OPERATOR'S MANUAL

WIL-RICH 7700 ROW CROP CULTIVATOR

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TO THE OWNER

It is the responsibility of the user to read the Operator's Manual and comply with the safe and correct operation procedures as pertains to the operation of the product and to lubricate and maintain the product according to the information outlined in the Operator's Manual.

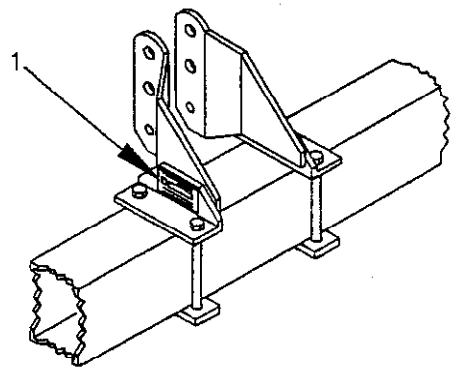
The user is responsible for inspecting his machine, and for having parts repaired or replaced when continued use of the product would cause damage or excessive wear to the other parts.

The word NOTE is used to convey information that is out of context with the manual text; special information such as specifications, techniques, reference information, and other information of supplementary nature.

When in need of parts, always specify the model and serial numbers, including prefix and suffix letters. Write these numbers in the spaces provided. The serial number plate is located on the left mast assembly. (See Item 1)

MODEL NUMBER _____

SERIAL NUMBER _____



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MODIFICATIONS

IT IS THE POLICY OF WIL-RICH OPERATIONS TO IMPROVE ITS PRODUCTS WHENEVER POSSIBLE AND PRACTICAL TO DO SO. WE RESERVE THE RIGHT TO MAKE CHANGES, IMPROVEMENTS, AND MODIFICATIONS AT ANY TIME WITHOUT INCURRING THE OBLIGATION TO MAKE SUCH CHANGES, IMPROVEMENTS, OR MODIFICATION ON ANY EQUIPMENT SOLD PREVIOUSLY.

SEE SAFETY EQUIPMENT PAGE 58

BEFORE OPERATING

Use extreme care when making adjustments.

When hitching the cultivator to the tractor, do not allow anyone to get between the tractor and the cultivator.

When hitching or unhitching, come from behind the cultivator to get the hitch pins.

When lubricating or working on the cultivator, make sure it is resting on the ground. If it is in a raised position, the cultivator should have proper supports under the tool bar to prevent the machine from falling.

After servicing, make sure all tools, parts, and servicing equipment has been removed from the cultivator.

Make sure that there is no one near the machine just before operating and during operation.

DURING OPERATION

Reduce speed when cornering on field ends and when operating on or across dead furrows.

Do not attempt to remove any obstruction while the cultivator is in motion.

Use extreme care when operating close to ditches, fences, or on hillsides.

No one other than the operator should ride on the tractor.

Before and during operation be sure no one is on or around the implement. Serious injury can result from improper use.

Always seat the parking stand(s) on a firm surface before unhitching the implement from the tractor.

Use safe operating practices at all times.

Hydraulic fluid escaping under pressure can have enough force to penetrate the skin. Hydraulic fluid may also infect a minor cut or opening in the skin. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately. Make sure all connections are tight and that hoses and lines are in good condition before applying pressure to the system. Relieve pressure before disconnecting the lines or performing other work on the hydraulic system. To find a leak under pressure use a small piece of cardboard or wood. Never use hands.

ON-HIGHWAY OPERATION

Be sure that all safety lights and/or reflectors are wiped clean before transporting.

Always place the machine in the transport position.

Comply with your state and local laws governing highway safety when moving machinery on a highway.

Reduce road speed on corners.

Drive at a reasonable speed to maintain complete control of the machine at all times.

A S.M.V. emblem should be used at all times while traveling on public roads.

THIS SYMBOL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS CONCERNING YOUR PERSONAL SAFETY. BE SURE TO OBSERVE AND FOLLOW THESE INSTRUCTIONS.

GENERAL INTRODUCTION

DANISH TINE - GENERAL

The Danish Tooth Row Crop Cultivator is designed for use with any row crop with spacings from 20 to 40 inches. The cultivator is equipped with 5 danish type tines per center gang.

NOTE: TO THE OPERATOR - PROPER FIELD SPEEDS ARE VITAL TO THE EFFICIENT OPERATION OF THIS DANISH TINE MACHINE. THIS CULTIVATOR IS DESIGNED FOR HIGH SPEED CULTIVATION (6 TO 8 MPH). A MINIMUM FIELD SPEED OF 4 MPH IS RECOMMENDED. THIS WILL ALLOW GREATER FIELD EFFICIENCY AND BETTER WEED ELIMINATION IN NEARLY ALL CONDITIONS.

A wide range of shovels are available for your Danish Tine Row Crop Cultivator.

The heavy duty reversible point will allow high speed cultivation with optimum soil shattering for weed destruction with minimum ridging.

The 2-1/2" shovel is best for medium row spacings at speeds slightly slower than those used with points.

The 4" shovels are recommended for medium to wide row spacings and operation at slightly shallower depths.

The 7" shovels are well suited to wide rows with operation at depths of 2" to 2-1/2". Satisfactory operation can be attained at slower speeds (4 to 5 MPH) with this shovel.

The operator will soon realize what is best suited to his operation and soil type. Quite often a combination of shovel widths is desirable.

C-SHANK - GENERAL

The Spring Loaded Shank Row Crop Cultivator is designed for use in any row crop with row spacings from 30 to 40 inches. The cultivator is designed to combine the advantages of a vibrating shank with full coverage sweeps. The cultivators are available with 3 shanks per gang for 30 inch row spacings and 5 shanks per gang for 32 to 40 inch row spacings.

Sweeps are available for the spring loaded shank in 4", 7", 9" and 7" and 9" half sweeps for various soil types and ground conditions. See your dealer for his recommendation in your area.

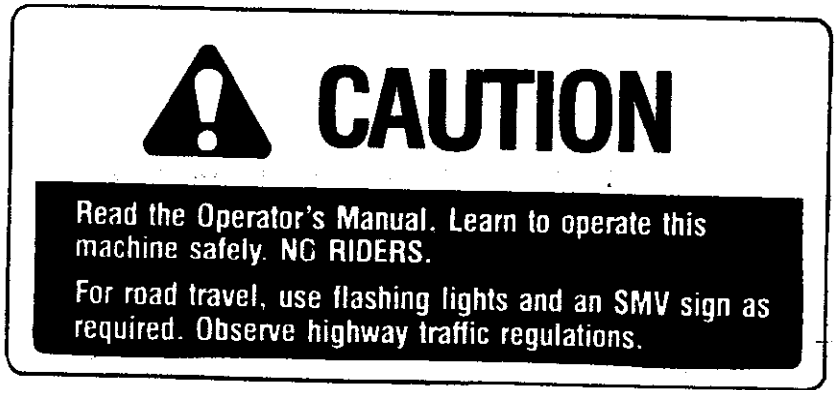
WRO-TILL - GENERAL

This versatile cultivator is an extremely rugged, heavy duty, high clearance machine designed for continuous service in very "tough" soil and crop residue conditions.

Its double "H-link" parallel linkage allows the gang to follow the ground contour while maintaining precise lateral control.

It is ballasted and is available with tool bar weight transfer springs to assure penetration in most hard soil conditions.

The gangs simple adjustment, rugged construction, tracking stability, controlled depth, trash clearance and aggressive but controlled soil handling makes it a high speed precision cultivator for virtually all conditions from conventional-till to no-till.



The working components of the cultivator are:

1. A single wide flat sweep with a friction trip mounting.

2. A crank adjustable coulter consisting of an 18" coulter to cut the residue ahead of the sweep and stabilize the gang over the row and two 12" diameter, 3" wide depth bands to gauge the depth of the gang.

3. Heavy duty twin tapered roller bearing equipped 14" diameter disk hillers, mounted on 1-1/2" diameter high carbon steel standards.

Gangs can be used for row spacing from 28" to 40" simply by the positioning of the fully adjustable disk hillers and the use of the appropriate sweep.

Both the disk hillers and sweep can be mounted at any of the many possible gang mounting positions. This allows the farmer to custom design his own particular arrangement to fit his needs or to quickly rearrange it if his needs change.

The gauge coulter is adjusted for depth by a quick turn of the crank. The disk hillers are fully adjustable for position, depth and cutting aggressiveness. The sweep is adjustable for depth, pitch and trip pressure.

The cultivator will most often be used with the optional tent shield to protect the young crop during high speed cultivation. The tent shield is a closed or "tent type" that is fully adjustable and positionable. It has a rugged parallel linkage for stability and strength.

OPERATING THE WRO-TILL CULTIVATOR

Best results are obtained at speeds of 4 to 6 miles per hour.

The power requirement is approx. 10 to 15 horsepower per row.

In normal conditions, the cultivator is held in the ground by having the point of the sweeps about 1" lower than the backs of the sweeps.

When cultivating under normal conditions, set the stop on the tractors lift arms so that the gang "H-links" are level on the pull.

The hydraulic-control lever for the tractors 3-point hitch should be backstopped so the lever can easily be brought to the same position each time.

With the front of the "H-links" 1" lower than the rear, the cultivator will stay in the ground better when operating in very hard or wet soil conditions. In varying conditions the tool bar may be raised or lowered to control the penetration of the cultivator.

In extremely heavy trash conditions, it may be necessary to lower the tool bar to increase pressure on the gauge coulter to achieve greater penetration and allow the coulter to cut through the residue.

IMPORTANT WRO-TILL CULTIVATOR OPERATING REMINDERS

Sucking Action: In setting the sweeps, the point of each sweep should be set 1" lower than the back part of the sweep. This provides the sucking action which keeps the cultivator in the ground.

IMPORTANT WRO-TILL CULTIVATOR OPERATING REMINDERS (CONT'D)

Guidelines: The settings and measurements discussed in this manual are average settings and are offered only as guidelines in setting your own machine. Of course, under various conditions you will want to vary these settings to better suit your specific needs.

When operating the cultivator, make sure the gauge coulters are completely out of the ground before beginning a turn. If the cultivator is not raised high enough to bring the gauge coulters completely out of the ground, the turn may force the gauge coulters to twist out of alignment.

CULTIVATOR PREPARATION

Before using the Wil-Rich cultivator, a careful inspection should become routine. A check should be made to insure that all hardware is securely tightened and moving parts properly lubricated.

Tighten all loose nuts and bolts and replace any bent or broken parts.

When tightening bolts, they should be torqued to the proper number of foot-pounds as indicated in the table unless specified otherwise. It is important that all bolts be kept tight. On new machines, all nuts and bolts should be rechecked after a few hours of operation.

BOLT DIA		3/8	1/2	5/8	3/4	7/8	1
HEX HEAD		9/16	3/4	15/16	1-1/8	1-5/16	1-1/2
UNC	GRADE 2	18	45	89	160	252	320
	GRADE 5	30	68	140	240	360	544
	GRADE 8	40	100	196	340	528	792
UNF	GRADE 2	21	51	102	178	272	368
	GRADE 5	32	70	168	264	392	572
	GRADE 8	48	112	216	368	792	840

TORQUE IN FOOT POUNDS

When replacing a bolt, use only a bolt of the same grade or higher.

Bolts with no markings and all u-bolts are grade 2.

Grade 5 bolts furnished with the machine are identified by three radial lines on the head.

Grade 8 bolts furnished with the machine are identified by six radial lines on the head.

TIRE INFLATION

The use of the proper air pressure is the most important factor in satisfactory performance and maintenance of implement tires. Underinflation will damage the cord body of the tire and cause a series of diagonal breaks in the fabric in the sidewall area..

If the tire buckles or wrinkles, the air pressure should be increased to the point where the sidewalls remain smooth while operating.

Check the air pressure every two to three weeks and do not allow the pressure to drop below the recommended pressure.

NOTE: DO NOT OVERINFLATE TIRES.

WHEEL BOLTS

It is recommended that all wheel bolts be checked for tightness before using and again after one day of use. Paint or rust can work out causing the wheel to become loose. Check periodically to be sure the wheel bolts remain tight.

BEARING ASSEMBLIES

Bearing assemblies should be checked periodically for looseness. A loose bearing will cause costly damage after a short period of time.

LUBRICATION

Make sure the cultivator is properly lubricated. (See Maintenance, page 59)

HYDRAULICS

Check wing folding linkages and cylinders for proper alignment and operation. On new machines, check that the hydraulic system has been properly charged and purged. (See Hydraulics, page 27)

TRACTOR PREPARATION

The distance between the centers of the rear tractor wheels should be twice the row width on all machines. Wide front adjustable wheels should be set accordingly.

Most late model tractors have some adjustment on the hydraulic lift rods to allow the lift arms to operate independently. This adjustment should be made to enable the cultivator to follow rough terrain better. This adjustment is usually an adjustable collar on the lift rod, a pin in an elongated hole to turn, a pin to remove, or some other adjustment to allow the lift arms some independent vertical movement. (See your tractor Operator's Manual for more details)

Some tractors should be equipped with additional front weight for easier and safer operation. The front end of the tractor should not be allowed to bounce when turning at the end of a row nor rear-up when starting out on the road.

HITCHING TO THE TRACTOR

The cultivator is hitched rigid to the tractor.

The tractor hitch should be set to lock out sway, when raised for transport. When operating, the tractor hitch should be set to allow side to side movement. Stabilizer bars, wedge plates, and other stabilizing units on the tractor should be positioned so the hitch linkage allows the freedom to follow sharp curves with out applying side forces to the gangs.

(See your tractor Operators Manual for more details)

Adjust the bypass of the tractor hydraulic lift as a precaution against the cultivator dropping too fast. Raise and lower the cultivator until the proper adjustment is made. (See your tractor Operator's Manual for more details)

By using a combination of the hitch pin and bushings, the Wil-Rich Row Crop cultivators will hitch to a category II or III quick-hitch or 3-point. (See Mast Assembly, Page 23)

Refer to your tractor Operator's Manual for exact hitching procedures.

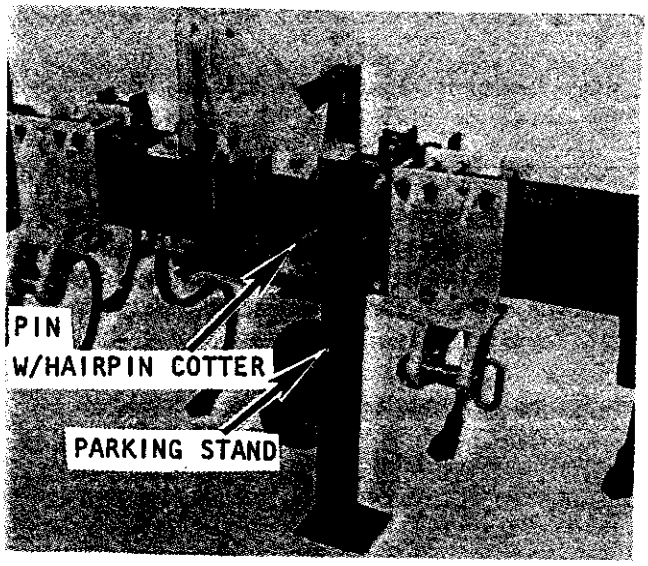
LEVELING THE CULTIVATOR

Level the cultivator so the gangs are parallel to the ground when the cultivator is at working depth. Use the top adjustment on the 3-point hitch of the tractor to level the cultivator front to rear. Adjust the tractor's lift arms so they are the same length to level the cultivator side to side.

TRANSPORTING OR STORING

A S.M.V. emblem should be used at all times while traveling on public roads.

Lower the parking stand and secure with the stand pin provided when parking or storing the cultivator. Use the lower hole in the stand for flat-fold bars. Use either hole for straight bars.



NOTE: ALWAYS SEAT THE STAND ON A FIRM SURFACE BEFORE UNHITCHING THE IMPLEMENT FROM THE TRACTOR.

NOTE: NEVER STORE MACHINE WITH WINGS IN RAISED POSITION.

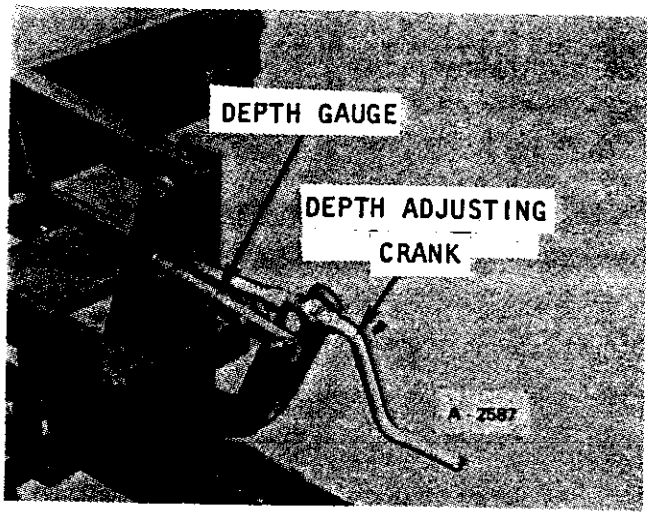
NOTE: ALWAYS SECURE THE PARKING STAND IN "UP" POSITION FOR FIELD USE.

⚠ CAUTION

To prevent personal injury ALWAYS lower folding wings to field working position and lower stand before disconnecting cultivator from tractor.

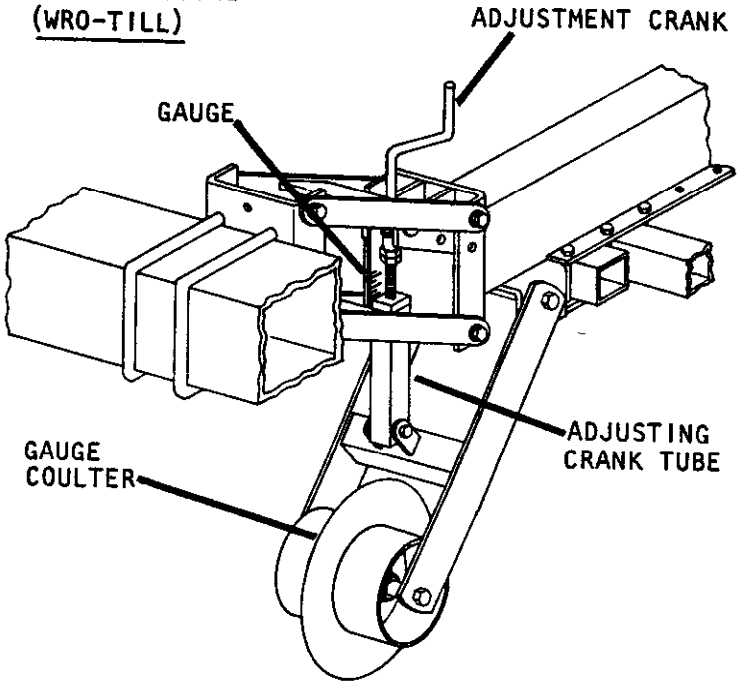
DEPTH SETTING

(C-SHANK & DANISH TINE)



Working depth is adjusted by raising or lowering the gang gauge wheels. Turn the adjusting crank until the desired depth is reached. Use the depth gauge to get equal depth settings on gangs. The gauge is calibrated in inches of tooth penetration. This will, however, vary with ground conditions and the type of points or shovels used.

DEPTH SETTING
(WRO-TILL)



Working depth is adjusted by raising or lowering the gang gauge coulter. Turn the adjusting crank until the desired depth is reached.

The gauge on the crank is provided for quick comparison between gangs. Read the mark aligned with the top of the adjusting crank tube. Never extend the crank to the point where it runs out of threads and comes out of the adjusting crank tube. This is approximately to the end of the gauge.

GAUGE COULTER

In operation the gauge coulter depth bands run on the ground and coulter blade is penetrating 3" into the soil. This penetration stabilizes the cultivator over the row and cuts the residue ahead of the sweep shank.

The gauge coulter and scrapers need very little, if any, adjustment. The scrapers running against the coulter are spring loaded to maintain position with wear. The coulter must be kept clean to allow penetration.

The scrapers come assembled from the factory. If disassembled:

1. The bolts and lock nuts holding the coulter scraper to the band scraper should be as tight as possible, but still allow the springs to keep the scrapers tensioned against the disk.

2. The scraper running against the depth bands has slots for adjustment with wear. It should be positioned to run as close to the depth bands as possible without actually touching them.

SEE ASSEMBLY & PARTS PAGE
FOR REFERENCE, PAGES 40-49

NOTE: THE RELATIVE DEPTHS OF THE SWEEP, DISK HILLERS AND GAUGE COULTER CAN ALSO BE ADJUSTED BY ADJUSTING THE LENGTH OF THE TOP LINKAGE BAR OF THE TRACTORS 3-POINT HITCH. THIS WILL CHANGE ALL OF THE GANGS AT ONCE. THE GANG DOES NOT NEED TO RUN LEVEL FRONT TO REAR.

DISK HILLER

The depth of the disk hillers can be adjusted independently by loosening the two u-bolts holding the disk hiller shank to its clamp and sliding the shank up or down on the clamp. Avoid this adjustment as much as possible because it will be necessary to reset the cutting angle of the disk hillers each time.

SWEEPS

The depth of the sweep can be adjusted independently by loosening the four bolts on the sweep shank clamp and sliding the shank up or down in the clamp as desired. The top of the shank must never be below the top bolts of the mounting clamp.

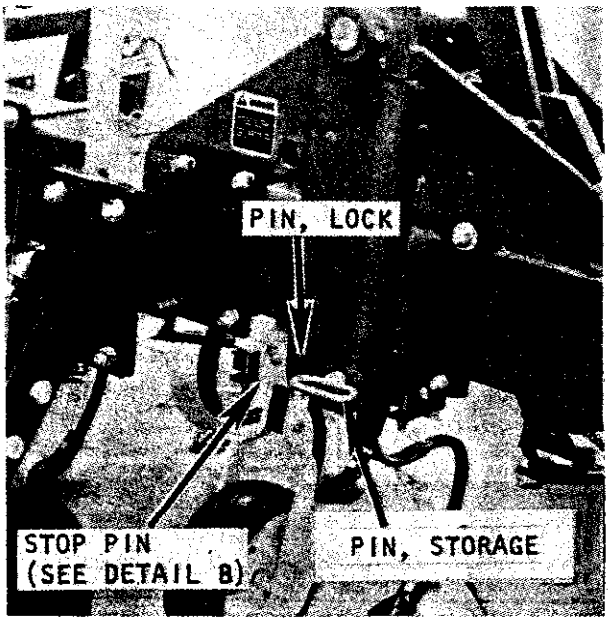
14" sweeps are standard on narrow-row machines (30"), while 20" sweeps are standard on wider row machines (36" 38" 40"). Other sizes of sweeps are available if desired.

NOTE: WHEN CULTIVATING IN CONDITIONS WHERE THE TRASH IS BURIED THE SWEEP SHOULD RUN DEEP ENOUGH TO GO UNDER THE TRASH RATHER THAN THROUGH THE TRASH. THIS WILL KEEP THE TRASH FROM BALLING UP.

WING SETTING

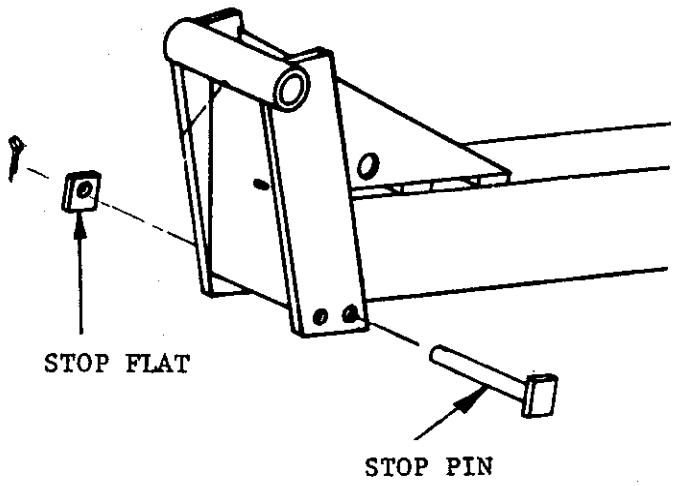
The flat-fold tool bar is designed for use as either a rigid bar or a flexible bar. The bar is pinned solid at the hinges to work as a rigid bar. When used as a flexible bar there is five degrees of float allowed at the hinge.

OPERATING THE FLAT-FOLD TOOL BAR - RIGID



Insert and secure the pin with the click pin for rigid cultivating.

NOTE: BEFORE ATTEMPTING TO FOLD FOR STORAGE OR TRANSPORTING BE SURE THAT THE PIN IN EACH WING HAS BEEN PLACED IN THE STORAGE POSITION.



DETAIL B

The stop pin and flat are used to align the center and wing tool bars to ease pinning for rigid cultivating.

WARNING

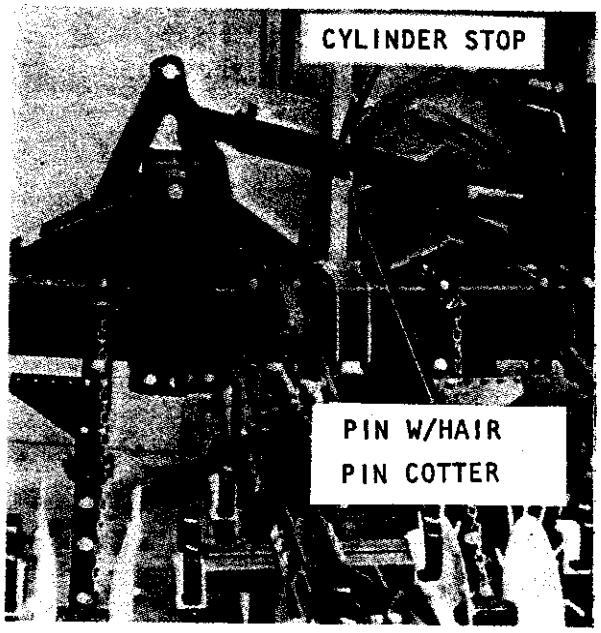
Everyone stand clear of implement when folding or unfolding wings.

