches. The size of gap between the stop plate (item 2, fig 1) and the hydraulic ram determines the amount the topper is allowed to drop. To adjust, turn the lock-nuts (item 5, fig 1) until the stop plate is in the correct position.

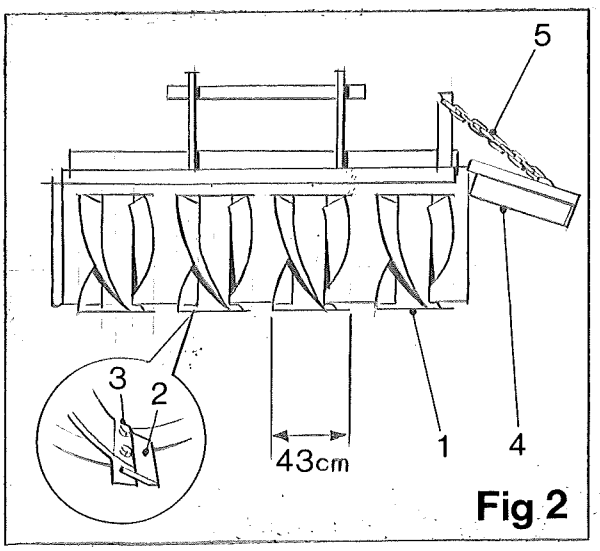


Fig 2

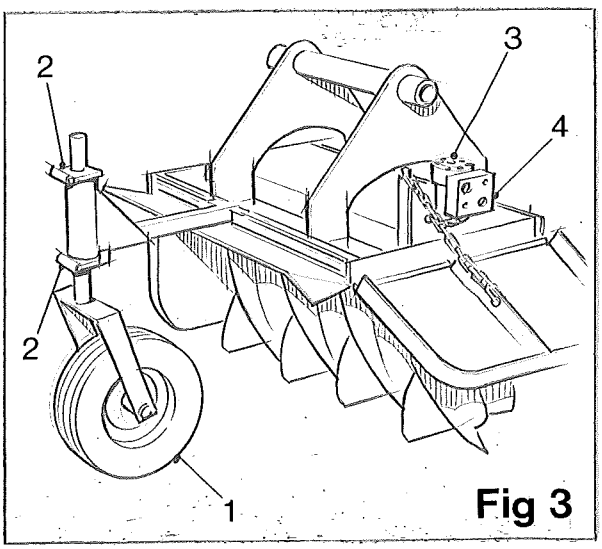


Fig 3

Steel knives (item 2. fig 2) are fitted to the rotors and can be removed or replaced by removing the retaining patch bolts (item 3, fig 2). When fitting or removing patch bolts, care should be taken not to overheat the nylon locking material fitted to the bolt. Always replace the bolts with new after they have been removed or fitted twice. Never set the topper so that the knives touch the soil as damage to the knives will ensue.

The sugar beet tops discharge end of the topper is fitted with a hinged tops deflector flap (item 4, fig 2) which can be adjusted to a high or low position, according to the amount of beet tops, to form a windrow or to spread the tops. Adjustment is made by lengthening or shortening the support chain (item 5, fig 2).

TOPPER DRIVES

C A U T I O N

ALL REVOLVING DRIVE MACHINERY CHAINS, SHAFT AND SPROCKETS ETC., ARE POTENTIALLY DANGEROUS. THEREFORE BEFORE ATTEMPTING ANY ADJUSTMENT OR MAINTENANCE OF THE DRIVE EQUIPMENT, SWITCH OFF THE ENGINE OF THE TWO VEHICLE, DISCONNECT THE POWER TAKE-OFF SHAFT AND SET THE HANDBRAKE. FAILURE TO OBSERVE THE ABOVE CAUTION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

The rotors are driven by a hydraulic motor (item 3, fig 3), being fed from a pump mounted on the harvester and driven from the tractor P.T.O. shaft, via a gearbox. The oil to the hydraulic pump is supplied from a tank mounted on the harvester. The tank should be filled with BP UK 46 Hydraulic Oil or equivalent and should always be kept full, especially when storing the machine for long periods of time.

Situated on the RH side of the quick hitch unit is a diverter valve (item 1, fig 4) designed to cut off the flow of oil to the rotors when the machine is in the raised position, so stopping the rotors from turning.

The diverter valve must be fitted or adjusted with the topper in the raised position and the valve must be closed. Adjusting slots are provided in the diverter valve support bracket (item 2, fig 4).

To adjust, loosen the cap screws (item 3, fig 4) securing the valve and slide the valve until the spool touches centrally on the lift arm (item 4, fig 4).

At the top of the diverter valve is a return spring fitted to push down on the top of the spool when the machine is lowered. The spring is encased for cleanliness and does not require adjusting. A pressure relief valve is situated adjacent to the pump. It is fitted to protect the hydraulic system should any blocking occur and is preset at a pressure of 3000 P.S.I. UNDER NO CIRCUMSTANCES SHOULD THIS VALVE BE TAMPERED WITH.

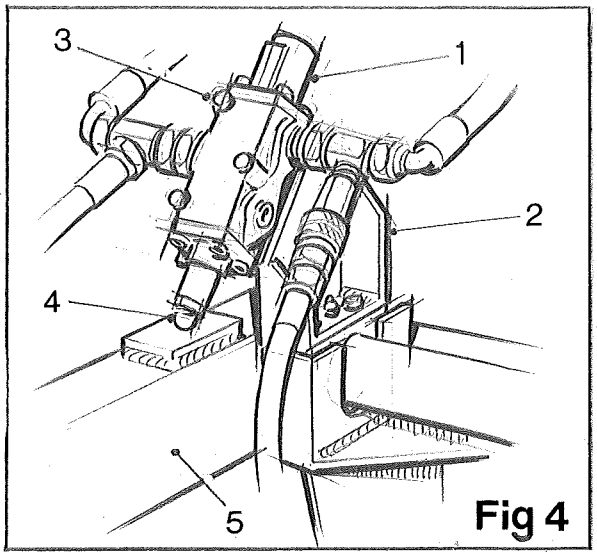


Fig 4

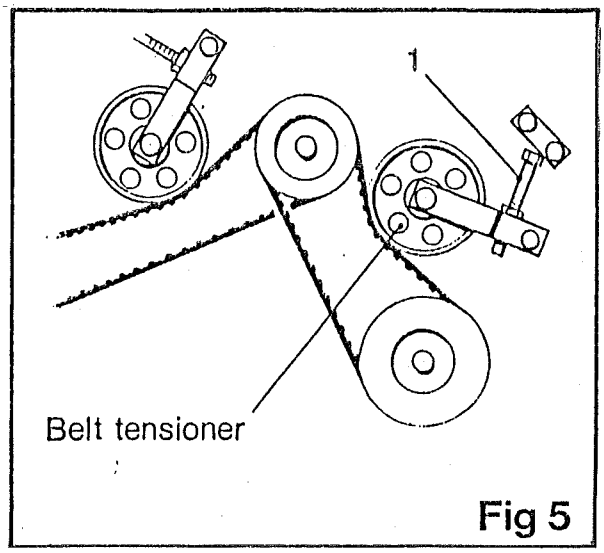


Fig 5

An aluminium check valve (item 4, fig 3) is fitted which enables the rotors to slow down when the oil supply is shut off. The motor must always be connected to the oil supply via the check valve. Failure to do so will cause severe damage to the motor.

From the hydraulic motor the drive is by toothed belts to the individual pulleys which in turn drive the topper rotors. To remove the drive guard, remove the securing bolts and slide the guard out of the RH side of the topper. These drives are situated beneath the guards.

To adjust the tension of the drive belts, turn the belt tensioner adjuster screw (item 1, fig 5) clockwise or anti-clockwise until the correct tension is achieved. The correct adjustment should allow 5 mm to 7 mm of movement of the belts at a point midway between the drive pulleys. After all the necessary adjustments have been made it is essential that the guards are securely replaced to avoid loose tops and trash blocking the pulley teeth and causing damage to the belts. Never allow the belts to run slack as this will result in severe damage and their subsequent failure.

C A U T I O N

ALWAYS REPLACE SAFETY GUARDS BEFORE ATTEMPTING TO ENGAGE THE P.T.O. DRIVE.

WARNING:

HYDRAULIC PIPES AND FITTINGS MAY BE UNDER PRESSURE WITH THE MACHINE AT REST. ENSURE THAT ALL RESIDUAL PRESSURE IS RELEASED BEFORE DISCONNECTING ANY PIPEWORK.

The P.T.O. coupling supplied with the harvester may require cutting to a correct length to suit individual tractors. To do this the coupling should be parted and the two ends fitted to the tractor and the harvester respectively. The male and female shafts can then be measured alongside each other and adjustments made by cutting the surplus bar from both male and female shafts. At least 4" (10 cms) overlap should be allowed (see fig. 6). After the correct length of the coupling has been obtained the P.T.O. guard should then be cut to correspond with the coupling. Before engaging the P.T.O. secure the guard by fixing the chain to a convenient place on the harvester, and ensure that the rubber hood to protect the knuckles of the P.T.O. coupling is in place.

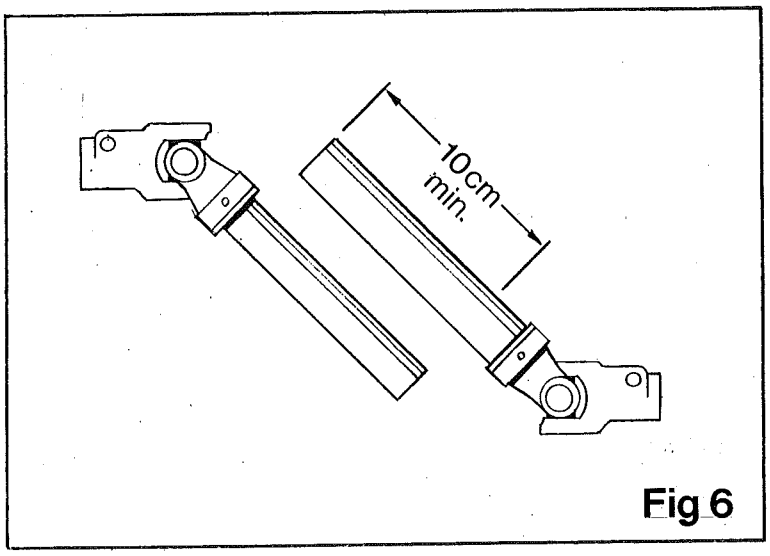


Fig 6

Situate the control box in a convenient place in the tractor. With the tractor battery disconnected, connect the black lead (-) to the negative side of the battery and connect the red lead (+) to a positive terminal on the tractor.

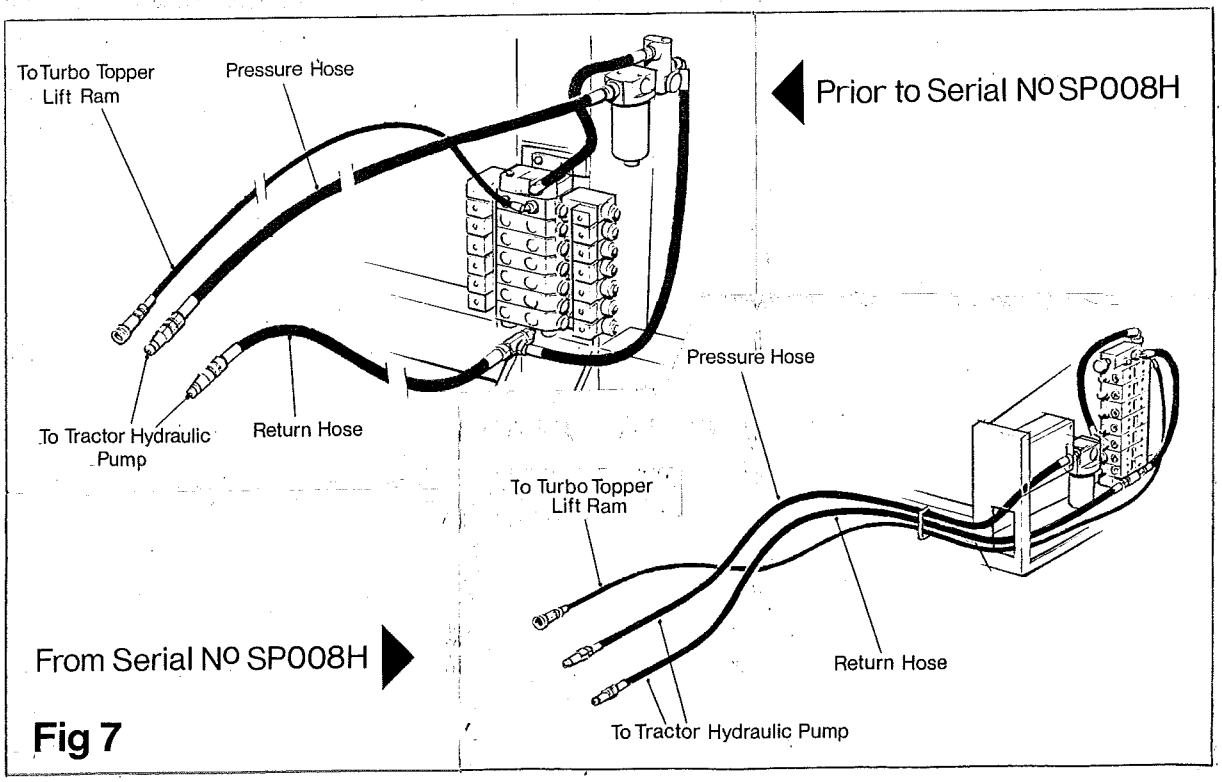


Fig 7

Connect the pressure and return hoses from the spool valve block and the turbo topper lift ram hose as shown in fig. 7.
Connect the pressure and return hoses from the relief valve block and the turbo topper motor drain hose as shown in fig. 8.

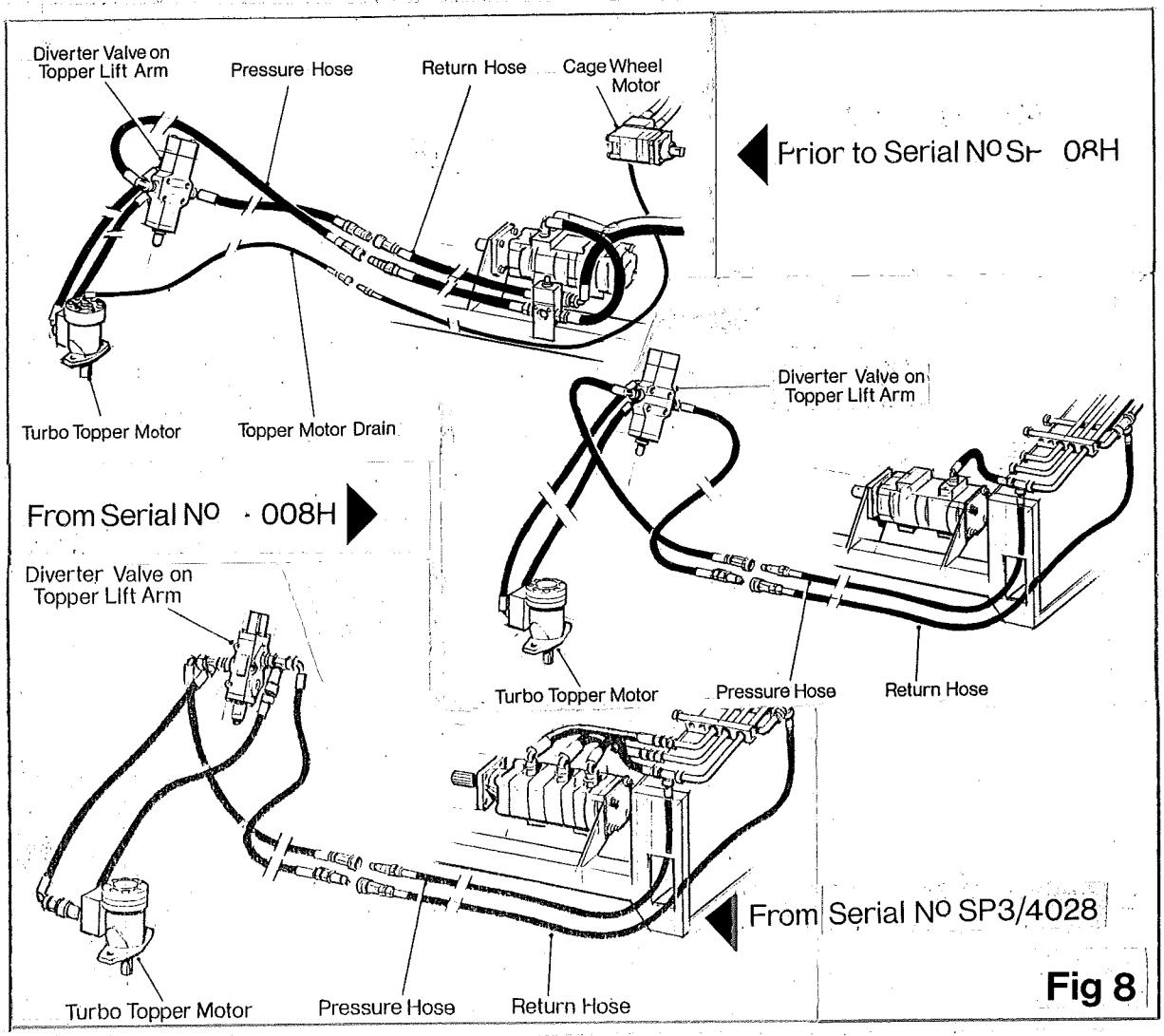


Fig 8

STEERABLE REAR WHEELS (OPTIONAL)

The rear wheels are steerable to assist with hillside work and also enable easier headland turning. Operation of the rear wheels is controlled from the tractor mounted control box (see section on Control Box). Wheel nuts are torque set to 185 lbs/ft.

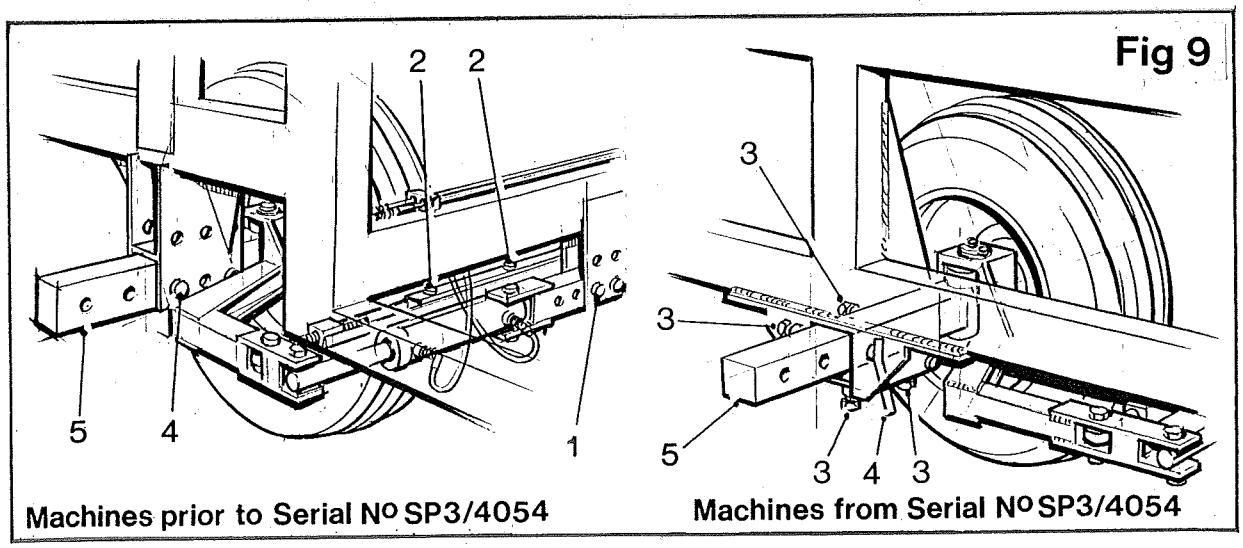


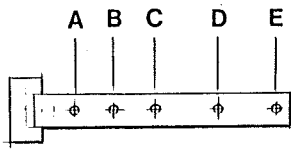
Fig 9

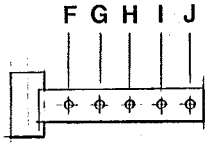
Both LH and RH wheels are adjustable for different row settings.
To adjust:-

1. Jack up machine.

2. Remove ram bolts (item 1, fig 9).
3. Remove retaining bolts (item 2, fig 9).
4. Loosen axle clamp bolts (item 3, fig 9).
5. Remove stub axle location bolts/pins (item 4, fig 9).
6. Slide stub axles (item 5, fig 9) to required position (see fig 10).
7. Reposition location bolts/pins (item 4, fig 9) in correct holes and resecure (see fig 10).
8. Retighten axle clamp bolts (item 3, fig 9).
9. Replace ram bolts (item 1, fig 9) and retaining bolts (item 2, fig 9).

Fig 10





LH STUB AXLE **RH STUB AXLE**

Row Width	Opening-up use holes :-	Work Position use holes :-	Row Width	Work Position use holes :-	
16"	A,B	C,D	16"	H,J	Machines prior to Serial No SP3/4054
18"	A,B	C,D	18"	G,I	
20"	B,C	D,E	20"	F,H	
16"	A	C	16"	J	Machines from Serial No SP3/4054
18"	A	C	18"	I	
20"	B	D	20"	H	

SAFETY FIRST

When carrying out wheel adjustments take care to place jack on firm ground under a solid part of the harvester. Before removing the wheel, place stout support under the harvester frame in case the jack should become dislodged.

ADJUSTABLE DRAWBAR

The drawbar is adjustable to pivot in two different directions. Vertical movement is controlled by a double acting hydraulic ram (item 1, fig 11) and is adjustable to give the harvester its correct digging depth and also to lift the harvester out of work. The hydraulic ram (item 1, fig 11) is actuated from the tractor mounted control box (see section on Control Box). Horizontal movement of the drawbar is provided by either an adjustable stay (item 2, fig 11) or a double acting hydraulic ram and provides easy manoeuvrability of the harvester to align it with the crop, also assisting when harvesting on hillsides. To adjust the drawbar fitted with an adjustable stay (item 2, fig 11), simply turn the stay centre section to give the required movement. The drawbar fitted with hydraulic ram is actuated from the tractor mounted control box (see section on Control Box). On later machines, a drive shaft carrier (item 3, fig 11) is fitted to support the PTO drive shaft after uncoupling from the tractor.

