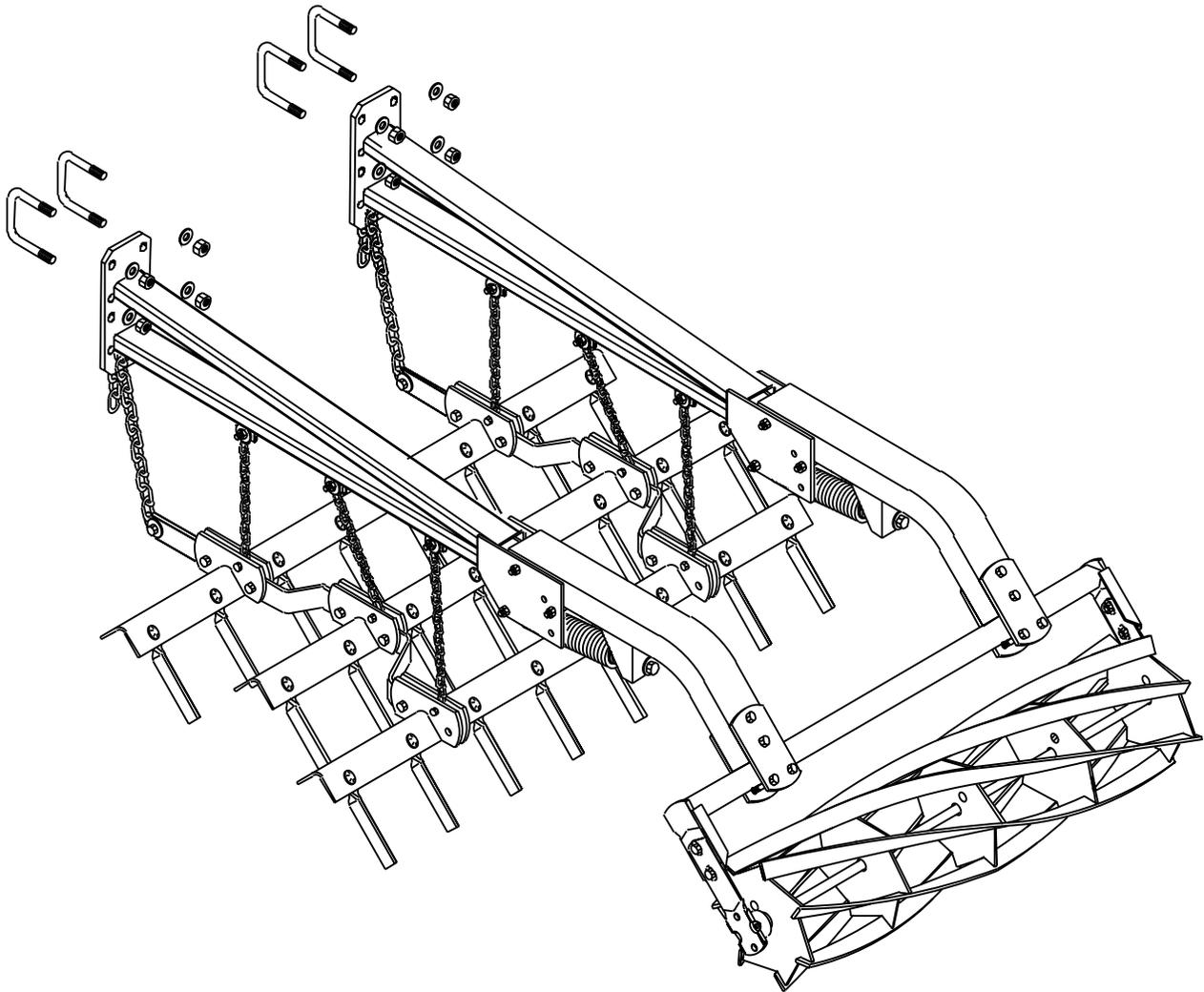


# 300FS Harrows

Flex Drag & Spiral Roller Combi

Kongskilde  
300 FS



ASSEMBLY INSTRUCTIONS  
& OPERATING GUIDE

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## INTRODUCTION:

Kongskilde 300FS Combi Harrows have been developed as a levelling attachment for field cultivators. When properly adjusted the Harrow will help to prepare a level surface for planting in various field conditions and soil types.

To achieve this, the 300FS Harrow combines a 3-Bar Flex Drag-Spike Harrow with a Single Offset Spiral Bar Rota Harrow.

This booklet has been developed to assist you in assembling your Combi Harrow Kit for the Kongskilde Field Cultivator Model VT2800. Harrow mounting patterns for each cultivator size is provided in a separate booklet.

## PRE ASSEMBLY TIPS:

Prior to assembling the Combi Harrows, the cultivator should be carefully unfolded and lowered to the ground, (resting on the tines), on a flat level area.

Combi Harrows are really two separate harrow systems that share a common hanger arm and should therefore be assembled in three stages:

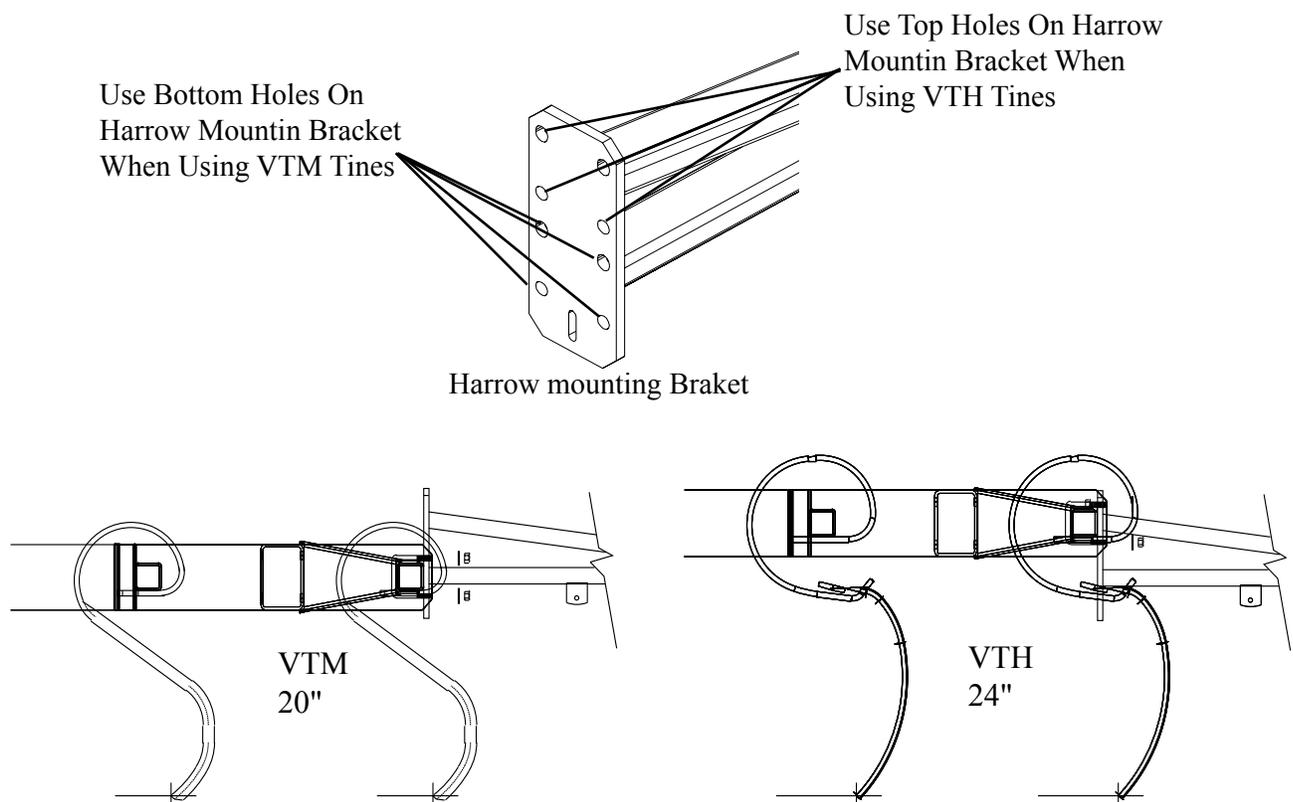
- 1) Assemble the 3 Bar Drag Harrows and position behind the machine.
- 2) Mount the hanger arms and attach the drag harrows to them.
- 3) Assemble the Spiral Bar Rota Harrows and attach to the ends of the hanger arms.