Before transporting or removing wing lift cylinders with wings folded — lock wings with pins.

WARNING

DO NOT use hydraulic cylinders until all trapped air has been removed from the system.

OPERATING THE FLAT-FOLD TOOL BAR - FLEXIBLE



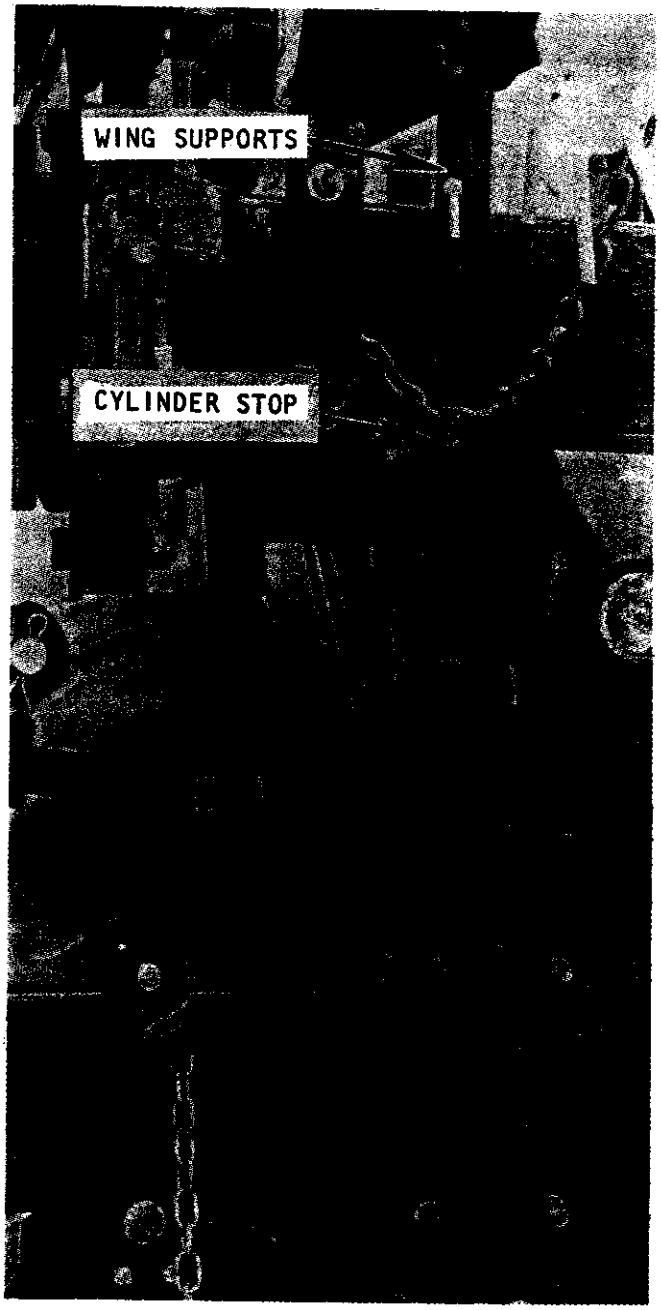
Remove the locking and stop pins as shown for cultivating in the flexible position.

Fully extend the hydraulic cylinders and install the cylinder stops.

NOTE: THE CYLINDER STOPS PROVIDED WITH YOUR IMPLEMENT MAY DIFFER IN APPEARANCE FROM THE ONE SHOWN IN THIS ILLUSTRATION, BUT ARE FUNCTIONALLY THE SAME.

NOTE: WHEN MAKING TURNS IN THE FIELD, ACTUATE THE WING LIFT CYLINDERS UNTIL THE CYLINDER STOPS RESTRICT FURTHER FOLDING. THIS WILL GIVE ADEQUATE WING CLEARANCE FOR MAKING TURNS IN THE FIELD.

NOTE: BEFORE ATTEMPTING TO FOLD FOR STORAGE OR TRANSPORT BE SURE AND REMOVE AND STORE THE CYLINDER STOPS. ATTACH THE CYLINDER STOPS TO THE WING SUPPORTS.



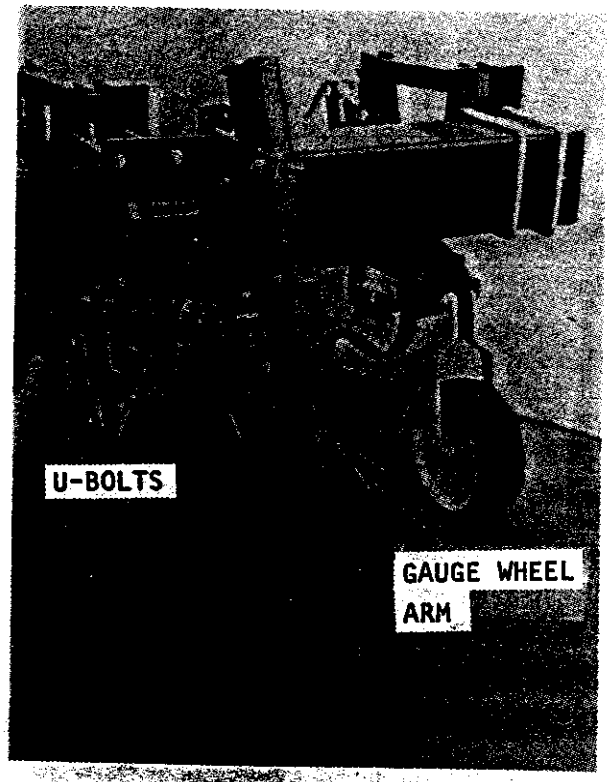
NOTE: STAND CLEAR OF THE MACHINE WHEN IT IS BEING FOLDED TO OR FROM THE TRANSPORT POSITION.

GAUGE WHEELS

FLAT-FOLD MODELS
(STANDARD EQUIPMENT)

Adjust the gauge wheels to a desired height by loosening the u-bolts and sliding the gauge wheel arm up or down.

The u-bolts will have to be loosened prior to adjusting and must be tightened after the adjustment is made.

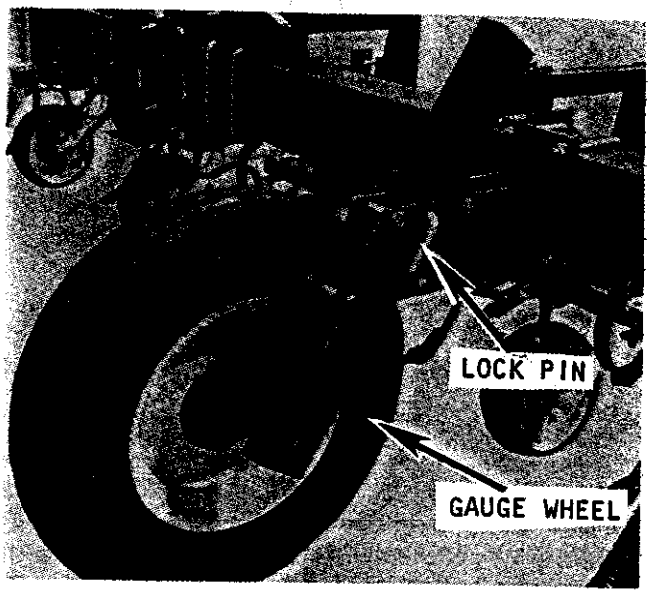


⚠ CAUTION

Gauge Wheel will not always clear tractor cabs when cultivator is folded. Use caution when selecting a mounting location.

NON-FOLD MODELS
(OPTIONAL EQUIPMENT)

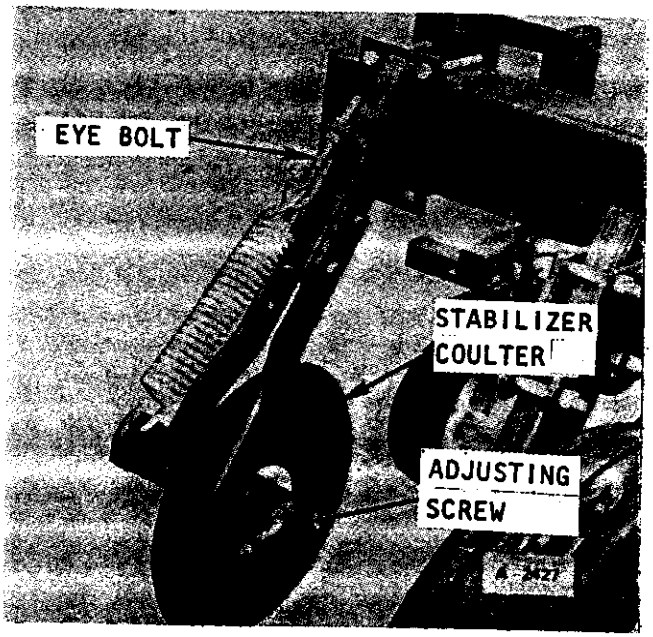
The optional gauge wheels may be raised or lowered by removing the lock pin and sliding the unit up or down as desired. The u-bolts will have to be loosened prior to adjusting and must be tightened after the adjustment is made.



STABILIZER COULTER

The stabilizer coulter (danish tine and C-shank only) may be raised or lowered as desired by increasing or decreasing the spring tension with the eye bolt.

Position the coulter with the adjusting screw shown to limit or control any "sway" or "draft" motion as may be encountered in various field conditions.

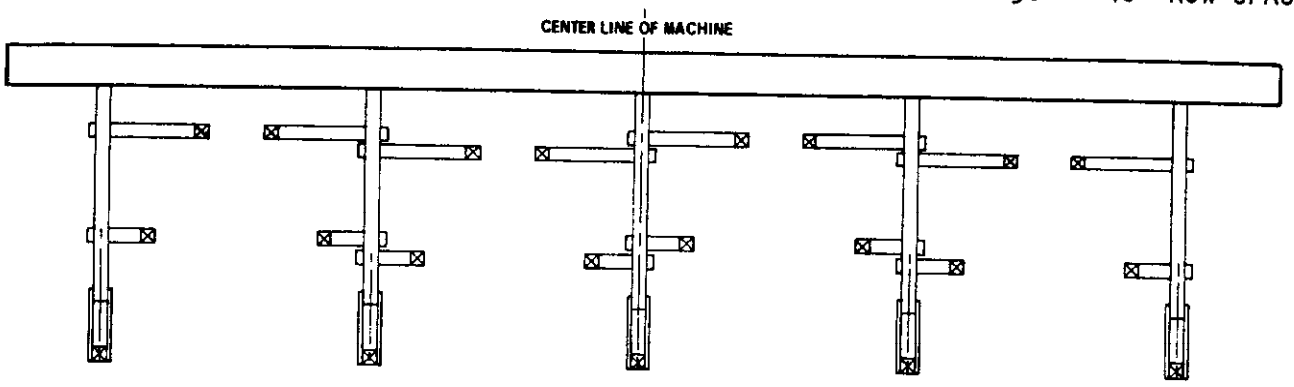


ROW SPACING DETAILS

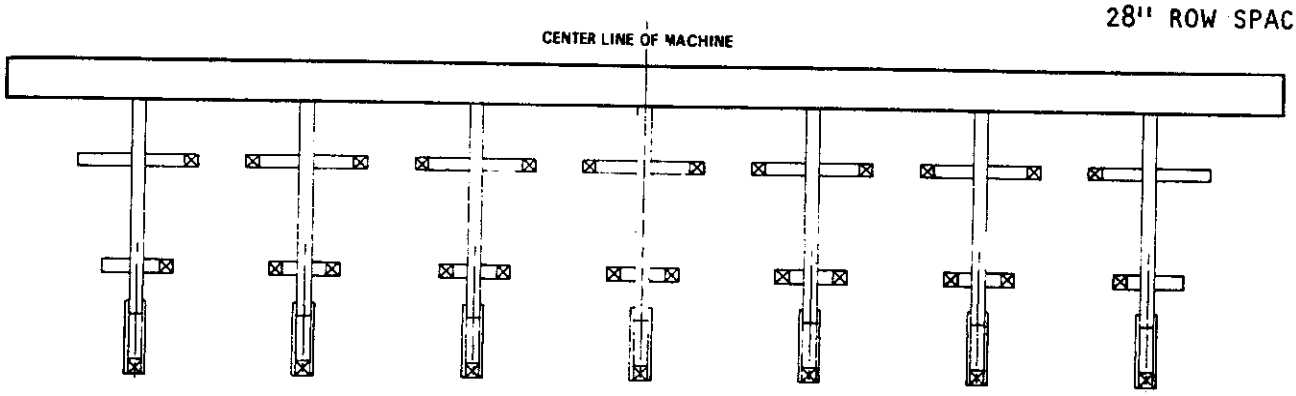
DANISH TINE

The shovel spacing on these illustrations will vary depending on the size of shovels used and if rolling shields are used. Adjust the shovel spacings to fit application.

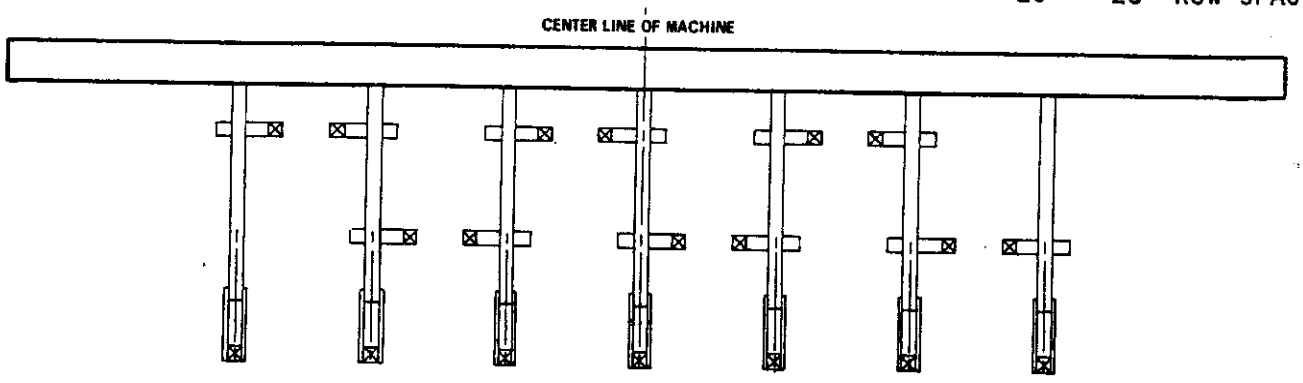
30" - 40" ROW SPACING



28" ROW SPACING

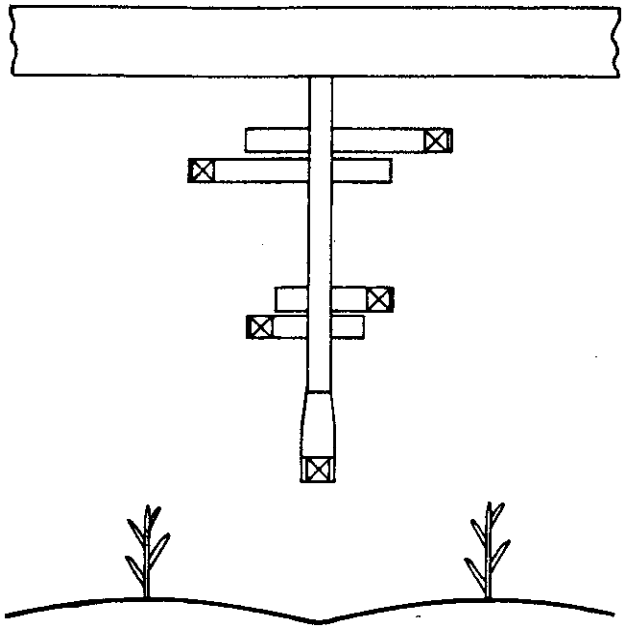


20" - 26" ROW SPACING

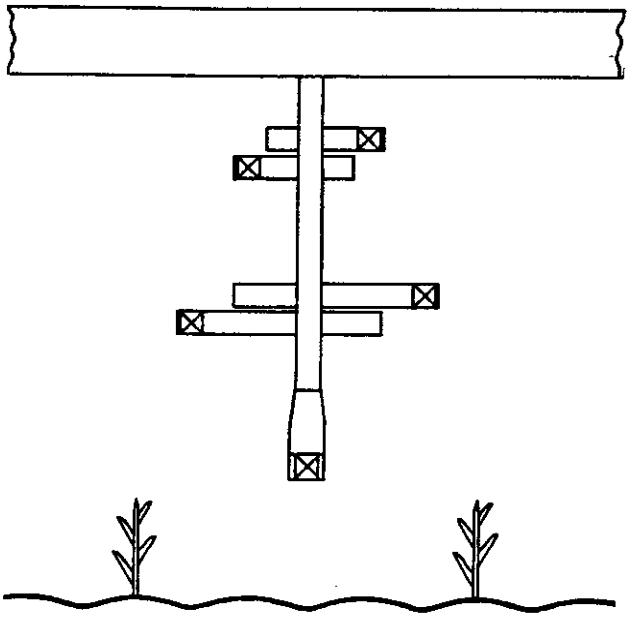


DANISH TINE ALTERNATE TOOTH ARRANGEMENT

Arrange the tooth bars and teeth to level (optional) or ridge the soil as may be desired for your particular application.



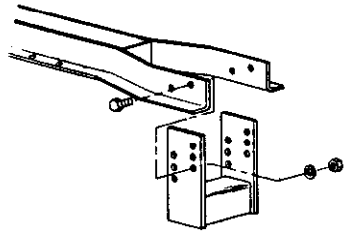
CONVENTIONAL



OPTIONAL

DANISH TINE ALTERNATE REAR TOOTH BAR ADJUSTMENT

Lower the rear tooth bar when additional ridging between the rows is desirable.

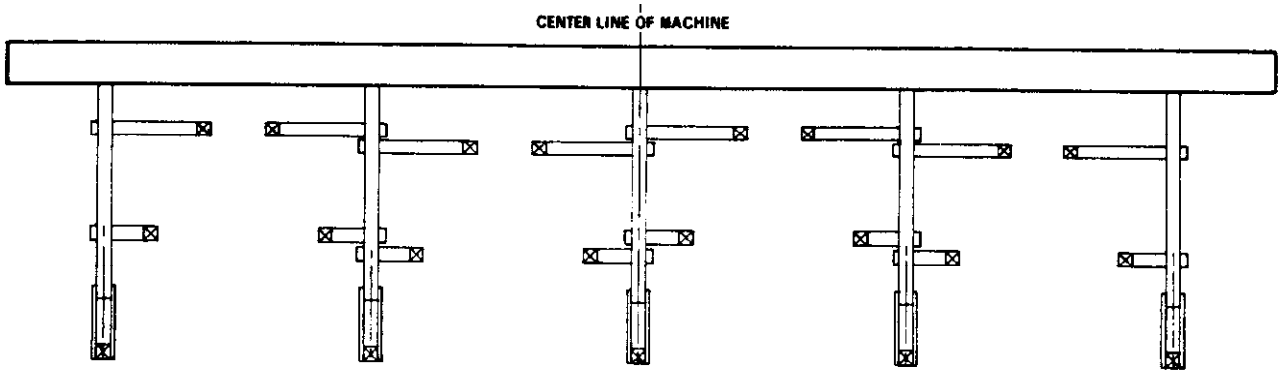


ROW SPACING DETAILS

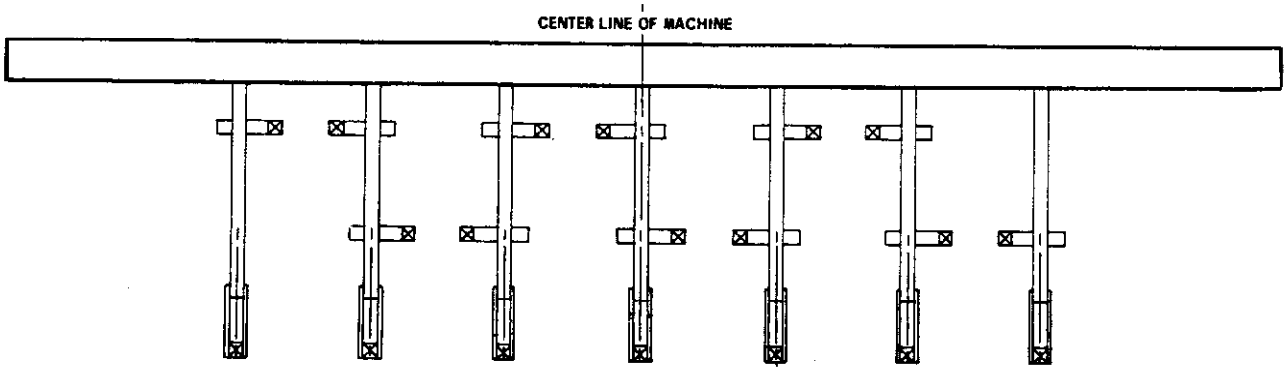
C-SHANK

The shovel spacing on these illustrations will vary depending on the size of shovels used and if rolling shields are used. Adjust the shovel spacings to fit application.

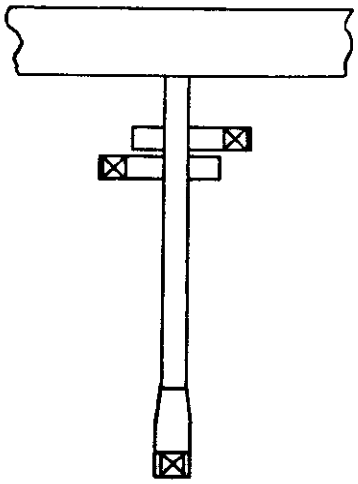
32" - 40" ROW SPACING



30" ROW SPACING

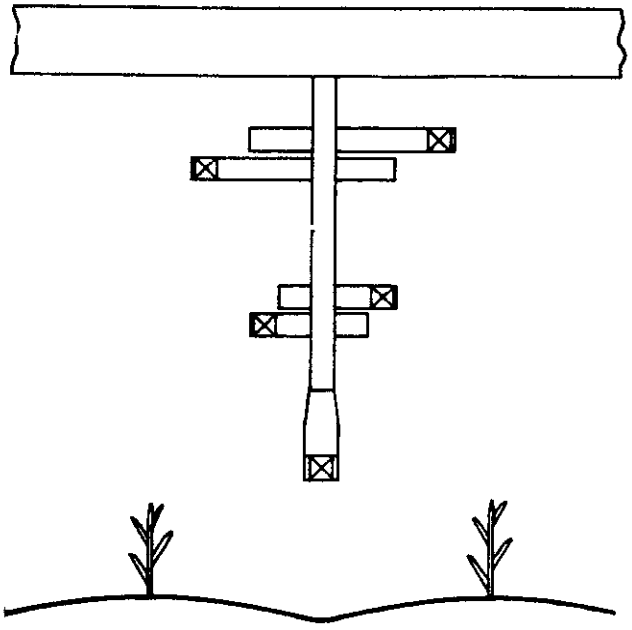


ALTERNATE 30" ROW SPACING

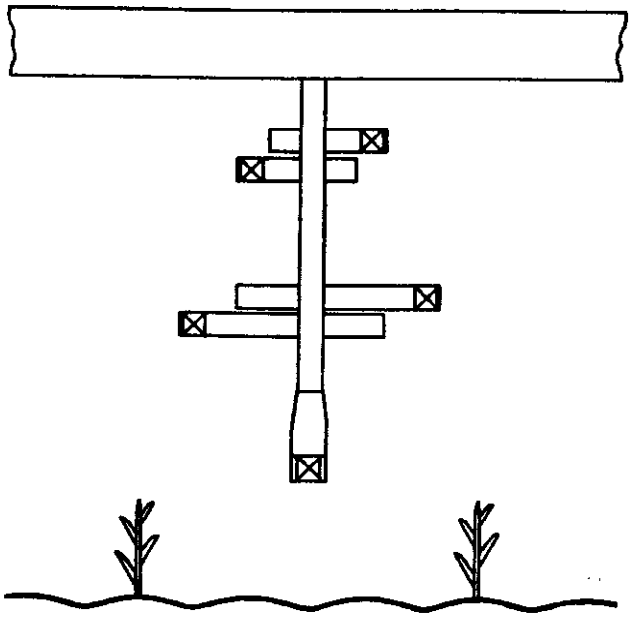


C-SHANK ALTERNATE TOOTH ARRANGEMENT

Arrange the tooth bars and teeth to level (optional) or ridge the soil as may be desired for your particular application.



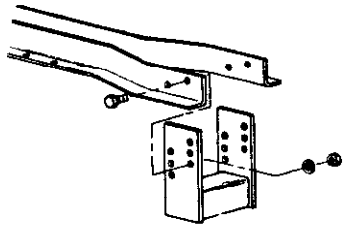
CONVENTIONAL



OPTIONAL

C-SHANK ALTERNATE REAR TOOTH BAR ADJUSTMENT

Lower the rear tooth bar when additional ridging between the rows is desirable.