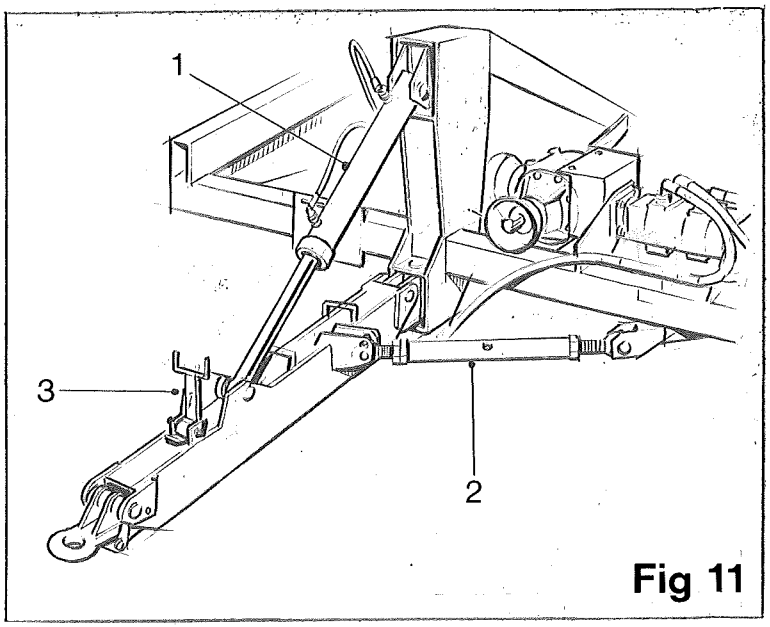


Fig 11

PARALLEL LINKAGE SCALPERS

The purpose of the scalper unit is to crown the beet cleanly and squarely by the use of a comb (item 1, fig 13) which runs on top of the beet holding it steady while the knife (item 2, fig 13) crowns it.

The topping unit frame is adjustable for height. The height of the topping unit is determined by the depth at which the harvester is lifting beet. As a general rule, the topping unit frame (item 1, fig 12) should run parallel with the ground, after the depth of lift has been established. To adjust the height, slacken the lock nuts (item 2, fig 12) and turn the adjuster nuts (item 3, fig 12) until the required height is reached. Ensure both sides are adjusted equally.

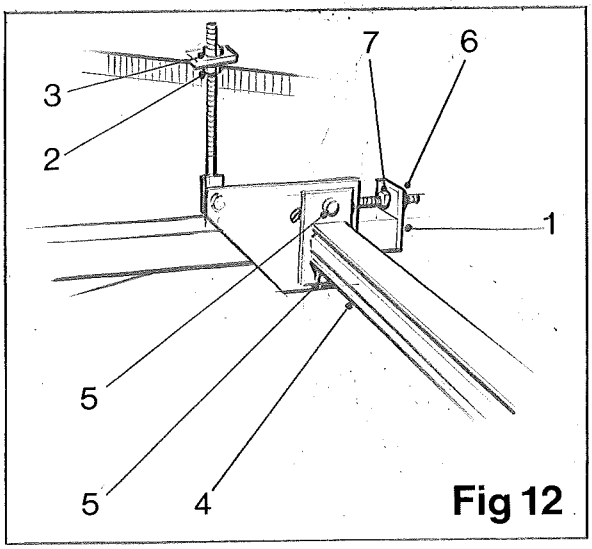


Fig 12

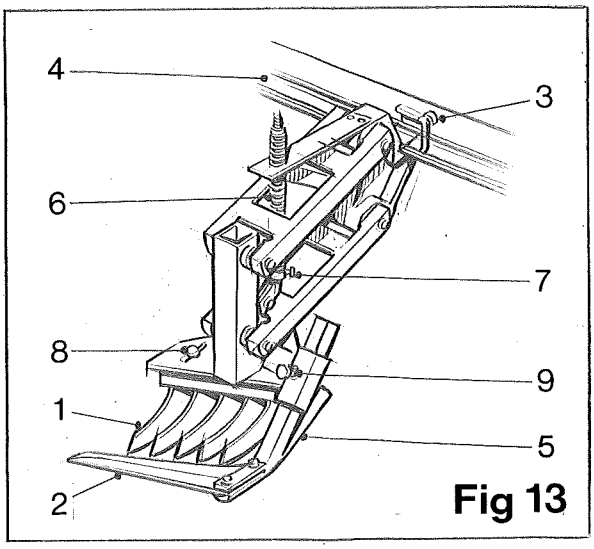


Fig 13

The pitch of the scalper unit is adjustable by pivoting the tool bar (item 4, fig 12). To adjust the tool bar, slacken the retaining bolts (item 5, fig 12) and the two lock nuts (item 6, fig 12) and turn the adjuster nuts (item 7, fig 12) to give the correct pitch.

The scalper units are adjustable for varying row widths. To adjust, slacken the retaining bolt (item 3, fig 13) and slide the complete unit along the tool bar, (item 4, fig 13) to the required position. Ensure that the knife is topping the beet as close to the knife arm (item 5, fig 13) as possible.

A very important part of the scalper unit is the tension of the spring (item 6, fig 13). The spring is designed to give a downward pressure on the knife. Enough pressure should be given to return the comb (item 1, fig 13) and the knife to successfully top a low beet after topping a high beet. Simultaneously too much pressure will force the knife to dig into the highest beet causing too much to be removed or the beet may be pushed over. To adjust the spring, slacken the retaining screw in the stop collar (item 7, fig 13) and reposition it to give the required amount of pressure.

TOPPING KNIFE SETTING

The comb (item 1, fig 13) should ride onto the beet before the knife starts to cut. For this reason the comb is made adjustable backwards and forwards. The comb should be forward (further away from the knife) for large beet and backwards for small beet. To adjust, slacken the two setscrews (item 8, fig 13) and slide the comb in the required direction to the correct position.

The amount of beet crown removed by the knife is determined by the distance between the comb and the knife. To adjust, slacken the retaining bolt (item 9, fig 13) and slide the knife arm (item 5, fig 13) to the required position.

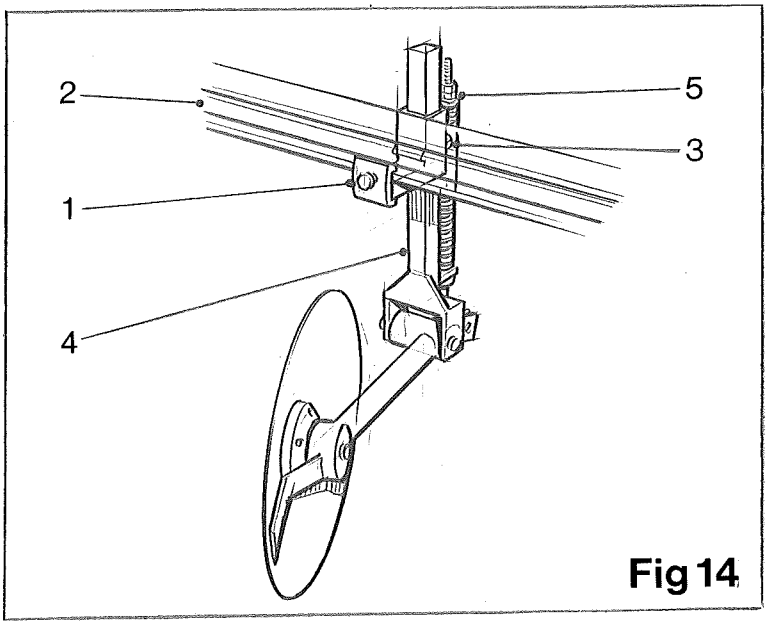


Fig 14

DISC COULTERS (For use with Parallel Linkage Scalpers)

The purpose of the disc coulters fitted at the side of the scalpers is to cut sugar beet leaves and trash to prevent them from building up and clogging on the knives and also to cut a 1½" deep (38 mm) deep furrow for the knife arms.

As with the scalpers, the disc coulters can also be adjusted to suit varying row widths. To adjust, slacken the securing bolt (item 1, fig 14) and slide the disc assembly along the tool bar (item 2, fig 14) to the required position and retighten. Adjustment is also provided to obtain different depths of cut. To adjust, loosen the securing bolt (item 3, fig 14) and slide the disc arm support (item 4, fig 14) either up or down. Once adjustments have been made for row widths, depth, etc., attention must be paid to the tension of the disc coulter. The pressure on the disc arm should be enough to make the disc cut into the soil but allow it to ride over obstructions. To adjust the disc, for the correct tension, either tighten or loosen the lock nuts (item 5, fig 14) until the right amount of pressure is acquired.

SKEWBAR TOPPER

The skewbar topper is designed to top beet with the use of a power driven barrel (skewbar). The skewbar barrel rubs off the remaining tops left by the Turbo Topper.

The amount of tops removed is determined by the height of the skewbar.

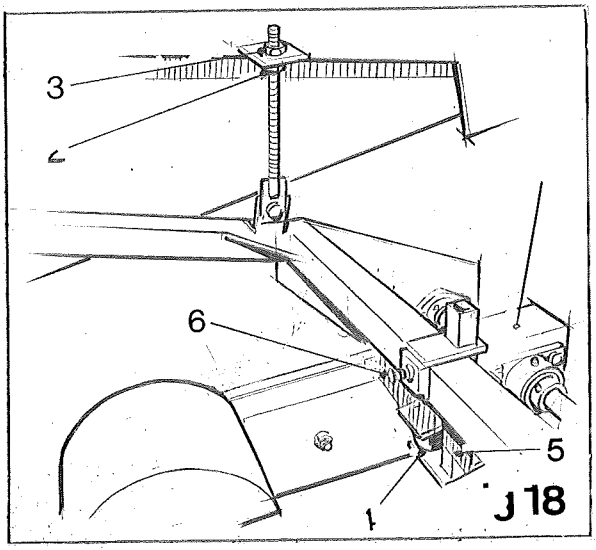
To obtain good, clean topping the pivot end of the skewbar arm (item 1, fig 18) should be set to clear the tops of the pre-topped beet; this setting is dependent on the depth at which the harvester is lifting beet. To adjust the height of the skewbar unit, slacken the lock nuts (item 2, fig 18) and turn the adjuster nuts (item 3, fig 18) until the required height is reached. Ensure both sides of the unit are adjusted equally.

MACHINES PRIOR TO SERIAL NO. SP 3/4028

The height at which the skewbar barrel operates at is determined by the position of the lower bump stop (item 4, fig 18). The height should be set so that the skewbar is able to top the low beet as well as the high beet. Initial adjustment can be made by removing the clamp bolt (item 6, fig 18) and moving the damper bracket (item 5, fig 19) to the required position. Finer adjustments can be achieved by turning the bump stop (item 4, fig 18).

MACHINES FROM SERIAL NO. SP 3/4028

The height at which the skewbar barrel operates is determined by the height of the skewbar unit frame and the damper assembly (item 1, fig 19). The height should be set so that the skewbar barrel is able to top the low beet as well as the high beet with the working angle of the skewbar arm (item 2, fig 19) between 10° and 15° from the horizontal. Adjustment of the damper assembly can be made by turning the lock nut (item 3, fig 19) in the required direction. When in work, the skewbar arm (item 2, fig 19) should be supported by the top damper spring (item 4, fig 19) when topping the lowest beet and a 3" to 4" gap should exist between the top damper spring and bottom damper spring (item 5, fig 19) allowing the skewbar barrel to successfully top the high beet. To adjust the gap, loosen the locking collar (item 6, fig 19) and reposition.



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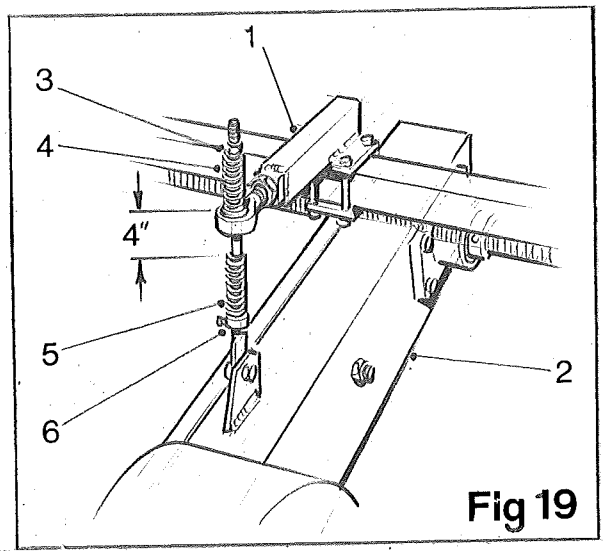


Fig 19

SKEWBAR DRIVES

The drives for the skewbat are taken from a centrally mounted gearbox (1:2.4 ratio) via a universal coupling to the skewbar unit. From the universal coupling, the drive is transmitted to the skewbar arms via a toothed belt (item 1, fig 20). The tension of the toothed belt can be adjusted by slackening the four securing bolts (item 2, fig 20), the lock nut (item 3, fig 20) and turning the adjuster screw (item 4, fig 20) until the correct tension is achieved. The correct adjustment should allow 10mm - 13mm of deflection on the

belt at a point midway between the pulleys.
Each skewbar is driven by two vee belts (item 5, fig 20). The tension of the belts can be adjusted by slackening the four securing bolts (item 6, fig 20) and the lock nut (item 7, fig 20). Turn the adjuster screw (item 8, fig 20) to obtain the correct amount of tension and retighten the bolts.

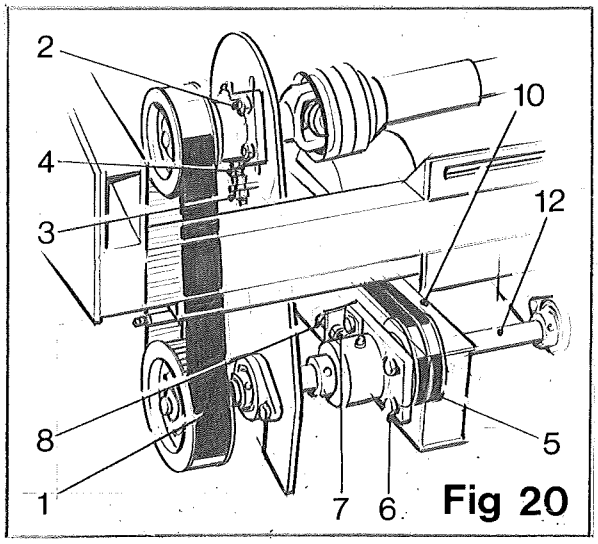


Fig 20

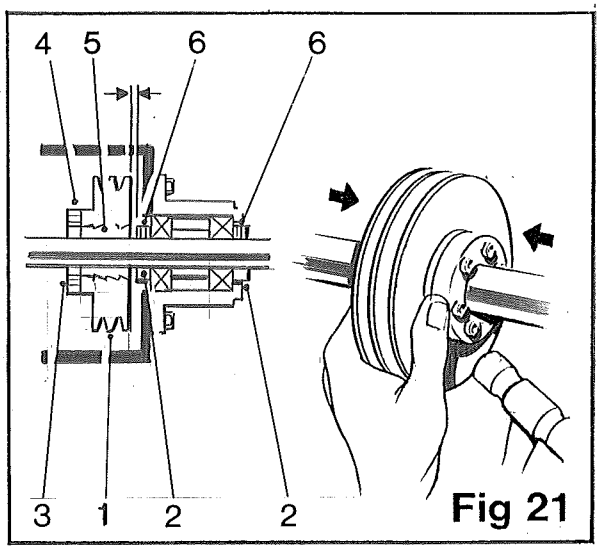


Fig 21

CAUTION

All revolving drive machinery chains, shafts, sprockets, etc., are potentially dangerous. Therefore before attempting any adjustment or maintenance of the drive equipment, switch off the engine of the tow vehicle, disconnect the power take off shaft, and set the hand-brake. Failure to observe the above caution could result in serious injury to personnel.

The skewbar arms are adjustable for different row settings. To adjust the position of a skewbar arm, the pulley (item 1, fig 21) and the eccentric locking collars (item 2, fig 21) must first be loosened.

To slacken the pulley:-

1. Loosen the locking screws (item 3, fig 21) until they are no longer in contact with the pulley.
2. Loosen the nut (item 4, fig 21) slightly.
3. Apply light blows to the nut (item 4, fig 21) as indicated by the arrows (fig 21). This is necessary to release the inner sleeve (item 5, fig 21). To release the sleeve even more, turn it out of the pulley (LH thread).
4. Now that the necessary components are loose, the pulley (item 1, fig 21) can be slid along the drive shaft (item 12, fig 20).

To slacken the eccentric locking collars (item 2, fig 21), loosen the grub screw (item 6, fig 21) and then, by using the blind hole, turn the locking collar in the opposite direction to the drive shaft rotation to release it.

The skewbar arm (item 10, fig 20) can now be slid along the drive shaft (item 12, fig 20) while simultaneously sliding the damper bracket (item 1, fig 19) along the support beam.

Once in the required position, re-tighten the eccentric locking collars (item 2, fig 21) as follows:-

Turn the locking collar in the direction of the drive shaft rotation until the eccentric diameter of the collar and inner ring fully engage. The blind hole in the collar facilitates tightening. Re-tighten the grub screw (item 6, fig 21) to a torque of 12.4 Nm to prevent the collar loosening during service.

To secure the pulley:-

1. Check to see that the locking screws (item 3, fig 21) do not protrude from the rear of the nut (item 4, fig 21).
2. Tighten the nut (item 4, fig 21) onto the inner sleeve (item 5, fig 21) as far as it will go.
3. Thread the pulley (item 1, fig 21) onto the inner sleeve (item 5, fig 21) (LH thread) until it abuts the nut (item 4, fig 21).
4. Turn the locking screws (item 3, fig 21) until they loosely abut the pulley (item 1, fig 21).
5. Ensure the pulley (item 1, fig 21) is in the desired position, leaving a slight gap between the pulley and the locking collar (item 2, fig 21) as shown (fig 21). This gap allows the pulley to move slightly while tightening.
6. Lightly tighten the locking screws (item 3, fig 21) using an allen key.
7. Tighten the locking screws (item 3, fig 21) to a torque of 9 Nm, tightening alternately on the diagonal.
8. Tighten locking screws to a torque of 18 Nm, again tightening alternately on the diagonal.
9. Tighten locking screws to a torque of 18 Nm by going circumferenially around the screws four times.

It is essential that this tightening procedure is followed to allow the bush assembly to transmit the required torque.

LIFTING WHEELS

The lifting wheels (item 1, fig 22) are designed to lift the beet from the ground and transfer them to the lift web. The working depth of the lifting wheel is determined by the depth control and according to the depth required to lift the beet from the ground without breaking off the root or lifting too much soil.

Further depth control can be effected by the angle of the lifting wheels (item 1, fig 22). On early machines, this adjustment is made by loosening the nuts and bolts (item 1, fig 23) holding the lifting wheel mounting (item 2, fig 23) to the lifting wheel mounting bracket (item 3, fig 23) which is provided with slotted holes in either side to allow the lifting wheel mounting to be adjusted up and down. At the top of the lifting wheel mounting bracket (item 3, fig 23) is fitted an adjusting screw (item 5, fig 23) which is provided to push down onto the lifting wheel mounting (item 2, fig 23).

On later machines, loosen the nuts and bolts (item 7, fig 23) and the lock nuts (item 8, fig 23) on the two adjusters and turn the adjuster nuts (item 9, fig 23) in the required direction to obtain the desired angle. Finally, retighten all nuts and bolts.

The adjustment described allows the lifting wheels (item 1, fig 22) to be raised or lowered irrespective of the harvester. It will also alter the point of lifting in relation to the width of the lifting wheels.

The working depth of the lifting wheels is approximately 2 inches (5.1 cm).

The width of the wheels at the narrowest point is from 11/2 inches (3.8 cm) to 13/4 inches (4.5 cm) and they can be adjusted by removing or adding spacers (item 2, fig 22) between the lifting wheels and the lifting wheel hubs (item 3, fig 22).

The lifting wheel spindles (item 4, fig 22) are fitted with tapered roller bearings (item 5, fig 22) and are adjusted by a castle nut (item 6, fig 22) after removing the hub cap (item 7, fig 22).

Care should be taken not to overtighten the bearings (item 5, fig 22). Adjust by turning the castle nut (item 6, fig 22) as tight as possible while slowly rotating the lifting wheel, the slacken off one or two castellations of the nut. Secure with a new split pin (item 8, fig 22).

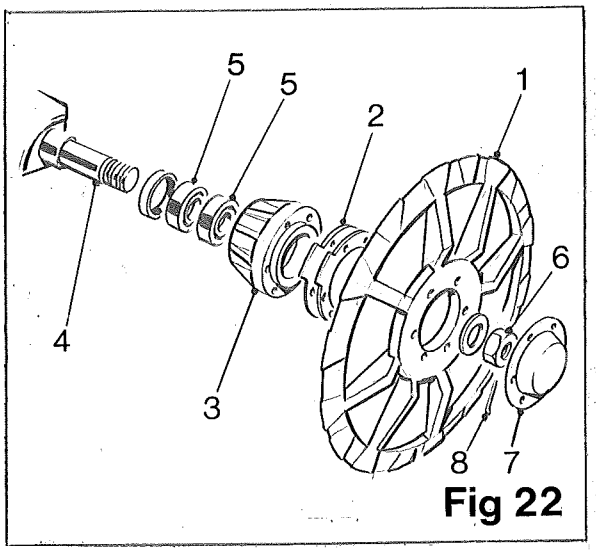


Fig 22

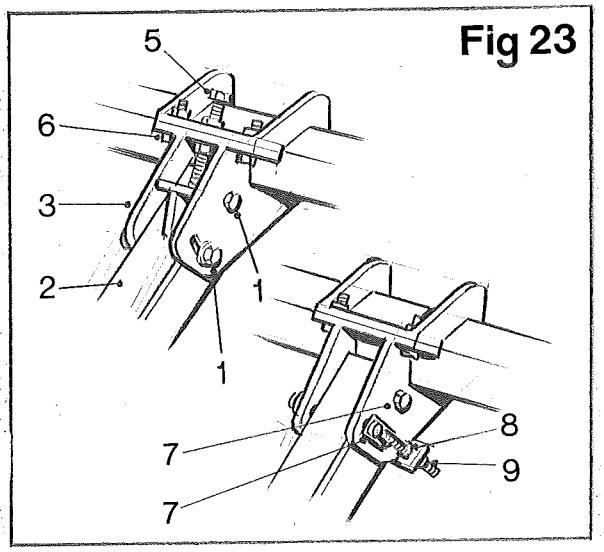


Fig 23

The lifting wheels (item 1, fig 22) can be adjusted to follow rows of 18 inches (46 cm) to 21 inches (53 cm) for a three row and 16 inches (41 cm) to 20 inches (51 cm) for a four row. (For 16 inches work a different bracket is required). To obtain these settings, loosen the nuts and bolts (item 6, fig 23) in the lifting wheel mounting bracket and move the lifting wheel assembly horizontally along the beam of the main frame.