(Refer to the detailed assembly instructions for each of the above stages)

The combi harrows are shipped from the factory in component form. They are packed together and include: the pre-assembled spike bars; the carrier arms; the rollers, roller frames, and roller arms; and the assembly hardware bags.

Refer to the parts list booklet for a detailed breakdown and description of the assembled components. This booklet will help you to identify the items required for proper assembly.

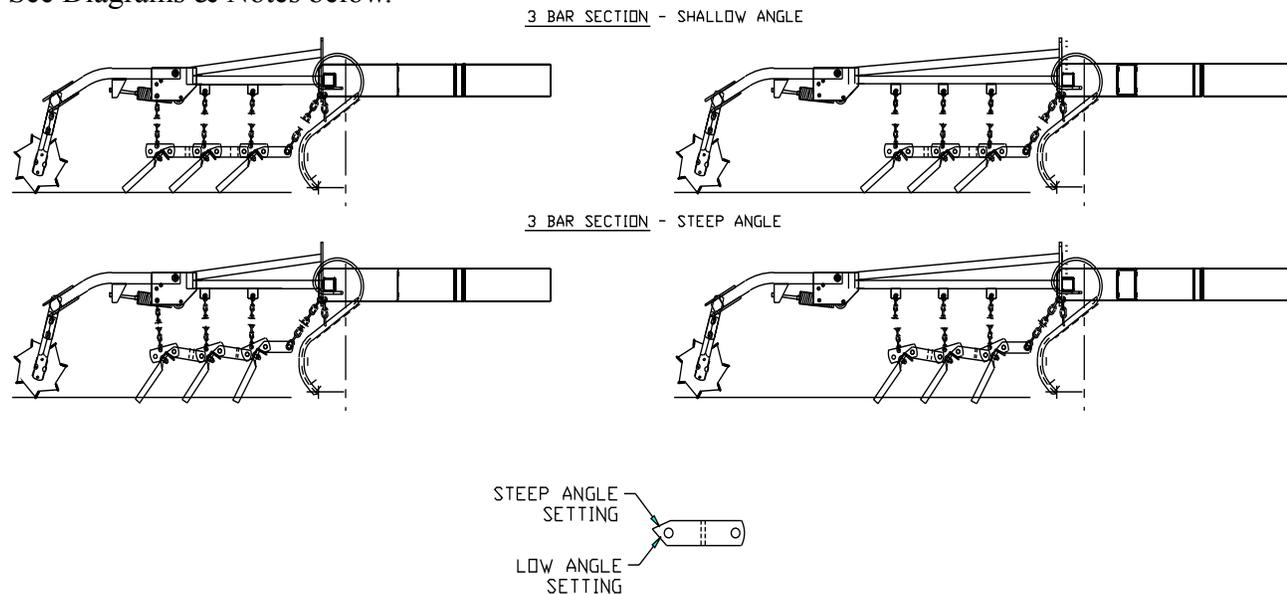
NOTE: Position the harrow mounting bracket holes according to the tine in use VTM or VTH



## ASSEMBLY INSTRUCTIONS: Working Angle of 3-Bar Drag Harrow

As an added feature, the straight and offset joiner links of the 3 bar drag sections have been double sheared on one end with two different angle cuts. This gives you the opportunity to set the spikes bars to run at a shallow angle of about 30° for levelling in heavy residue or lighter soils, or set at a steeper angle of about 45° for breaking clods and lumps in heavier soils. The harrows come pre-assembled from the factory on the steep angle setting. However, If you want to change to the shallow angle setting you must flip the offset brackets over on all sections before starting the assembly, as all sections must be set the same way.

See Diagrams & Notes below.



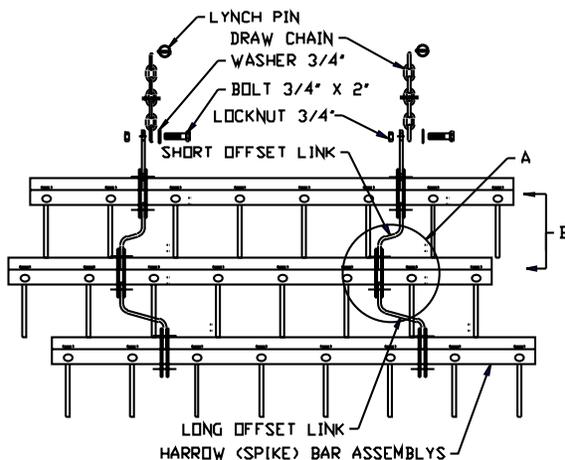
**NOTE 1:** Depending on the setting chosen, the harrow bars may be flipped over and offset in the opposite direction to the diagrams shown in the harrow layout booklets. For example; a right offset joiner link set in the shallow angle position becomes a left offset link when flipped over into the steep angle position.

**NOTE 2:** All offset brackets must be assembled to work at the same angle; either shallow or steep. You do not have the option to mix one angle setting with another. Therefore, you cannot set the front row to run at the steep angle and the rear 2 rows to run shallow. All spike bars must work at the same angle to allow for proper spacing between the spikes.