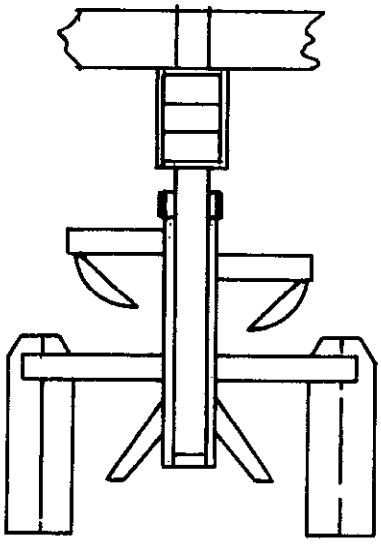
MAIN GANG SET-UP ARRANGEMENTS

The Wro-Till cultivator is a very versatile machine. It can be set in many different ways to handle a wide variety of situations. This section shows some of these arrangements.

The two most frequently used settings of the cultivator are throwing soil away from the row and throwing soil toward the row. Repositioning the disk hillers is the primary change required to switch from one type of operation to the other.

NOTE: WHEN REPOSITIONING THE DISK HILLERS, DO NOT LOOSEN THE U-BOLTS HOLDING THE DISK HILLER STANDARDS. THIS WILL CHANGE YOUR CUTTING ANGLE SETTING AND IS UNNECESSARY. INSTEAD, SIMPLY REMOVE THE ENTIRE DISK HILLER AND CLAMP ASSEMBLY FROM THE TUBE AND EXCHANGE THESE ASSEMBLIES FROM SIDE TO SIDE ON THE SAME GANG.

THROWING SOIL AWAY FROM THE ROW

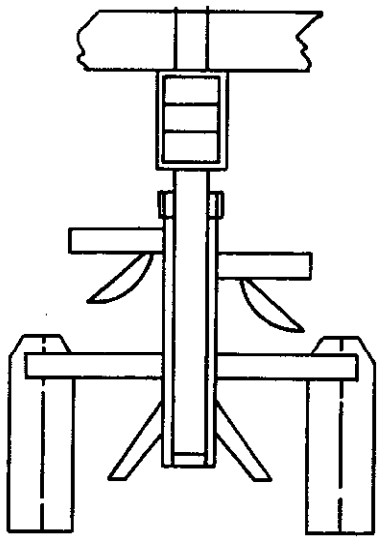


WRO-TILL

The disk hillers are set to throw soil away from the row. This arrangement is used for early cultivation. Tent shields are often used to protect the young crop. When two cultivations are made under the till-plant system, this arrangement is used for the first cultivation.

NOTE: DO NOT HAVE THE DISK HILLER SET TOO DEEP WHEN THROWING SOIL AWAY FROM THE ROW. OPERATING TOO DEEP MAY CAUSE THE DISK HILLER TO CUT THE ROOTS OF THE CROP.

THROWING SOIL TOWARD THE ROW



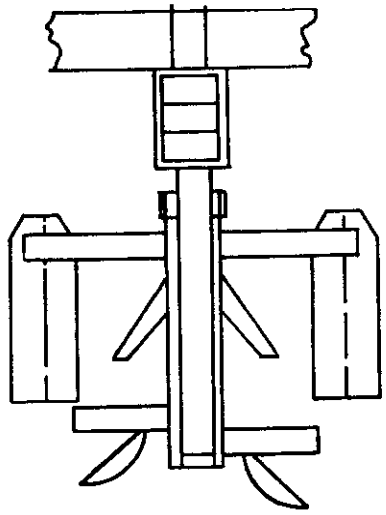
The disk hillers are set to throw soil toward the row. This arrangement is used for hilling crops, building seedbeds, ditching for irrigation, etc. Under the till-plant system, this arrangement is used only when one cultivation is made or for the second cultivation when two cultivations are made.

THROWING SOIL TOWARD THE ROW (CONT'D)

This setup is also used where a herbicide band has kept the row clean of weeds. The tent shield should be removed if the crop is big enough to withstand the moving soil.

NOTE: TO AVOID PRUNING ROOTS, THE REGULAR SWEEPS SHOULD BE REPLACED WITH SMALLER SWEEPS OR FURROW OPENERS. IT IS RECOMMENDED THAT 12" SWEEPS BE USED ON WIDE ROW WIDTHS AND 10" SWEEPS ON NARROW ROW WIDTHS.

DITCHING OR HILLING



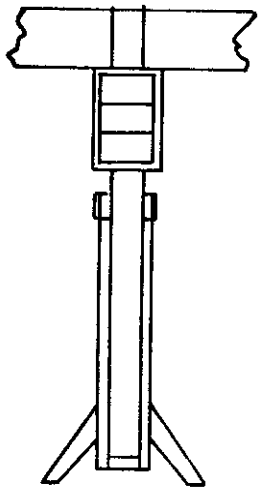
When it is necessary to move more soil at the last cultivation, such as when ditching for irrigation, either the sweeps or the furrow openers may be used.

The sweeps are mounted in front of the disk hillers. With this arrangement, the sweep loosens the soil so the disk hillers throw more soil to hill crops, build seedbeds, ditch for irrigation, etc. If the crop is small, tent shields should be used with this arrangement.

All cultivator sizes would use this same mounting arrangement for the sweeps and disk hillers; however, the smaller 14" sweeps would naturally be used on the narrow row widths (28", 30", 32").

NOTE: WHEN CROPS ARE LARGE OR SOIL BECOMES DRY OR HARD, WE RECOMMEND USING SMALLER SWEEPS TO PREVENT PRUNING ROOTS AND EXCESSIVE WEAR AND BREAKAGE OF THE CULTIVATOR. WE RECOMMEND 12" SWEEPS ON ROW WIDTHS OF 36", 38" AND 40" AND 10" SWEEPS ON ROW WIDTHS OF 28" AND 30".

PRE-PLANT & UNDERCUTTING



PRE-PLANT CULTIVATION

By raising or removing the tent shields and disk hillers, this cultivator arrangement can be used ahead of the till planter to eliminate early weed growth. The weeds between the rows are killed without drying out the soil and mixing weed seed into the top of the ridge. Then, during the planting operation, the till planters sweep will clear the weeds from the row area. This procedure of controlling early weed growth also helps prevent erosion because residue is left on the surface.

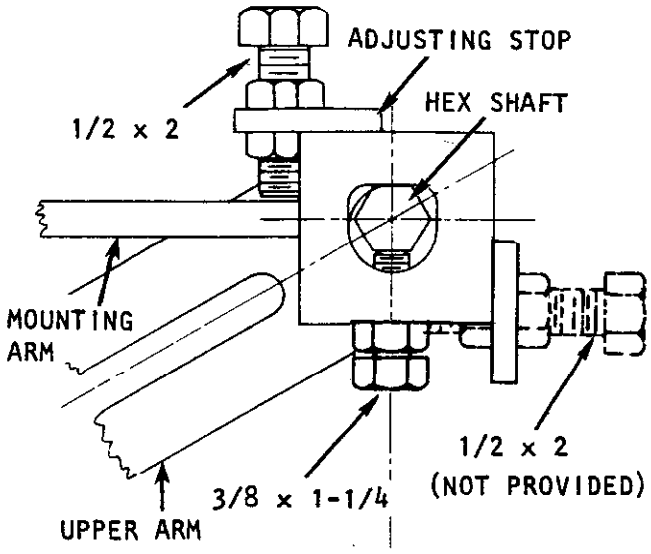
UNDERCUTTING

By raising or removing the tent shields and disk hillers, this cultivator arrangement can also be used for undercutting, such as in killed sod. The gauge coulter will cut the residue in front of the sweep shank to prevent plugging. Undercutting with this setup will leave the residue on the surface to prevent the soil from blowing or washing away.

GANG SHIELDS

DANISH TINE & C-SHANK (OPTIONAL EQUIPMENT)

The gang mounted rolling cultivator shield is designed to be used for any row crop with 30" or larger row spacing. It is fully adjustable for any application or condition. The adjustments include those for height, position relative to the cultivator shanks and for crop width. It has maintenance free bearings and the pivot attaching point is simple and positive locking. The shields are attached to the cultivator gang with a single Grade 5 L-bolt.



HEIGHT ADJUSTMENT

The rolling cultivator shields can be set at almost any height desired for field use and they can be left on the cultivator and rotated up out of the way when not in use.

IMPORTANT: To avoid damaging the shields it is important that they do not hang below the points or shovels when your cultivator is raised off the ground in transport position.

The height of the shields is determined by the position of the adjusting stop on the hex shaft of the upper arm. Refer to the following instructions to set or adjust the shields for field or non-use positions.

1. Attach the 1/2 x 2 bolts (GR 5) and jam nuts to the adjusting stops. The jam nuts should be in approximately the center of the bolt. The bolts should be attached so that they will always stop the downward rotation of the shields.

2. Hold the shields in the approximate position desired and rotate the adjusting stop until the threaded end of the bolt rests on the mounting arm.

3. The adjusting stop has two threaded holes in it. Into the hole that is the most nearly lined up with a flat surface of the hex shaft, insert a 3/8 x 1-1/4 bolt (GR 5) and tighten until the hex shaft is firmly and squarely against the back of the adjusting stop, and lock in position with jam nut.

IMPORTANT: To avoid damaging the upper arm do not tighten the 3/8 x 1-1/4 bolt against a corner of the hex shaft.

4. If your shields are still not in quite the position you desire, they can be adjusted 15 degrees either way by loosening the jam nuts and turning the 1/2 x 2 bolt in or out to the desired location.

CROP WIDTH ADJUSTMENT

To center the shield over the crop row, simply loosen the 3/8 x 1-1/4 bolt and slide the upper arm in or out to the position desired, being careful not to let the hex shaft rotate.

The distance between the standard mount shields can be narrowed by shifting one or both of the spacers from between, to outside of the shields. (SEE STANDARD MOUNTING PHOTO)

FORWARD & REARWARD ADJUSTMENT IN RELATION TO THE CULTIVATOR SHANKS

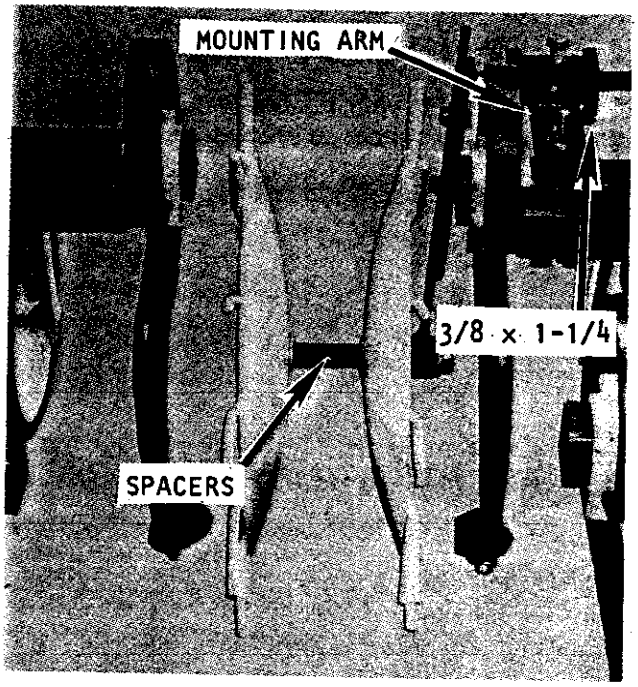
The slotted hole in the upper arm allows forward or rearward adjustment of the shields to allow the desired amount of soil in the row for hilling or to protect the herbicide band.

For a general setting the shield should be 2" behind the cultivator shank. Adjustments will change with speed of travel and soil conditions.

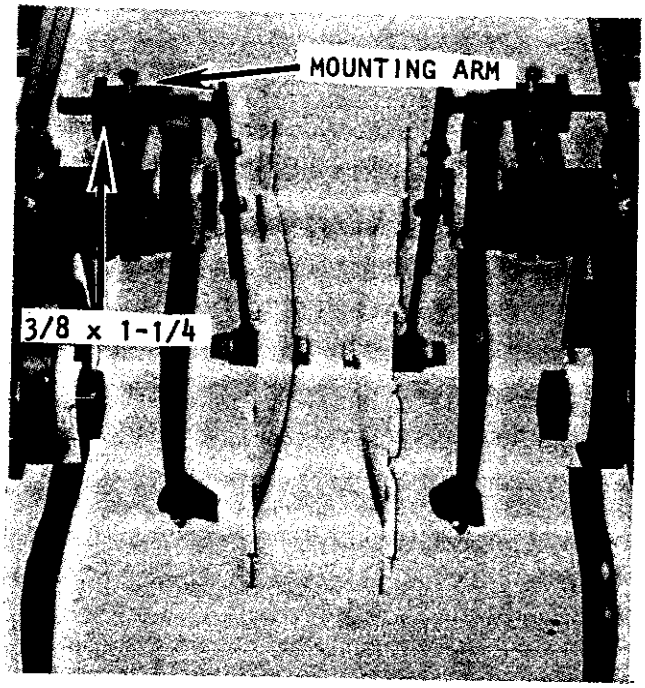
SHIELDS MOUNTED ON CULTIVATORS WITH FOLDING TOOL BARS

The adjusting stop is designed so that in most cases, when the cultivator is folded to transport position, the shields used on the tool bar wings will not hang down and hit the middle gangs. If you have a situation where the shields are still hitting the other gangs, attach a 1/2 x 2 bolt and (2) jam nuts (NOT PROVIDED) to the adjusting stop as shown. This will further restrict the travel of the shields.

IMPORTANT: Do not turn the bolt into the adjusting stop to a point where there is no travel in the shields at all.



STANDARD MOUNT



SPLIT ARM MOUNT

TENT SHIELDS

WRO-TILL (OPTIONAL EQUIPMENT)

The tent shields should be positioned to shield the crop from the flow of soil off of the cultivator tool. This position will vary with soil type, soil conditions and the cultivator setup being used.

HEIGHT ADJUSTMENT

The shield should be run high enough to let as much soil as desired flow under the shield and around the crop. The correct height is maintained by a spring lock pin through the appropriate linkage height adjustment hole.

To maintain obstacle trip clearance, only use the holes above the top horizontal linkage bars.

When the crop is tall enough not to need shields, raise them up, out of the way and pin them. If they still interfere with the crop take them off. The easiest way to do this is to loosen the 3/8 u-bolts and slide the bracket and all off the end of the mounting tube. If the mounting tube still interferes with the crop, remove it.

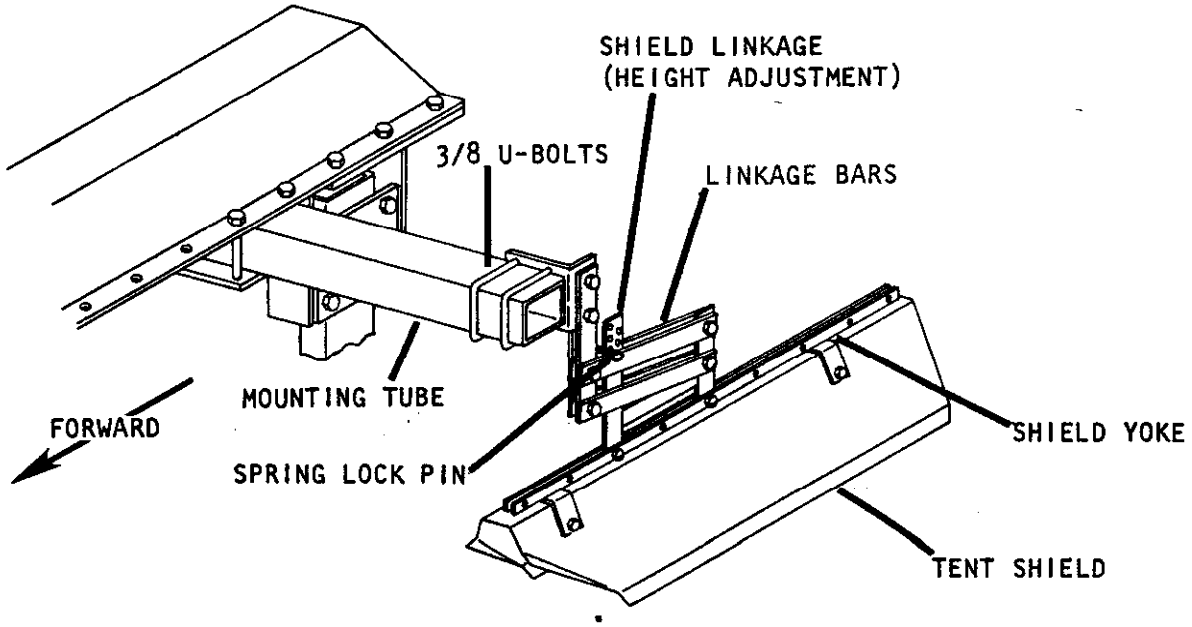
FORWARD & REARWARD ADJUSTMENT IN RELATION TO THE CULTIVATOR SHANKS

The shield linkage can be attached to the shield in any of the seven positions available on the shield yoke. (For best results keep the shield linkage on the forward half of the shield so the shield is being "pulled" rather than "pushed".)

LATERAL ADJUSTMENT

Center the shield over the crop row.

NOTE: IN SOME SITUATIONS (HIGH SPEEDS AND SMALL CROPS) THE ROWS NEXT TO THE OUTSIDE ROWS BEING CULTIVATED WILL BE COVERED PERIODICALLY. THESE ROWS CAN BE PROTECTED BY USING AN EXTRA SET OF SHIELDS OVER THE ROWS. FOR EXAMPLE, YOU WOULD USE 8 SHIELDS ON A 6 ROW CULTIVATOR. IF THIS IS DONE, SHIFT ALL MOUNTING TUBES OVER ONE GANG AND PUT THE EXTRA MOUNTING TUBE ON THE OUTSIDE GANG.



ASSEMBLY INFORMATION

Remove all wires and arrange the parts conveniently.

Wherever the terms "left" and "right" are used, it should be understood to mean from a position behind and facing the machine.

Lubricate all bearings and moving parts as you proceed and make sure they work freely.

Loosely install all bolts connecting mating parts before final tightening.

When tightening bolts, they should be torqued to the proper number of foot-pounds as indicated in the table unless specified. It is important that all bolts be kept tight.

On new machines, all nuts and bolts should be rechecked after a few hours of operation.

BOLT DIA		3/8	1/2	5/8	3/4	7/8	1
HEX HEAD		9/16	3/4	15/16	1-1/8	1-5/16	1-1/2
UNC	GRADE 2	18	45	89	160	252	320
	GRADE 5	30	68	140	240	360	544
	GRADE 8	40	100	196	340	528	792
UNF	GRADE 2	21	51	102	178	272	368
	GRADE 5	32	70	168	264	392	572
	GRADE 8	48	112	216	368	792	840

TORQUE IN FOOT POUNDS

When replacing a bolt, use only a bolt of the same grade or higher.

GRADE 2

Bolts with no markings and all u-bolts are grade 2.

GRADE 5

Grade 5 bolts furnished with the machine are identified by three radial lines on the head.

GRADE 8

Grade 8 bolts furnished with the machine are identified by six radial lines on the head.

ABBREVIATIONS:

RIGHT HAND--RH
LEFT HAND---LH
DANISH TINE-DT
C-SHANK-----C-S
WRO-TILL----W-T

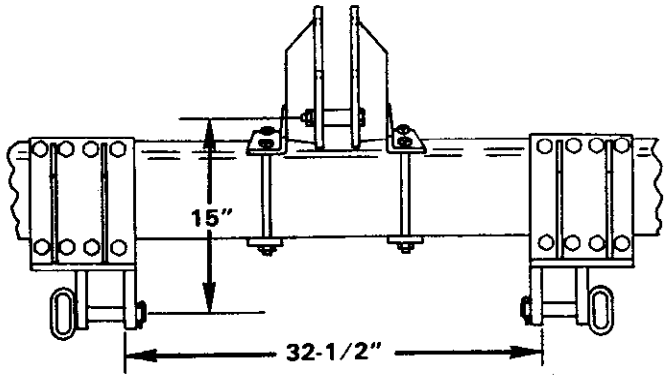
MAST ASSEMBLY

NOTE: THE FRONT SIDE (TRACTOR SIDE) OF A STRAIGHT OR CENTER SECTION TOOL BAR IS NOTED BY THE WORD "FRONT" STAMPED IN THE APPROXIMATE CENTER OF THE TOOL BAR. THE FRONT IS NOTED TO ASSURE THE CORRECT ORIENTATION OF DECALS ON THE TOOL BAR.

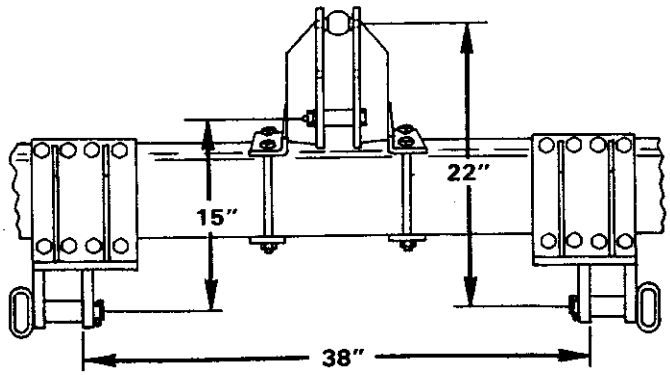
NOTE: FOR SAFETY AND EASE OF SETUP, IT IS RECOMMENDED THAT THE TOOL BAR BE ATTACHED TO A TRACTOR AFTER THE HITCH POINTS HAVE BEEN SECURED. DO NOT DEPEND ON YOUR TRACTORS HYDRAULIC SYSTEM AS THE SOLE SUPPORT OF THE BAR.

Attach the masts to the tool bar center approximately as shown. Attach the lower hitch points to the tool bar as shown below for your particular 3-point hitch.

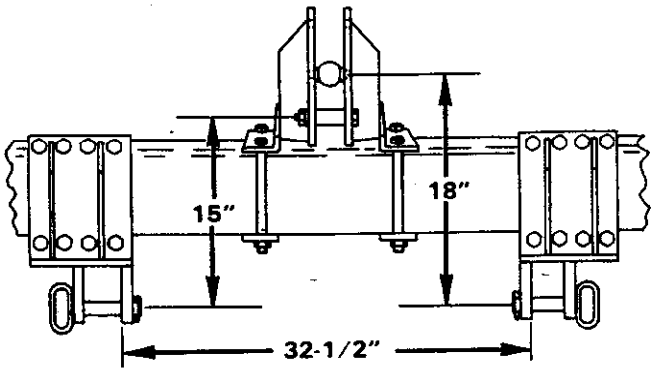
NOTE: DANISH TINE MAST AND LOWER POINTS SHOWN. C-SHANK AND WRO-TILL MAST AND LOWER POINTS REQUIRE THESE SAME LOCATIONS.