SPLIT CAGE WHEELS

The cage wheels (item 1, fig 24) are fitted between the lifting wheels to transfer the beet onto the lift web. Provision is made to raise or lower the cage wheels, which generally should be set higher when the beet are large and lower when the beet are small.

To adjust the height of the cage wheels, loosen the lock nuts (item 2, fig 24) and turn the adjuster nuts (item 3, fig 24) until the cage wheels (item 1, fig 24) are in the required position. It is important when carrying out the above adjustment that the final position of the cage wheel shaft (item 4, fig 24) is in a direct horizontal line across the machine.

When various row settings are carried out it is also necessary to move the cage wheels (item 1, fig 24) to correspond with the final position of the lifting wheels.

To adjust the cage wheels (item 1, fig 24), loosen the nut and bolt (item 5, fig 24) in the cage wheel clamp (item 6, fig 24) and move the cage wheels (item 1, fig 24) across the cage wheel drive shaft (item 4, fig 24) to the required position. Retighten the nut bolt (item 5, fig 24).

To remove the cage wheels, remove the four retaining bolts (item 7, fig 24) and the four securing bolts (item 8, fig 24).

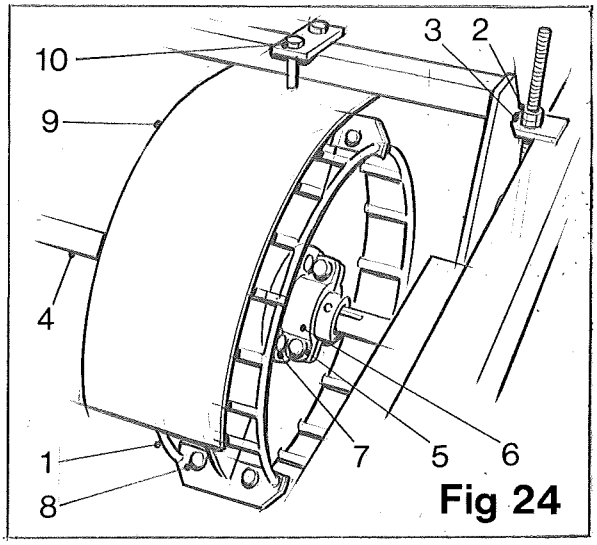


Fig 24

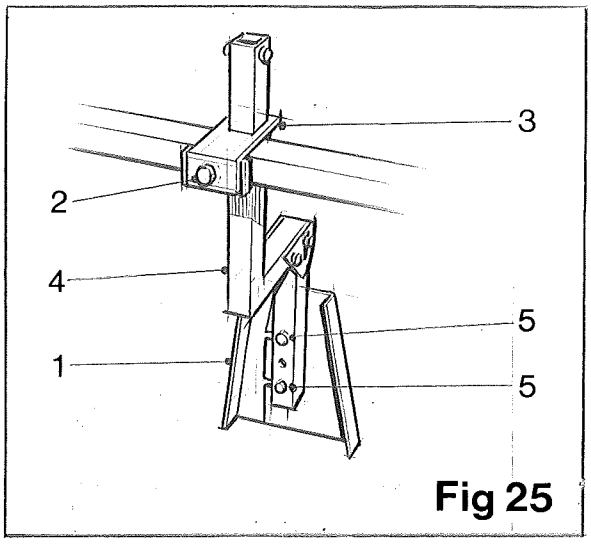


Fig 25

CAGE WHEEL MUD GUARDS

The cage wheel mud guards (item 9, fig 24) are designed to fit directly over the top of the cage wheels (item 1, fig 24) to eliminate the danger of dirt and stones being thrown from the wheels. Always ensure they are positioned correctly, especially when moving the cage wheels to a new setting. To adjust the cage wheel mud guards (item 9, fig 24), loosen the retaining nut and bolts (item 10, fig 24) move the mud guards (item 9, fig 24) to the required position, retighten the nuts and bolts (item 10, fig 24).

BEET DEFLECTORS

After moving the cage wheels it will be necessary to move the deflector flaps (item 1, fig 25) to a position centrally between the outsides of the lifting wheels. To adjust the deflector flaps (item 1, fig 25), loosen the securing bolt (item 2, fig 25) in the support clamp (item 3, fig 25) and move the flap support bracket (item 4, fig 25) until the deflector flaps (item 1, fig 25) are in the required position. Retighten the securing bolt (item 2, fig 25). It may also be necessary to alter the spacing of the flaps to fill the space between the lifting wheels. To do this, simply loosen the securing bolts (item 5, fig 25) and slide the flaps together or apart and then retighten.

LIFT WEB

The lift web transfers the beet from the lifting wheels to the cleaner or trash extractor.

The beet pass over a trip roller and then onto a cage feed roller where material such as stones, clods and trash pass through onto the ground. The beet is then elevated by means of two webs running in the same direction. The beet are trapped between the two webs and while they are travelling up the elevator, they are being cleaned by being able to rotate and move around. If more cleaning is required, the gaps between the two webs can be made larger. This will then allow less grip on the beet and allow them to roll around, thus removing the soil. The adjustment can be made by repositioning the web carrying rollers (item 10, fig 26) into a different hole.

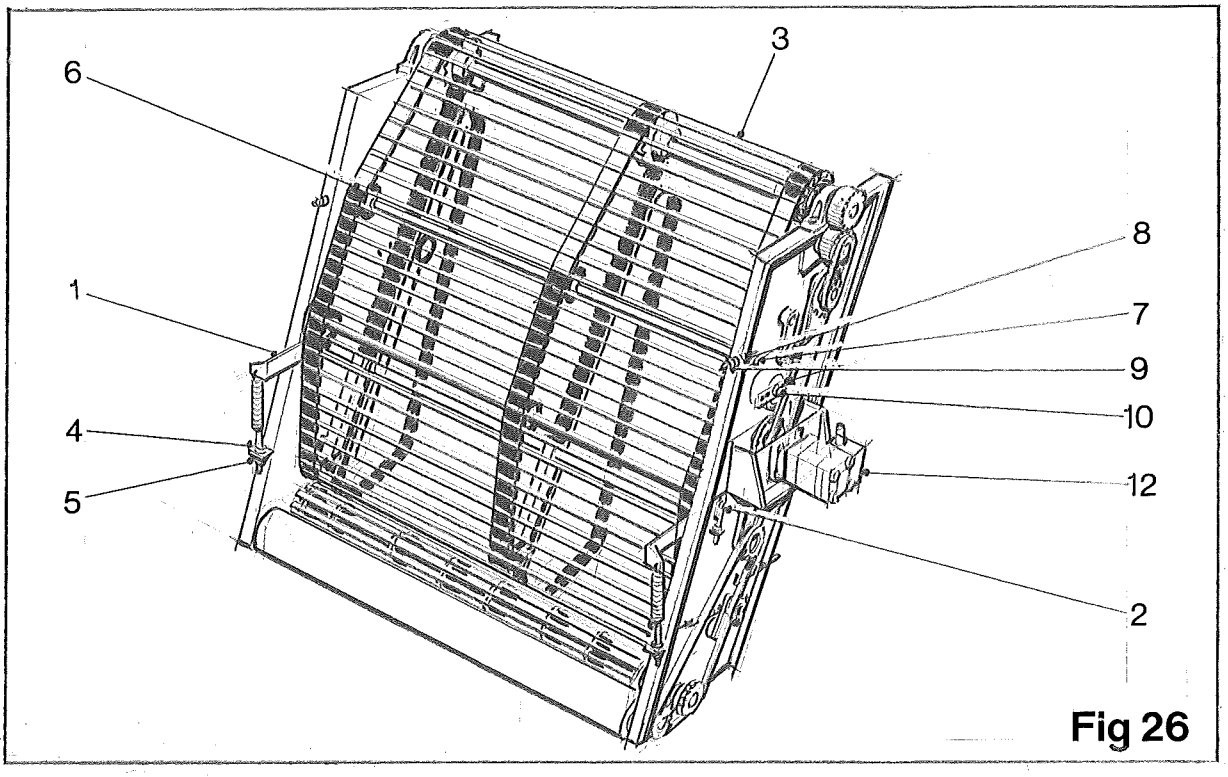


Fig 26

The top track frame (item 1, fig 26) is adjustable to allow large beet into the elevator. To adjust, slacken the two set screws (item 2, fig 26) and slide the top track frame further up the adjusting slot. When lifting small beet the top track frame should be as low as possible, therefore allowing the outer web (item 3, fig 26) to grip the beet rather than letting them fall and possibly block the lift web. The top track frame is spring loaded and can be adjusted to suit crop conditions. To adjust the tension, loosen the lock nut (item 4, fig 26) and turn the adjuster nut (item 5, fig 26).

The outer web (item 3, fig 26) is tensioned by three rollers (item 6, fig 26). This web should never be allowed to become slack. To tension the web, loosen the set screws (item 7, fig 26) and the lock nuts (item 8, fig 26) and turn the adjusting nuts (item 9, fig 26) to give the required tension. NOTE: The outer web will require tensioning after carrying out any adjustments to the web. Always loosen the web to lower the top track frame. Tighten the web after the top track frame has been lifted.

The trip roller, cage feed roller, inner and outer webs are driven by a hydraulic motor (item 12, fig 26). If a blockage in the lift web should occur, a relief valve preset at a pressure of 2800 P.S.I. is fitted to protect the hydraulic system. UNDER NO CIRCUMSTANCES SHOULD THIS VALVE BE TAMPERED WITH.

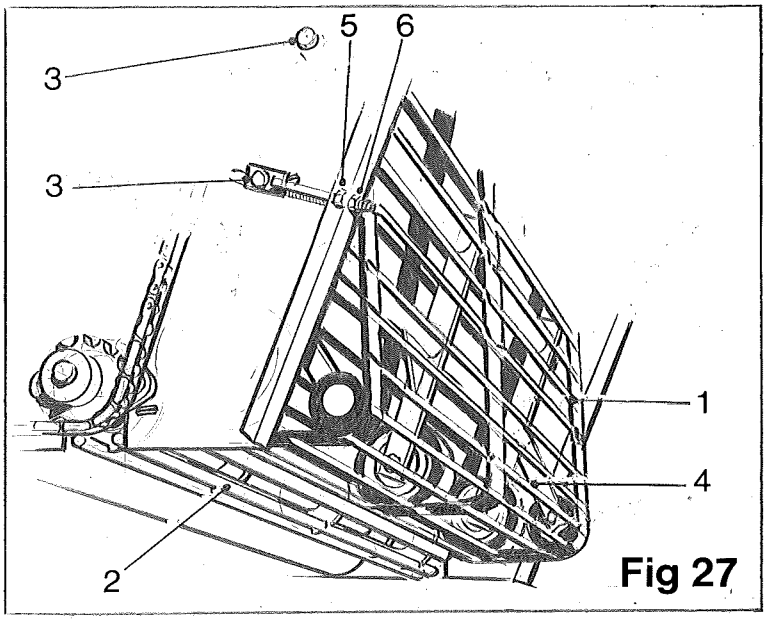


Fig 27

The inner web (item 1, fig 27) is adjustable at the lower end to allow for repositioning the web in relationship to the cage feed roller (item 2, fig 27). The larger the gap between the two, the more clods and trash etc., can be removed, although too bigger gap will result in beet loss. To adjust, slacken the set screws (item 3, fig 27) and the lock nuts (item 5, fig 27) then turn the adjuster nuts (item 6, fig 27) to reposition the roller support frame (item 4, fig 27) in relation to the cage feed roller.

TRASH EXTRACTOR (OPTIONAL)

Once the beet reach the top of the lift web they are transferred onto the trash extractor unit. The trash extractor unit consists of a feed elevator, a trash roller and a trash extractor. The beet pass along the feed elevator (item 1, fig 28) and the fall past the trash roller (item 2, fig 28) while leaves and trash etc., carry on under the trash roller to be thrown out of the harvester. The beet fall onto the reverse running trash extractor web (item 3, fig 28) where further cleaning takes place and then roll down onto the discharge elevator feed web.

Adjustment is provided to the rubber trash roller (item 2, fig 28) to accomodate varying soil conditions. To adjust the trash roller, you must first loosen the chain tensioner (item 4, fig 28), loosen the nuts (item 5, fig 28) and the lock nut (item 6, fig 28) and turn the adjusting nut (item 7, fig 28) to loosen the chain. Loosen the lock nuts (item 8, fig 28) and remove the bolts (item 9, fig 28) and then pivot the roller to the required position. Ensure the roller is parallel with the web before resecuring the roller. Finally retension the chain by turning the adjuster nut (item 7, fig 28) and then retighten the chain tensioner nuts (item 5, fig 28).

The angle at which the trash extractor web (item 3, fig 28) operates is adjustable. When the trash is dense the trash extractor should operate at a shallow angle, whereas when a small amount of trash is evident, then the trash extractor should operate at a steeper angle. The adjustment can be made by repositioning the six web carrying rollers by removing the set screws (item 10, fig 28) and swinging the rolled into a new position and resecuring.

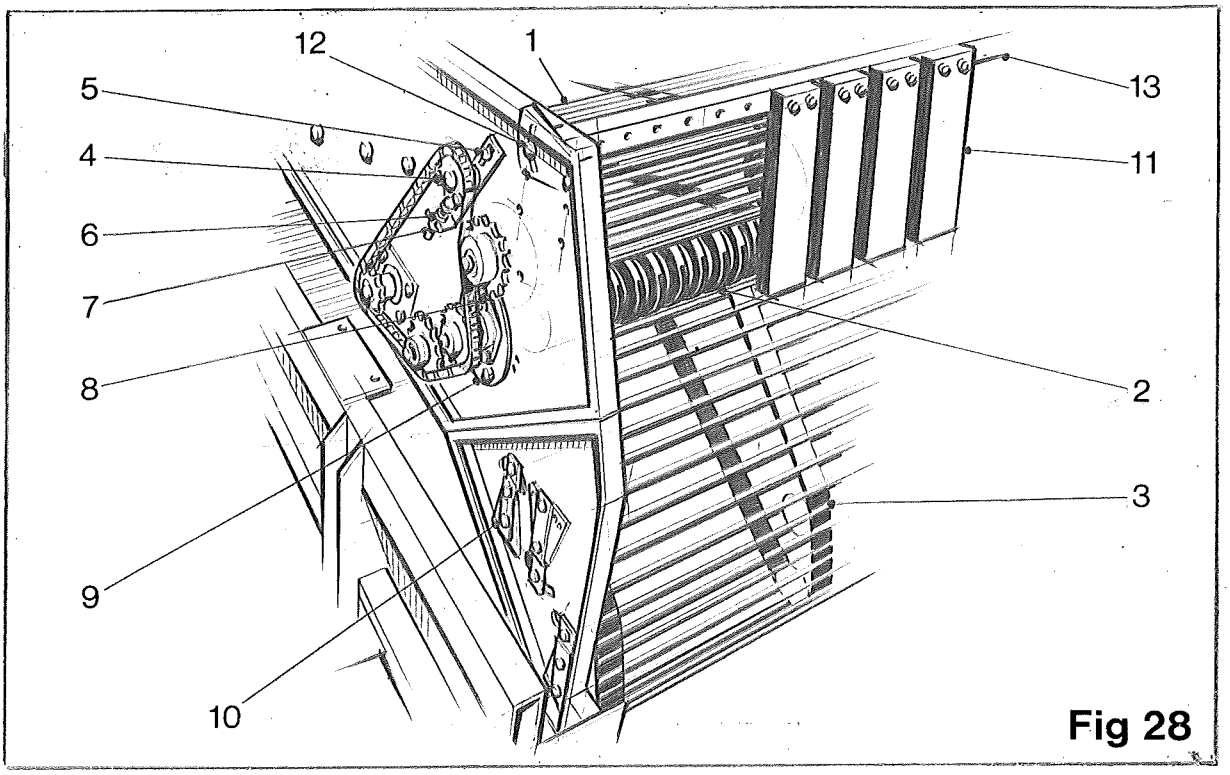


Fig 28

Rubber deflector blocks (item 11, fig 28) are positioned at the rear of the feed web to deflect the beet down onto the trash extractor web. The deflectors are adjustable for height and angle depending on crop conditions. To adjust the angle of the deflectors, loosen the securing bolts (item 12, fig 28) and pivot the deflector frame (item 13, fig 28) to the desired angle. To adjust the height of the deflectors, remove the securing bolts (item 12, fig 28) and reposition the deflector frame (item 13, fig 28) over any one of the three pairs of adjusting holes and resecure.

CLEANER (OPTIONAL)

The major feature of the Spectrum is the cleaning system designed to produce a clean sample of the beet under a widely varying range of soil conditions.

Two pairs of contra-rotating rollers are fitted with twelve steel rods which, when revolving expand or retract in the slots of the end and centre plates. Heavy density material such as stones, clods or trash force the rods inwards, allowing such material to fall through to the ground, whilst the beet is retained by the centre oscillating roller. As the beet passes down the rods towards the discharge elevator the rods clean the beet. The amount of cleaning obtained is determined by the angle of the cleaner.

The contra-rotating rollers consist of the centrifugal roller shaft (item 1, fig 29) to which is bolted the centrifugal roller plate (item 2, fig 29). Critically designed angle slots are cut into the plates into which are fitted the centrifugal rods (item 3, fig 29) which are held into place by the centrifugal rod retaining plates (item 4, fig 29).

After a period of working it may be necessary to replace the centrifugal rods (item 2, fig 29) and some, if not all, of the centrifugal roller plates (item 1, fig 29). To do so, first remove the roller spinner (item 5, fig 29) and then the centrifugal rod retaining plates (item 4, fig 29) taking care not to lose the retaining spacers (item 6, fig 29). The centrifugal rods can then be withdrawn through the slots in the centre roller support plate (item 7, fig 29). The centrifugal roller plates (item 2, fig 29) fitted forward to the cleaner are designed to be split for easier fitting and removal. To remove, cut through the plates at point 'A', open the locking tabs (item 8, fig 29) and remove the retaining bolts (item 9, fig 29).

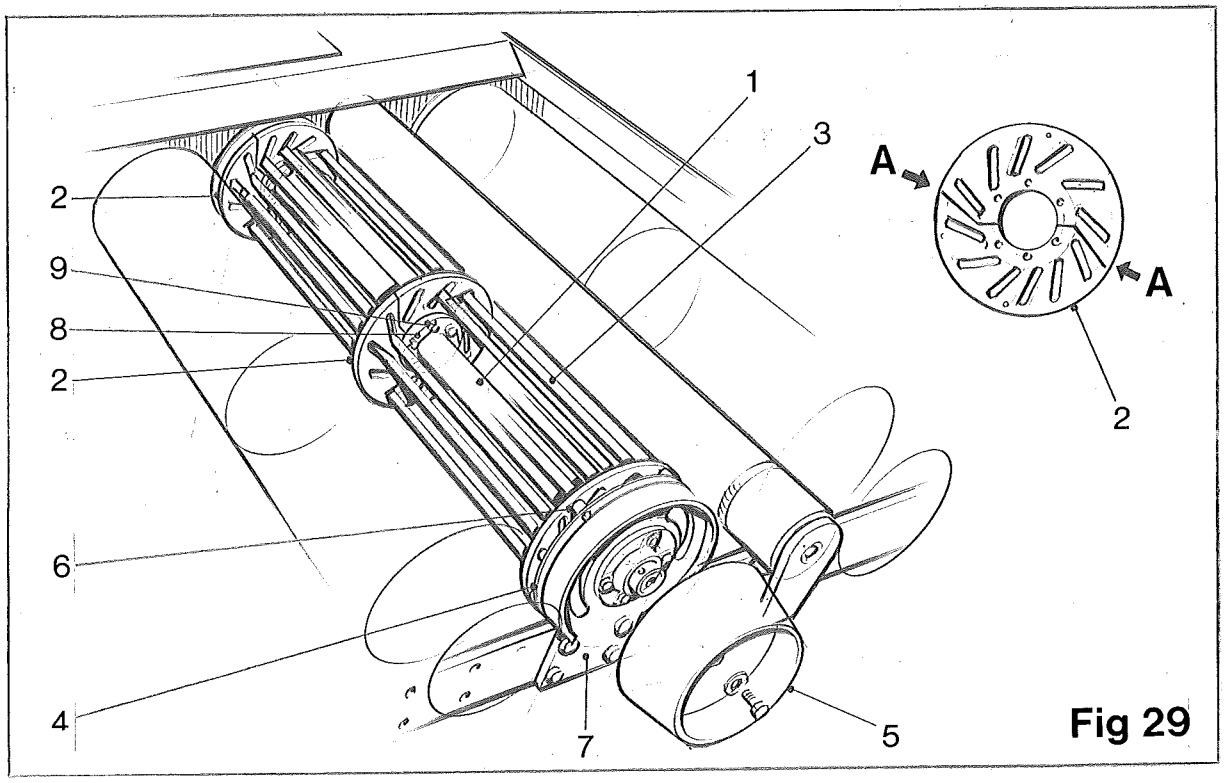


Fig 29

The rear centrifugal roller plates (item 1, fig 30) are not split. but they can be removed by following carefully this procedure:-

1. Remove the centrifugal rods (item 2, fig 30). (See previous text for Removal of Centrifugal Rods).
2. Support the lower end of the centrifugal roller shaft (item 3, fig 30). FAILURE TO DO SO COULD RESULT IN DAMAGE TO THE CLEANER DRIVES.
3. Open the locking tabs (item 4, fig 30) and remove the retaining bolts (item 5, fig 30).
4. Finally, remove the centre roller support plate (item 6, fig 30) by removing the four securing bolts (item 7, fig 30). Access is then gained to the centrifugal roller plate (item 1, fig 30).

The centre oscillating rollers (item 8, fig 30) are each fitted with a roller bearing and are removed by first removing the retaining bolts (item 9, fig 30) and the roller rear mounting plates (item 10, fig 30).