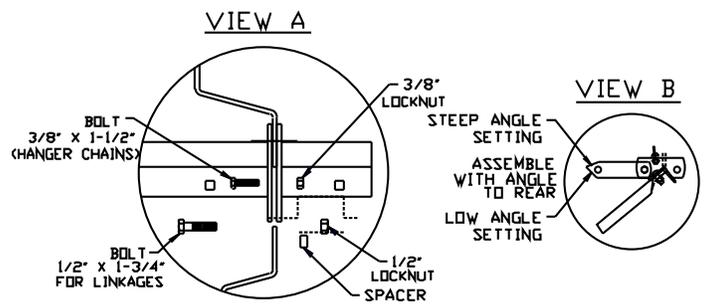
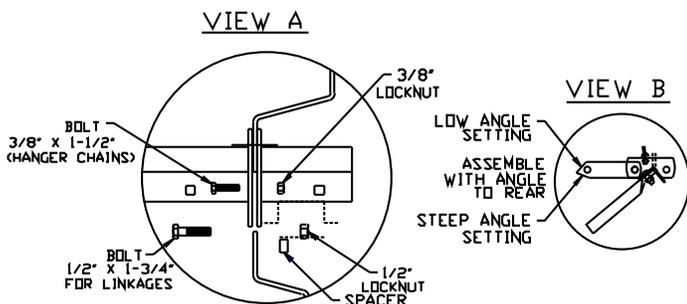
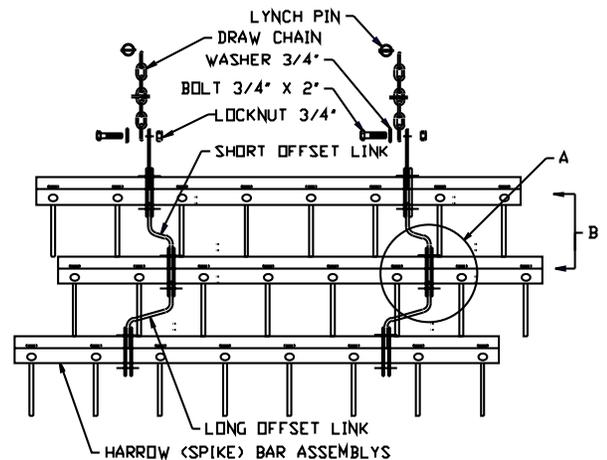
## ASSEMBLY INSTRUCTIONS: Drag Harrow Sections

1. Before starting, be sure you have the correct quantity and size of drag harrow bundles and spiral bar rollers for the machine that is being assembled. The size combinations and mounting location for each machine are shown in the harrow layout booklet provided for each model of cultivator.
2. Each harrow section may be assembled separately and then positioned behind the cultivator. However these harrow sections are very heavy and awkward to move when completely assembled. You may want to position them behind the cultivator first and then complete the assembly.
3. Lay the 3 bar harrow sections out behind the cultivator and assemble the offset joiner links and chains according to the layout diagrams below. Start with the Centre Section first, then assemble the right and left hand wing sections.