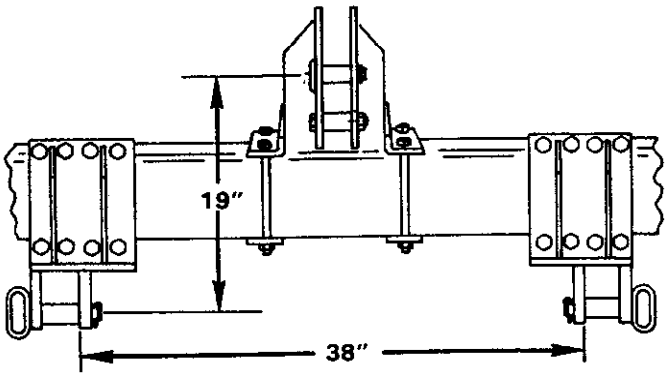
CATEGORY II RAPID COUPLER



CATEGORY III DIRECT HITCH

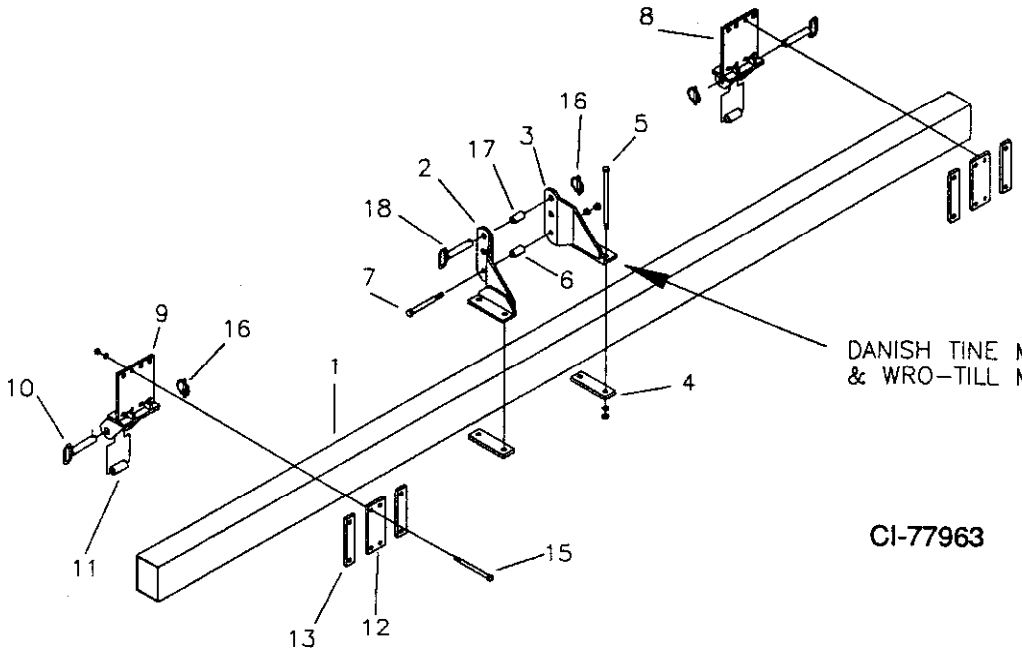


CATEGORY II DIRECT HITCH



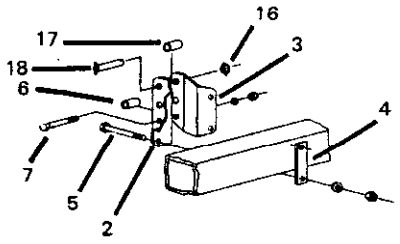
CATEGORY III RAPID COUPLER

TOOL BAR (NON-FOLD)



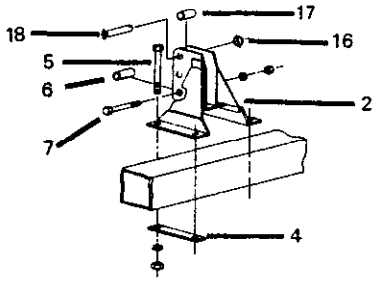
DANISH TINE MAST (SEE C-SHANK & WRO-TILL MAST DETAILS)

CI-77963



C-SHANK MAST DETAIL

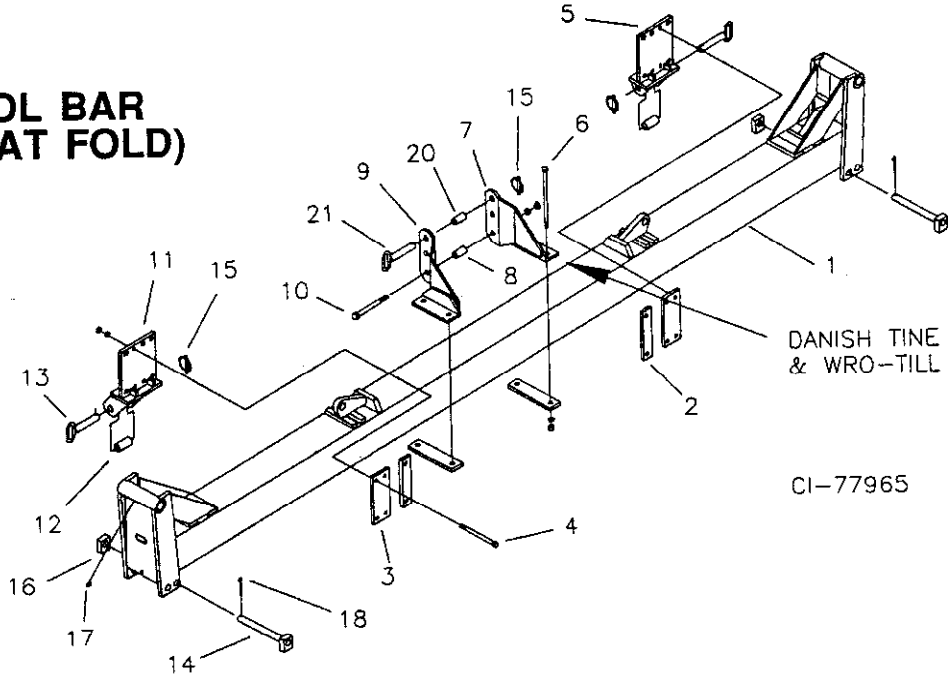
PI-76122



WRO-TILL MAST DETAIL

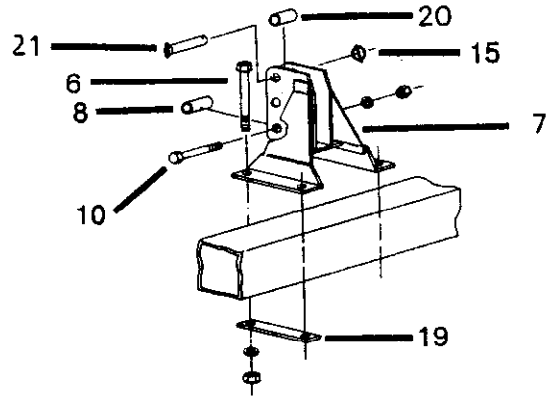
ITEM	PART NO.	DESCRIPTION
1	31891	Tool Bar 189 IN (DT, C-S)
	31892	Tool Bar 249IN (DT, C-S)
	23307	Tool Bar 189IN (W-T)
	23308	Tool Bar 249IN (W-T)
2	23033	Left Mast (DT)
	23224	Left Mast (C-S)
	23228	Left & Right Mast (W-T)
3	23032	Right Mast (DT)
	23223	Right Mast (C-S)
4	23401	Mast Clamp (DT)
	39575	Mast Clamp (C-S, W-T)
5	88402	3/4NCx9 GR5 Bolt (DT, W-T)
	88556	3/4NCx7-1/2 (C-S)
	88130	3/4 Lock Washer
	88110	3/4NC Nut
6	23008	.77IDx1-1/4ODx2.25IN Bushing
7	88421	3/4NCx4-1/2 GR 5 Bolt
	88130	3/4 Lock Washer
	88110	3/4NC Nut
8	38813	Lower Hitch Point * (DT,W-T)
	23225	Lower Hitch Point * (C-S)
		* Category II = LH
		* Category III = RH
9	38812	Lower Hitch Point * (DT,W-T)
	23222	Lower Hitch Point * (C-S)
		* Category II = RH
		* Category III = LH
10	23011	Hitch Pin
11	23010	2.86IN Bushing
12	23406	Mounting Plate (DT,W-T)
	23221	Mounting Plate (C-S)
13	38826	Attaching Flat
15	88533	5/8NCx7-1/2 GR 5 Bolt
	88565	5/8NCx9-1/2 GR 5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
16	23013	Click Pin
17	23219	1"IDx1-1/4OD Upper Bushing
18	23220	1"OD Upper Pin

TOOL BAR (FLAT FOLD)



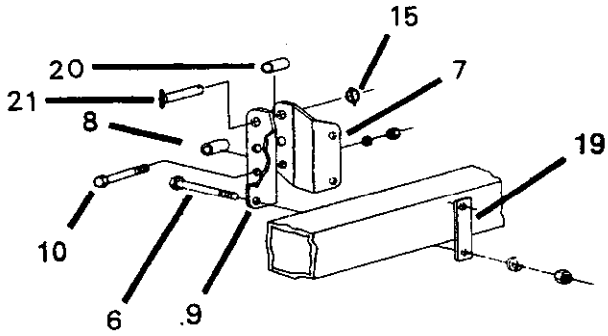
DANISH TINE MAST (SEE C-SHANK & WRO-TILL MAST DETAILS)

CI-77965



WRO-TILL MAST DETAIL

PI-76122

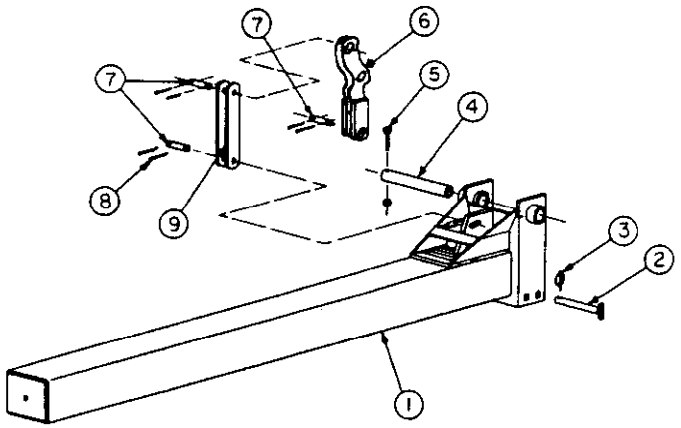


C-SHANK MAST DETAIL

ITEM	PART NO.	DESCRIPTION
1	23000	Center Tool Bar 138"
	23001	Center Tool Bar 178"
	23002	Center Tool Bar 198" (DT,C-S ONLY)
	31780	Center Tool Bar 258" (DT,C-S ONLY)
2	38826	Attaching Flat (DT,W-T)
3	23406	Mounting Plate (DT,W-T)
	23221	Mounting Plate (C-S)
4	88565	5/8NCx9-1/2 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
5	23005	Lower Hitch Point * (DT,W-T)
	23225	Lower Hitch Point * (C-S)
		* Category II = LH
		* Category III = RH
6	88402	3/4NCx9 GR5 Bolt
	88130	3/4 Lock Washer
	88110	3/4NC Nut
7	39574	Right Mast (DT)
	23223	Right Mast (C-S)
	23228	Left & Right Mast (W-T)

ITEM	PART NO.	DESCRIPTION
8	23008	.77IDx1-1/4"ODx2.25" Bushi
9	23007	Left Mast (DT)
	23224	Left Mast (C-S)
10	88421	3/4NCx4-1/2 GR5 Bolt
	88130	3/4 Lock Washer
	88110	3/4NC Nut
11	23009	Lower Hitch Point * (DT,W-T
	23222	Lower Hitch Point * (C-S)
		* Category II = RH
		* Category III = LH
12	23010	2.86" Bushing
13	23011	Hitch Pin
14	31383	Stop Pin
15	23013	Click Pin
16	31386	Stop Flat
17	88530	3/16 Grease Fitting
18	88134	1/4 Dia x 1-1/2" Cotter Pin
19	39575	Mast Clamp
20	23219	1"IDx1-1/4" Upper Bushing
21	23220	1"OD Upper Pin

WING (FLAT-FOLD)



NOTE: ORIENTATE ITEM 6 AS SHOWN

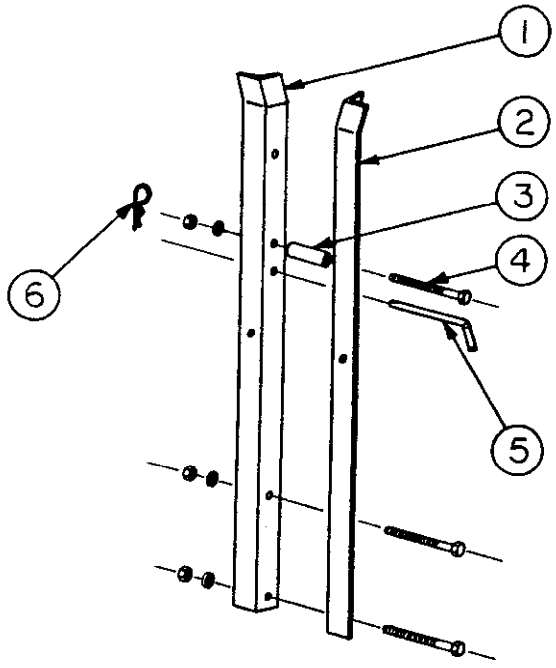
WING SUPPORT (FLAT-FOLD)

Attach the wing supports to the center tool bar, one on each side of the machine center. You will have to find an open spot on the tool bar where there won't be any interference when the wings are folded.

NOTE: THE WING SUPPORTS MUST BE SECURED TO THE CENTER TOOL BAR BEFORE ANY ATTEMPT IS MADE TO RAISE THE WINGS.

WING (FLAT-FOLD)

ITEM	PART NO.	DESCRIPTION
1	23020	Tool Bar Wing 55"
	23021	Tool Bar Wing 75"
	23022	Tool Bar Wing 85"(DT,C-S ONLY)
	31782	Tool Bar Wing 115"(DT,C-S ONLY)
2	23023	Pin
3	23013	Click Pin
4	23024	13.19" Hinge Pin
5	88531	3/8NCx3 GR5
	88162	3/8NC Lock Nut
6	23026	Center Pivot Arm
	53427	**Center Pivot Arm (115" Tool Bar Wing Only)**
7	23027	3.80" Pin
8	88532	3/8 x 2 Cotter Pin
9	23028	Wing Pivot Flat



WARNING

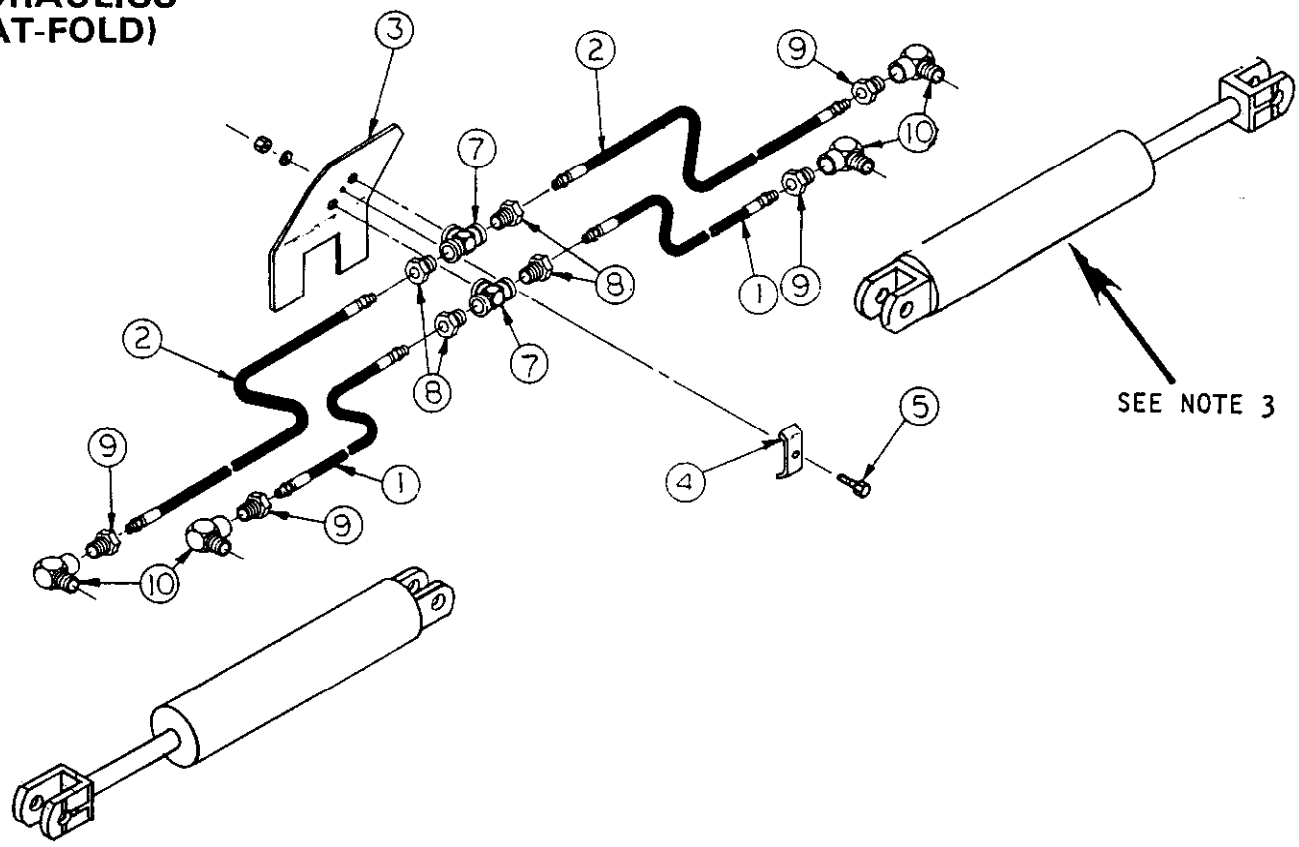
Everyone stand clear of implement when folding or unfolding wings.

Before transporting or removing wing lift cylinders with wings folded — lock wings with pins.

WING SUPPORT (FLAT-FOLD)

Item	Part #	Description	Qty.
1	23035	Right Wing Support	2
2	23036	Left Wing Support	2
3	23037	Spacer	2
4	88534	Bolt, 1/2 NC x 8-1/2 GR 5	6
	88303	Lock Washer, 1/2	6
	88104	Nut, 1/2 NC	6
5	23038	Pin	2
6	23039	Hairpin Cotter	2

HYDRAULICS (FLAT-FOLD)



HYDRAULICS (FLAT-FOLD)

NOTE 1: ITEM 3 IS ATTACHED TO THE REAR SIDE OF THE CENTER GANG ANGLE CLAMP.

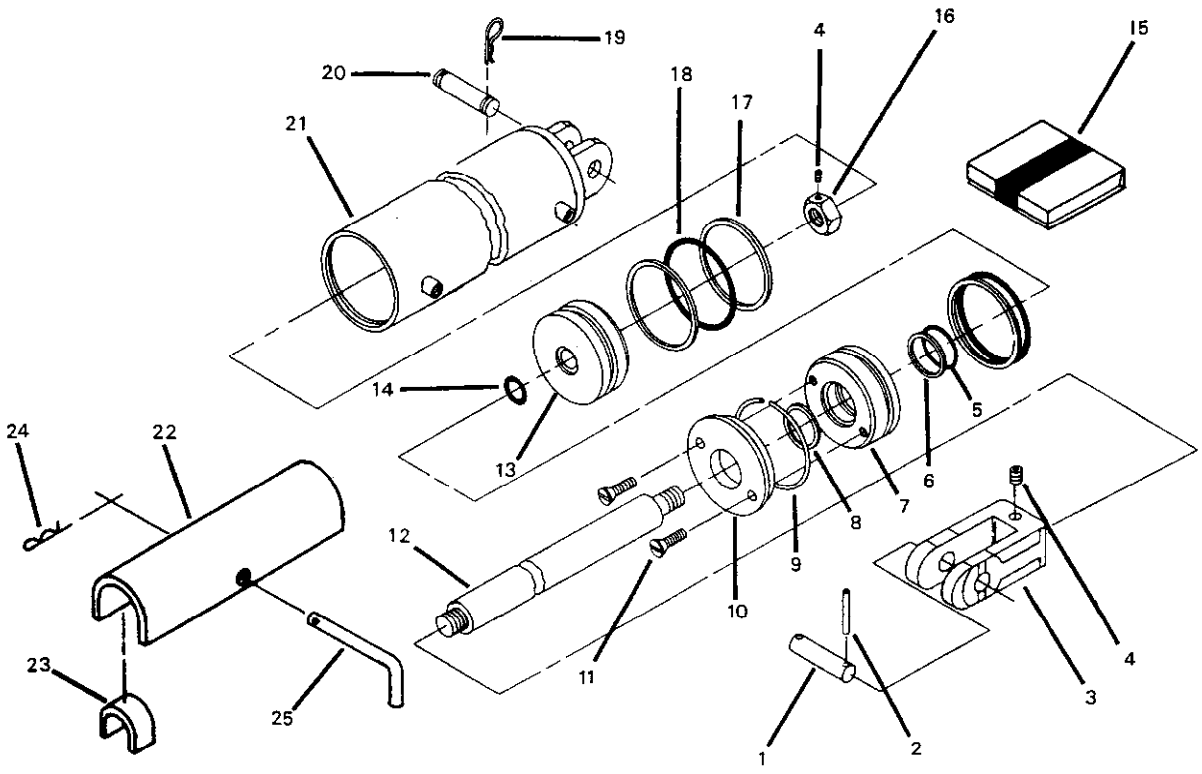
NOTE 2: HYDRAULIC HOSES & FITTINGS ARE NOT PROVIDED FROM IMPLEMENT TO TRACTOR.

NOTE 3: BEFORE ATTACHING CYLINDER TO UNIT, STROKE CYLINDERS FULL LENGTH SEVERAL TIMES TO ALLOW OIL TO FILL CYLINDER AND HOSES, OTHERWISE CYLINDER MAY DROP WHEN FIRST USED.

NOTE: CHECK YOUR TRACTOR'S HYDRAULIC FLUID LEVEL AFTER CYCLING HYDRAULICS AND FILLING NEW CYLINDERS AND LINES. REFILL IF NECESSARY.

ITEM	PART NO.	DESCRIPTION
1	23142	1/4 x 30 Hose (138" Center Tool Bar)
	23143	1/4 x 48 Hose (178" Center Tool Bar)
	23144	1/4 x 60 Hose (198" Center Tool Bar)
2	23143	1/4 x 48 Hose (138" Center Tool Bar)
	23146	1/4 x 66 Hose (178" Center Tool Bar)
	23147	1/4 x 78 Hose (198" Center Tool Bar)
3	23148	Hose Guide
4	23149	Hose Clamp
5	88544	5/16NCx2 GR5 Bolt
	88358	5/16 Lock Washer
	88127	5/16NC Nut
7	23793	3/8 NPT Female Tee
8	42685	3/8 to 1/4 NPT Reducing Bushing
9	23150	1/2 to 1/4 NPT Reducing Bushing
10	31401	3/4-16 ORB Elbow

3-1/2 X 16 HYDRAULIC CYLINDER



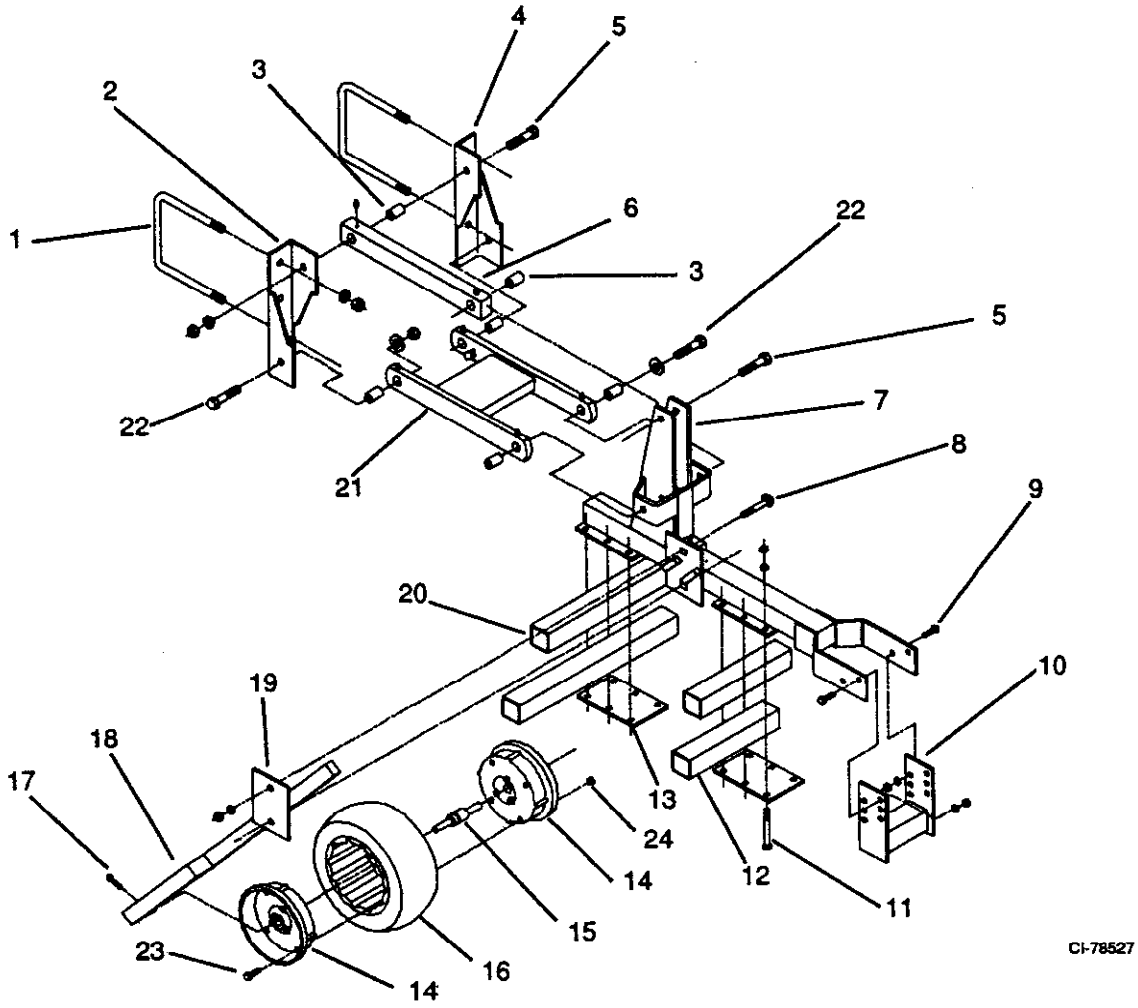
3-1/2 X 16 HYDRAULIC CYLINDER

Item	Part #	Description	Qty.
	51236	3-1/2 x 16 Hyd. Cylinder	
1	22022	1-1/4 Rod Cylinder Pin	1
2	22030	1/4 x 2-1/2 Yoke Pin	2
3	22019	Cylinder Yoke	1
4	88161	Set Screw, 1/4 NC x 1/4	2
5	14902	1-1/2IN O-Ring	1
6	14903	1-1/2IN Backup Washer	1
7	12300	3-1/2IN Cylinder Gland	1
8	12288	Rod Wiper	1
9	12293	3-1/2IN Snap Ring	1
10	21513	Stop Plate	1
11	88508	1/4 NC x 1 Flt Hd Screw	2
12	22020	3-1/2 x 16 Cylinder Rod	1
13	12299	Cylinder Piston	1
14	12290	Shaft Seal	1
15	14905	Seal Kit - Serial #NB	1
	51211	Seal Kit - Serial #RG	1
16	14824	Piston Lock Nut	1
17	12294	3-1/2IN Backup Washer	3
18	12292	3-1/2IN Piston Seal	2
19	88318	Spring Lock Pin	2
20	22021	1-1/4 Butt Cylinder Pin	1
21	22024	3-1/2 x 16 Cylinder Tube	1
22	23330	Cylinder Stop Assembly	1
23	23332	Foam Cushion	2
24	23039	Hairpin Cotter	1
25	23042	Pin	1

WARNING

DO NOT use hydraulic cylinders until all trapped air has been removed from the system.