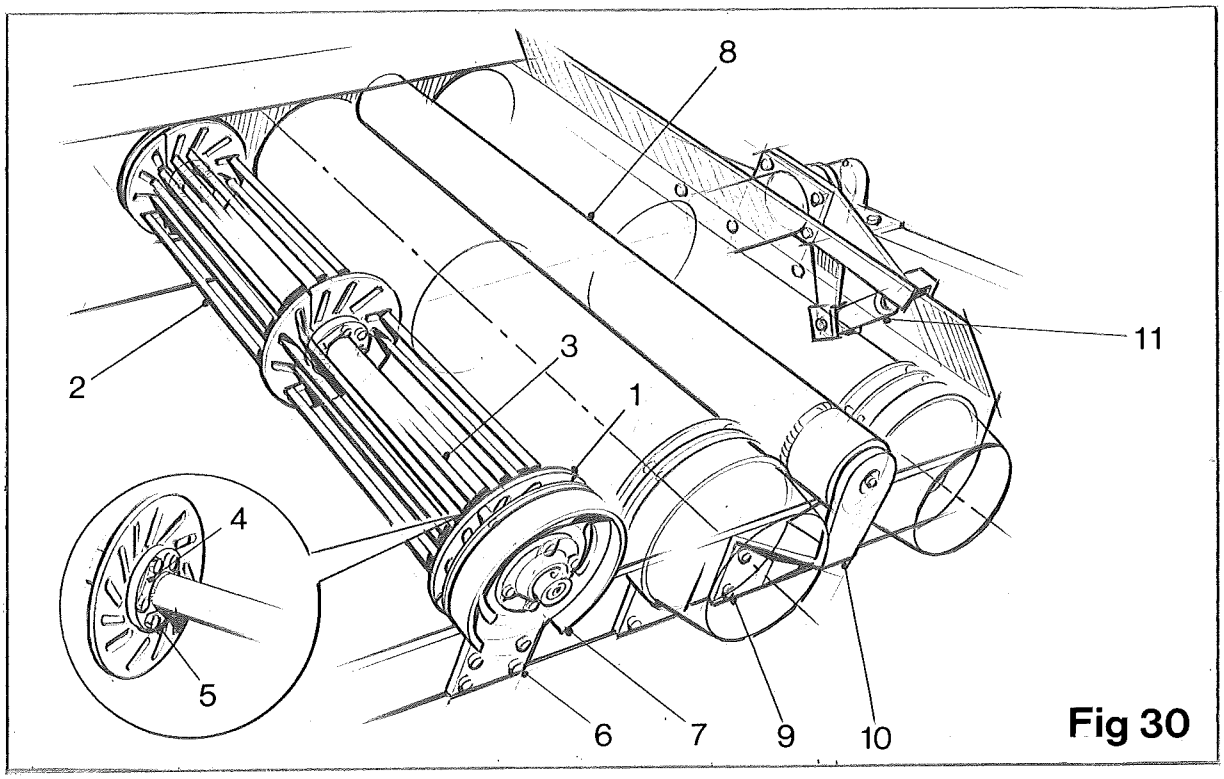


Fig 30

Provision is provided to vary the angle of the cleaner unit according to the amount of cleaning required. The rear of the cleaner should be raised to increase the cleaning and lowered to decrease. The variance of cleaning will be noticable on hilly ground and counteracted by the setting of the angle of the cleaner. It must be realised that if the cleaner unit is set to a flat position no cleaning will be achieved as the crop flow over the cleaner is part gravity. The angling of the cleaner is achieved by operating the hydraulic rams (item 11, fig 30) via the control box mounted in the tractor cab.

DISCHARGE ELEVATOR

The discharge elevator is designed to provide easy folding from the working position to the transport position and vice-versa.

To operate the discharge elevator, move the switch on the control box (see section on Control Box) in the required direction. The swan neck of the discharge elevator is also adjusted hydraulically, this allows even filling of a trailer and also to keep the drop of the beet to a minimum. Again adjustment of the swan neck is made by movement of the required switch on the control box.

The beet fall from the trash web (or cleaner) onto the discharge elevator feed web. This conveys the beet across the rear of the machine towards the discharge elevator.

Minor adjustments in tension and tracking of the discharge elevator feed web (outer web) can be made by slackening the end roller lock nut (item 1, fig 31) and the lock nuts (item 2, fig 31), then turning the adjuster nuts (item 3, fig 31) in the required direction.

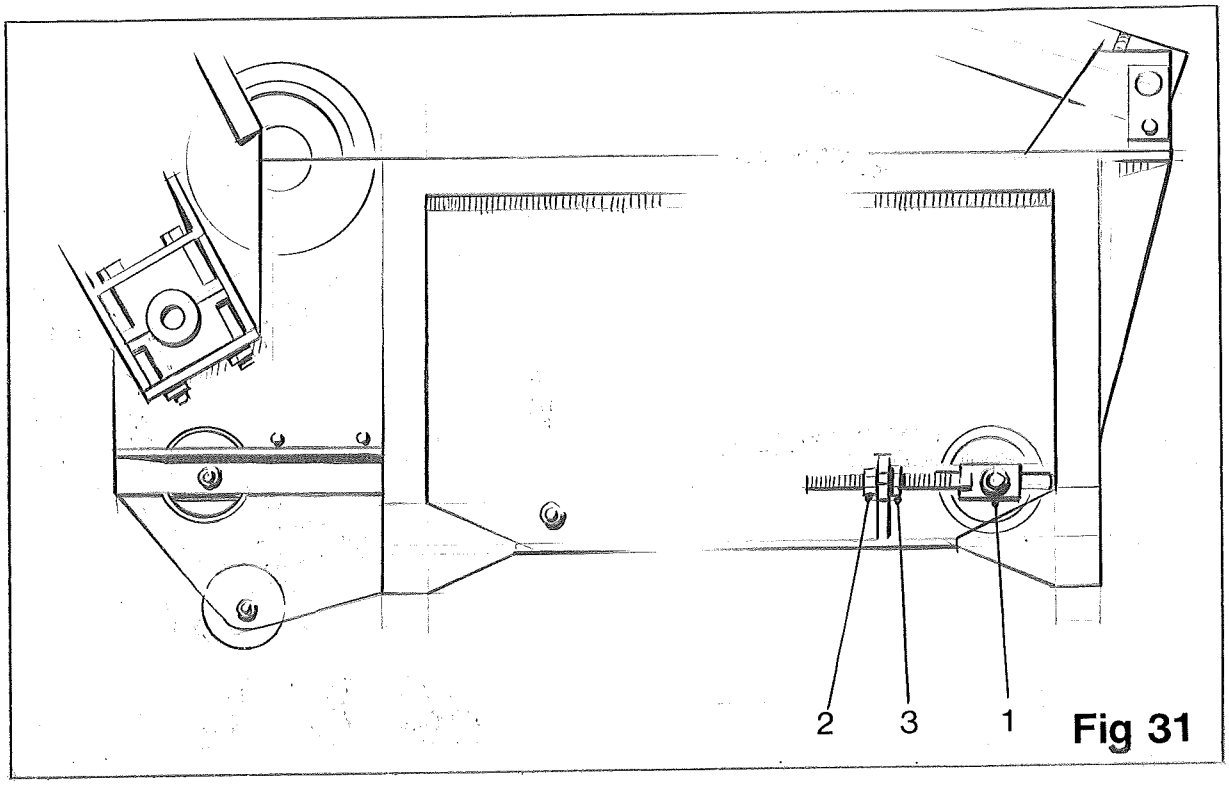


Fig 31

The beet are then elevated by means of two webs which are running in the same direction. The beet are trapped between the two webs and taken up to the top of the elevator where they are discharged into a waiting trailer.

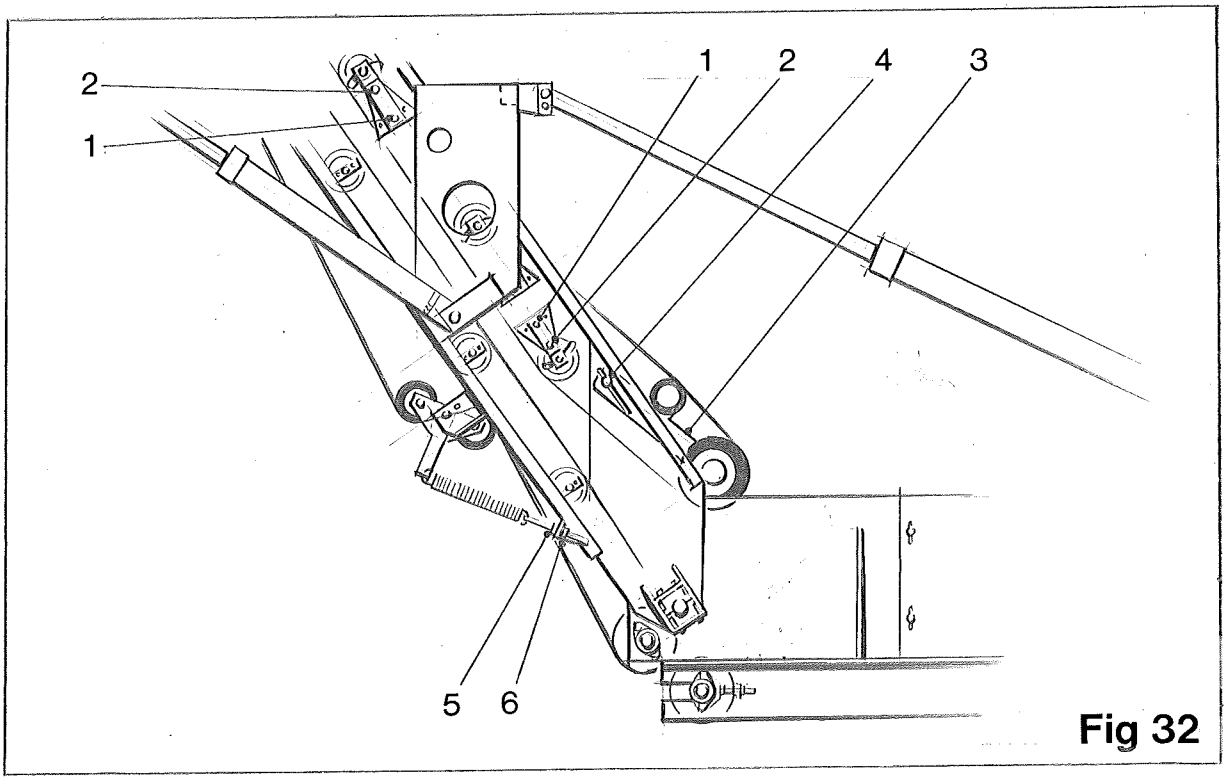


Fig 32

Whilst the beet are travelling up the elevator, they are cleaned by being allowed to rotate and move about between the webs. If more cleaning should be required, the gap between the two webs can be made larger. This will allow less grip on the beet and allow then to roll about even more, thus removing more soil. **Six adjustable rollers incorporated into the design of the discharge elevator; allow the gap to be increased or decreased.**
To adjust the gap, first remove the set screw (item 1, fig 32) and slacken the lock nut (item 2, fig 32), then rotate the roller arm to the desired position. Resecure the set screw and tighten the lock nut.

The top track (item 3, fig 32) is adjustable to allow large beet into the elevator. When lifting small beet the top track should be as low as possible, therefore allowing the top track to grip the beet, rather than letting them fall. Failure to do this could result in a possible blockage in the elevator.

To adjust the top track, slacken the set screw (item 4, fig 32) on both sides of the elevator, then slide the top track up and down the slot until the position required is reached. Now retighten the set screws.

Tension for the discharge elevator outer web is provided by a spring loaded mechanism fitted to the lower half of the elevator.

Adjustment for the tension is as follows - Slacken the spring adjuster lock nut (item 5, fig 32), turn the adjuster nut (item 6, fig 32) in the direction required until the tension desired is achieved. Retighten the lock nut.

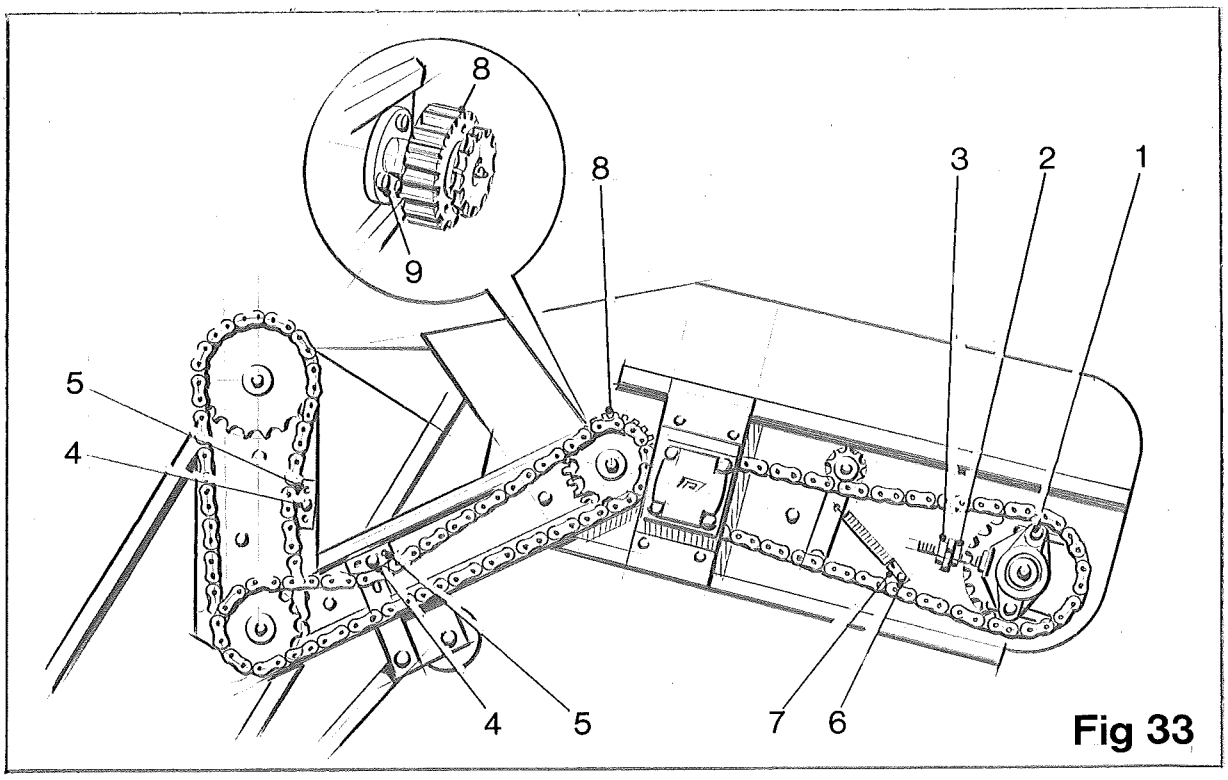


Fig 33

To maintain correct alignment of the discharge elevator outer web, adjustment is made by moving the top shaft bearings.

To adjust, slacken the bearing retaining nuts (item 1, fig 33) and loosen the adjuster lock nut (item 2, fig 35). turn the adjuster nut (item 3, fig 33) in the direction required until alignment of the web is achieved. Lastly, retighten the lock nut and bearing retaining nuts.

DISCHARGE ELEVATOR DRIVES

Drive for the discharge elevator is provided by a hydraulic motor, 3 chains and two gears (see fig 33). Two of the chains can be adjusted for tension by loosening the retaining bolt (item 4, fig 33) and sliding the adjusting block (item 5, fig 33) to the required position. Retighten the securing bolt.

The third chain has a spring adjusted tensioner. If adjustment is required, loosen the retaining bolt (item 6, fig 33) and turn the spring anchor (item 7, fig 33). Retighten the retaining bolt.

The gear idler (item 8, fig 33) can be moved onto or away from the motor driven gear as required.

To adjust, slacken the retaining nuts (item 9, fig 33) and rotate the gear and spigot in the slots until the desired position is achieved. Retighten retaining nuts.

SPLIT SPROCKETS

Various webs on the harvester are driven by split web sprockets. These sprockets have been designed to simplify the maintenance work. Rather than dismantling a complete drive assembly, the sprocket can be individually split and removed from the shaft as described below.

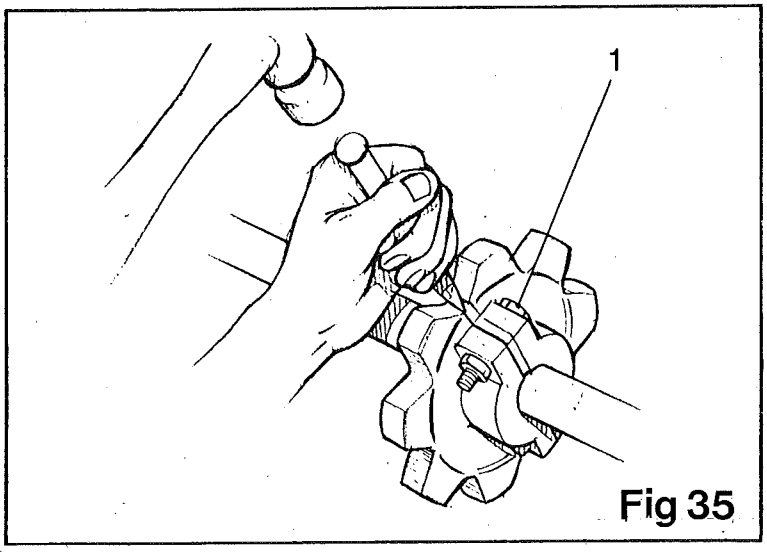


Fig 35

SPROCKET REMOVAL

1. Loosen the fixing bolts (item 1, fig 35) and remove.
2. Using a hammer and chisel, split the sprocket along the groove provided (fig 35).
3. Remove both halves of the sprocket from the shaft.

SPROCKET REPLACEMENT

1. Mark each half of the sprocket clearly before splitting.
2. Split the sprocket with a hammer and chisel in the groove provided (fig 35).
3. Locate both halves on the shaft and secure using the fixing bolts (item 1, fig 35).

The purpose of the self steering is to allow the harvester to follow the rows of beet irrespective of the contours of the land. This is achieved by the two steerage feet (item 1, fig 36) running beside the beet. Once either of the feet (item 1, fig 36) has been lifted it will actuate a proximity switch which in turn operates a hydraulic ram connected to the drawbar. This will then correct the harvester.

Once the harvester working depth has been set, the bottom of the curve on both the steerage feet should be touching the ground simultaneously running either side of the largest beet. To achieve this, the height, width between the steerage feet, and the position of the steerage unit can all be adjusted.

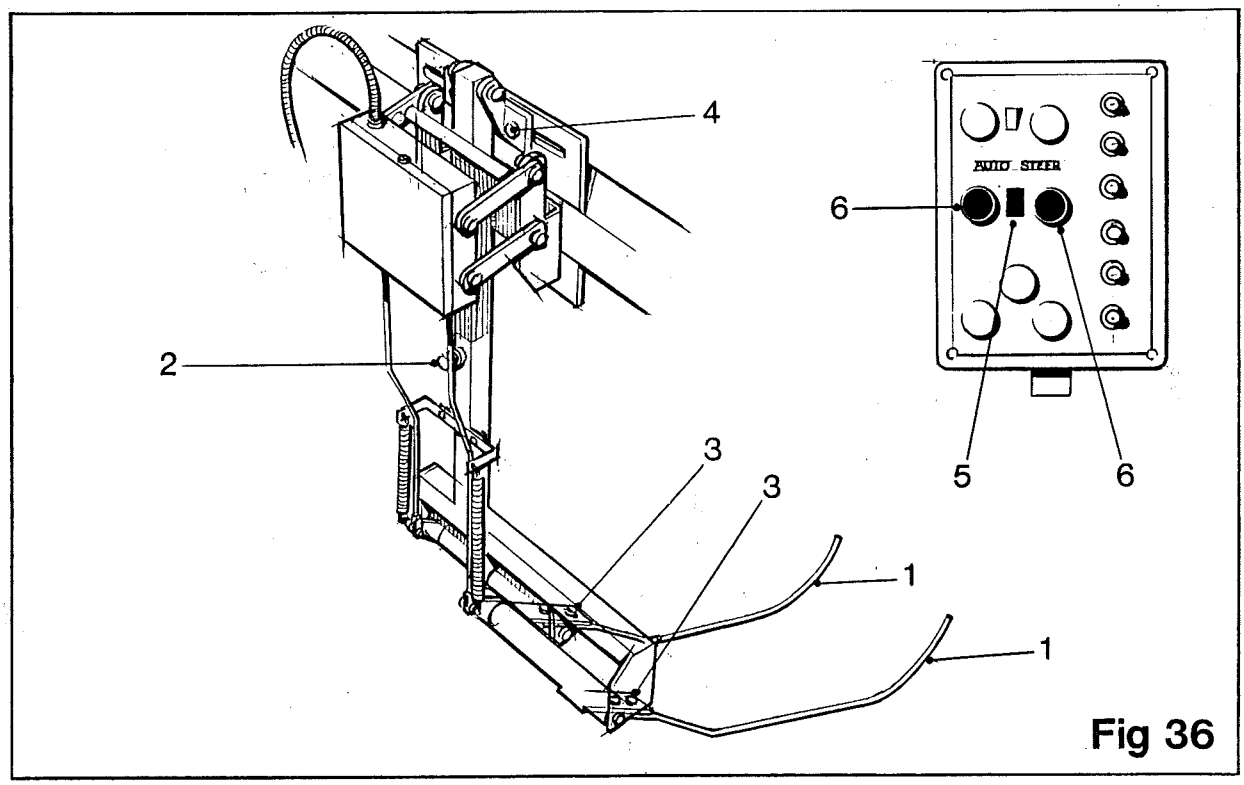


Fig 36

The height of the steerage unit is adjusted by loosening the retaining bolt (item 2, fig 36) and raising or lowering the complete unit.

The distance between the two steerage feet (item 1, fig 36) can be adjusted to allow the feet to pass the largest beet. To adjust slacken the two set screws (item 3, fig 36) on each of the steerage feet and move the feet in or out to give the required width. Both feet should be adjusted to leave them central about the steerage unit.

The position of the steerage unit can be adjusted to suit varying row widths. To adjust, slacken the two retaining bolts (item 4, fig 36) and move the steering unit across to the required position.

To engage the automatic self steering, press the switch (item 5, fig 36) on the control box. If during work steerage of the harvester needs to be made manually, the automatic self steering can be overridden by pressing iether the left or right switch (item 6, fig 36).