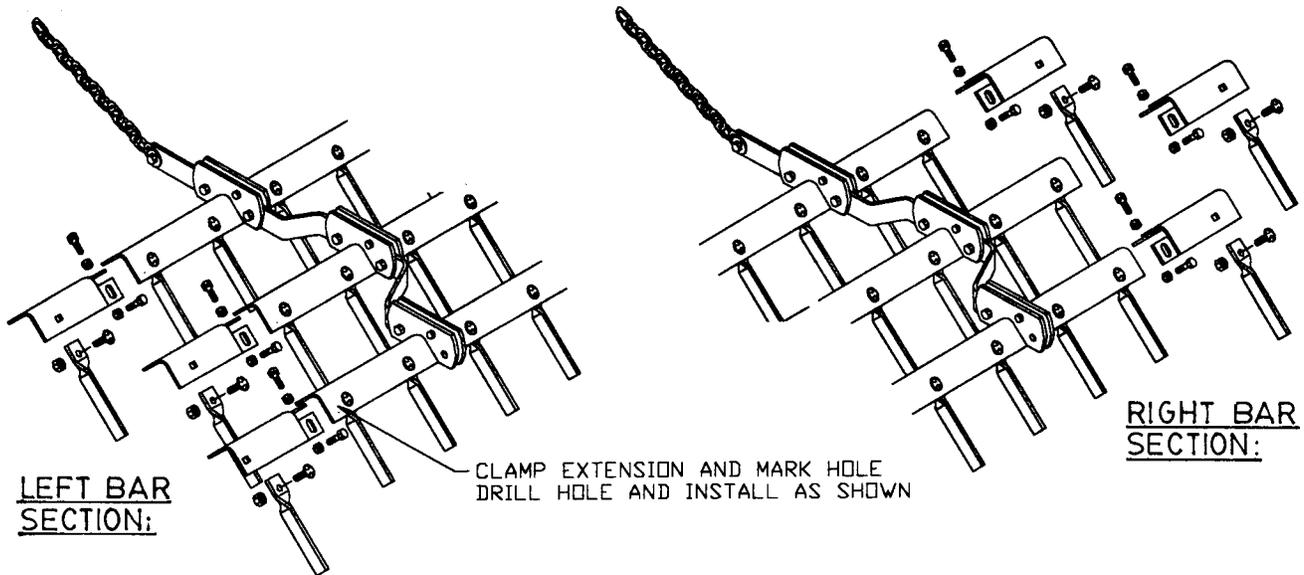
3 BAR SECTION - STEEP ANGLE



3 BAR SECTION - SHALLOW ANGLE

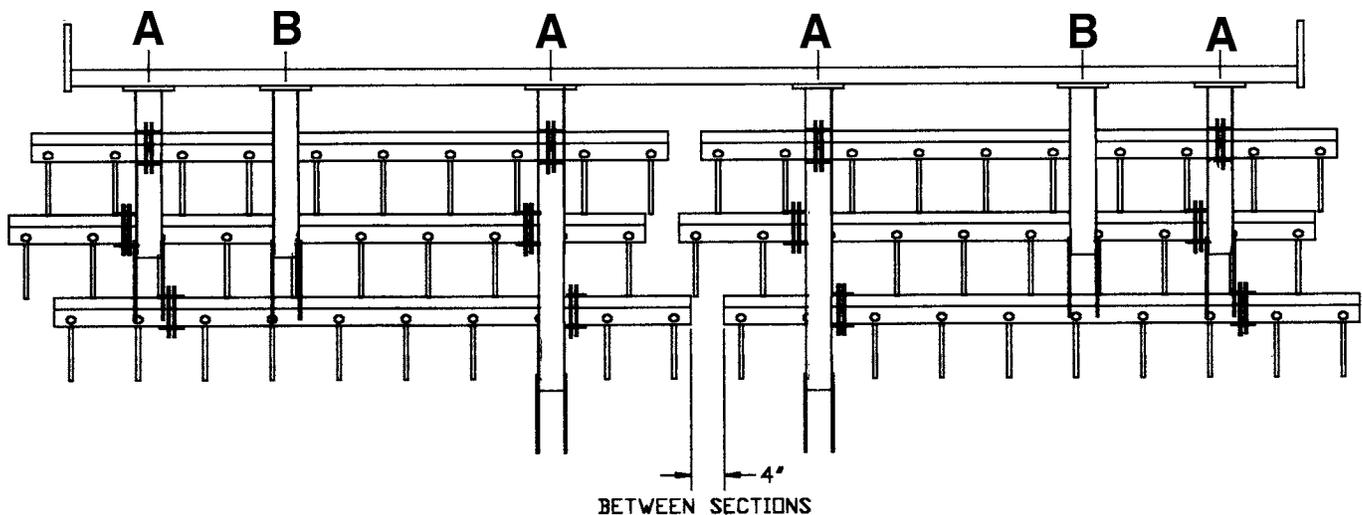


4. Note: On some cultivator models you will need to mount a special extension to the ends of the spike bars. Mark the locations for the bolt holes, or clamp the extensions to the spike bar and use them as a guide for drilling. Secure with bolts and locknuts supplied. See detail below.



5. Mount the carrier arms to the rear toolbar of the cultivator centre section with the 5/8" U-bolts, washers and locknuts provided. Always start in the centre of the machine and work out to the wings to keep the spacing even between the harrow sections. Position 4 of the arms above the chain brackets on the drag harrow assemblies according to the sample diagram below.

NOTE: Only four of the arms (A) below are used to hang the drag harrow sections. The extra pair of arms (B) shown are required for mounting the rota harrows only. If required, these are positioned in between the arms for mounting the drag harrows as shown. Pay close attention to the layout diagrams provided with each machine for correct placement of the harrow arms.

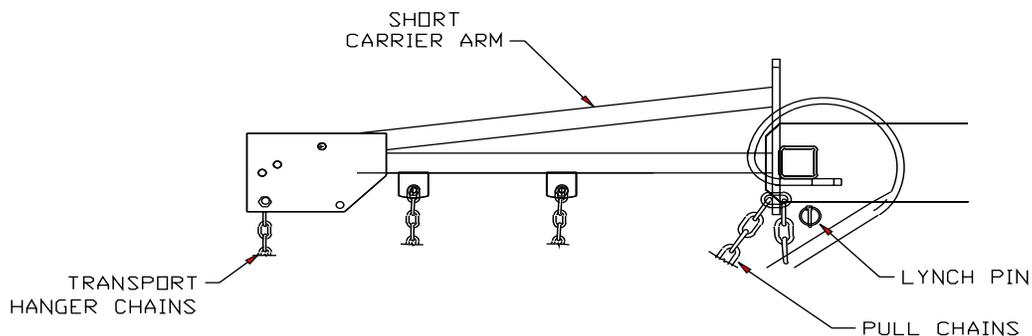
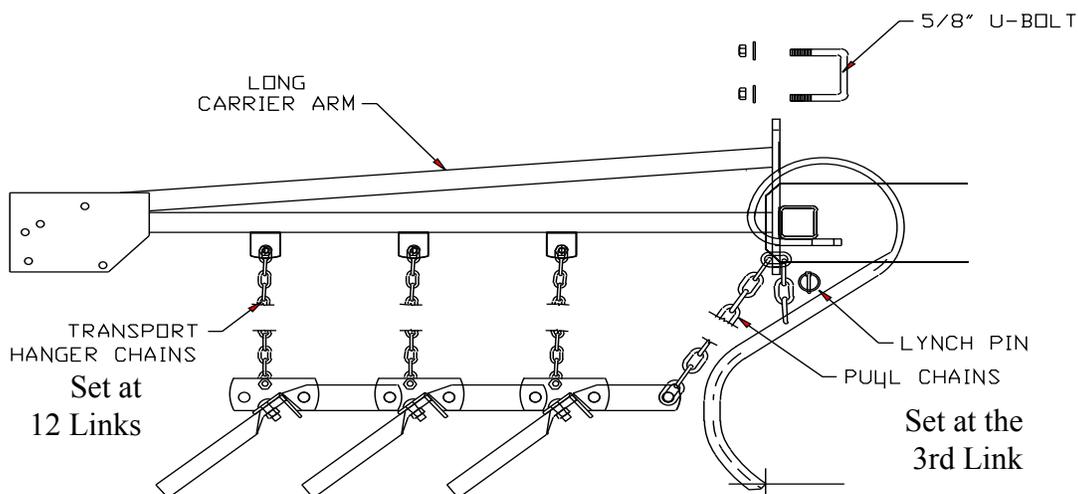


6. The pull chains are connected to a slot in the bottom of the harrow mounting bracket.

7. Connect the pull chains to the draw brackets by inserting one of the chain links thru the slot in the bracket and securing with the lynch pin provided. The length of the pull chains may be adjusted as required to obtain optimal levelling and grooming of the soil surface. Initially they can be set at about the 3rd link. (See the field settings section later in this manual. )

8. Connect the transport chains to the tabs on the bottom side of the carrier arms with the bolts, washers and locknuts provided.

Note that there are only 2 tabs on the short arms. An extra hole is provided on the harrow mounting bracket for the 3rd hanger chain. The length of these chains may be adjusted according to desired transport height, (about 12 links to start).



9. When the centre section harrow assembly is complete, mount the carrier arms and harrow sections to the wings in a similar manner, repeating points 3 to 8 again for the wing sections.

NOTE: To avoid interference between the harrow sections there should be a minimum of 4" between the ends of each harrow bar.

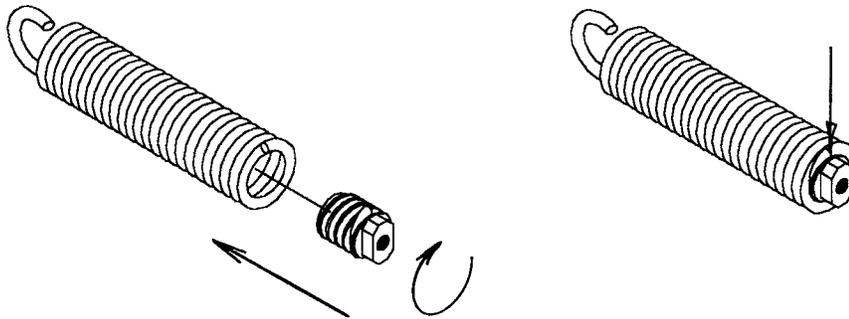
10. Ensure that all bolts are tight.