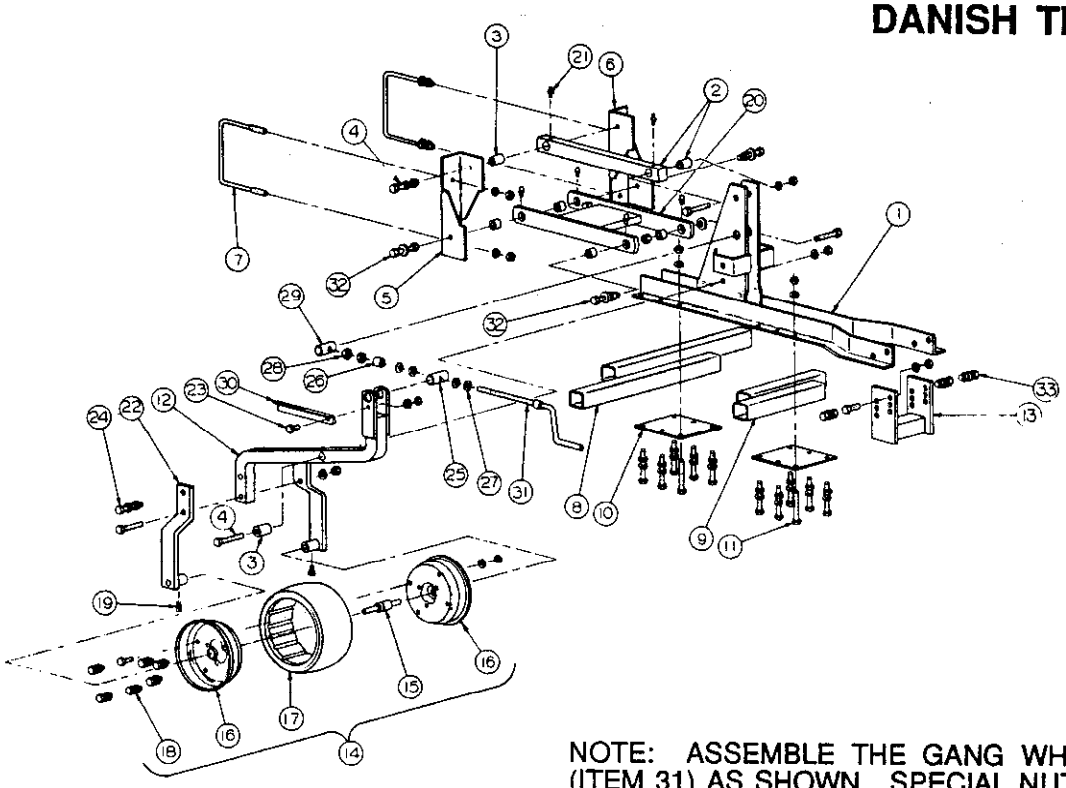
DANISH TINE GANG (MANUAL ADJUST)



ITEM	PART NO.	DESCRIPTION
	31788	Gang Wheel Assy-Complete (Items 14,15,16,23&24)
1	23078	5/8 U-Bolt (5x7 Tool Bar)
	23046	5/8 U-Bolt (7x7 Tool Bar)
2	23058	Left Angle Clamp
3	23057	1.28" Bushing
4	23059	Right Angle Clamp
5	88537	5/8NC x 2-3/4 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
6	31505	Linkage Arm & Grease Zerk
7	31769	Gang
8	88846	Carriage Bolt 1/2NC x 2
9	88554	1/2NC x 1-1/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
10	23064	Rear Tooth Bar
11	88538	7/16NC x 3-1/2 GR5 Bolt

ITEM	PART NO.	DESCRIPTION
12	23061	Tooth Bar Tube
13	31777	Flat Clamp
14	23067	Gang Wheel Disc
15	31707	Bearing W/Shaft
16	23068	Gauge Tire
17	88702	Set Screw 3/8NCx3/4 SQHD
18	31663	Gang Wheel Arm
19	31674	Wheel Attaching Plate
20	23060	Tooth Bar Tube
21	23069	Linkage Bar
22	88294	5/8NCx2 GR5 Bolt
	88277	5/8 Flat Washer
	88845	5/8NC Top Lock Nut
	23077	.7 Sleeve Bearing
23	88539	5/16NCx1/2 GR5 Bolt
24	88834	5/16NC Whiz Lock Nut (Flanged)

DANISH TINE GANG

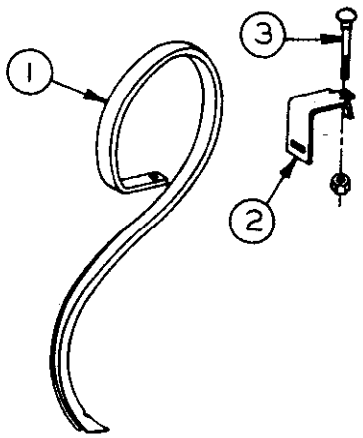


NOTE: ASSEMBLE THE GANG WHEEL CRANK (ITEM 31) AS SHOWN. SPECIAL NUTS (ITEM 28) MUST BE SET AND LOCKED AGAINST EACH OTHER TO ALLOW THE GANG WHEEL CRANK TO TURN FREELY IN THE PIVOT BUSHING (ITEM 25).

ITEM	PART NO.	DESCRIPTION
1	23055	Gang
2	23056	Linkage Arm W/Bushing and Grease Fitting
3	23057	1.28" Bushing
4	88537	5/8NCx2-3/4 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
5	23058	Left Angle Clamp
6	23059	Right Angle Clamp
7	23078	5/8 U-Bolt (5x7 Tool Bar)
	23046	5/8 U-Bolt (7x7 Tool Bar)
	88129	5/8 Lock Washer
	88126	5/8NC Nut
8	23060	18" Tooth Bar Tube
9	23061	10.3" Tooth Bar Tube
10	23062	Tooth Flat Clamp
11	88538	7/16NCx3-1/2 GR5 Bolt
	88269	7/16 Lock Washer
	88270	7/16NC Nut
12	23063	Gang Wheel Arm
13	23064	Rear Tooth Bar
14	23065	Gang Wheel Complete (Includes Item W/*)
15	23066	* Bearing W/Shaft
16	23067	* Gang Wheel Disk
17	23068	* Gang Tire

ITEM	PART NO.	DESCRIPTION
18	88539	* 5/16NCx1/2 GR5 Bolt
	88540	* 5/16NC Lock Nut
19	88253	3/8NCx1/2 Set Screw
20	23069	Linkage Bar
21	88530	3/16 Grease Fitting
22	23070	Gang Wheel Yoke
23	88478	5/16NCx1" GR5 Bolt
	88358	5/16 Lock Washer
	88127	5/16NC Nut
24	88541	1/2NCx3 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
25	23071	Pivot Bushing
26	23072	Bushing
27	88542	5/8x1-1/8x14GA Machinery Bushing
28	23073	Special Nut
29	23074	Threaded Pivot Bushing
30	23075	Depth Gauge
31	23076	Gang Wheel Crank
32	88294	5/8NCx2 GR5 Bolt
	88277	5/8 Flat Washer
	88369	5/8NC Lock Nut
	23077	.7" Sleeve Bearing
33	88554	1/2NCx1-1/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut

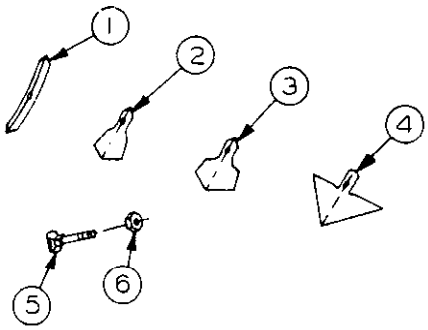
DANISH TINE - TINE & CLAMP



DANISH TINE - TINE & CLAMP

ITEM	PART NO.	DESCRIPTION
1	20009	Tine
2	23044	Tooth Clamp
3	88844	7/16NCx3-1/2 Carriage Bolt
	88660	7/16NC Lock Nut

DANISH TINE - SHOVELS & POINTS

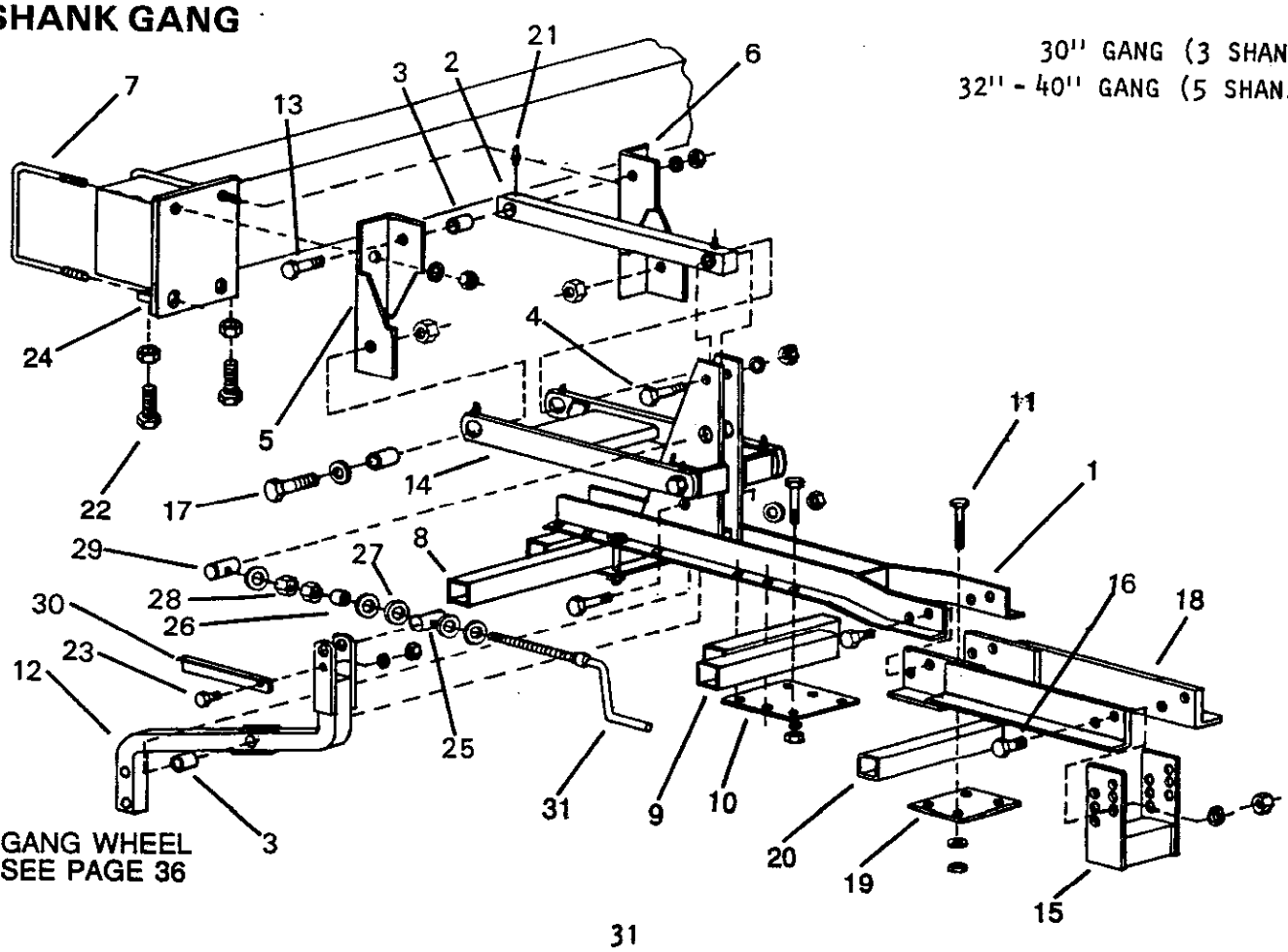


DANISH TINE - SHOVELS & POINTS

ITEM	PART NO.	DESCRIPTION
1	23136	Super HD Point
2	20021	2-1/2" Shovel
3	23138	4" Shovel
4	23139	7" Shovel
5	23140	* Plow Bolt
6	88463	* 3/8NC Nut
	32964	Plow Bolt Assy Complete (Includes Items W/*)

C-SHANK GANG

30" GANG (3 SHANK)
32" - 40" GANG (5 SHANK)



GANG WHEEL
SEE PAGE 36

30" GANG (3 SHANK)
32" - 40" GANG (5 SHANK)

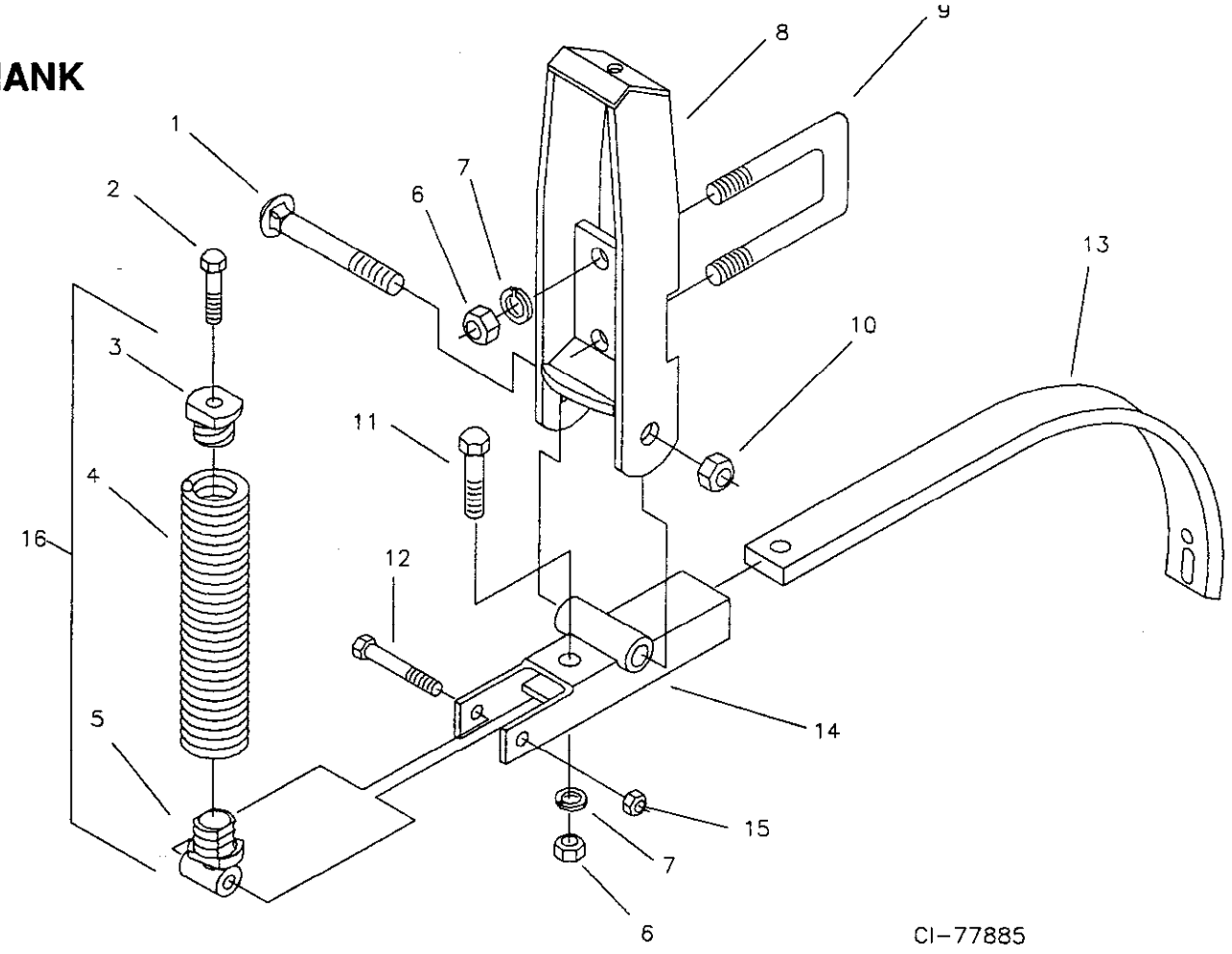
C-SHANK GANG

ITEM	PART NO.	DESCRIPTION
1	23079	Gang
2	26780	Linkage Arm W/Bushing & Grease Fitting
3	23057	.64IDx1"ODx 1.28" Bushing
4	88408	5/8x3 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
5	23058	Left Angle Clamp
6	23059	Right Angle Clamp
7	23046	5/8 U-Bolt (7x7 Tool Bar)
	23078	5/8 U-Bolt (5x7 Tool Bar)
	88129	5/8 Lock Washer
	88126	5/8NC Nut
8	23083	19.24" Tube (32"-40" Gang)
	23080	15.44" Tube (30" Gang)
9	23084	11.62" Tube (32"-40" Gang)
10	23081	6 Hole Clamp Plate
	23334	4 Hole Clamp Plate
11	88543	* 1/2NCx3-3/4 GR5 Bolt
	88303	* 1/2 Lock Washer
	88104	* 1/2NC Nut
12	26781	Gang Wheel Arm
13	88537	5/8NCx2-3/4 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
14	26783	Linkage Bar
15	23082	Rear Tooth Bar
16	88475	* 1/2NCx1-1/2 GR5 Bolt
	88303	* 1/2 Lock Washer
	88104	* 1/2NC Nut
17	88294	5/8NCx2 GR5 Bolt
	88277	5/8 Flat Washer
	88369	5/8NC Lock Nut
	23077	.70" Sleeve Bearing

ITEM	PART NO.	DESCRIPTION
18	26790	* Gang Extension
19	26785	* Clamp Plate
20	23084	11-5/8" Tube
21	88530	3/16 Grease Fitting
22	23153	1/2NCx2 GR5 Bolt
	88561	1/2NC Jam Nut
23	88478	5/16NCx1 Bolt
	88358	5/16 Lock Washer
	88127	5/16NC Nut
24	26794	Stabilizer Plate
25	23071	Pivot Bushing
26	23072	Bushing
27	88542	5/8x1-1/8-14GA Machinery Bushing
28	23073	Special Nut
29	23074	Threaded Pivot Bushing
30	23075	Depth Gauge
31	23076	Gang Wheel Crank
	26791	C-Shank Gang Extension 2R Add-On (Includes Item W/*)

NOTE: ASSEMBLE THE GANG WHEEL CRANK (ITEM 31) AS SHOWN. SPECIAL NUTS (ITEM 28) MUST BE SET AND LOCKED AGAINST EACH OTHER TO ALLOW THE GANG WHEEL CRANK TO TURN FREELY IN THE PIVOT BUSHING (ITEM 25).

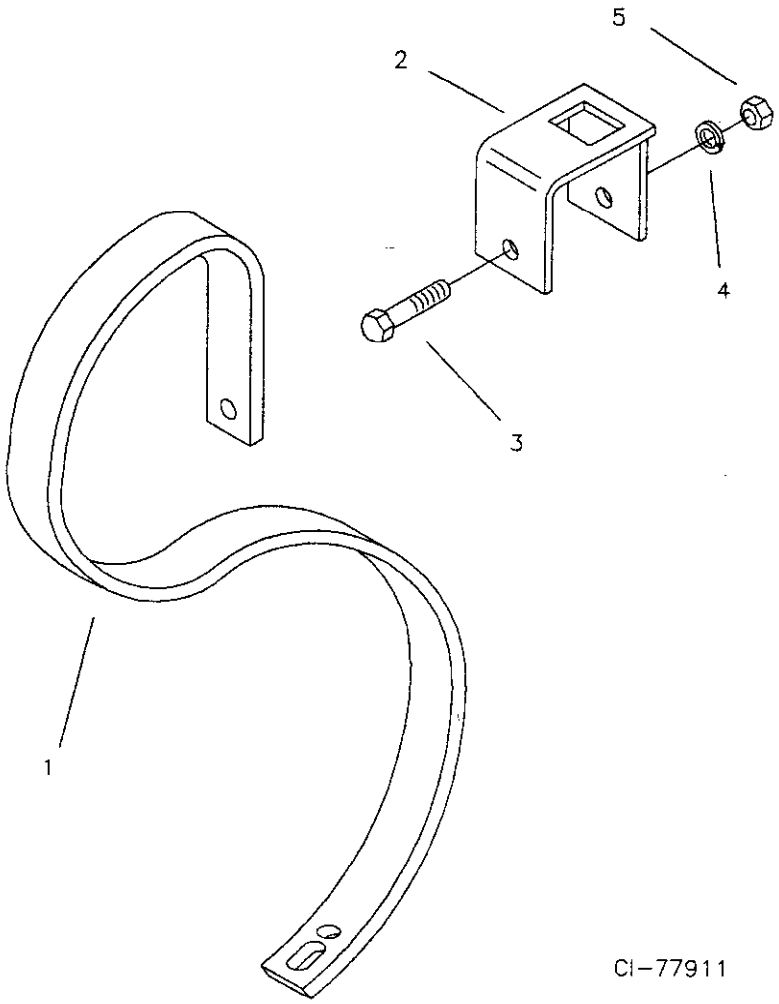
C-SHANK



NOTE:
SHANK INSTALLATION CAN BE SIMPLIFIED BY REMOVING THE SPRING ADJUSTMENT BOLT (ITEM 2) AND SWINGING THE SPRING FORWARD, THUS PROVIDING EASY ACCESS TO THE U-BOLT.

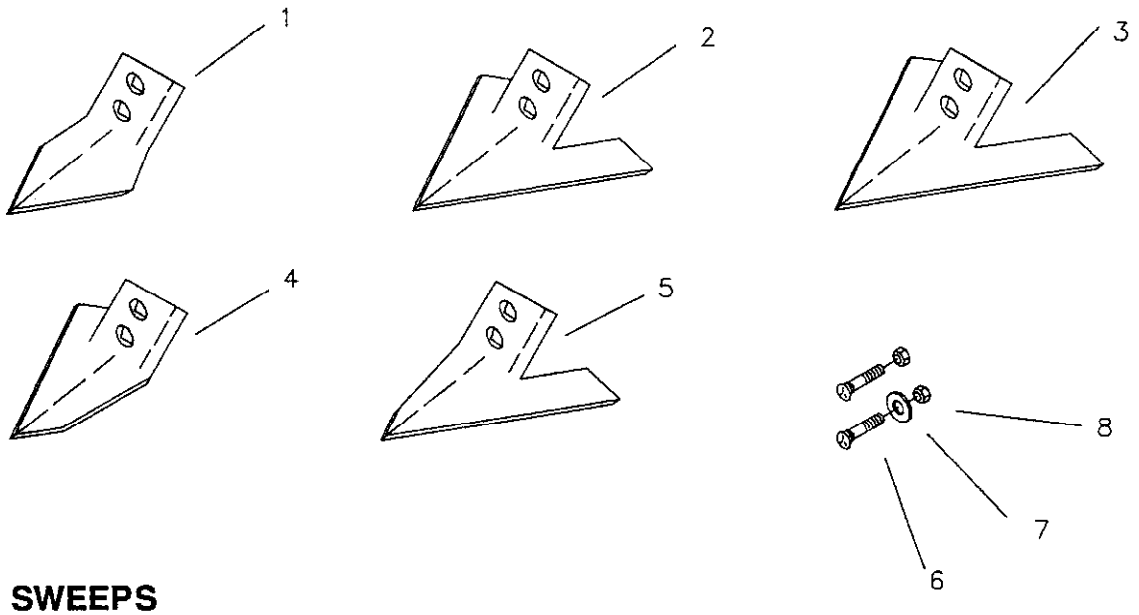
ITEM	PART NO.	DESCRIPTION
	11455	C-Shank (Ref Items 1-8,10-16)
1	15579	Shank Carriage Bolt
2	23153	1/2NCx2-1/2 Bolt
3	11398	Spring Plug
4	11510	3/8 Dia Wire Spring
5	11397	Spring Handle
6	88126	5/8NC Nut
7	88129	5/8 Lock Washer
8	11512	Shank Bracket
9	88311	5/8NCx2-1/2x4 U-Bolt
10	88306	3/4NF Lock Nut
11	88294	5/8NCx2 GR5 Bolt
12	20637	1/2NFx3 Bolt
13	11511	Shank
14	11509	Shank Holder
15	88304	1/2NF Lock Nut
16	11540	Spring & Plug Assembly (Ref Items 3,4 & 5)

S-SHANK



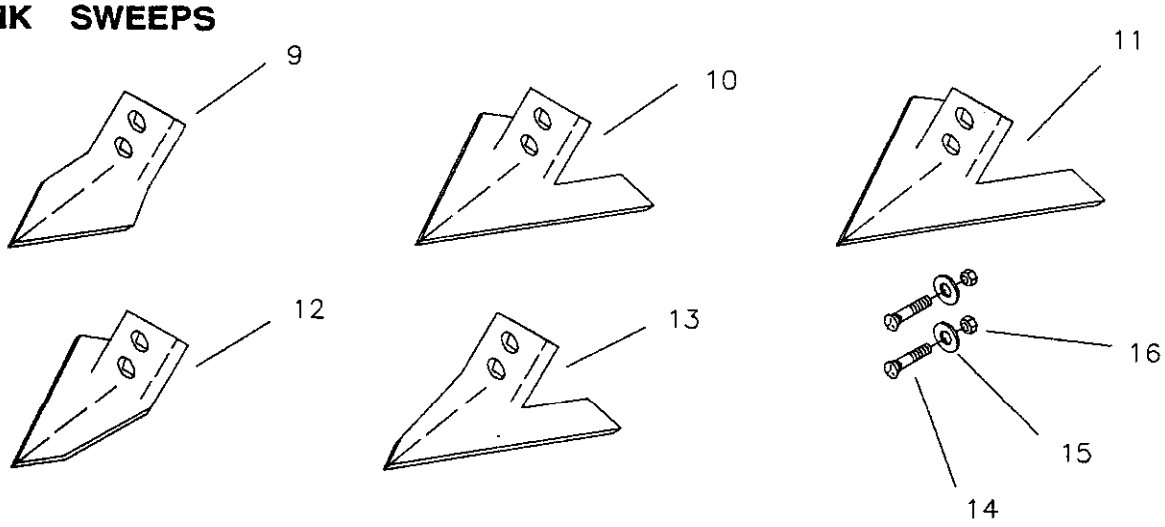
ITEM	PART NO.	DESCRIPTION
	41311	2-1/2 Sq S-Shank W/Hardware
1	41412	S-Shank
2	41151	2-1/2 Sq S-Shank Clamp
3	88381	5/8NCx4-1/2 Bolt
4	88129	5/8 Lock Washer
5	88126	5/8NC Nut