Inside the self steering box (item 1, fig 37) there are adjustments for setting up the proximity switches (item 2, fig 37). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

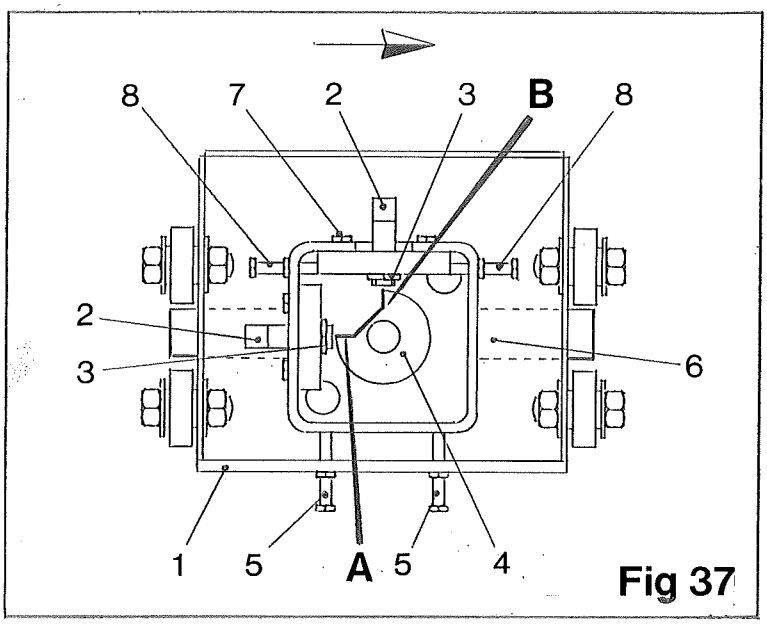


Fig 37

The retaining nut (item 3, fig 37) holds the proximity switch in place. If the nut is loosened, the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 37).

The adjusting screws (item 5, fig 37) tilts the steering housing so that the corner of the spindle marked 'A' can be aligned with the proximity switch once the control arm (item 6, fig 37) is in its horizontal position.

The remaining adjustment is for altering the time that elapses between one switch deactuating before the other one acutates. To adjust, slacken the retaining bolts (item 7, fig 37) and slide the switch by using the two adjusting screws (item 3, fig 37). The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow the large the delay.

AUTOMATIC DEPTH CONTROL (prior to SERIAL NUMBER SP008H)

The Spectrum is fitted with an automatic depth control to ensure the lifting wheels are always lifting at the same depth.

The depth foot (item 1, fig 38) runs along the ground between two rows of beet following the contours of the land. The depth foot actuates a proximity switch which in turn operates the depth ram on the drawbar, which then connects the harvester.

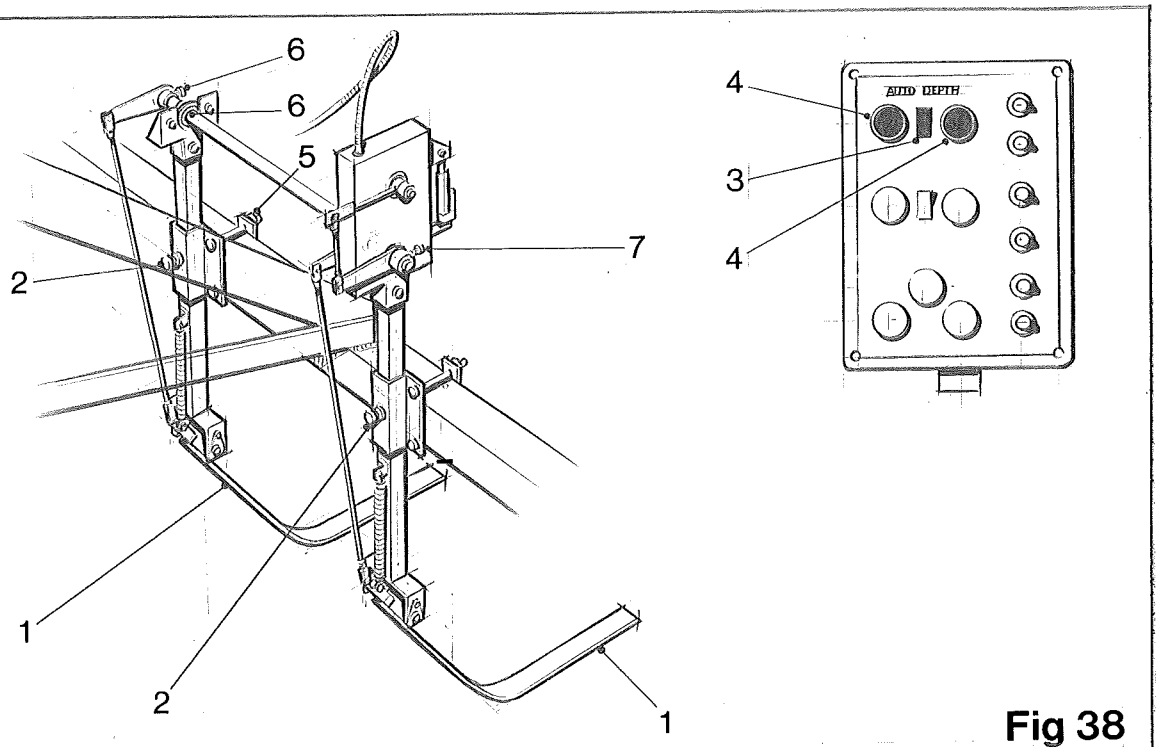


Fig 38

SETTING THE DEPTH CONTROL

When setting the depth control it is advisable to stand the harvester on a concrete floor with the lifting wheels also touching the ground.

1. Position underneath both the depth feet (item 1, fig 38) a 2" (51mm) block of wood or something to represent the depth at which you wish to lift.
2. Loosen the retaining bolts (item 2, fig 38) and raise or lower the complete unit until the corner marked 'A' on the centre spindle (item 4, fig 39) is in line with the centre of the proximity switch (item 2, fig 39)
3. Retighten the retaining bolts. The machines is now set to lift the required depth.

To engage the automative depth control, press the switch (item 3, fig 38) on the control box. If during work extra depth is required on, the machine needs to be raised out of the ground. The depth control can be overridden by pressing the up or down switch (item 4, fig 38).

The position of the LH depth foot assembly can be adjusted to suit varying row widths. To adjust, slacken the clamp bolts (item 5, fig 38) and the retaining bolts (item 6, fig 38) and slide the assembly to the required position.

Inside the depth control box (item 1, fig 39) there are various adjustments for setting up the proximity switches (item 2, fig 39). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

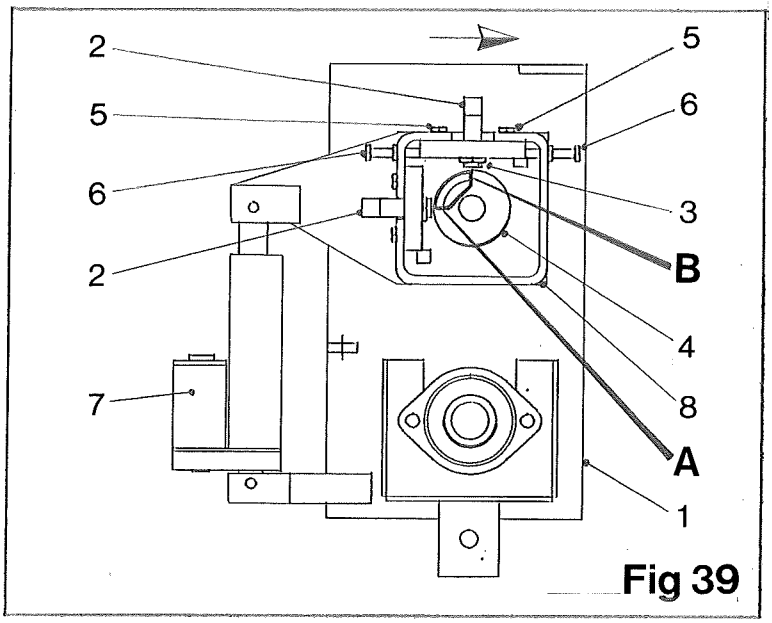


Fig 39

The retaining nut (item 3, fig 39) holds the proximity switch in place. If the nut is loosened the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 39).

Another adjustment is for altering the time that elapses between one switch deactuating before the other one actuates. To adjust, slacken the retaining bolts (item 5, fig 39) and slide the switch by using the two adjusting screws (item 6, fig 39). The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow, the larger the delay.

On the depth control box a linear actuator (item 7, fig 39) is fitted to allow adjustment of the depth housing (item 8, fig 39). If the depth housing has to be reset for any reason, the following sequence should be followed.

1. Ensure the depth foot (item 1, fig 38) is touching the ground by lowering the machine.
2. Set the linear actuator (item 7, fig 39) in its midway position (see fig. 39).
3. Loosen the lever lock screws (item 7, fig 38)
4. Turn the spindle (item 4, fig 39) until the corner marked 'A' is aligned with the centre of the proximity switch (item 2, fig 39).
5. Retighten all retaining bolts.

AUTOMATIC SELF STEERING (from SERIAL NO. SP008H)

The purpose of the self steering is to allow the harvester to follow the rows of beet irrespective of the contours of the land. This is achieved by the two steerage feet (item 1, fig 36A) running beside the beet. Once either of the feet (item 1, fig 36A) has been lifted it will actuate a proximity switch which in turn operates a hydraulic ram connected to the drawbar. This will then correct the harvester.

Once the harvester working depth has been set, the bottom of the curve on both the steerage feet should be touching the ground simultaneously running either side of the largest beet. To achieve this, the height, width between the steerage feet, and the position of the steerage unit can all be adjusted.

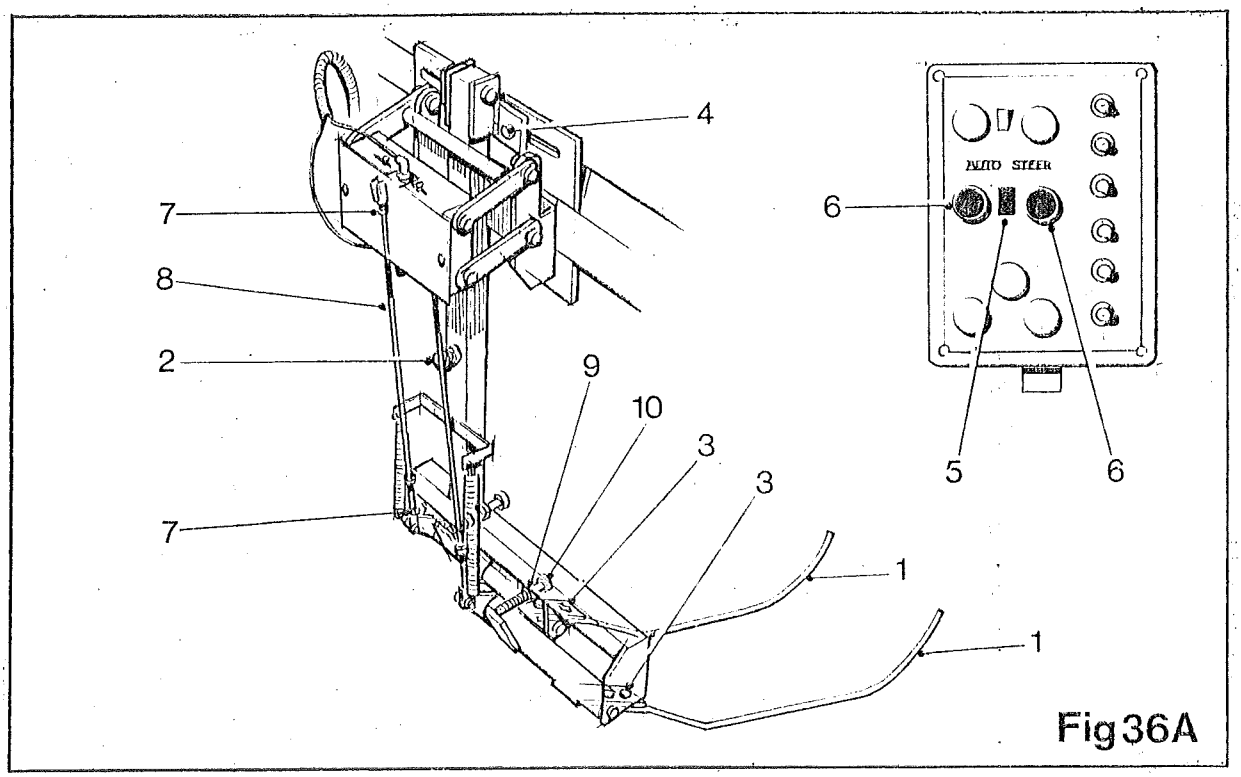


Fig 36A

The height of the steerage unit is adjusted by loosening the retaining bolt (item 2, fig 36A) and raising or lowering the complete unit.

The distance between the two steerage feet (item 1, fig 36A) can be adjusted to allow the feet to pass the largest beet. To adjust slacken the two set screws (item 3, fig 36A) on each of the steerage feet and move the feet in or out to give the required width. Both feet should be adjusted to leave them central about the steerage unit.

The position of the steerage unit can be adjusted to suit varying row widths. To adjust, slacken the two retaining bolts (item 4, fig 36A) and move the steering unit across to the required position.

Once the steering feet height and width have been set it may be necessary to adjust the position of the spindle. The is done by:-

1. Slacken off the clevis locknuts (item 7, fig 36A).
2. Then according to the direction that the spindle (item 4, fig 37A) is to move, select the appropriate con rod (item 8, fig 36A) and with the aid of a spanner turn it.

3. Correct adjustment is achieved when surface 'A' of the spindle (item 4, fig 37A) is aligned with the centre of the sensor (item 2, fig 37A).

4. Retighten all locknuts (item 7, fig 36A).

Provision has been made for the position of the steering feet when the machine is lifted up. This is achieved by taking the machine out of work and:-

1. Slackening the locknuts (item 9, fig 36A) and by adjusting the set screws (item 10, fig 36A) ensure that the depth feet (item 1, fig 36A) are level.

2. Retighten all locknuts (item 9, fig 36A).

To engage the automatic self steering, press the switch (item 5, fig 36A) on the Control Box. If during work steerage of the harvester needs to be made manually, the automatic self steering can be overridden by pressing either the left or right switch (item 6, fig 36A).

Inside the self steering box (item 1, fig 37A) there are adjustments for setting up the proximity switches (item 2, fig 37A). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

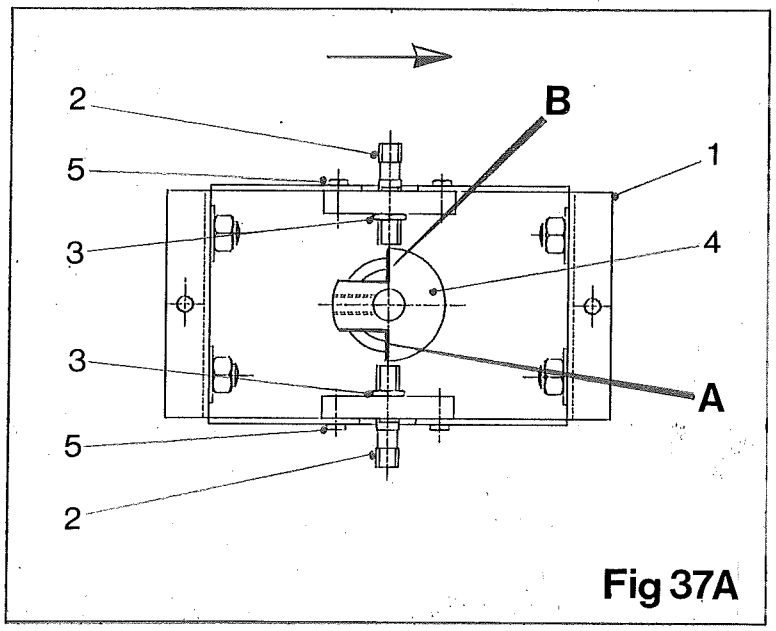


Fig 37A

The retaining nut (item 3, fig 37A) holds the proximity switch in place. If the nut is loosened, the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 37A).

The remaining adjustment is for altering the time that elapses between one switch deactuating before the other one acutates. To adjust, slacken the retaining bolts (item 5, fig 37A) and slide the switch fractionally to either side. The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow, the larger the delay.

AUTOMATIC DEPTH CONTROL (SERIAL NO. SP008H onwards)

The Spectrum is fitted with an automatic depth control to ensure the lifting wheels are always lifting at the same depth.

The depth foot (item 1, fig 38A) runs along the ground between two rows of beet following the contours of the land. The depth foot actuates a proximity switch which in turn operates the depth ram on the drawbar, which then connects the harvester.

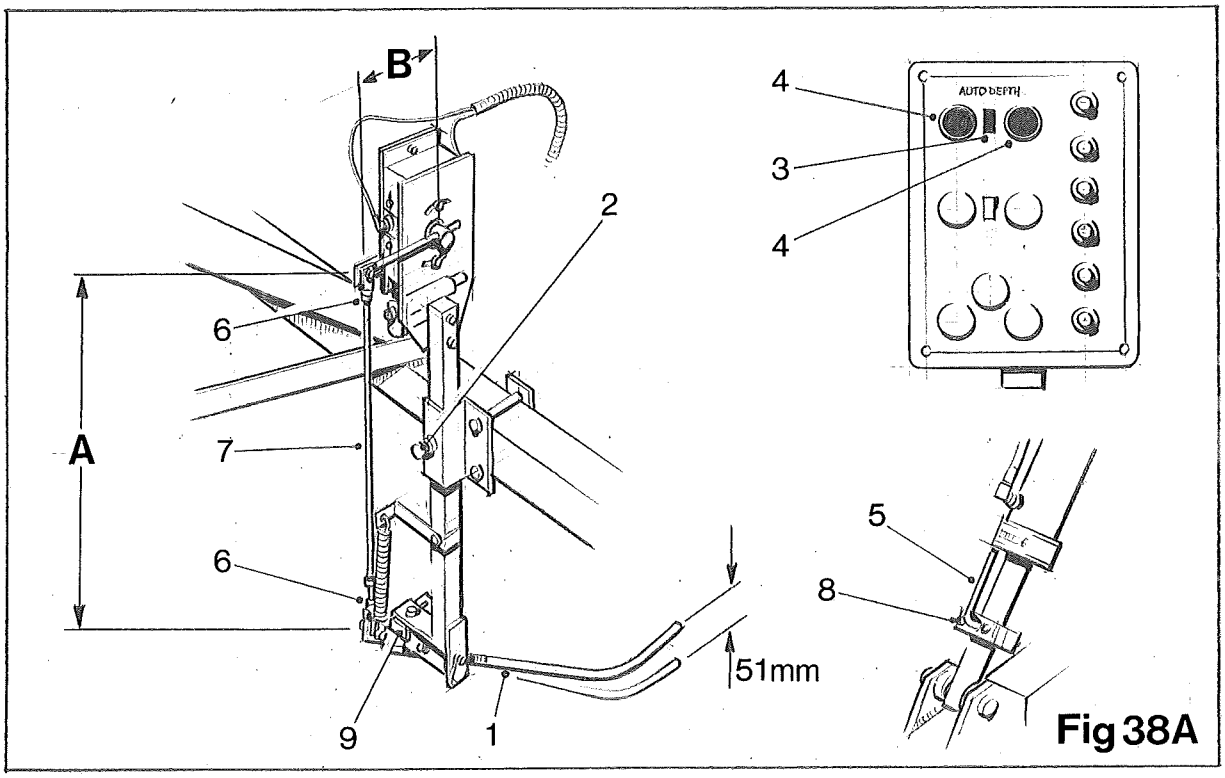


Fig 38A

SETTING THE DEPTH CONTROL

When setting the depth control it is advisable to stand the harvester on a concrete floor with the lifting wheels also touching the ground.

1. Position underneath the depth foot (item 1, fig 38A) a 2" (51 mm) block of wood or something to represent the depth at which you wish to lift.
2. Ensure dimensions A and B are set correctly (fig 38A).

   Dimension A - 960 mm Dimension B - 190 mm
3. Loosen the retaining bolts (item 2, fig 38A) and raise or lower the complete unit until the corner marked 'A' on the centre spindle (item 4, fig 39A) is in line with the centre of the proximity switch (item 2, fig 39A).
4. Retighten the retaining bolts. The machine is now set to lift the required depth.
5. If finer adjustment is required, slacken the clevis locknuts (item 6, fig 38A) and using a spanner turn the connecting rod (item 7, fig 38A) until correct adjustment is achieved. Be sure not to turn the connecting rod (item 7, fig 38A) more than a couple of turns. Finish by retightening all locknuts.
6. Once the depth foot (item 1, fig 38A) has been set, adjust the stop bracket (item 9, fig 38A) to allow the depth foot to drop approximately 2" (51mm).

Inside the depth control box (item 1, fig 39A) there are various adjustments for setting up the proximity switches (item 2, fig 39A). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

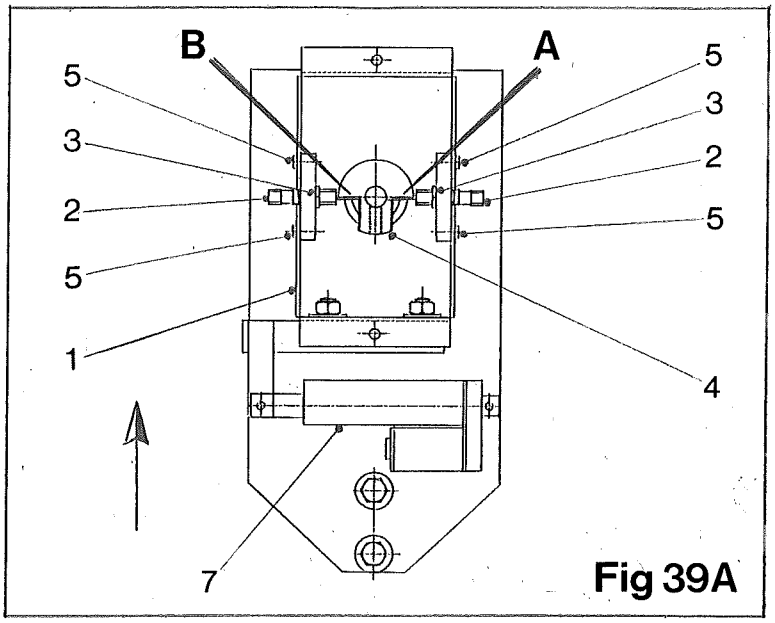


Fig 39A

The retaining nut (item 3, fig 39A) holds the proximity switch in place. If the nut is loosened the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 39A).