## Assembling and Mounting the Spiral Bar Rollers:

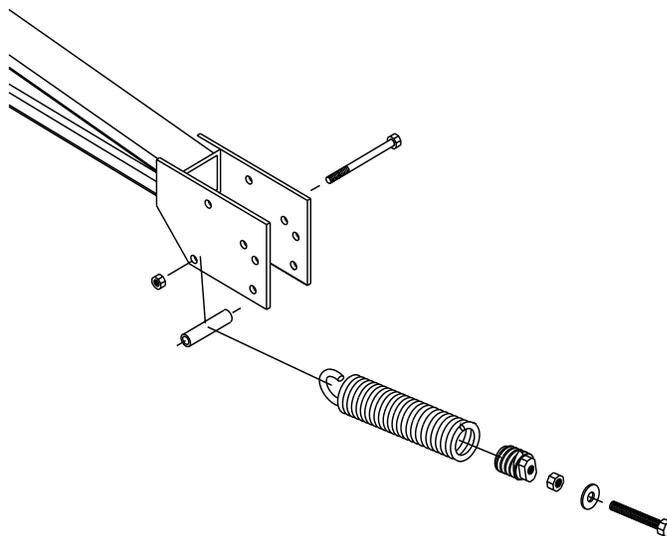
1. After completing the assembly of the drag harrow sections and all sections have been mounted to the hanger arms, start assembling the components for the rota harrows. Once again, begin with the centre section and move out to the wings.

### Springs:

2. The Harrow Arms and Spring Assemblies for the rollers are pre-assembled at the factory. However, for repair or replacement of the spring assemblies, assemble the spring insert into the open end of the spring with the wrench tab pointing outwards. Use a wrench to screw the insert down inside the spring until the stop tab at the end of the threads contacts the end coil of the spring. See diagram below:

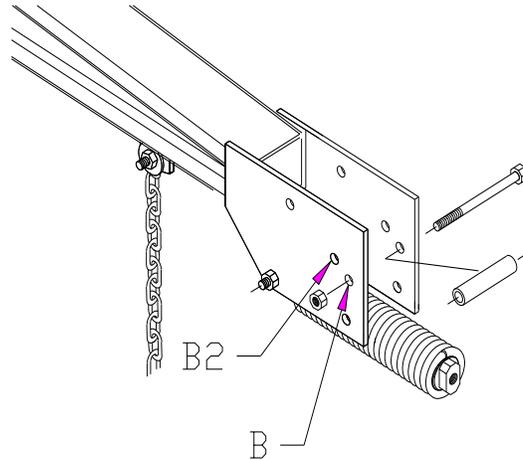


3. Mount the spring assembly into each mounting bracket by placing a wear bushing through the hook of the spring. Align the bushing with the lowest hole (A) in the mounting bracket as shown below, and secure with the 1/2" x 4-1/2" bolt and locknut provided. Leave hanging loose.



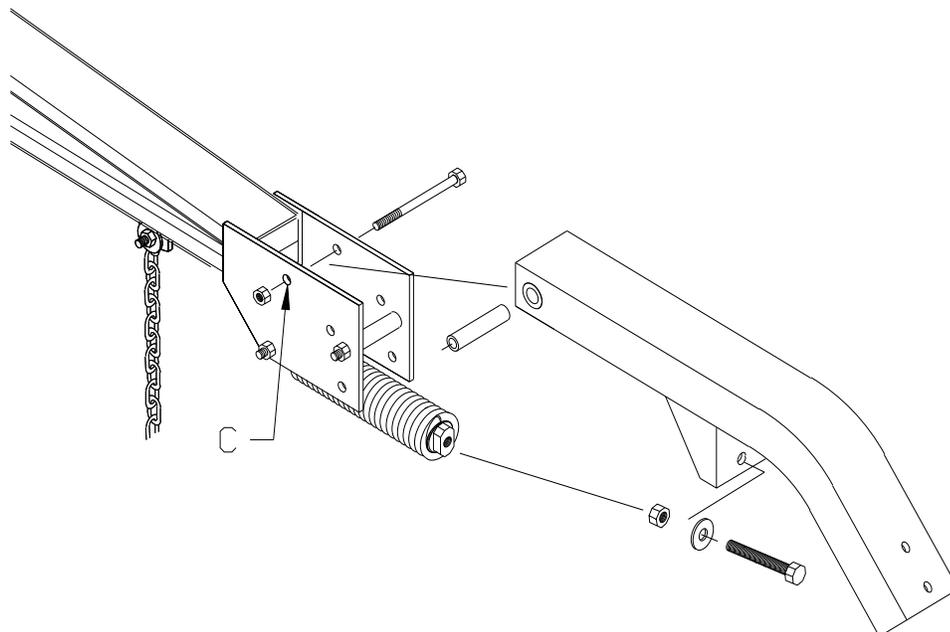
## Hanger Arms:

4. For all High Tine machines, align a wear bushing with hole (B) in the mounting bracket and secure with 1/2" x 4-1/2" bolt and locknut as shown below. This will allow the proper ground clearance for the harrow when the cultivator is raised for road transport. Hole (B2) may be used in cases where it is necessary to provide a higher transport position for the rota-harrow, or when the cultivator is equipped with Standard S-tines.



5. Insert a wear bushing into the pivot bushing of the rota-harrow hanger arms. Assemble the short hanger arms into the mounting brackets by aligning the hole in the wear bushing with hole (C) in the mounting bracket. Secure with 1/2" x 4-1/2" bolt and locknut provided.

6. Insert the 5/8" x 4" full thread spring adjustment bolt (with washer) through the hanger arms. Thread the 5/8" jamnut about 2" on to the adjustment bolt. Thread the bolt by hand into the threaded insert in the end of the spring assembly. Tighten with a socket wrench until the spring has been stretched approx 1/2" - 1", then secure the jamnut.