SWEEP



C-SHANK SWEEPS

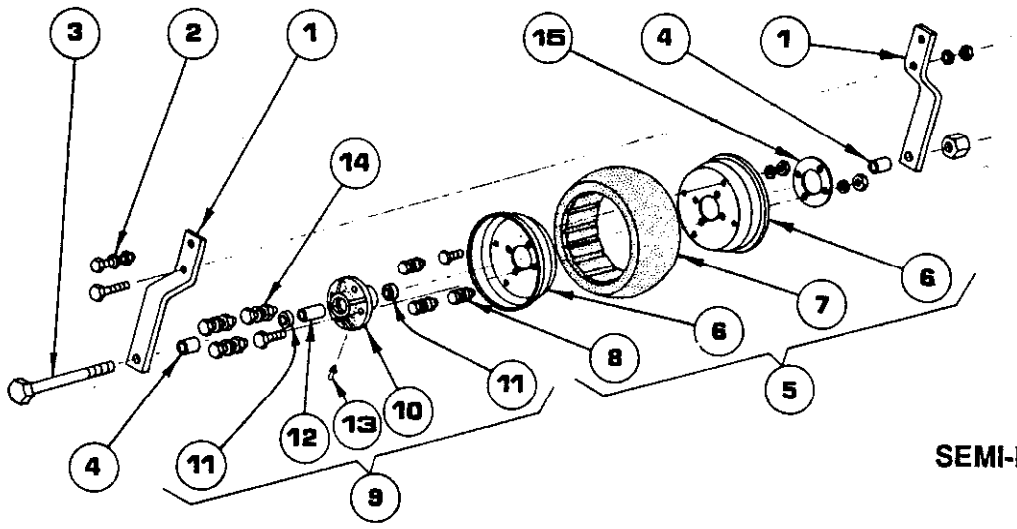
S-SHANK SWEEPS



ITEM	PART NO.	DESCRIPTION
1	25853	4" Sweep
2	21488	7" Sweep
3	21489	9" Sweep
4	25624	Right Hand 7" Half Sweep
	25626	Right Hand 9" Half Sweep
5	25623	Left Hand 7" Half Sweep
	25625	Left Hand 9" Half Sweep
6	14685	Shovel Bolt Kit 7/16x1-1/2 (Contains Hardware For 50 Shovels)
	88342	7/16NCx1-1/2 Plow Bolt
7	88152	7/16 Flat Washer
8	88344	7/16NC Heavy Hex Nut

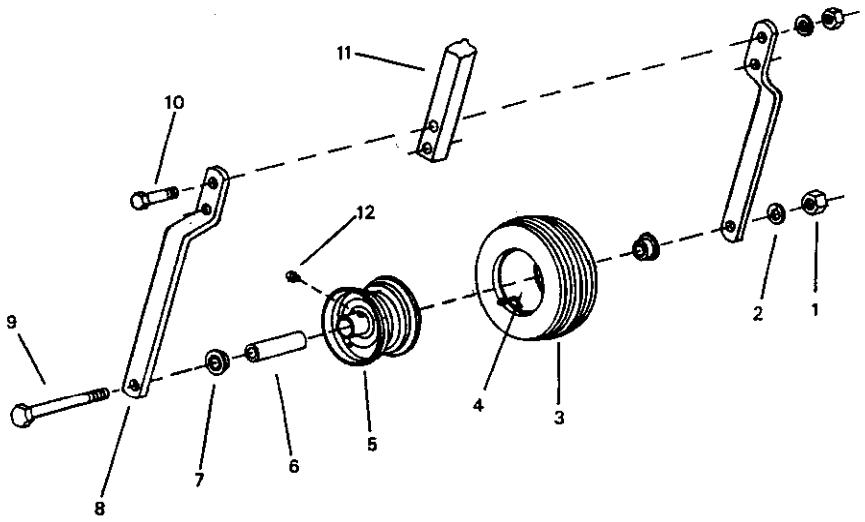
ITEM	PART NO.	DESCRIPTION
9	41638	4" Sweep (41 Deg)
10	41639	7" Sweep (41 Deg)
11	41640	9" Sweep (41 Deg)
12	41870	RH 7" Half Sweep (41 Deg)
13	41869	LH 7" Half Sweep (41 Deg)
14	41637	Shovel Bolt Kit 3/8x1-1/2 (Contains Hardware For 25 Shovels)
	88494	3/8NCx1-1/2 Plow Bolt
15	88282	3/8 Flat Washer
16	88103	3/8NC Heavy Hex Nut

C-SHANK GAUGE WHEEL



SEMI-PNEUMATIC

ITEM	PART NO.	DESCRIPTION
1	26797	Yoke Flat
2	88680	1/2NCx3-1/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
3	88383	5/8NCx7 GR5 Bolt
	88845	5/8NC Lock Nut
4	23086	.64IDx1"ODx.94" Bushing
5	31635	Heavy Duty Wheel Assy (Includes Items W/*)
6	23088	* Gang Wheel Disk
7	23068	* Gang Tire
8	88539	* 5/16NCx1/2 GR5 Bolt
	88358	* 5/16 Lock Washer
	88834	* 5/16NC Whiz Nut
9	23089	* Hub Assy Complete (Includes Items W/#)
10	23090	# Hub
11	23091	# Bearing
12	23092	# Bearing Spacer
13	88550	# 1/4" Grease Fitting
14	88553	3/8NCx1-1/2 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
15	23093	Support Washer



PNEUMATIC

ITEM	PART NO.	DESCRIPTION
1	88126	5/8NC Nut
2	88129	5/8 Lock Washer
3	23983	Wheel Assembly (Includes Items W/*)
	23984	* 15x6.00 4Ply Rib Tire
4	23985	* 15x6.00 Tube
5	23986	* 6x4.5 Rim
6	23987	* Spacer
7	23988	* 5/8 Sealed Bearing
8	**52826**	21" Yoke
9	88557	5/8x9 GR5 Bolt
10	88680	1/2x3-1/4 GR5 Bolt
11	26781	Gang Wheel Arm
12	88550	* 1/4" Grease Fitting

GANG SHIELDS

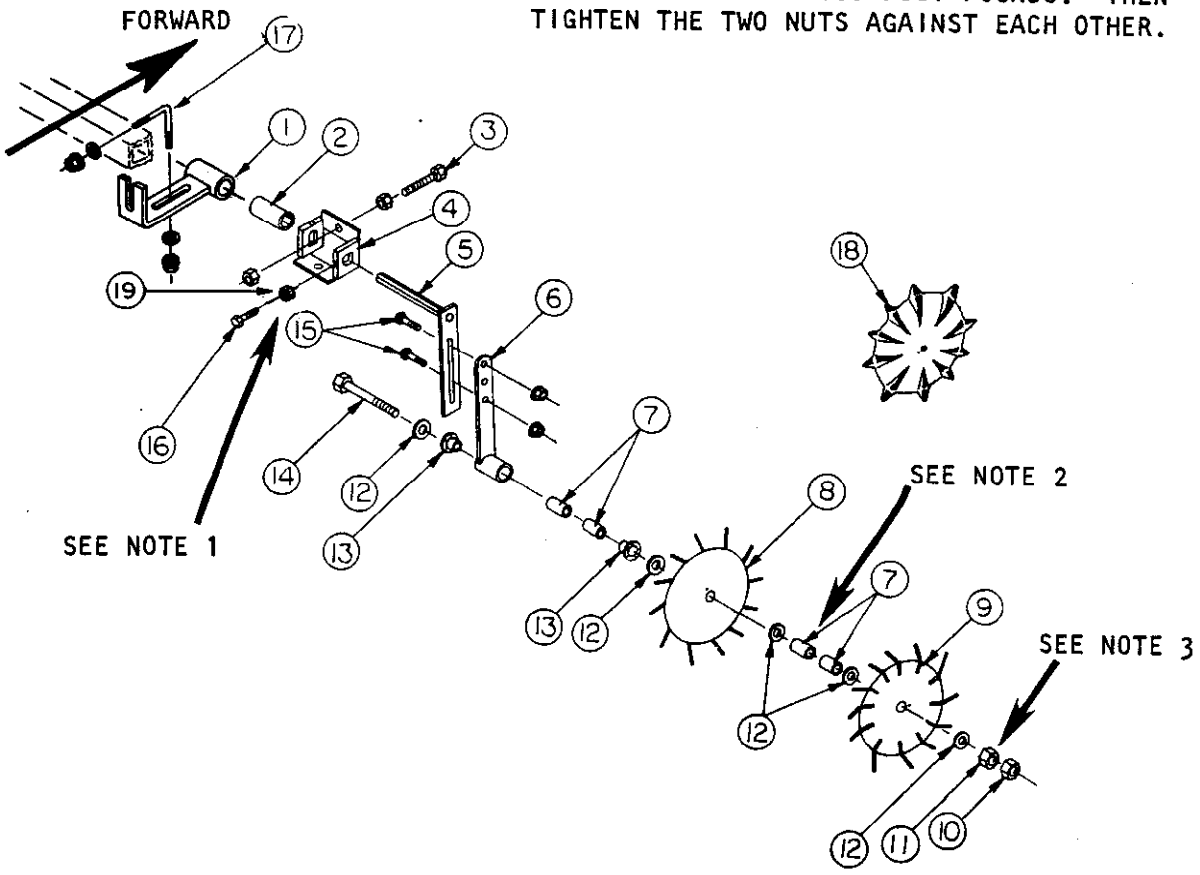
The mounting arm is shown in one of its many possible mounting positions.

Orientate the mounting arm as desired, but be sure to maintain adequate clearance with the tool bar. (The recommended orientation of the mounting arm is shown)

Position the mounting arm as close as possible to either side of the outside shank, but make sure that its location will not interfere with the shank's operation.

Refer to Gang Shield Adjusting and Operating for additional mounting considerations.

STANDARD MOUNT SYSTEM 30" ROW & WIDER



STANDARD MOUNTING SYSTEM -30" ROW & WIDER

When using the standard mounting system (two shields per mounting arm) the shields should be mounted on every other cultivator gang, one pair of shields on each side. This will eliminate the minimal possibility of side draft caused by the shields.

NOTE 1: INSERT THE 3/8 x 1-1/4 BOLT INTO THE ADJUSTING STOP AND SECURE WITH 3/8 JAM NUT. REFER TO ADJUSTING & OPERATING (HEIGHT ADJUSTMENT).

NOTE 2: TO NARROW THE DISTANCE BETWEEN THE TWO SHIELDS, THEY CAN BE ASSEMBLED AS SHOWN, WITH ONLY ONE SPACER BETWEEN THE SHIELDS AND THE OTHER SPACER BETWEEN THE OUTSIDE SHIELD AND NUTS. IF A NARROWER SETTING IS DESIRED BOTH SPACERS CAN BE PLACED BETWEEN THE OUTSIDE SHIELD AND NUTS.

NOTE 3: TIGHTEN THE BOLT AND NUT SECURELY BUT DO NOT EXCEED 160 FOOT POUNDS. THEN TIGHTEN THE TWO NUTS AGAINST EACH OTHER.

STANDARD MOUNTING SYSTEM-

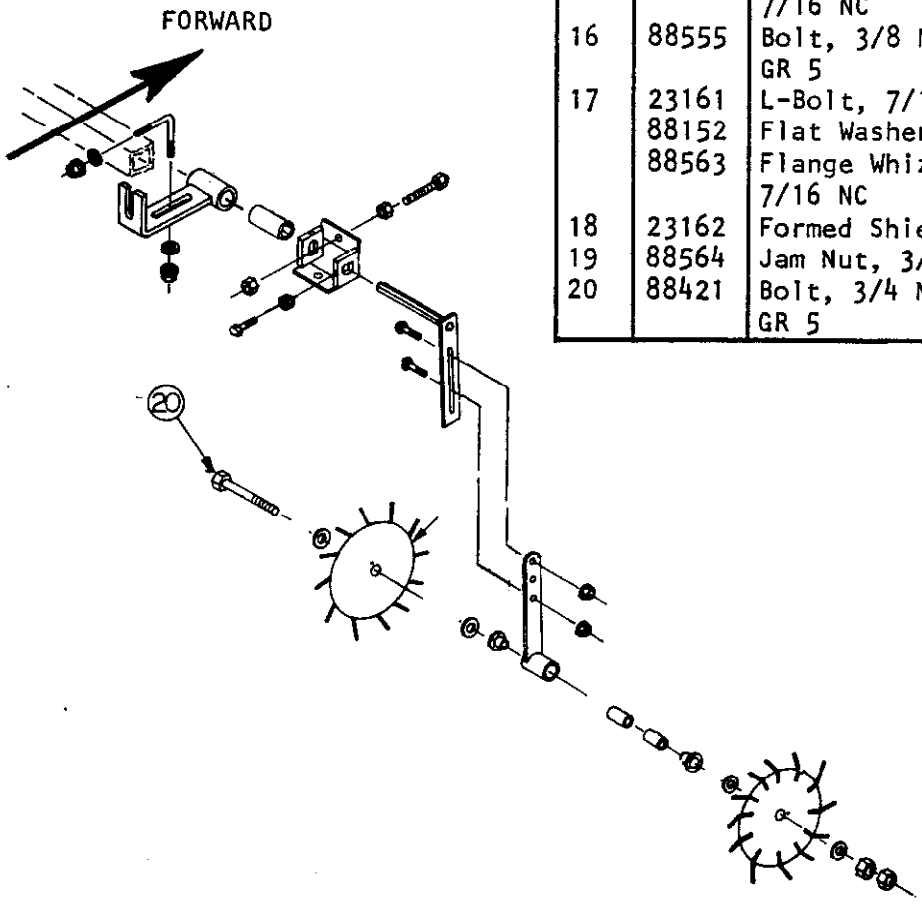
30"-32" ROWS (C-SHANK)

NOTE: THIS ARRANGEMENT IS NECESSARY WHEN MOUNTING TO NARROW ROW C-SHANK ROW CROP CULTIVATORS.

When using the standard mounting system (two shields per mounting arm) the shields should be mounted on every other cultivator gang, one pair of shields on each side. This will eliminate the minimal possibility of side draft caused by the shields.

NOTE: ASSEMBLE THE STANDARD MOUNTING SYSTEM - 30"-32" ROW AS SHOWN. PARTS AND ASSEMBLY ARE THE SAME AS THE STANDARD MOUNTING SYSTEM - 30" & WIDER EXCEPT WHERE NOTED.

STANDARD MOUNT SYSTEM 30" - 32" ROW



GANG SHIELDS

STANDARD MOUNT SYSTEM - 30" ROW & WIDER
STANDARD MOUNT SYSTEM - 30" - 32" ROW
SPLIT ROW MOUNT

Item	Part #	Description	Qty.
1	23151	Mounting Arm	1
2	23152	Nylon Bearing	1
3	23153	Special Bolt, 1/2 NC x 2 GR 5	1
	88561	Jam Nut, 1/2 NC	2
4	23154	Adjusting Stop	1
5	23155	Upper Arm	1
6	23156	Bearing Housing Arm	1
7	23157	Spacer	4
8	23158	Left Welded Shield	1
9	23159	Right Welded Shield	1
10	88562	Jam Nut, 3/4 NC	1
11	88110	Nut, 3/4 NC	1
12	88131	Flat Washer, 3/4	5
13	23160	Flange Bearing	2
14	88556	Bolt, 3/4 NC x 7-1/2	1
15	88505	Carriage Bolt, 7/16 NC x 3-1/2	2
	88563	Flange Whiz Lock Nut, 7/16 NC	2
16	88555	Bolt, 3/8 NC x 1-1/4 GR 5	1
17	23161	L-Bolt, 7/16	1
	88152	Flat Washer, 7/16	2
	88563	Flange Whiz Lock Nut, 7/16 NC	2
18	23162	Formed Shield	1
19	88564	Jam Nut, 3/8 NC	1
20	88421	Bolt, 3/4 NC x 4-1/2 GR 5	1

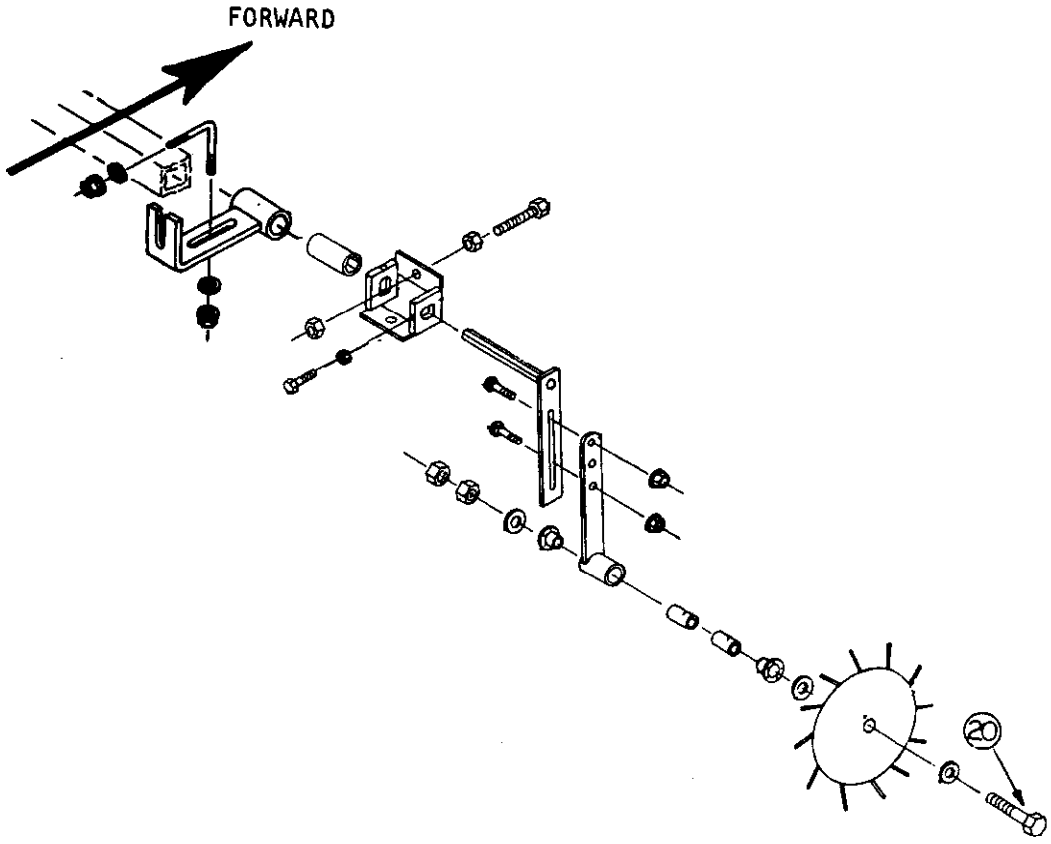
GANG SHIELDS

SPLIT ROW MOUNTING SYSTEM

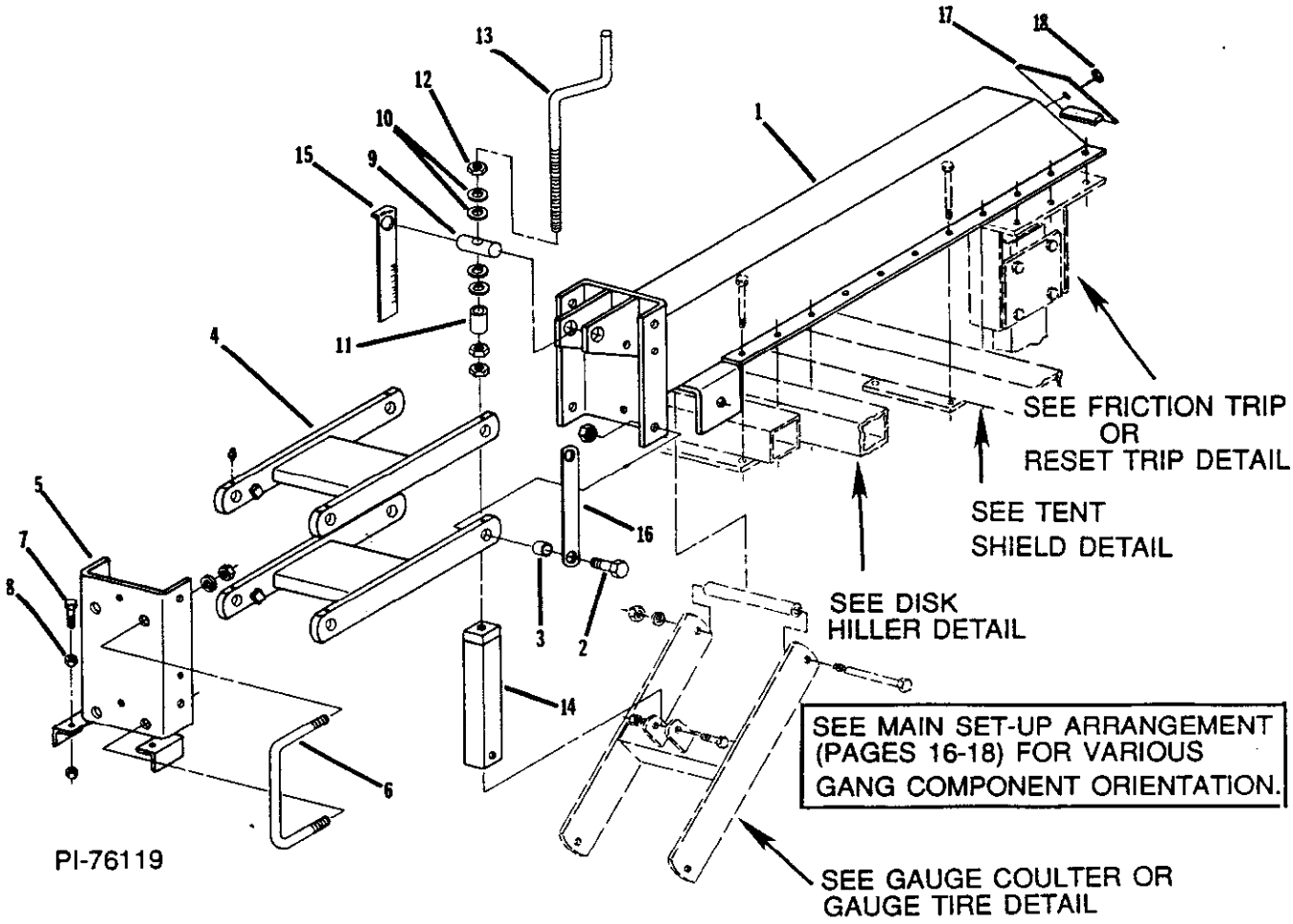
When using the split row mounting system (one shield per mounting arm) shields are mounted on every cultivator gang, one shield on each side.

NOTE: ASSEMBLE THE SPLIT ROW AS SHOWN. PARTS AND ASSEMBLY ARE THE SAME AS THE STANDARD MOUNT - 30" ROW & WIDER EXCEPT WHERE NOTED.

SPLIT ROW MOUNT



WRO-TILL GANG



ITEM	PART NO.	DESCRIPTION
1	31302	Gang Assembly
	31399	Gang Weldment
2	88294	5/8NCx2 GR5 Bolt
	88845	5/8NC Lock Nut
3	23077	.7" Sleeve Bearing
4	31389	Linkage Bar W/ Grease Fittings
	88550	Grease Fitting
5	23184	Attaching Bracket
6	23185	3/4 U-Bolt
	88130	3/4 Lock Washer
	88110	3/4NC Nut
7	23153	1/2x2 GR5 Clamp Screw
8	88104	1/2NC Nut
9	23186	Pivot Bushing
10	88548	3/4x1-1/2-10GA Machinery Bushing
11	23187	Bushing
12	23188	Special Nut
13	23189	Crank
14	23190	Adjusting Crank Tube
15	23191	Depth Gauge
16	31388	Flat
17	23989	Tube Cap
18	88835	7/16NC Whiz Lock Nut

To keep the gang tight and level, and to keep it from twisting on the tool bar,the clamp screws (Item 7) on the front of the gang assembly that reaches under the tool bar must be adjusted.

To adjust clamp screws:
(1) Level the gang with the tool bar. The gang is level when looking from the rear, with the tool bar level side to side, the sweeps and gauge coulter are straight up and down.
(2) Tighten both screws tightly against the tool bar and lock in place with the double nut.

Assemble the depth adjusting crank (Item 13) on the gang as shown. Tighten the top jam nut against the end of the threads as tight as possible. Leave just enough room for the pivot bushing and machinery bushing between the top jam nut and the lower pair of jam nuts to allow the crank to turn freely. Tighten on jam nut of the lower pair against the other to maintain this distance.

Assemble the depth gauge (Item 15) so that the numbers and markings are to the inside, against the adjusting crank tube (Item 14). This will allow you to sight across the tube to read the gauge.

GAUGE COULTER DETAIL

Attach the gauge coulter to the gang as shown. (See Also Wro-Till Gang, Page 40)

Use the adjusting screw on the coulter fork to set the direction of the coulter, so it runs straight ahead. Recheck this adjustment in the field.