Another adjustment is for altering the time that elapses between one switch deactuating before the other one actuates. To adjust, slacken the retaining bolts (item 5, fig 39A) and slide the switch fractionally to either side. The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow, the larger the delay.

To engage automatic depth control, press the switch (item 3, fig 38A) on the Control Box. If extra depth is required, the depth control can be overridden by pressing the up or down switch (item 4, fig 38A). This operates a linear actuator (item 7, fig 39A) fitted to the depth box (item 1, fig 39A) which when moved alters the relationship of the spindle and proximity switches.

When the preset depth is required again, press the up or down switch (item 4, fig 38A) until the depth marker (item 5, fig 38A) is aligned with the bottom edge of the depth ram.

DEPTH MARKER

The depth marker (item 5, fig 38A) should be set after the harvester lifting depth has been established.

1. Slacken the retaining bolts (item 8, fig 38A) and slide the marker (item 5, fig 38A) until the top edge of the marker (item 5, 38A) is aligned with the bottom edge of the ram.
2. Finally, retighten all retaining bolts (item 8, fig 38A).

The purpose of the self steering is to allow the harvester to follow the rows of beet irrespective of the contours of the land. This is achieved by the two steerage feet (item 1, fig 36B) running beside the beet. Once either of the feet (item 1, fig 36B) has been lifted, it will actuate a proximity switch which in turn operates a hydraulic ram connected to the drawbar. This will then correct the harvester.

Once the harvester working depth has been set, the bottom of the curve on both the steerage feet should be touching the ground simultaneously running either side of the largest beet. To achieve this, the height, width between the steerage feet, and the position of the steerage unit can all be adjusted.

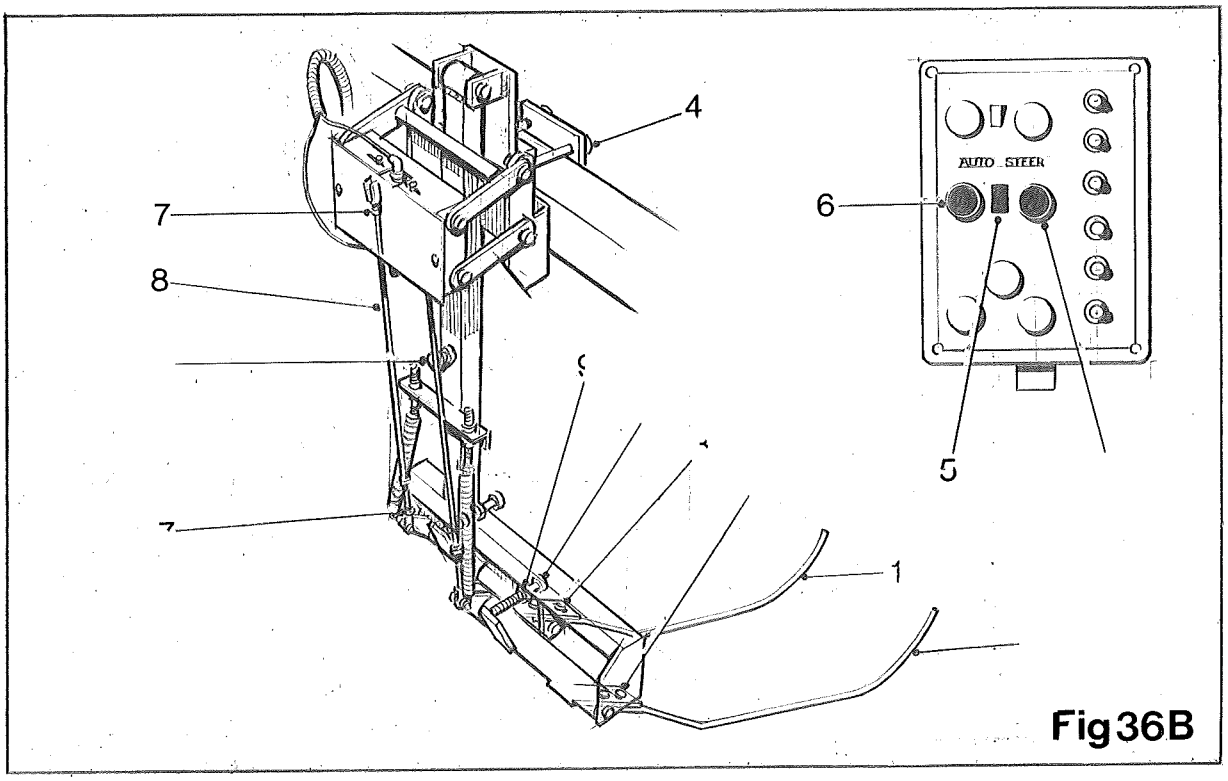


Fig 36B

The height of the steerage unit is adjusted by loosening the retaining bolt (item 2, fig 36B) and raising or lowering the complete unit.

The distance between the two steerage feet (item 1, fig 36B) can be adjusted to allow the feet to pass the largest beet. To adjust, slacken the two set screws (item 3, fig 36B) on each of the steerage feet and move the feet in or out to give the required width. Both feet should be adjusted to leave them central about the steerage unit.

The position of the steerage unit can be adjusted to suit varying row widths. To adjust, slacken the four retaining bolts (item 4, item 36B) and move the steering unit across to the required position.

Once the steering feet height and width have been set, it may be necessary to adjust the position of the spindle. This is done by:-

1. Slacken off the clevis lock nuts (item 7, fig 36B).

2. Then according to the direction that the spindle (item 4, fig 37B) is to move, select the appropriate con rod (item 8, fig 36B) and with the aid of a spanner, turn it.

3. Correct adjustment is achieved when surface 'A' of the spindle (item 4, fig 37B) is aligned with the centre of the sensor (item 2, fig 37B).

4. Retighten all lock nuts (item 7, fig 36B).

Provision has been made for the position of the steering feet when the machine is lifted up. This is achieved by taking the machine out of work and:-

1. Slackening the lock nuts (item 9, fig 36B) and by adjusting the set screws (item 10, fig 36B) ensure that the depth feet (item 1, fig 36B) are level.

2. Retighten all lock nuts (item 9, fig 36B).

To engage the automatic self steering, press the switch (item 5, fig 36B) on the Control Box. If during the work steerage of the harvester needs to be made manually, the automatic self steering can be overrideen by pressing either the left or right switch (item 6, fig 36B).

Inside the self steering box (item 1, fig 37B), there are adjustments for setting up the proximity switches (item 2, fig 37B). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

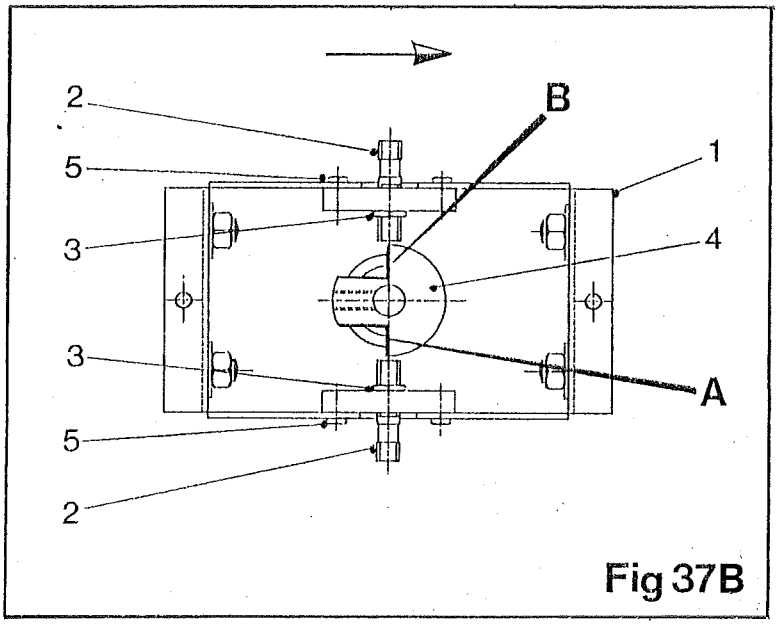


Fig 37B

The retaining nut (item 3, fig 37B) holds the proximity switch in place. If the nut is loosened, the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 37B).

The remaining adjustment is for altering the time that elapses between one switch deactuating before the other one actuates. To adjust, slacken the retaining bolts (item 5, fig 37B) and slide the switch fractionally to either side. The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow, the larger the delay.

AUTOMATIC DEPTH CONTROL (Serial No. SP 3/4028 onwards)

The Spectrum is fitted with an automatic depth control to ensure the lifting wheels are always lifting at the same depth.

The depth foot (item 1, fig 38B) runs along the ground between two rows of beet following the contours of the land. The depth foot actuates a proximity switch which in turn operates the depth ram on the drawbar, which then corrects the harvester.

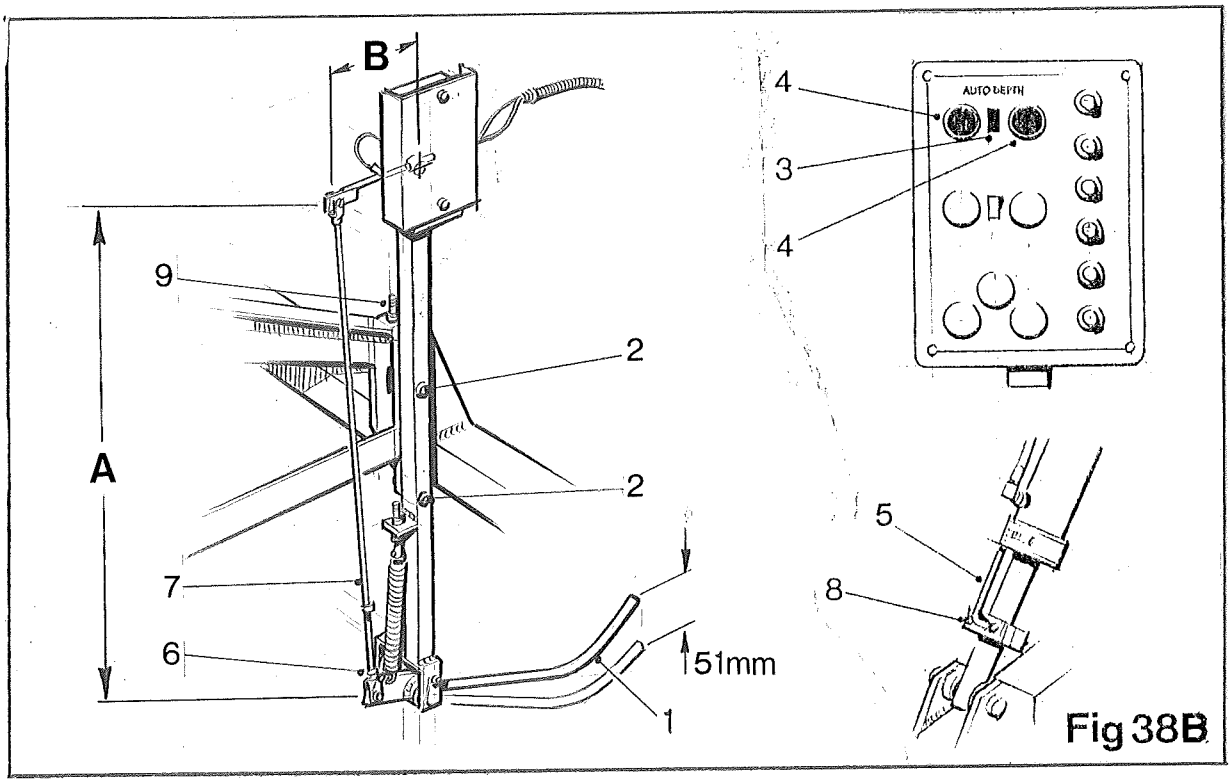


Fig 38B

SETTING THE DEPTH CONTROL

When setting the depth control, it is advisable to stand the harvester on a concrete floor with the lifting wheels also touching the ground.

1. Position underneath the depth foot (item 1, fig 38B) a 2" (51 mm) block of wood or something to represent the depth at which you wish to lift.

2. Ensure Dimensions A and B are set correctly (fig 38B).

   Dimension A - 960 mm
   Dimension B - 190 mm

3. Loosen the retaining bolts (item 2, fig 38B) and with the use of the adjuster (item 9, fig 38B) raise or lower the complete unit until the corner marked 'A' on the centre spindle (item 4, fig 39B) is in line with the centre of the proximity switch (item 2, fig 39B).

4. Retighten the retaining bolts. The machine is now set to lift the required depth.

5. If finer adjustment is required, slacken the clevis lock nuts (item 6, fig 38B) and using a spanner, turn the connecting rod (item 7, fig 38B) until correct adjustment is achieved. Be sure not to turn the connecting rod (item 7, fig 38B) more than a couple of turns. Finish by retightening all lock nuts.

Inside the depth control box (item 1, fig 39B) there are various adjustments for setting up the proximity switches (item 2, fig 39B). Under normal circumstances these are factory set. Below is a brief explanation for each of them.

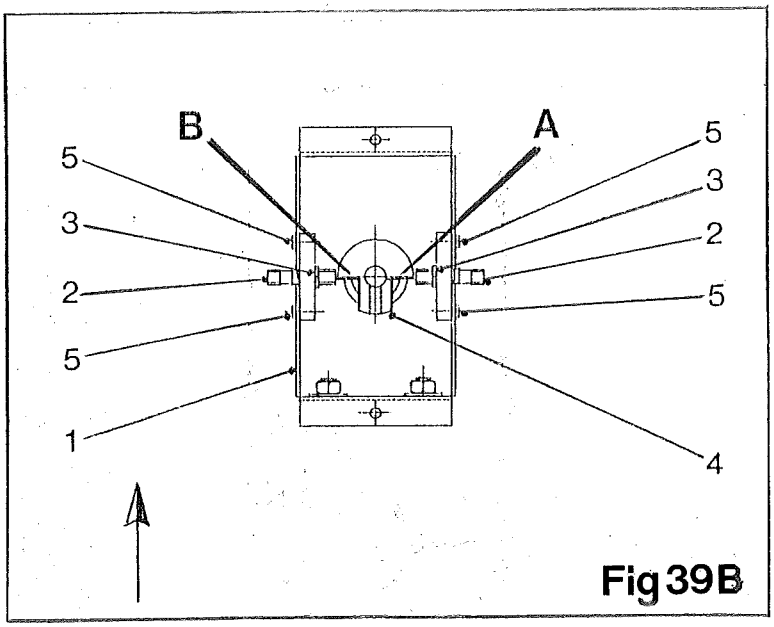


Fig 39B

The retaining nut (item 3, fig 39B) holds the proximity switch in place. If the nut is loosened, the switch can be turned so it can be positioned closer or further away from the spindle (item 4, fig 39B).

Another adjustment is for altering the time that elapses between one switch deactuating before the other one actuates. To adjust, slacken the retaining bolts (item 5, fig 39B) and slide the switch fractionally to either side. The further the switch is away from the corner marked 'B' moving in the direction shown by the arrow, the larger the delay.

To engage automatic depth control, press the switch (item 3, fig 38B) on the Control Box. Manual control can be obtained by disengaging the automatic depth control and pressing the up or down switch (item 4, fig 38B).

DEPTH MARKER

The depth marker (item 5, fig 38B) should be set after the harvester lifting depth has been established.

1. Slacken the retaining bolts (item 8, fig 38B) and slide the marker (item 5, fig 38B) until the top edge of the marker (item 5, fig 38B) is aligned with the bottom edge of the ram.

2. Finally, retighten all retaining bolts (item 8, fig 38B).

Control for the eight major functions of the Standen Spectrum is provided by fifteen switches mounted on top of the remote control box. Seven of these functions are operated by actuating individual hydraulic rams. The rams being actuated by a bank of solenoid valves (item 1, fig 41), and the valves being energised from the control box. The remaining function operated from the control box is the engagement of the discharge elevator hydraulic drive. This drive is controlled by the switch makred 'Elevator (On-Off)'. The switch energises a dump valve which in turn permits a flow of oil to the motor.

Figure 40 shows the control box with the various functions it operates.

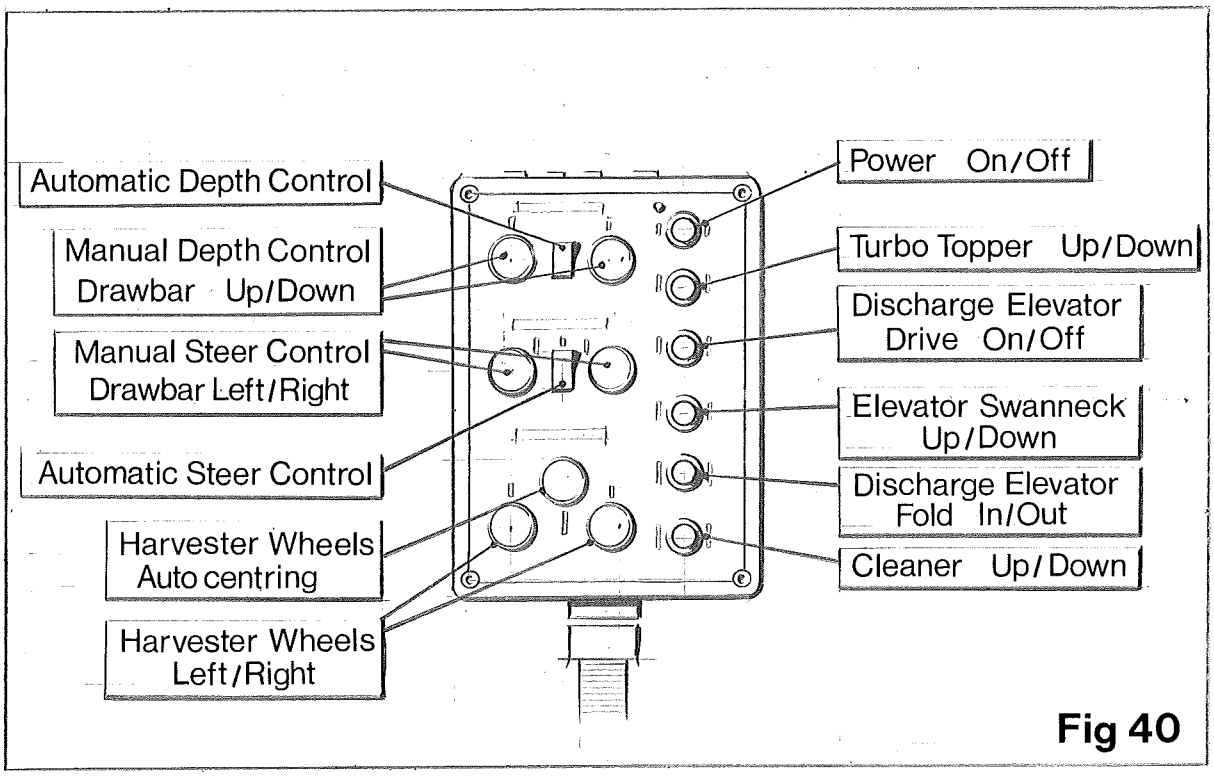


Fig 40

Always disconnect the control box from the tractor when not in use, so avoiding the possibility of draining the battery.

For installation of the control box, see section headed 'Connecting the Harvester to the Tractor'.

HYDRAULIC SYSTEM

The hydraulic oil to operate the various rams on the Spectrum is supplied from the tractor pump via the solenoid bank mounted on the harvester (item 1, fig 41). The solenoid valves which in turn actuate the individual hydraulic rams are electrically controlled from the tractor mounted control box (see section on Control Box). The only item requiring any maintenance is the pressure line filter (item 2, fig 41). When the indicator (item 3, fig 41) is pointing to the red segment then the element (item 4, fig 41) will need replacing. To replace the element, simply unscrew it from the bottom of the filter assembly. The flow divider (item 5, fig 41) should be adjusted to deliver a flow rate of 2 gallons/minutes to the solenoid valve bank (item 1, fig 41).

NOTE: On tractors equipped with an open circuit, the screw located on the rear of the return section of the valve block (location A, fig 41) should be screwed out as far as possible (anti-clockwise). On tractors equipped with a closed circuit (e.g. John Deere), the screw should be screwed in as far as possible (clockwise).

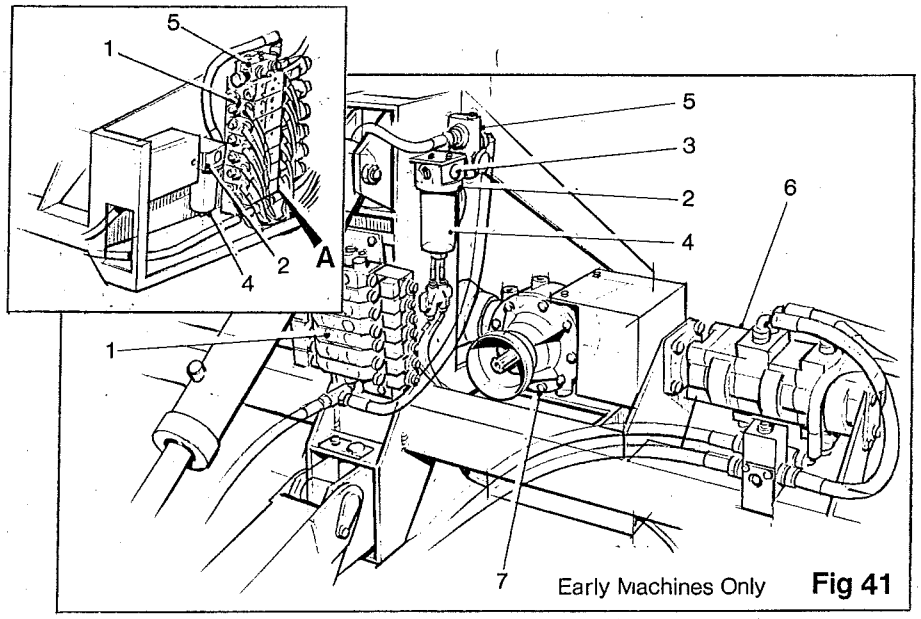


Fig 41

WARNING:

HYDRAULIC PIPES AND FITTINGS MAY BE UNDER PRESSURE WITH THE MACHINE AT REST. ENSURE THAT ALL RESIDUAL PRESSURE IS RELEASED BEFORE DISCONNECTING ANY PIPEWORK.

HYDRAULIC DRIVES

The hydraulic drives system for the Standen Spectrum comprises of a hydraulic pump (item 6, fig 41) driven from a 1:2.4 ratio gearbox (item 7, fig 41). This pump provides the necessary hydraulic pressure to drive the hydraulic motors that perform the working functions of the machine. A schematic hydraulic layout is shown in fig. 47, depicting the main items of the hydraulic system together with their mechanical working functions. Control for the hydraulic drives system (discharge elevator) is provided electrically from the tractor mounted control box (see section on Control Box).