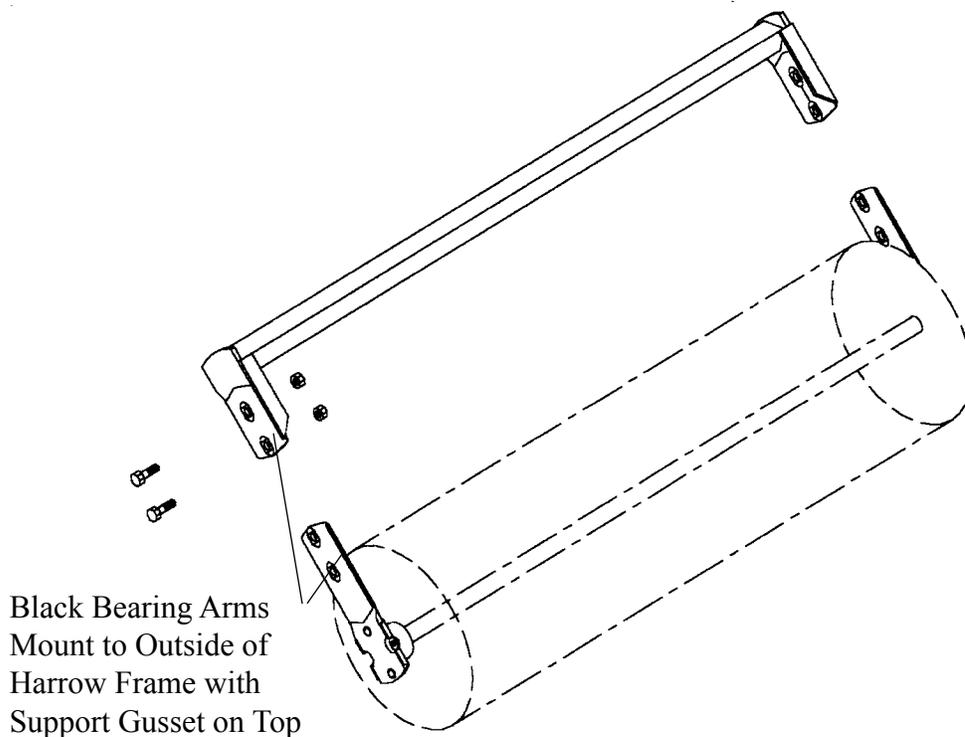
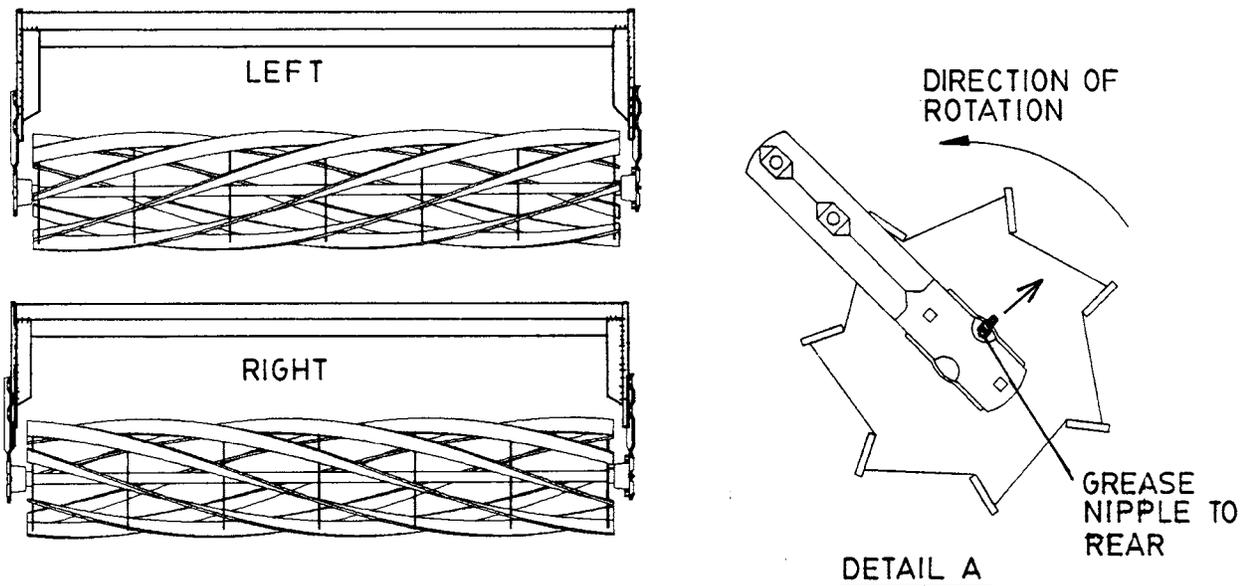


7. Ensure that all nuts and bolts are tight.

## Rollers and Assembly:

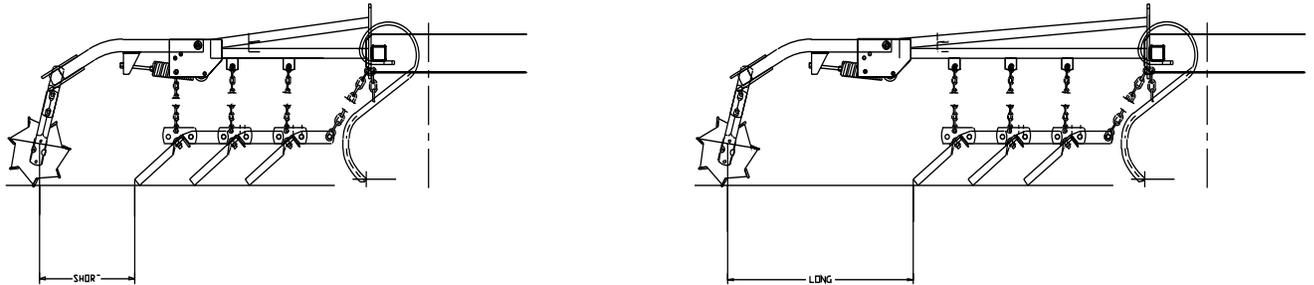
8. When assembling the Spiral Bar Rota-Harrows it is important to note that there are left and right hand rollers. These are identified by a decal on the roller assemblies. If the decal is missing the rollers can be identified by looking at them from the end. The Left rollers have the spiral bar turning to the Left and the Right roller spiral bars turn to the Right. Mount the rollers to the roller frames with the 3/8" x 1-1/2" bolts and locknuts provided. The gusset on the frames should be on top with the black bearing arms mounted to the outside of the frames. See diagram below.

**IMPORTANT NOTE:** All rollers are assembled at the factory so that the grease fittings on the roller bearings point to the rear and not in the direction of travel. See detail A below.