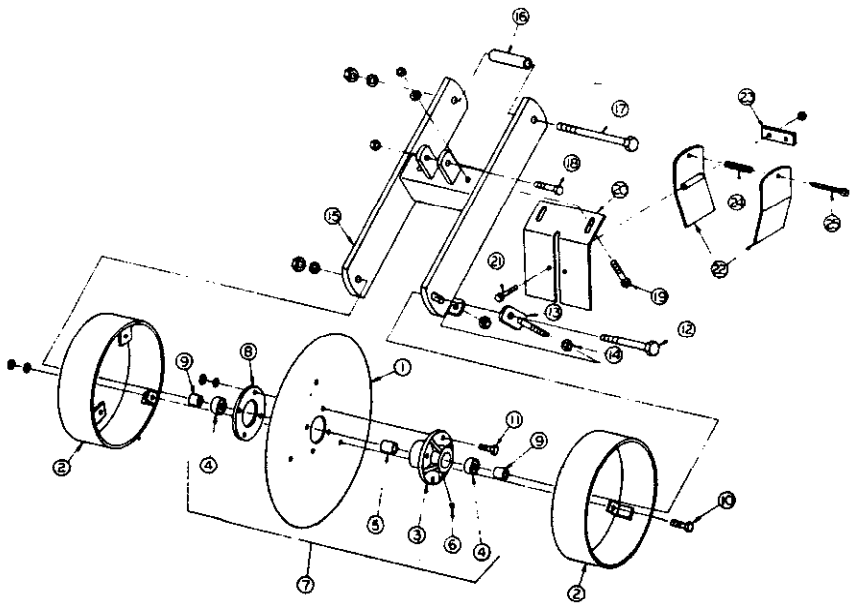
The band scrapers (Item 20) should be set to run as close as possible to the depth control bands, without touching.

Coulter scrapers (Item 22) are spring loaded and require no adjustment.

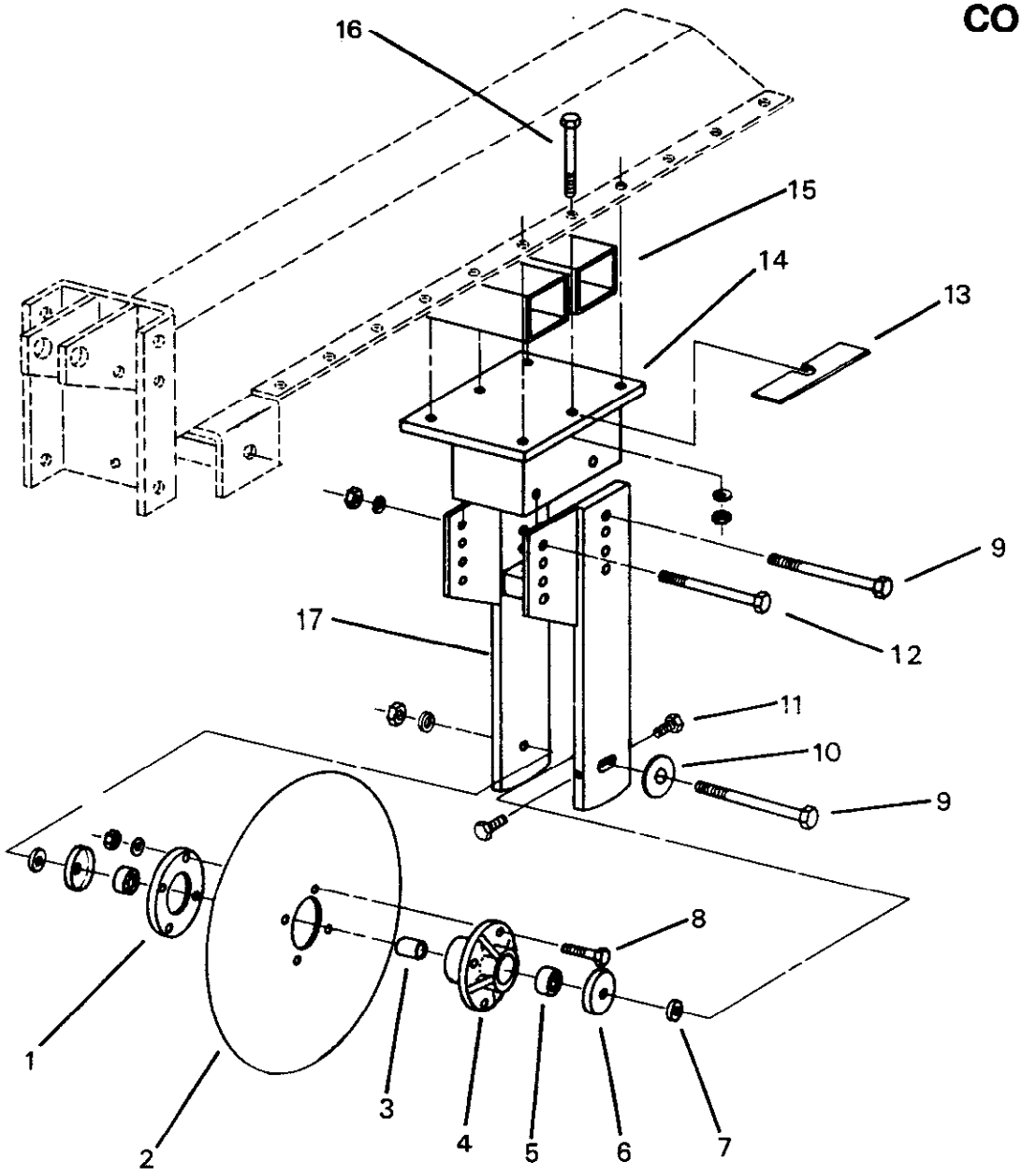
GAUGE COULTER

ITEM	PART NO.	DESCRIPTION
1	23192	Coulter Blade
2	23193	Depth Control Band
3	23090	* Hub
4	23091	* Bearing
5	23092	* Bearing Spacer
6	88550	* 1/4 Grease Fitting
7	23089	Hub Assembly (Includes Items W/*)
8	23093	Support Washer
9	23194	.64IDx1"ODx1.93" Bushing
10	88555	3/8NCx1-1/4 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
11	88553	3/8NCx1-1/2 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
12	88557	5/8NCx9 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
13	23124	Adjusting Screw
14	88104	1/2NC Nut
15	23195	Fork
16	23196	.64IDx1"ODx7" Bushing
17	88557	5/8NCx9 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
18	88541	1/2NCx3 GR5 Bolt
	88363	1/2NC Lock Nut
19	88571	3/8NCx3-1/2 Carriage Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
20	23197	Band Scraper
21	88412	3/8NCx3-1/2 Bolt
	88162	3/8NC Lock Nut
22	31397	Coulter Scraper
23	23199	Spanner Flat
24	23200	Spring
25	88572	1/4 Diax3-1/2 Ex.Prong Cotter Pin

GAUGE COULTER DETAIL

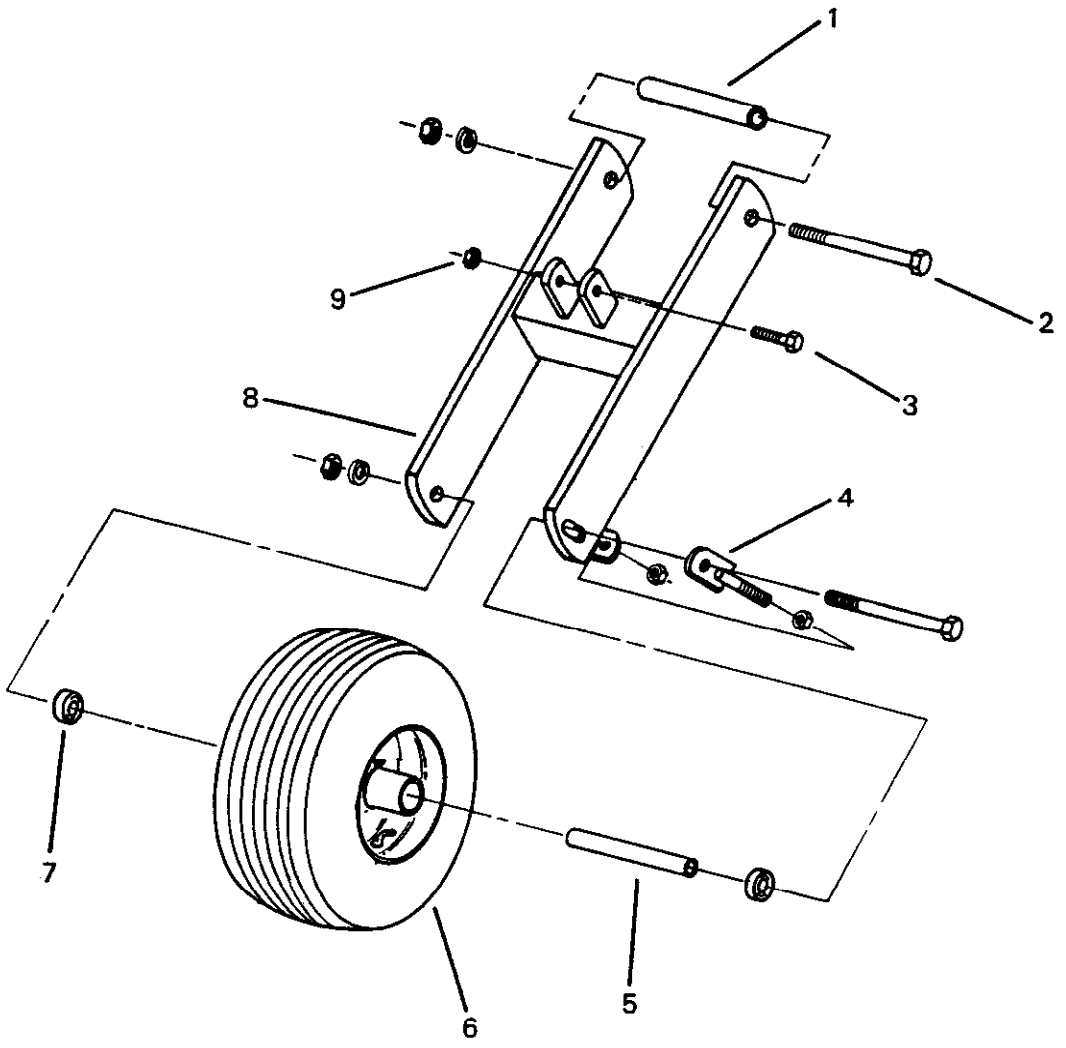


COULTER



ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	23093	Support Washer	8	88553	3/8NCx1-1/2 Bolt
2	23192	* Solid Coulter Blade	9	88295	5/8NCx6 Bolt
3	23092	* Bearing Spacer	10	88630	5/8 Flat Washer
4	23089	Hub Assembly	11	88854	5/16NCx1-1/2
		(Includes Items W/*)	12	88796	5/8NCx5-1/2
	23090	* Hub	13	24987	1/16" Spacer
	88550	* 1/4 Grease Fitting		24986	1/8" Spacer
5	23091	* Bearing	14	23993	Attaching Bracket
6	23999	Bearing Guard	15	24738	Tube
7	24711	Bushing	16	88595	1/2NCx4 Bolt
			17	24716	Auxiliary Coulter Fork

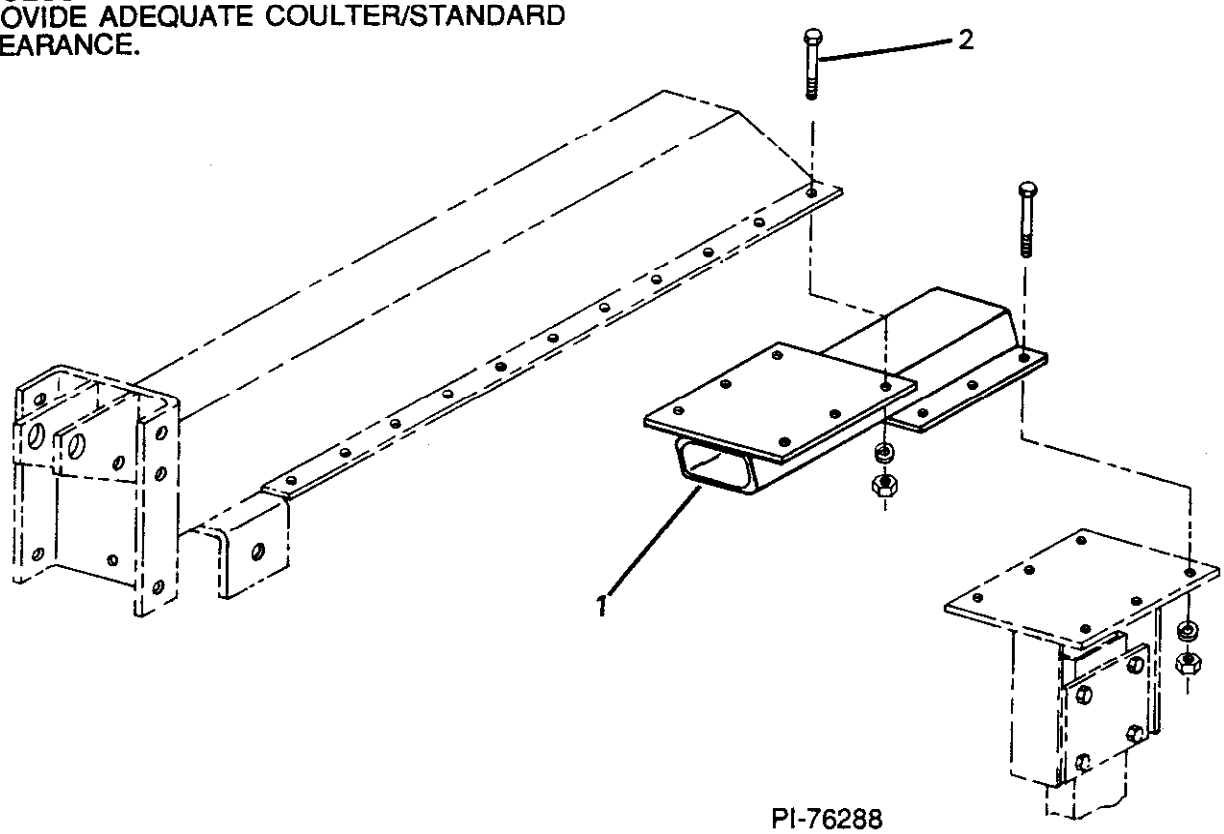
GAUGE WHEEL



ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	23196	Crank Adjust Tube		23984	* 15 x 6.00 4Ply Tire
2	88557	5/8NCx9 GR5 Bolt		23986	* 6 x 4.5 Rim
3	88541	1/2NCx3 GR5 Bolt		23985	* 15 x 6.00 Tube
4	23124	Adjusting Screw		88422	* 1/4 NF Grease Fitting
5	23987	* Spacer	7	23988	* 5/8 Sealed Bearing
6	23983	15 x 6.00-6 Wheel Assy (Includes Item W/*)	8	23195	Fork
			9	88661	1/2NC Lock Nut

RIGID GANG EXTENSION

WHEN MOUNTING THE GAUGE TIRE & COULTER WITH A FRICTION TRIP STANDARD IT IS NECESSARY TO USE A GANG EXTENSION TO PROVIDE ADEQUATE COULTER/STANDARD CLEARANCE.



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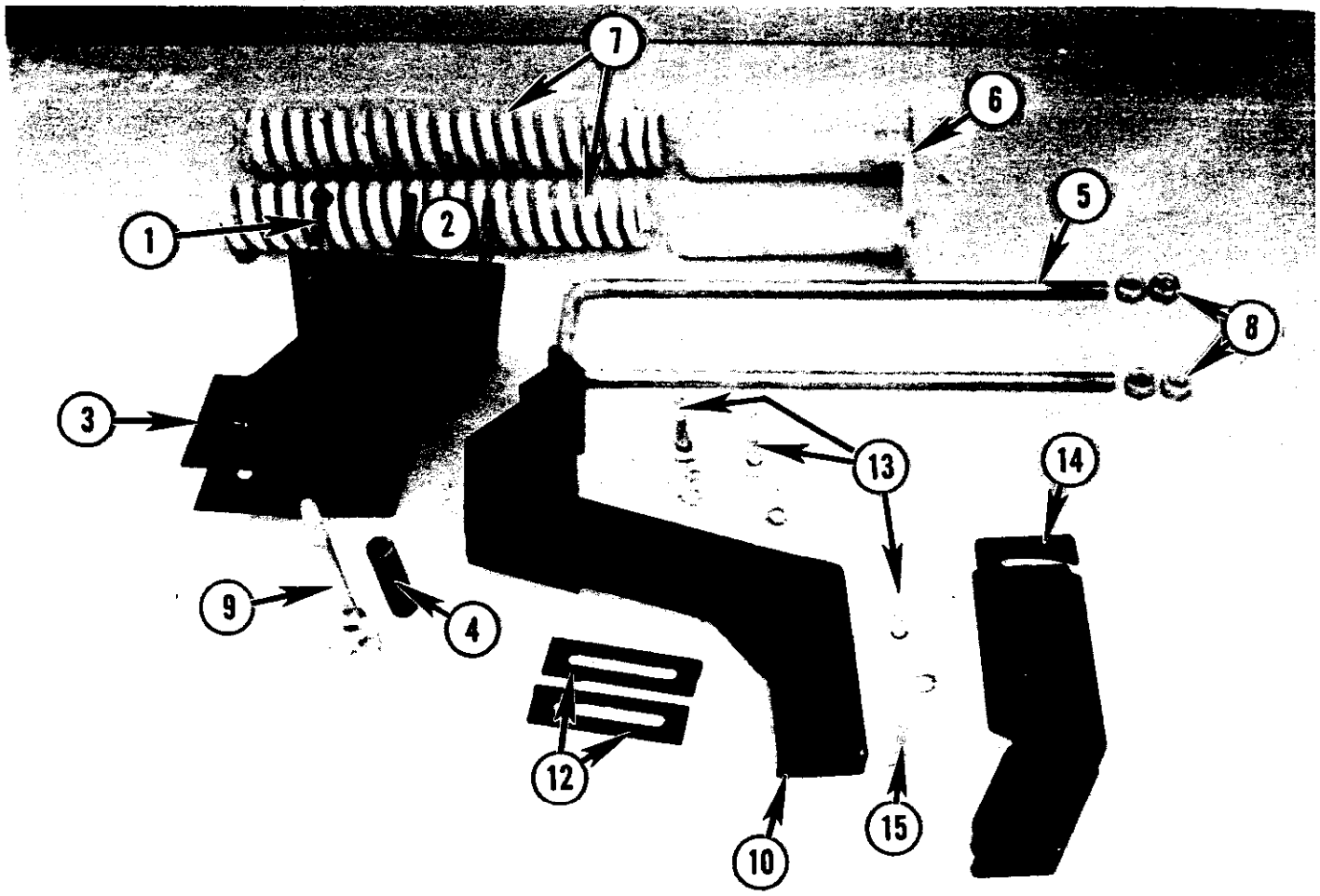
ITEM	PART NO.	DESCRIPTION
1	23997	Gang Extension
2	88475	1/2NCx1-1/2 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut

SPRING TRIP STANDARD



ITEM	PART NO.	DESCRIPTION
1	88543	1/2NCx3-3/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
2	23169	Mounting Tube (Not Shown)
3	23336	Welded Mount
4	23337	Bushing
5	23338	3/4 U-Bolt
6	23339	Welded Spring Guide
7	23340	Spring
8	88110	3/4NC Nut
9	88633	5/8NCx5-1/2 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut

ITEM	PART NO.	DESCRIPTION
10	23341	Welded Standard
11	88550	1/4 Grease Fitting
12	23348	Flat
13	88541	1/2NCx3 GR5 Bolt
	88347	1/2 Flat Washer
	88303	1/2 Lock Washer
	88104	1/2NC Nut
14	23201	Foot Bracket
15	88541	1/2NCx3GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut

1. Attach the spring shank assembly using the spacer tubes and hardware provided, (the two shipping straps must be removed and discarded before mounting), in either the rear position or...

2. .... the front position, depending on your setup used.

   NOTE: Whenever you try a new setup or adjustment, make sure the spring trip has adequate clearance to trip back. To do this, remove the 3/4" nuts from the U-bolt. Then pivot the shank standard back until it hits the stop on the clamp, checking for interferences. Rearrange as necessary and check again.

3. Either or the spacer tubes can be replaced by the shield mounting tube if needed to get the proper shield position.

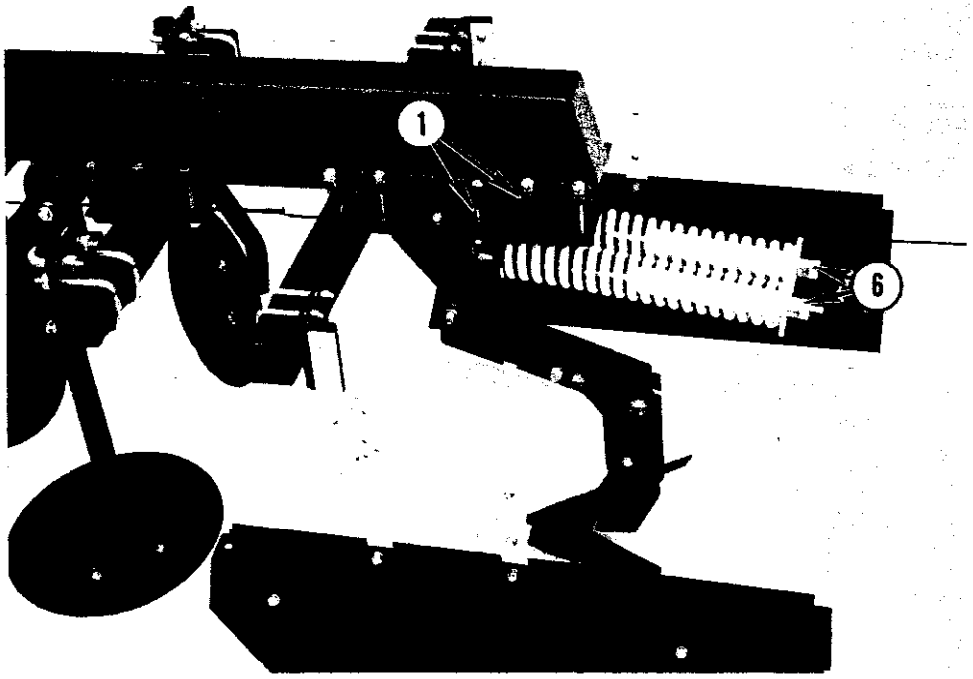
4. Set the sweep pitch (see page 45 in your Operator's Manual).

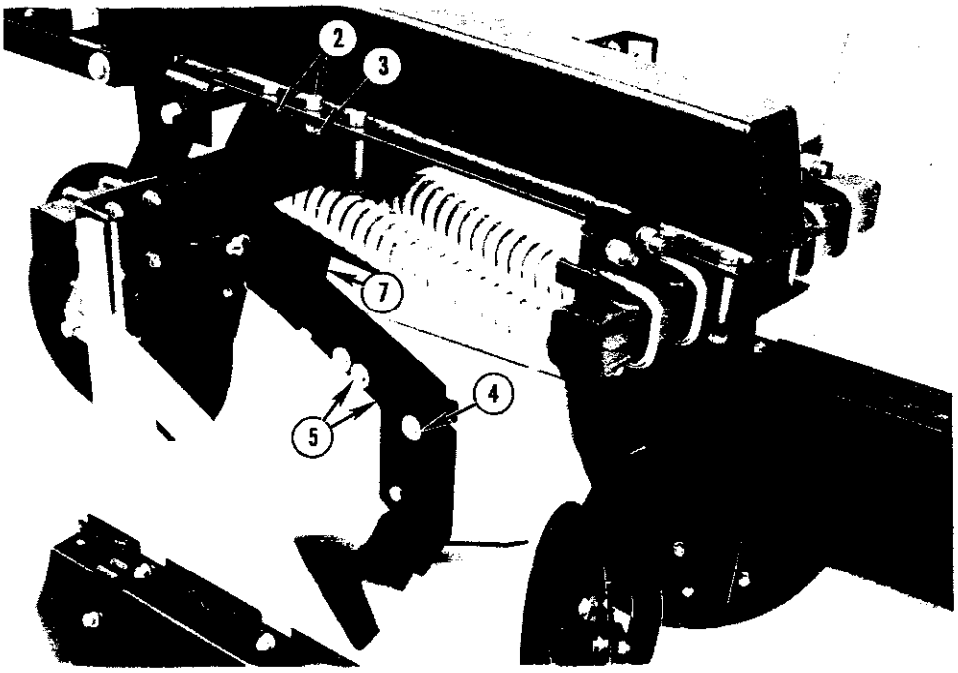
5. Slide the slotted flats against the mounting foot and tighten in place. This will keep the foot at the proper pitch. Tighten the bolts only tight enough to keep the foot from slipping in your normal conditions. If you have tree roots you may want to leave the slotted flats off or loose.

6. Tighten or loosen the nuts on the springs to adjust the shank trip pressure.

   Tighten one nut against the other to lock in place.

7. Grease the pivot bushing every 10 hours of operation.





FRICTION TRIP STANDARD DETAIL

The sweep mounting foot is designed to let the sweep trip back, if the sweep hits a solid object. The mounting foot bolts should be tight, but only tight enough to keep the sweep from tripping unnecessarily.