Detailed descriptions of the components that make up the hydraulic system of the Standen Spectrum follows together with any relevant maintenance information necessary to ensure the trouble free operation of the system.

HYDRAULIC FLUID TANK

Located on the left hand side of the machine, the hydraulic tank provides the necessary hydraulic fluid to drive the components of the hydraulic system. The tank has a fifty gallon capacity and is fitted with removable lid for easy maintenance to the two strainers on the suction hose ports inside.

A 10 micron filter mounted on the tank removes any foreign bodies from the hydraulic fluid.

C A U T I O N

THE HYDRAULIC TANK SHOULD ONLY BE FILLED WITH CLEAN BP UK 46 HYDRAULIC FLUID OR RECOMMENDED MANUFACTURERS DIRECT EQUIVALENT. FAILURE TO ADHERE TO THIS SPECIFICATION COULD RESULT IN DAMAGE TO THE EQUIPMENT.

HYDRAULIC PUMP

The triple pump (item 6, fig 41) that provides the hydraulic power for Spectrums working functions is a double gear type. Each section of the triple pump delivers fluid at a rate of 12 gallons/minutes (at tractor PTO speed of 540 r.p.m.).

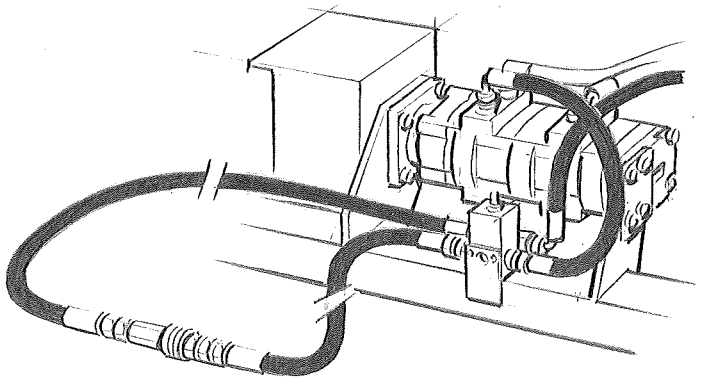


Fig 42

C A U T I O N

IF THE TOPPER IS NOT IN USE THE MALE AND FEMALE PIPE CONNECTORS OF THE FLOW AND RETURN LINES TO IT, MUST BE CONNECTED TOGETHER TO COMPLETE THE HYDRAULIC CIRCUIT. FAILURE TO DO SO WILL RESULT IN SERIOUS DAMAGE TO THE MACHINE (SEE FIGURE 42).

PRESSURE RELIEF VALVE

Pressure relief valves are fitted to protect the hydraulic system should any blockage occur. On early machines the relief valves are fitted on/or in-line to each of the hydraulic motors. On later machines, a valve block containing three relief valves is mounted on top of the hydraulic tank. The relief valve located nearest to the front of the tank protects the Turbo Topper circuit. The centre relief valve protects the lifter web and discharge elevator circuit. The rear relief valve protects the cleaner/trash extractor and the cage wheel circuit. The working pressure of each circuit can be rated by removing the blanking plug on the appropriate relief valve and inserting a pressure gauge.

CAUTION

THE PRESSURE RELIEF VALVES ARE AN ESSENTIAL SAFETY FEATURE OF THE STANDEN SPECTRUM HYDRAULIC SYSTEM. THEY ARE PRESET AT THE FACTORY TO A PRESSURE OF 2800 P.S.I. AND SHOULD NEVER BE TAMPERED WITH.

HYDRAULIC DUMP VALVE

The hydraulic dump valve is electrically operated from the tractor mounted control box (see section on Control Box) and engages or disengages the discharge elevator hydraulic motor drive. The dump valve is mounted on the main frame behind the LH harvester wheel.

MAINTENANCE

The components utilised in the design of the hydraulic system have been chosen for their maintenance free characteristics. The only components requiring maintenance are the pressure line filter (item 2, fig 41) and the hydraulic tank reservoir tank strainers and tank filter. The recommended maintenance schedule for these items is as follows:-

PRESSURE LINE FILTER:

When the indicator is pointing to the red, the filter element will need replacing.

AFTER FIRST 50 HOURS RUNNING:

Replace tank top filter

EVERY 500 HOURS:

Replace tank filter

AT THE END OF EVERY SEASON:

Remove tank lid, dismantle strainers and clean thoroughly

Two shut-off valves have been fitted to the hydraulic tank to allow the undertaking of any maintenance to the hydraulic system without draining the tank.

When carrying out any maintenance to the hydraulic system, cleanliness is of the utmost importance so avoid dirt entering the system.

NEVER OPERATE THIS MACHINE WITH THE SHUT-OFF VALVE IN THE CLOSED POSITION.

Closed **Open**

Fig 43

The hydraulic tank should be filled with BP UK 46 hydraulic oil or equivilent and should always be kept full, especially when storing the machine for long periods of time. A level gauge is mounted on the side of the tank.

MAINTENANCE AND LUBRICATION

Regular maintenance will ensure that the Standen Spectrum provides a long and efficient service life. Depending on the soil and weather conditions, the maintenance time schedule can vary. However, it is recommended that the machine be lubricated and gearbox oil levels checked once a week throughout the season.

Correct lubrication should be employed to ensure the full life of the various working parts and the efficient operations of the machine.

A general purpose grease should be used for the bearings and the universal coupling drives.

NOTE: With reference to the lubrication chart that some of the bearings are sealed and pre-lubricated (Ref. GS) and care should be taken not to flood these bearings with grease, or the seals will burst allowing the grease to escape and dirt to get in. Should this happen, more frequent greasing will be required in order to keep the dirt at bay. When lubricating sealed bearings, only two or three strokes of the grease gun every twenty acres of work is required.

The non-sealed bearings (Ref. G) should be greased at least once a day or every ten acres.

The gears driving the cleaner unit and the gears driving the discharge elevator should be smeared liberally with BP FGOO-EP Energrease, each month. These gears are marked 'A' on the lubrication chart.

Particular care must be taken to ensure that the grease or oil does not come into contact with the vee belts.

Grease points requiring individual quantities of lubrication will be found on the lubrication point chart.

We recommend that the universal couplings should be dismantled periodically and their shaft smeared with general purpose grease. Also all drive chains should be kept well greased.

The gearbox (Ref. O) should be checked regularly and topped up with EP90 gear oil as necessary.

LUBRICATION CHART

Fig 44

KEY

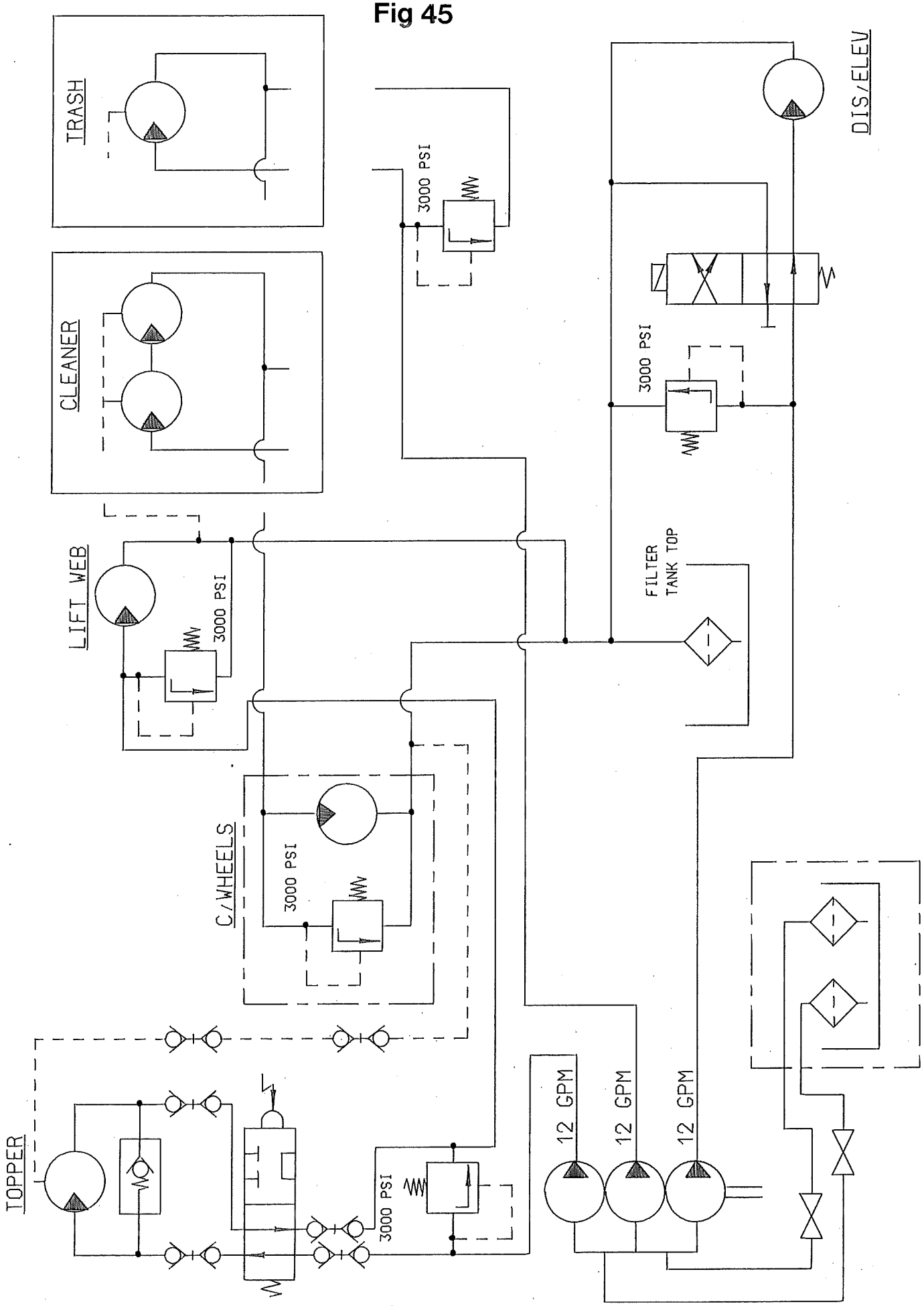
A:- GEAR DRIVES NEEDING A LIBERAL SMEARING OF BP FG00-EP ENERGREASE, EACH MONTH.
O:- MAIN GEARBOX, REGULAR CHECKING AND TOPPING UP WITH EP90 GEAR OIL.
G:- NON-SEALED BEARINGS, EVERY DAY OR EVERY TEN ACRES.
GS:- SEALED BEARINGS, TWO OR THREE PUMPS EVERY TWENTY ACRES.

GREASE POINT DESCRIPTION	A	O	G	GS
MAIN DRIVE PTO			✓	
MAIN GEARBOX		✓		
LIFTER WHEEL HUBS			✓	
CAGE WHEEL SHAFT				✓
MAIN LIFT WEB FRONT DRIVE SHAFT				✓
MAIN LIFT WEB REAR DRIVE SHAFT				✓
MAIN LIFT WEB CAGE FEED ROLLER				✓
MAIN LIFT WEB TRIP ROLLER				✓
TRASH EXTRACTOR FEED WEB DRIVE SHAFT				✓
TRASH EXTRACTOR WEB DRIVE SHAFT				✓
TRASH ROLLER DRIVE SHAFT				✓
TRASH EXTRACTOR DRIVE TENSIONER				✓
REAR AXLE KING PINS			✓	
REAR AXLE WHEEL HUBS				✓
CLEANER PIVOTS			✓	
CLEANER DRIVE GEARS	✓			
CLEANER FRONT DRIVE BEARINGS				✓
CLEANER REAR BEARINGS				✓
ELEVATOR FEED WEB DRIVE SHAFT				✓
DISCHARGE ELEVATOR OUTER WEB BOTTOM SHAFT				✓
DISCHARGE ELEVATOR OUTER WEB TOP SHAFT				✓
DISCHARGE ELEVATOR INNER WEB DRIVE SHAFT				✓
DISCHARGE ELEVATOR IDLER SPROCKET				✓
DISCHARGE ELEVATOR IDLER GEAR			✓	
DISCHARGE ELEVATOR GEAR DRIVE	✓			
TURBO TOPPER SPINDLE HOUSING			✓	
(ACCESS THROUGH HOLE IN ROTOR SIDE)				
SKEWBAR DRIVE PTO			✓	
SKEWBAR DRIVE INPUT HOUSING				✓
SKEWBAR DRIVE SHAFT BEARINGS				✓
SKEWBAR ARM BEARING HOUSING (2 POSITIONS)				✓
SCALPER DISCS PIVOT HOUSING			✓	

HYDRAULICS
MOTOR CIRCUIT

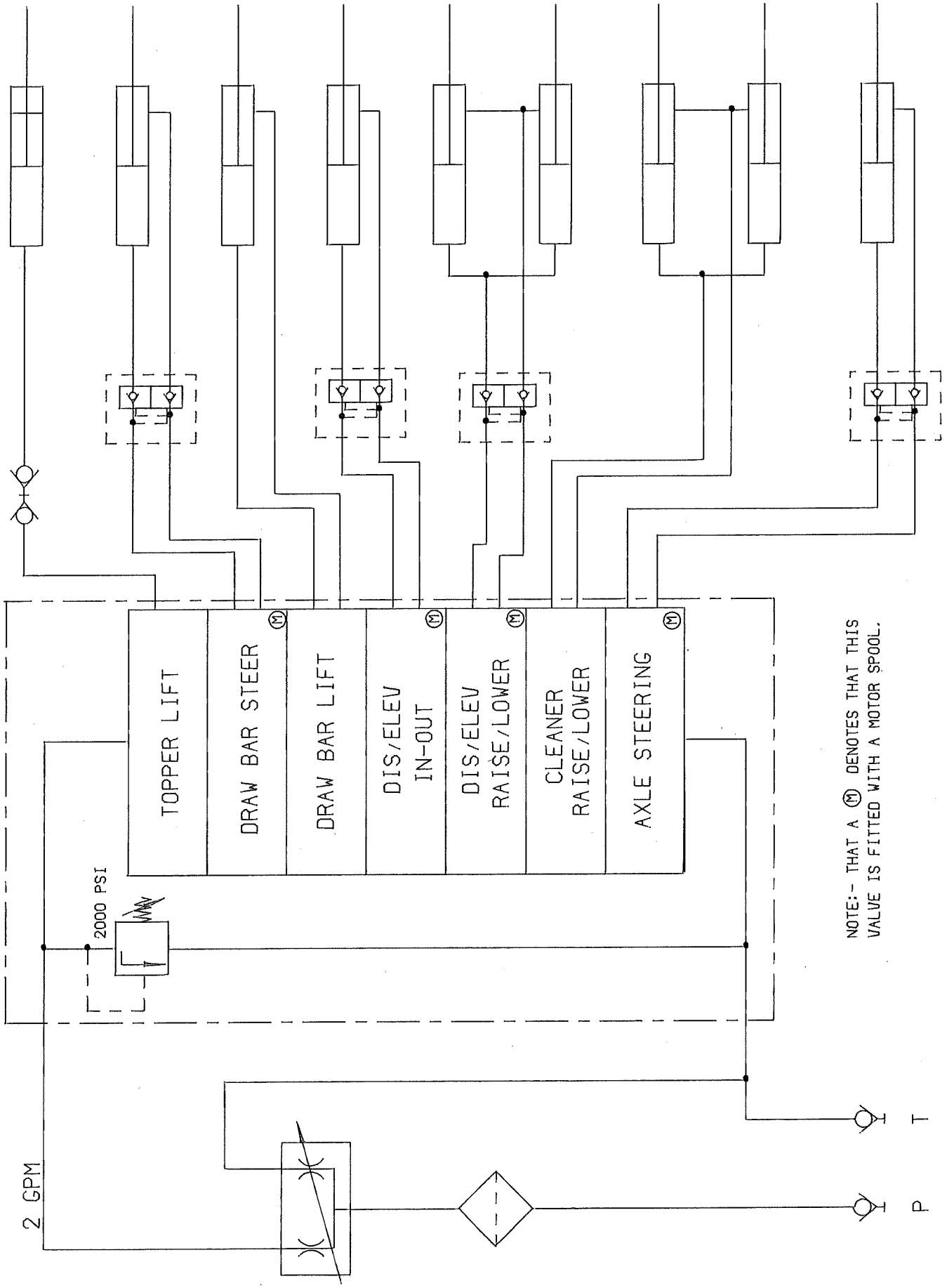
Prior to Serial Nº SP008H

Fig 45



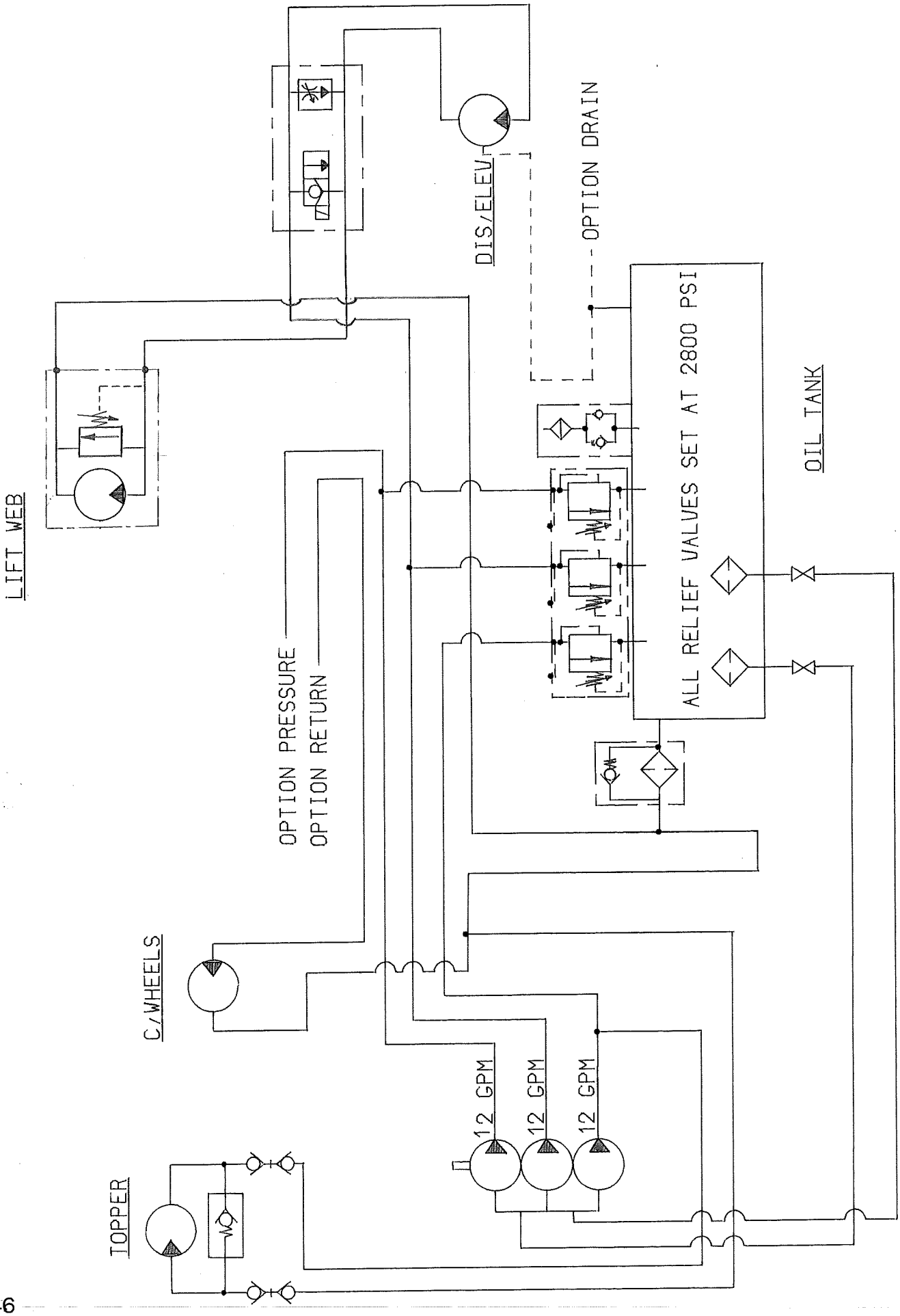
HYDRAULICS
ACTUATOR CIRCUIT Prior to Serial Nº SP008H

Fig 46



HYDRAULICS
MOTOR CIRCUIT From Serial Nº SP008H

Fig 47

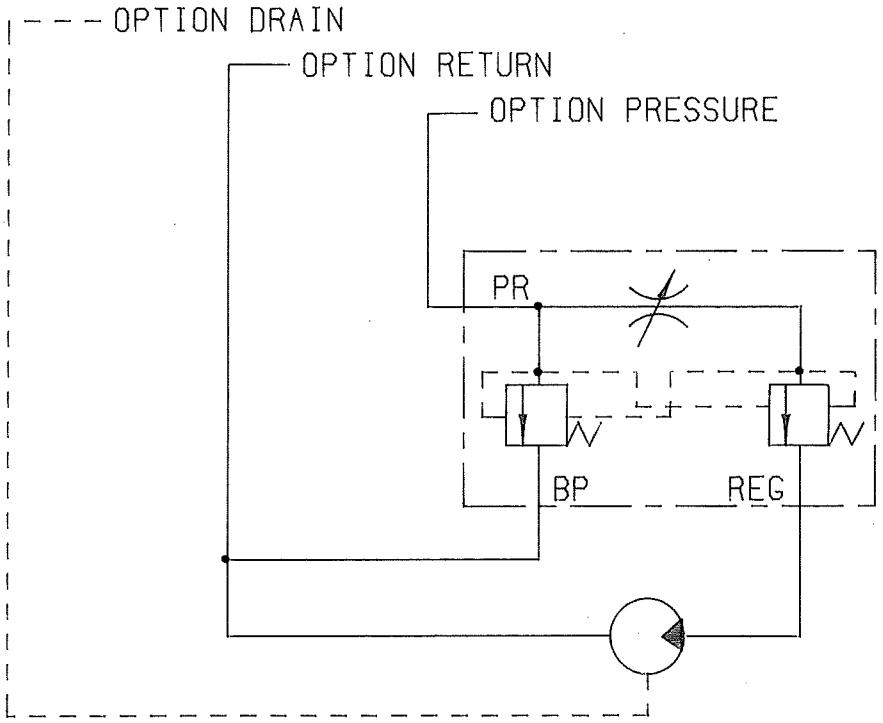


HYDRAULICS
MOTOR CIRCUIT (OPTIONS)