## Assembly of Rollers to Hangers:

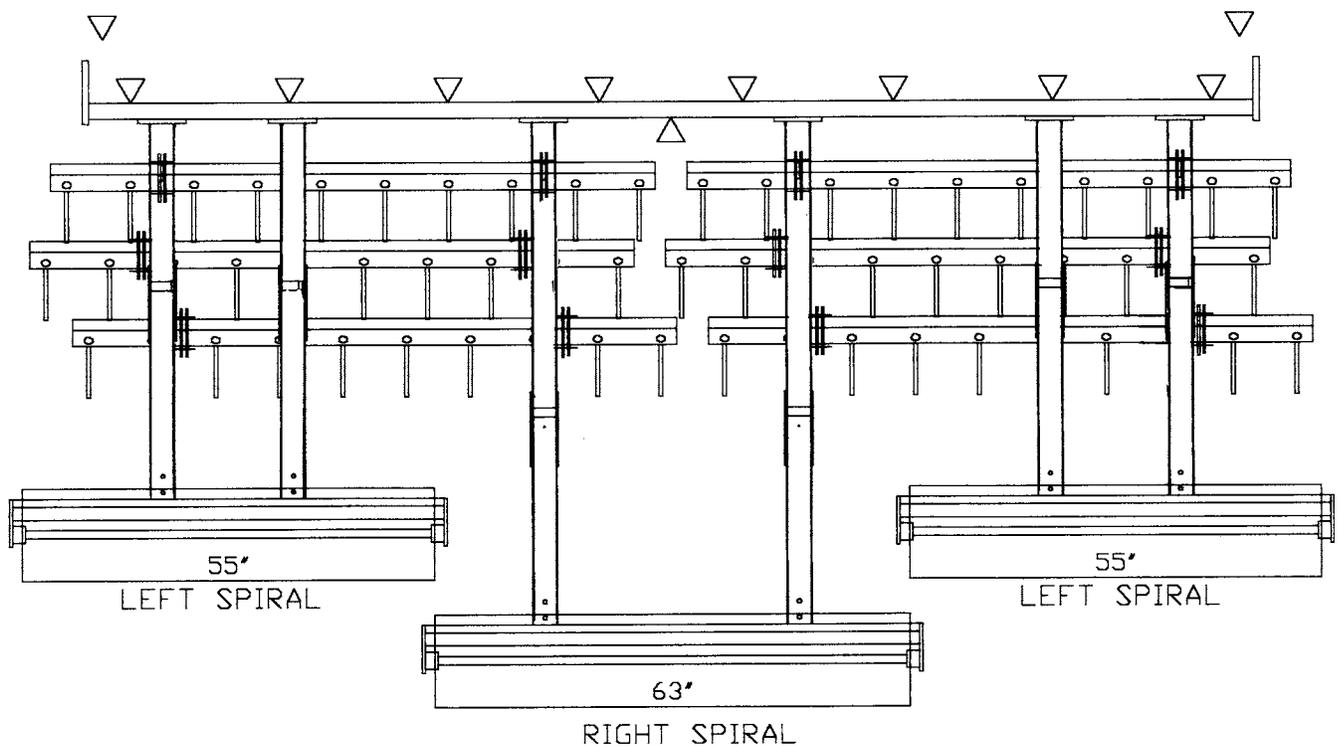
9. When assembling the rollers to the arms, the Left roller is always mounted to the front (or short) hanger arms and the Right roller is always mounted to the rear (or long) hanger arm. This insures that the soil contacting the rota harrows is moved completely in both directions to provide optimal levelling. Alternate mounting of the left and right spiral rollers will also help to minimize side draft.



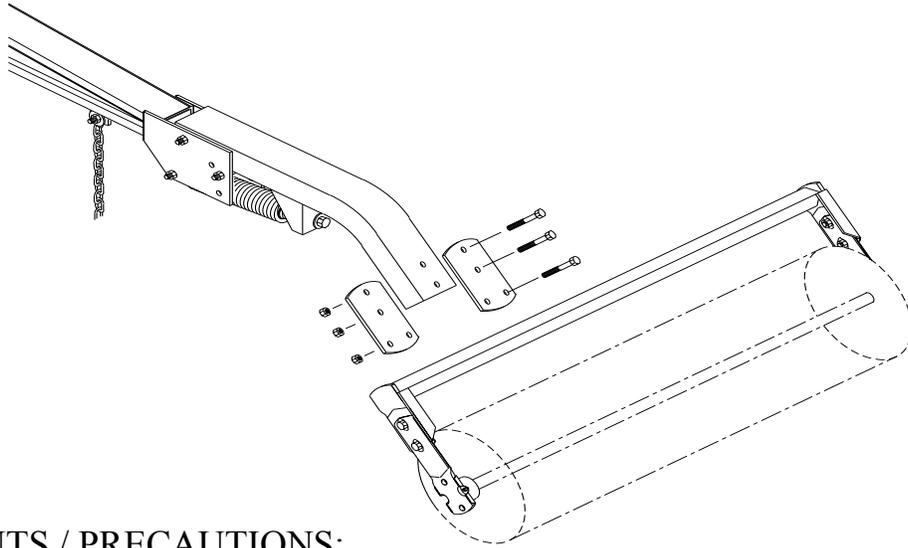
10. Move the roller assemblies into position behind each assembled section of hanger arms. Refer to the layout diagrams provided in the cultivator harrow mounting patterns booklet in order to determine the correct location for each roller section.

11. Start assembling the rollers beginning with the middle roller in the centre section and work out in both directions to the wings. See sample diagram below.

NOTE: On some harrow patterns, the centre section has only 2 rollers. In this situation the rollers must be positioned equally on either side of the centre line of the cultivator. Proper centring of the harrow sections across the back of the machine is important to make sure that the harrows have equal overlap and spacing on both sides. Proper centring of the harrows will prevent the cultivator from pulling crooked in the field.



12. Mount the rollers to the arms with the mounting plates and 1/2" x 3-1/2" bolts and locknuts provided. Be sure to butt the roller frames tight against the end of the hanger arms before tightening the locknuts. See diagram below.



### ADJUSTMENTS / PRECAUTIONS:

When the assembly of the harrows has been completed check to make sure that the complete assembly appears evenly spaced and centred across the back of the cultivator. If the harrow assembly is not centred you will have to shift the harrow sections as required. Improper centring of the rota harrows may cause the cultivator to pull crooked in the field.

Check to make sure that the 4" spacing between the drag harrow sections has been maintained. It is important to insure that the spacing between the spikes is maintained to ensure the soil surface is groomed evenly. It is also important that the drag sections have enough clearance between each other so they will not hit each other as they work and move up and down over the surface of the ground.

Check all nuts and bolts and secure if loose.

Take care when folding the cultivator for transport for the first time after completing the assembly. Check to make sure that the harrows do not interfere with other cultivator frame components when folding and unfolding.

 **DANGER!** NEVER STAND OR WORK IN THE AREA BELOW THE WINGS OR UNDER AN UNSUPPORTED CULTIVATOR FRAME.

- a) ALWAYS USE WING LOCK PINS, AND WHEEL CYLINDER TRANSPORT LOCKS.
- b) USE EXTREME CAUTION WHEN WORKING AROUND HEAVY EQUIPMENT.
- c) BLOCK THE WHEELS AND MAKE SURE THAT THE UNIT IS SUPPORTED TO PREVENT IT FROM FALLING BEFORE ATTEMPTING TO MAKE ADJUSTMENTS OR WHEN PERFORMING MAINTENANCE OPERATIONS.

## FIELD SETTINGS:

The 3 Bar Flex Drag Spike with Single Spiral Roller “Combi Harrows” were initially designed to work as a levelling harrow in high residue conditions without the adverse effects of other similar type harrows available on the market, (specifically bunching and dumping of residue).

Testing has demonstrated that in some field conditions and soil types a more aggressive working angle on the spikes has improved the breaking ability of the harrow with respect to clods and lumps. However, there may be a trade-off in that the harrow may have a reduced ability to clear residue in some field conditions. The Straight and Offset Joiner Links for the Flex-Spike Drag Harrows have been sheared with two different angles on the rear end in order to accommodate both working conditions. See assembly instructions page 4.

Pre-Assembled Harrows may be changed in the field by disassembling the offset brackets, and then flipping them over and reassembling opposite to the original offset. This modification to the linkages is time consuming but will allow you to change the harrow working angle setting should you find the original set up is not providing the desired results.

NOTE: This modification must be done to all offset linkages to allow for proper re-assembly.

### Additional Adjustments and Settings:

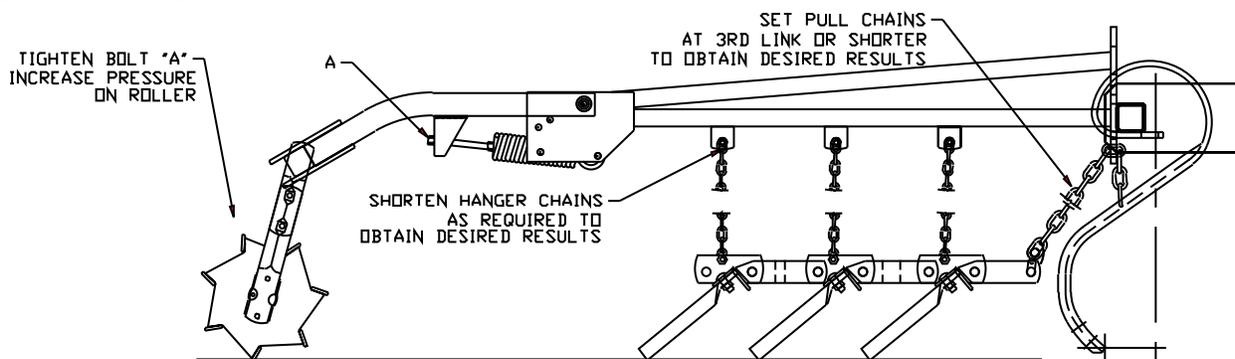
A) The pull chains for the drag harrows may be shortened in order to raise the front bar and therefore increase the working angle of the spikes. This will make the harrow more aggressive but may reduce the ability of the harrow to clear residue in some conditions. This setting will vary depending on working conditions. (See Note D).

Initially, the 3rd chain link should be inserted thru the slot in the draw bracket and secured with the lynch pin.

B) The transport chains may be shortened to reduce the working depth of the harrow. This will also change the working angle of the spikes slightly and the soil will take on a “groomed” appearance. Shortening the chains will also reduce the weight or pressure of the drag harrow on the soil surface that is needed for levelling.

Some experimentation with the settings A and B above, will be required to obtain the best results for your field conditions.

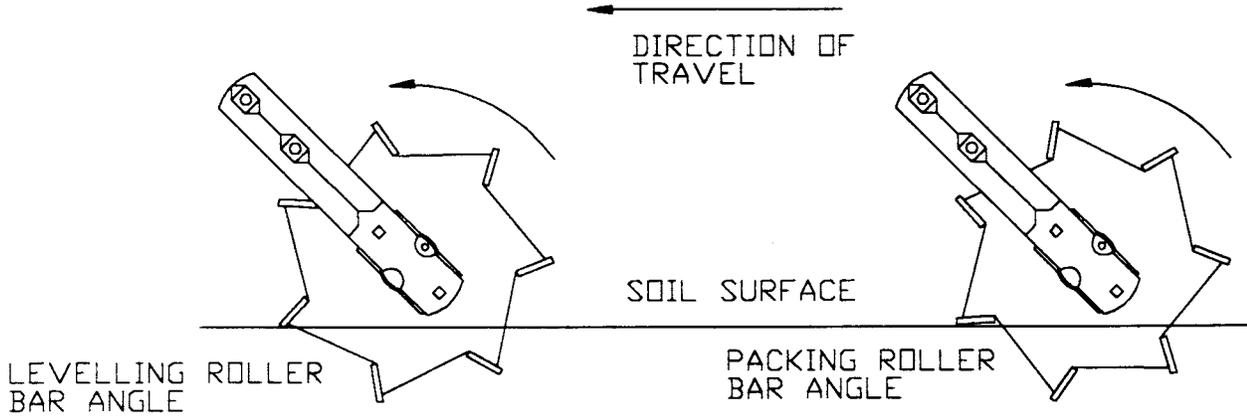
C) The down pressure on the rollers can be increased or decreased by loosening the jamnut and turning the spring adjustment bolt with a socket wrench. Adjust the down pressure on the rollers as required to firm the soil, break lumps and obtain an even granular soil surface. Secure the jamnut to prevent the adjustment bolt from working loose.



D) NOTE: There are many factors that can affect the ability of the harrows to level or even out the soil surface behind the cultivator; Cultivator tine spacing, type of shares (sweeps), cultivating depth, ground speed, direction of travel across the field (angle), soil type, and soil conditions like moisture content and crop residue levels, all have an affect on the quality and levelness of the seed bed. Therefore, do not expect the same settings to work in every case. Be prepared to adapt and adjust your equipment and operating practices to obtain the best results for each field condition.

E) Spiral bar rollers can be run as a levelling and crumbling roller, or as a packing and firming roller. When assembled in the frames as described earlier in this manual, the rollers are set up to run as a levelling and crumbling roller.

To set as a packing and firming roller, the rollers can be turned end for end in the frames. This will alter the angle at which the spiral bars enter the soil and hence act as a packing roller. If you change the rollers to operate in this way, it is important to remember to change the bearing arms so that the grease fitting is pointing to the rear, away from the direction of travel. See diagram below.



## MAINTENANCE:

- A) Periodically check all nuts and bolts and secure if loose.
- B) Lubricate the G-bearings after every 12 hours of operation. **DO NOT OVER GREASE THE G-BEARING:** Over greasing may cause damage to the bearing seals.
- C) Periodically check and remove any foreign material that may become tangled in the harrow sections or wound around the rollers or bearings. Remove any objects (ie: stones) that have become trapped in the rollers.
- D) Always check the condition of your field cultivator and levelling attachments at regular intervals and keep in good repair. Optimal performance cannot be expected of equipment in poor condition.

## INSTALLATION ON OTHER CULTIVATORS

Combi Harrows are also available in modular sections for adaptation to other tillage machines. An optional OEM Mounting Kit provides for easy installation on most field cultivators with tubular frames. See dealer for details or refer to the Combi Harrow - OEM Mounting Kit supplement: EDP #03-150-119.