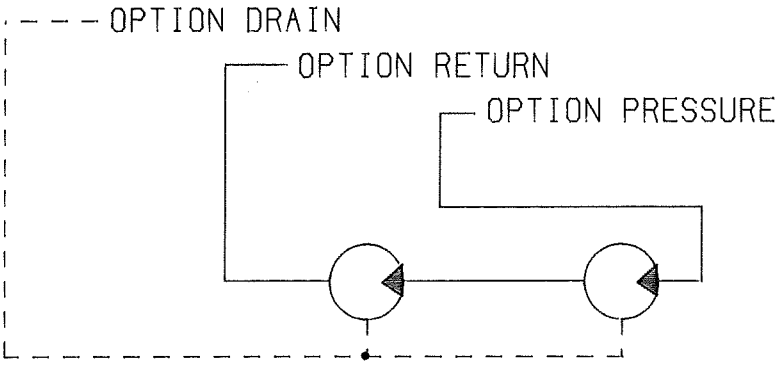
From Serial Nº SP008H

Fig 48

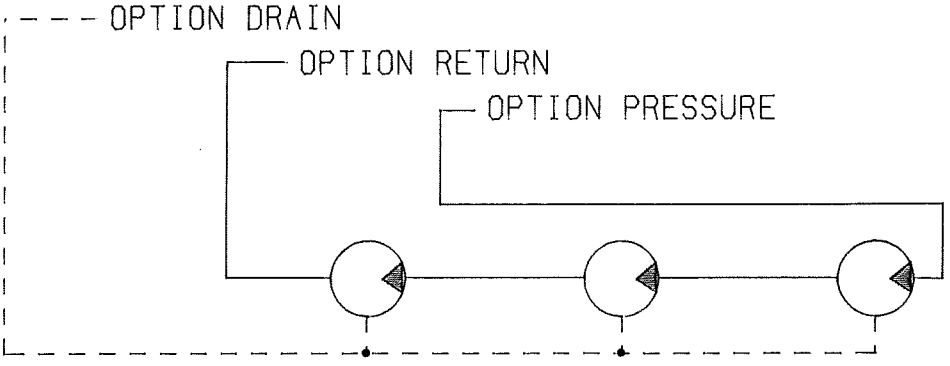
TRASH EXTRACTOR OPTION



3 ROW CLEANER OPTION



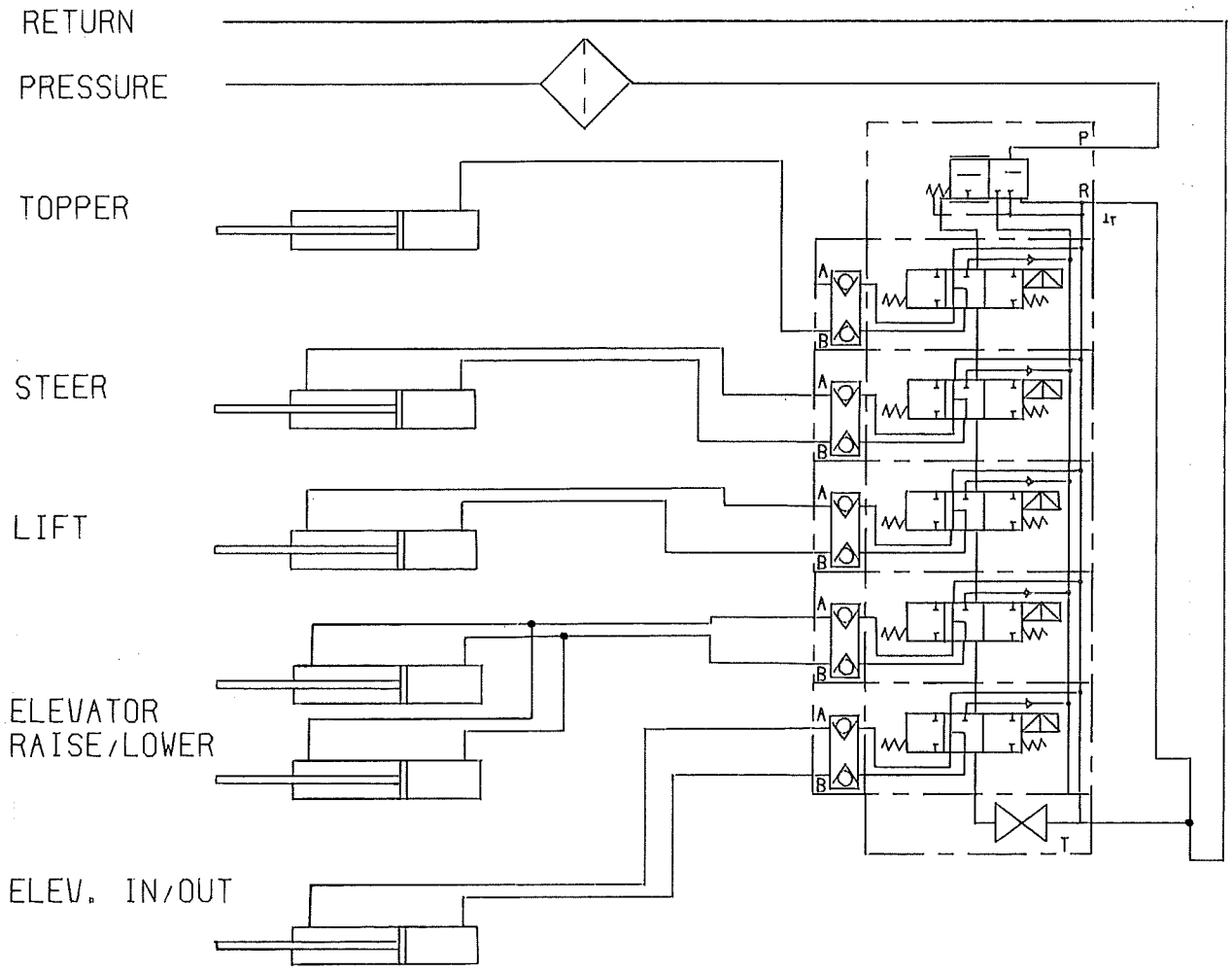
4 ROW CLEANER OPTION



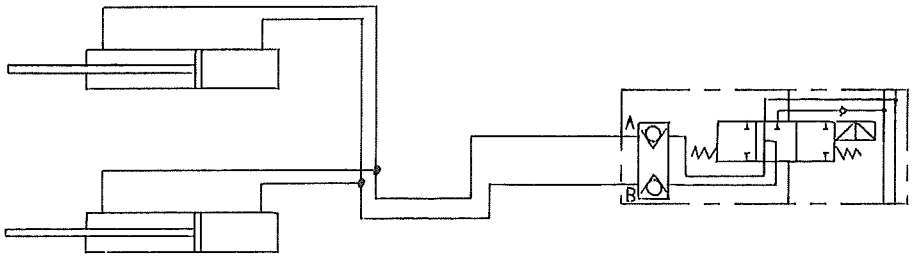
HYDRAULICS

ACTUATOR CIRCUIT From Serial Nº SP008H

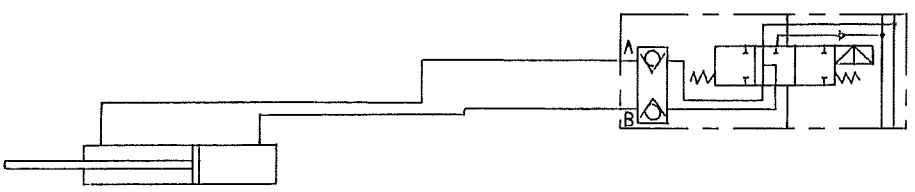
Fig 49



BASIC BUILD



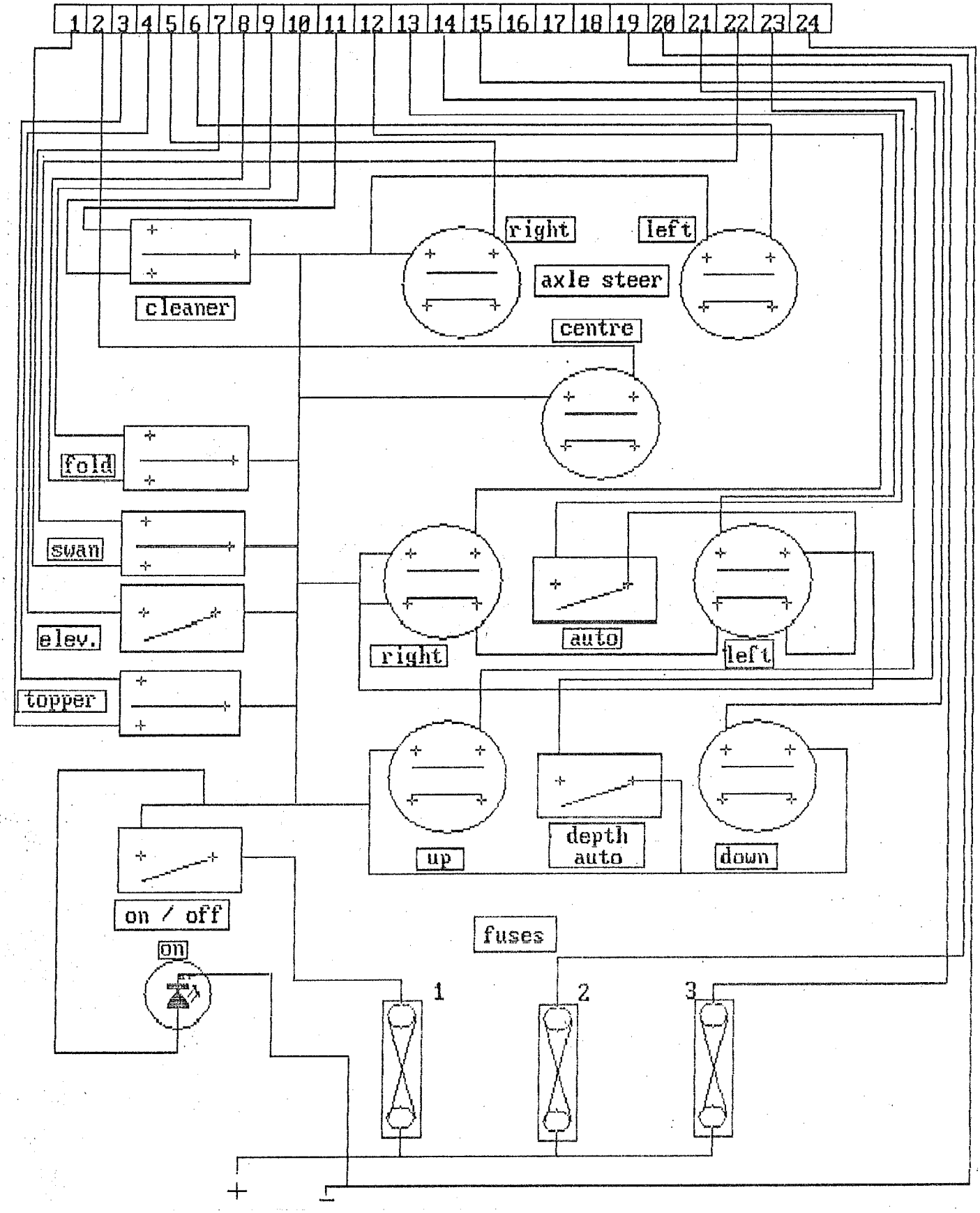
CLEANER OPTION



REAR STEER OPTION

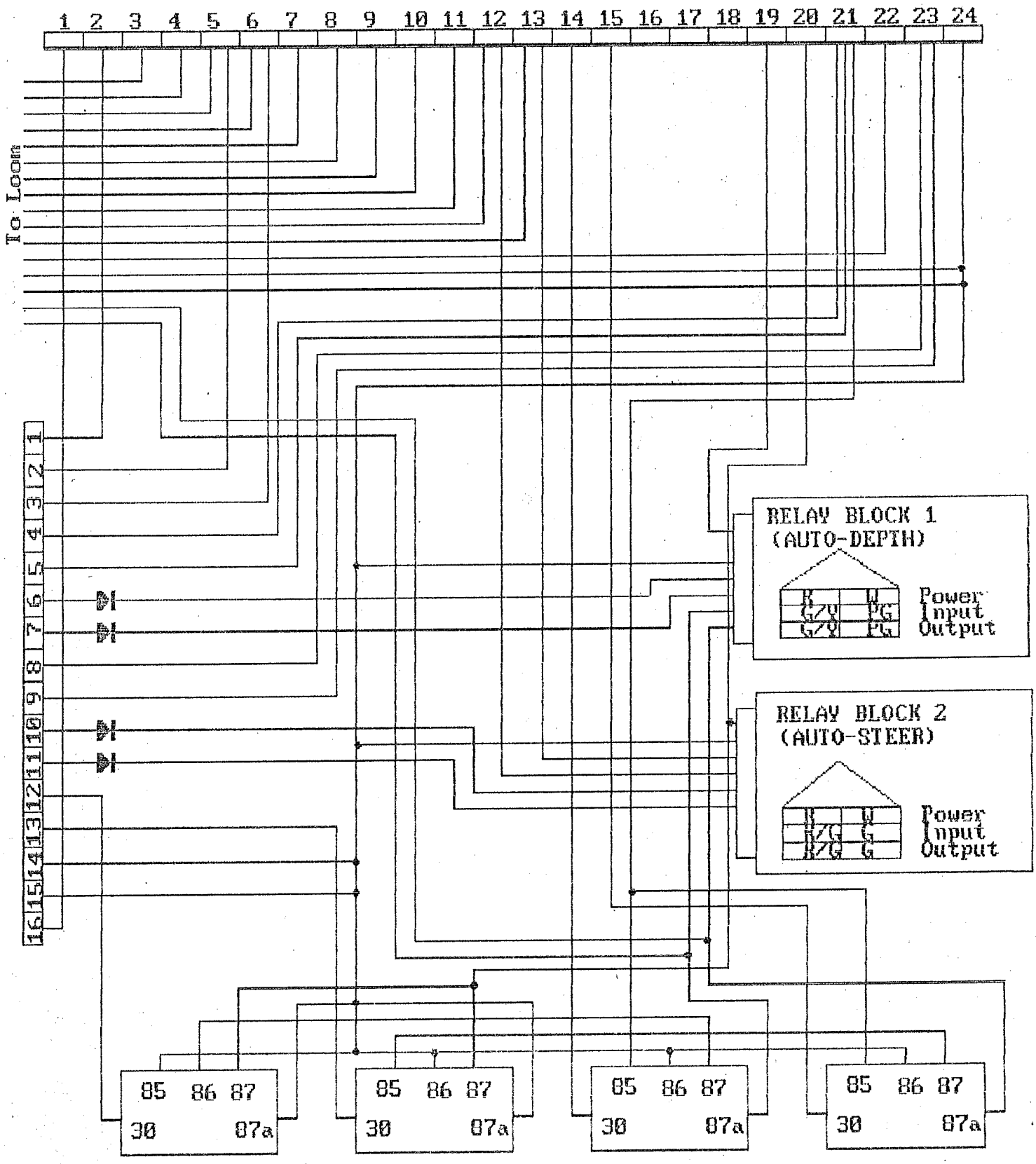
Pin No.	Colour.	Function.
1.	Brown.	Elevator On.
2.	Orange.	Steering Centre.
3.	Blue.	Topper Down.
4.	Red/Blue.	Topper Raise.
5.	Red(small).	Axle Steer Right.
6.	Red/White.	Axle Steer Left.
7.	Grey.	Swanneck Down.
8.	Yellow/Red.	Fold In.
9.	Yellow.	Fold Out.
10.	Mauve.	Cleaner Up.
11.	Violet.	Cleaner Down.
12.	Red/Green.	Steer Right.
13.	Green.	Steer Left.
14.	Green/Yellow.	Depth Down.
15.	Pale Green.	Depth Up.
16.		
17.		
18.		
19.	Red(Large).	Power Fuse 3.
20.	Red(Large).	Power Fuse 2.
21.	Black/White.	Auto Depth.
22.	Grey/Blue.	Swanneck Up.
23.	Red/Brown.	Auto Steer.
24.	White.	Earth.

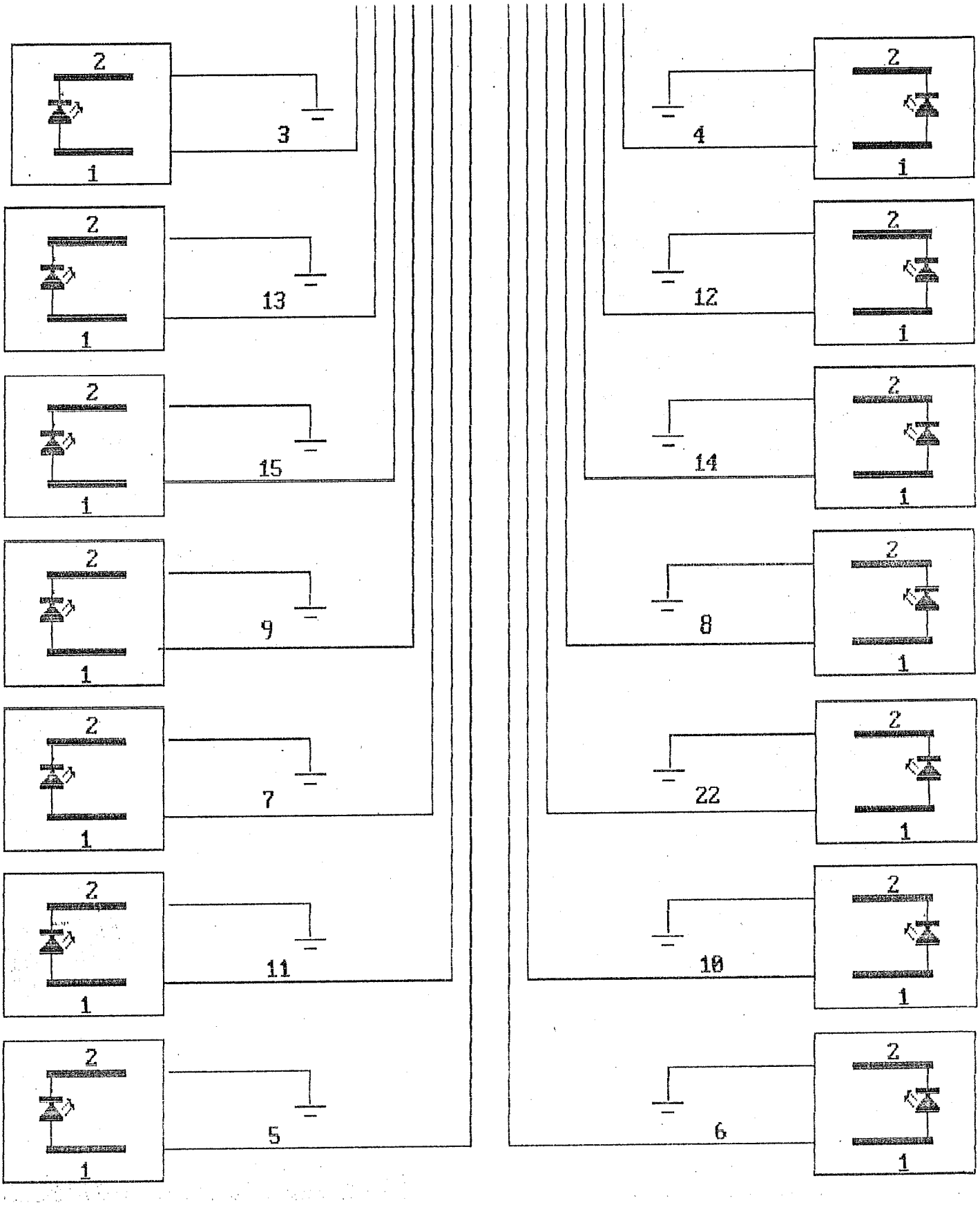
16 way plug/socket.		
1.	Orange.	Axle Steer Centre.
2.	Red(small).	Axle Steer Right.
3.	Red/White.	Axle Steer Left.
4.	Black/White.	Depth Sensor Feed Up.
5.	Black/White.	Depth Sensor Feed Down.
6.	Pale Green.	Depth Sensor Trigger Up.
7.	Green/Yellow.	Depth Sensor Trigger Down.
8.	Red/Brown.	Auto Steer Feed Right.
9.	Red Brown.	Auto Steer Feed Left.
10.	Green.	Steer Sensor Trigger Left.
11.	Red/Green.	Steer Sensor Trigger Right
12.	Yellow/Green.	Depth Sensor Actuator Up.
13.	Yellow/Green.	Depth Sensor Actuator Down
14.	White.	Steer Sensor Earth Left.
15.	White.	Steer Sensor Earth Right.
16.	Brown.	Elevator On.



SPECTRUM CONTROL BOX

SPECTRUM JUNCTION BOX





SPECTRUM VALVE BANK

TECHNICAL DATA

	3 ROW	4 ROW
ROW WIDTHS	18" to 22"	16" to 20"
LENGTH IN WORK	7.1 m	7.1 m
WIDTH IN WORK (EXTENDED ELEVATOR)	5.2 m	5.2 m
WIDTH IN TRANSPORT	3.0 m	3.0 m
HEIGHT IN WORK (EXTENDED ELEVATOR)	4.0 m	4.0 m
HEIGHT IN TRANSPORT	3.3 m	3.3 m
MAXIMUM UNDER ELEVATOR CLEARANCE	3.5 m	3.5 m
MINIMUM UNDER ELEVATOR CLEARANCE	2.5 m	2.5 m
WEIGHT	4.4 t	5.1 t
WHEEL SIZE	12.5 x 20	12.5 x 20
TYRE PRESSURE	40 P.S.I.	40 P.S.I.
TRACTOR HP REQUIREMENT (SCALPER)	85	95
TRACTOR HP REQUIREMENT (SKEW BAR)	95	105
HYDRAULIC REQUIREMENT	ONE SPOOL VALVE WITH CONSTANT PUMPING	
HYDRAULIC TANK CAPACITY	50 GALS	50 GALS
HYDRAULIC OIL	BP UK46	BP UK46
RELIEF VALVE SETTING	2800 P.S.I.	2800 P.S.I.
SHIPPING DIMENSIONS	5.6 m (l) 2.9 m (w) 3.0 m (h)	

SECTION 2

EXPLODED PARTS ILLUSTRATIONS