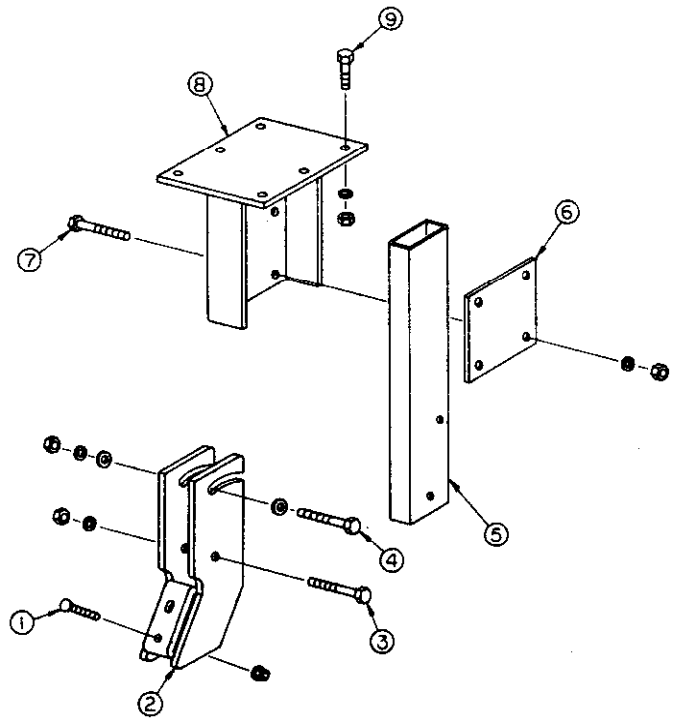
Adjust the foot bracket so that the tip of the sweep is 1" lower than the back of the sweep. This will provide sucking action, allowing the cultivator to penetrate.

Set the tip of the sweep 28-1/2" below the underside of the 4 x 6 gang tube.

(SEE PAGE 43 FOR ADDITIONAL SWEEP AND FURROWER INFORMATION)

Item	Part #	Description	Qty.
1	88573	Plow Bolt, 7/16 NC x 3 No. 3 GR 5	2
	88835	Flange Whiz Lock Nut, 7/16 NC	2
2	23201	Foot Bracket	1
3	88541	Bolt, 1/2 NC x 3 GR 5	1
	88303	Lock Washer, 1/2	1
	88104	Nut, 1/2 NC	1
4	88541	Bolt, 1/2 NC x 3 GR 5	1
	88347	Flat Washer, 1/2	2
	88303	Lock Washer, 1/2	1
	88104	Nut, 1/2 NC	1
5	23202	Shank Tube	1
6	23203	Clamp Flat	1
7	88541	Bolt, 1/2 NC x 3 GR 5	4
	88303	Lock Washer, 1/2	4
	88104	Nut, 1/2 NC	4
8	23204	Mounting Clamp	1
9	88475	Bolt, 1/2 NC x 1-1/2 GR 5	6
	88303	Lock Washer, 1/2	6
	88104	Nut, 1/2 NC	6

FRICTION TRIP STANDARD DETAIL

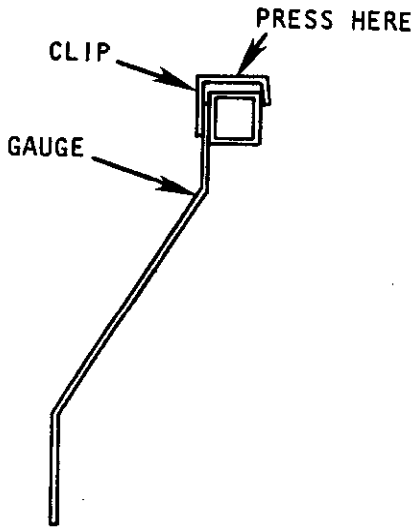


DISK HILLER DETAIL

The stop blocks on the disk hiller clamps should be positioned so that the block under the tube is always on the same side as the offset of the disk hiller standard. (See Front View)

This will keep the clamp from twisting on the tube and is therefore essential.

Set the bottom of the disk 26-1/2" below the underside of the 4 x 6 gang tube.



GAUGE DETAIL

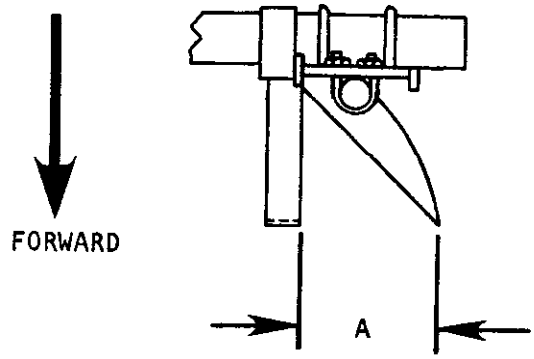
SETTING DISK HILLER ANGLE

All disk hillers must be set at the same angle. This is done by using the disk hiller angle gauge.

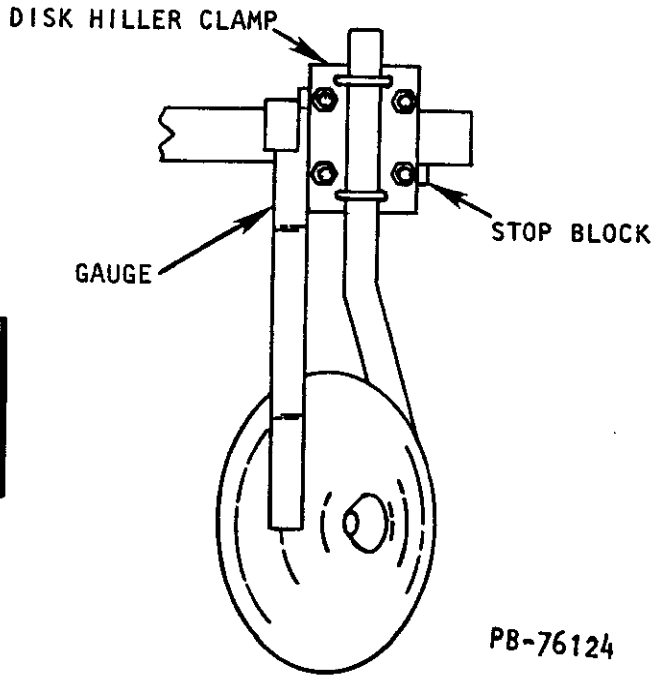
Clamp the gauge to the 2-1/2" tube using the gauge clip, by positioning the long leg of the clip over the gauge and pressing down with the heel of your hand. (See Gauge Detail)

The gauge must be tight against the edge of the disk hiller clamp. (See Front View)

Measure over from the inside of the gauge to the leading edge of the disk. Position the disk so that this distance is the same for all disk hillers. The table below gives suggested distances for various row widths. (See Top View)

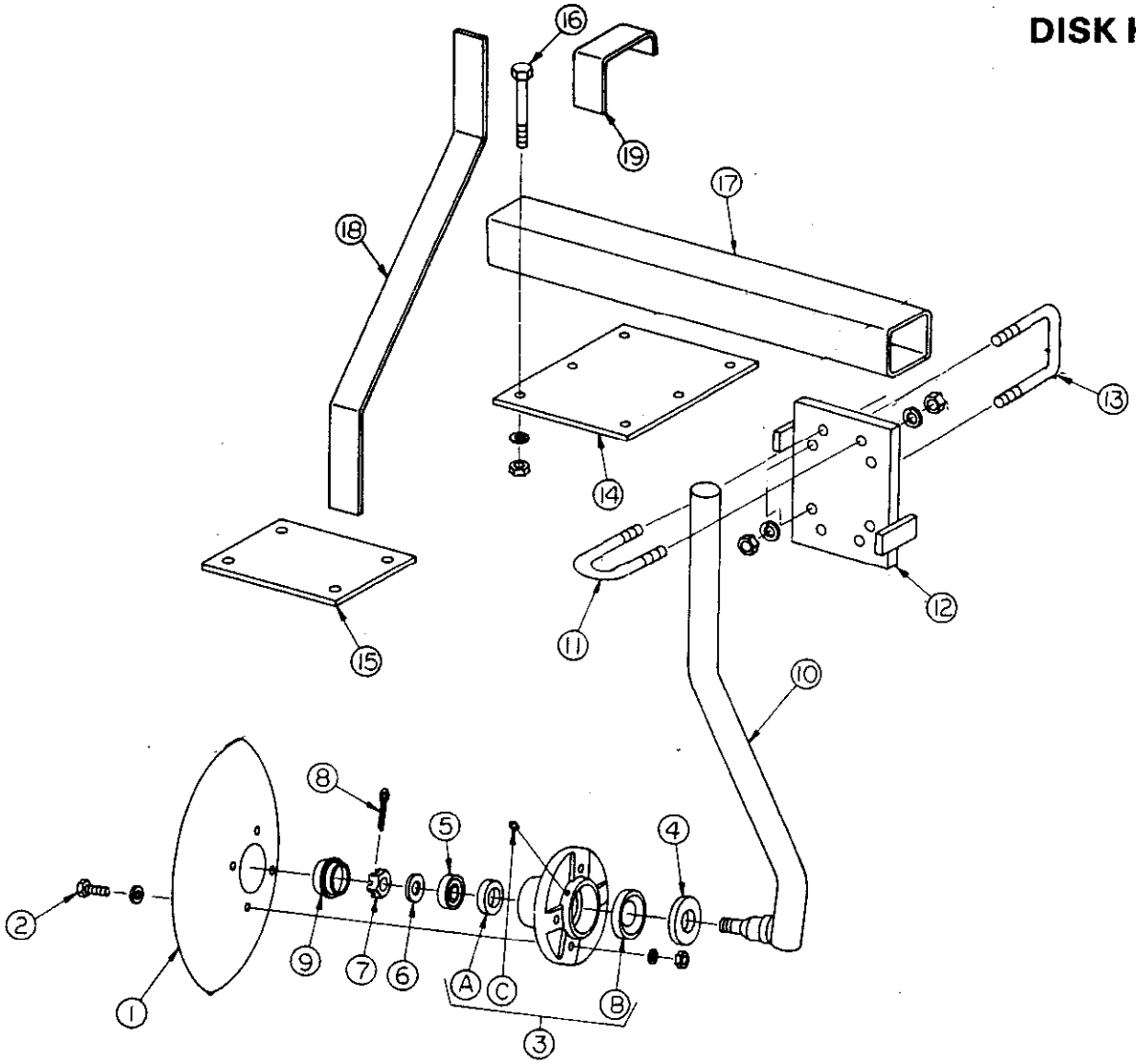


TOP VIEW



FRONT VIEW

ROW WIDTH	30"	36"	38"	40"
Distance from gauge to forward edge of disk hiller (A), in inches.	4-1/2	5	5-1/4	5-1/2



DISK HILLER

ITEM	PART NO.	DESCRIPTION
1	23205	Disk
2	88553	3/8NCx1-1/2 GR5 Bolt
	88282	3/8 Flat Washer
	88362	3/8 Lock Washer
	88103	3/8NC Nut
3	23206	Hub W/ Cups & Grease Fitting
A	23101	Outer Cup
B	10344	Inner Cup
C	88550	1/4 Grease Fitting
4	23207	Bearing & Seal
5	23029	Outer Cone Bearing
6	88548	3/4 SAE Flat Washer
7	88300	3/4NF Slotted Nut
8	88560	1/8 Diax1-1/4 Cotter Pin
9	23209	Cap
10	23210	Disk Hiller Standard
11	23211	5/8 U-Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
12	23212	Disk Killer Clamp
13	23213	5/8NC U-Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
14	23214	Flat W/6 Holes (Inside Gangs)
15	23168	Flat W/4 Holes (Outside Gangs)
16	88543	1/2NCx3-3/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
17	23215	2-1/2 SQ x 22" Tube
18	23216	Disk Hiller Gauge
19	23217	Disk Hiller Gauge Clip

WRO-TILL - SWEEPS & FURROW OPENERS

SWEEPS

Half-sweeps are used instead of smaller full sweeps to give more trash clearance between the end sweep shank and the end tent shield.

FURROW OPENERS

In certain situations, furrow openers may be desired instead of the regular sweeps.
These furrow openers are ideal for gravity-irrigated fields because they clear such good, clean furrows. Furrow openers are recommended when one wishes to throw a great deal more soil than is possible with the regular sweeps.

Tent shields are optional, depending on the height of the crop when the furrowing operation is performed.

When the furrower is used, the foot mounting bracket must be tipped back to allow the furrower to run approximately level or flat with the ground.

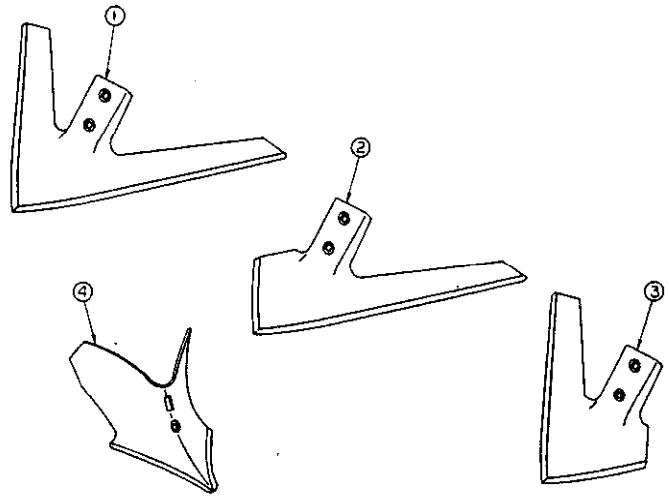
The 9" size measures 9" across the bottom and 11" across the wings. The 12" size measures 12" across the bottom and 14-1/2" across the wings.

For narrow row widths (30") the 9" furrow openers are recommended. For wide row widths (36", 38", 40") the 12" furrow openers are recommended.

SWEEPS & FURROW OPENERS

Item	Part #	Description	Qty.
1	23174	14IN Full Sweep	1
	23175	20IN Full Sweep	1
2	23176	14IN Half Sweep Left	1
	23178	20IN Half Sweep Left	1
3	23177	14IN Half Sweep Right	1
	23179	20IN Half Sweep Right	1
4	23180	9IN Furrower	1
	23181	12IN Furrower	1

SWEEPS & FURROW OPENERS



TENT SHIELD
(WRO-TILL ONLY)

ITEM	PART NO.	DESCRIPTION
1	23025	Tent Shield
2	88566	3/8NCx3/4 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
3	23145	Yoke
4	88553	3/8NCx1-1/2 GR5 Bolt
5	23942	Link
6	88553	3/8NCx1-1/2 GR5 Bolt
	88162	3/8NC Nut
7	23946	Flat
8	88567	3/8NCx1-3/4 GR5 Bolt
	88162	3/8NC Lock Nut
9	23944	Flat
10	88553	3/8NCx1-1/2 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
11	23166	L-Bracket
12	23218	3/8 U-Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
13	31395	2-1/2 SQx39" Mounting Tube
14	31396	Flat W/2 Holes
15	88543	1/2NCx3-3/4 GR5 Bolt
	88303	1/2 Lock Washer
	88104	1/2NC Nut
16	23039	Hairpin Cotter
17	24738	2-1/2 SQx7" Mounting Tube

The shields are to be centered over the row.

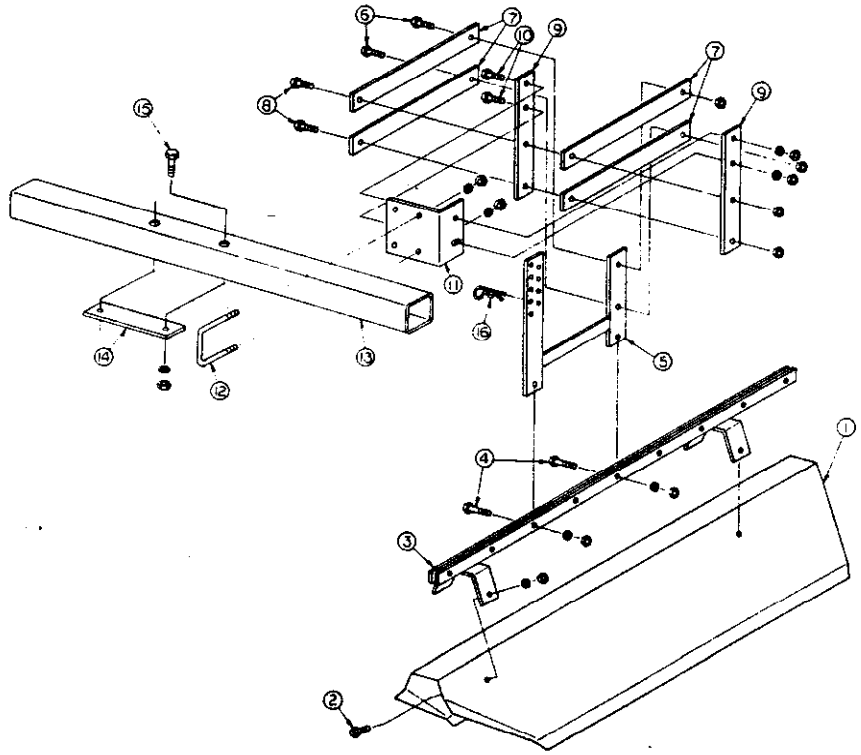
The shield are mounted two per every other gang. Start with the gangs on either side of the center gang.

Refer to the Operating and Adjusting section for mounting adjustments.

NOTE: THE BOLTS AND LOCK NUTS AT THE SHIELD LINKAGE PIVOT POINTS SHOULD BE KEPT AS TIGHT AS POSSIBLE AND STILL ALLOW MOVEMENT OF THE LINKAGE. THE PARALLEL LINKAGE OF THE SHIELD KEEPS THE SHIELD LEVEL THROUGH ITS RANGE OF VERTICAL ADJUSTMENT.

NOTE: A SLOTTED HOLE IS PROVIDED IN THE L-BRACKET TO ALLOW THE SHIELD TO BE ALIGNED PARALLEL TO THE GROUND. BE SURE TO MAKE THIS ADJUSTMENT BEFORE TIGHTENING THE SHIELD TO THE L-BRACKET.

TENT SHIELD



WEIGHT TRANSFER SPRING ASSEMBLY

(WRO-TILL OPTIONAL EQUIPMENT)

The optional weight transfer springs transfer the weight of the tool bar onto the gangs making it working weight. This may be needed to help the cultivator penetrate when soils are hard and/or crop residue is very heavy.

Use one spring per gang with a straight tool bar and two springs per gang with a folding tool bar.

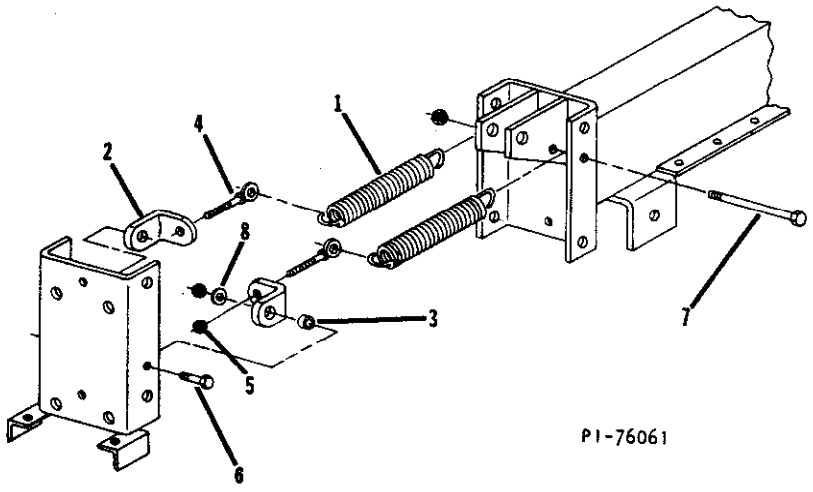
Assemble the components as shown. Tighten the adjusting bolt all the way up.

If the springs hold the tool bar up too high when in use, either loosen the adjusting bolt or add weight to the tool bar until the parallel linkage runs level.

WEIGHT TRANSFER SPRING ASSEMBLY

Item	Part #	Description	Qty.
1	23170	Spring, 9-1/2IN	1
2	23171	Anchor Clip	1
3	23172	Spacer Bushing, 3/4 OD x .42IN	1
4	23173	Adjusting Bolt	1
5	88563	Flange Whiz Lock Nut, 7/16 NC	1
6	88554	Bolt, 1/2 NC x 1-1/4 GR 5	1
	88363	Lock Nut, 1/2 NC	1
7	88568	Bolt, 1/2 NC x 7-1/2	1
	88363	Lock Nut, 1/2 NC	1
8	88152	Flat Washer, 7/16	1

WEIGHT TRANSFER SPRING ASSEMBLY



Flat-fold units are equipped with (2) parking stands which should be mounted on the ends of the center tool bar on the front side.

Non-fold units are equipped with (1) parking stand which should be mounted in the center of the tool bar on the front side.

NOTE: SOME TRACTOR CAB DESIGNS MAY CAUSE INTERFERENCE WITH THE PARKING STAND WHEN TRANSPORTING. UNDER THESE CONDITIONS THE PARKING STAND MAY BE ATTACHED ON THE BACK SIDE OF THE TOOL BAR TO PROVIDE ADDITIONAL CLEARANCE.

WHEN ATTACHING THE PARKING STAND ON THE BACK SIDE OF THE TOOL BAR, LOCATE IT ON THE SIDE OF THE GANG WHERE THERE IS THE GREATEST AMOUNT OF CLEARANCE BETWEEN THE TOOL BAR AND TOOTH BAR.

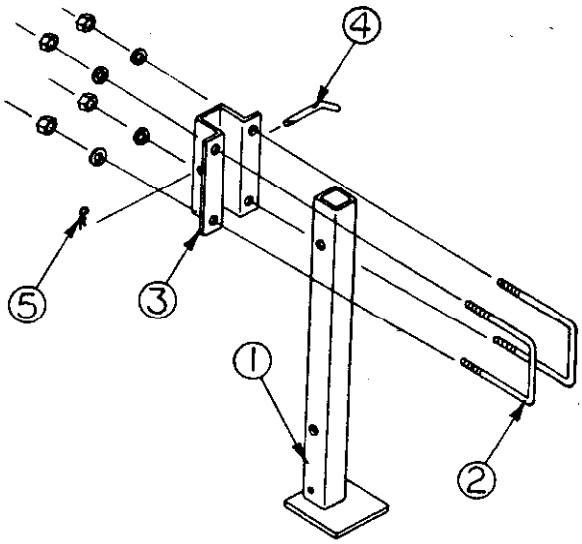
PARKING STAND

Item	Part #	Description	Qty.
1	23045	Parking Stand	1
2	23078	U-Bolt, 5/8 (5 x 7 Tool Bar)	2
	23046	U-Bolt, 5/8 (7 x 7 Tool Bar)	2
	88129	Lock Washer, 5/8	4
	88126	Nut, 5/8 NC	4
3	23047	Stand Retainer	1
4	23048	Pin	1
5	23039	Hairpin Cotter	1

⚠ CAUTION

To prevent personal injury ALWAYS lower folding wings to field working position and lower stand before disconnecting cultivator from tractor.

PARKING STAND



STABILIZER COULTERS

(DANISH TINE & C-SHANK ONLY)

There are two styles of stabilizing coulters, outside and center.

The outside style is used in pairs. They are attached to the tool bar, one on each side of tractor, either in-line or adjacent to the gangs angle clamps. This style is used with non-fold and flat-fold models.

The center style uses a single coulter.

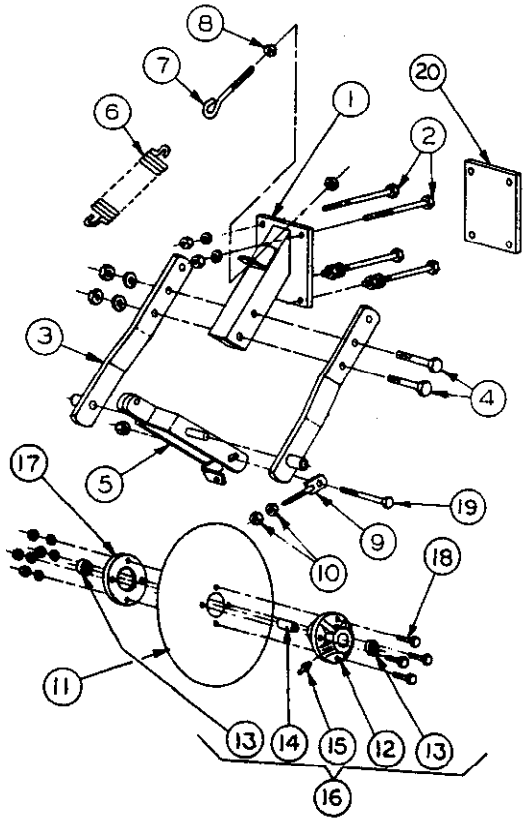
It is mounted just off the tool bar centerline. Attach by straddling one side of the mast and bolt the inside to the angle clamp of the center gang.

The center mounting style can be used with non-fold danish tine models only.

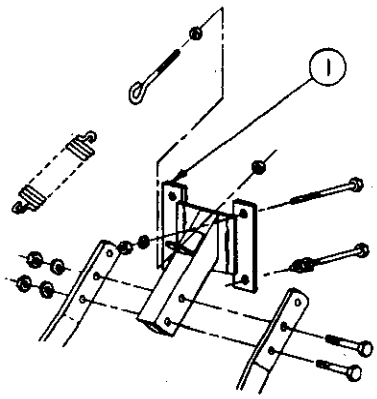
NOTE: WHEN MOUNTING THE STABILIZER COULTER IN-LINE WITH THE CULTIVATOR GANG, IT IS ADVISABLE TO INSTALL THE COULTER EXTENSION BRACKET BETWEEN THE TOOL BAR AND STABILIZER COULTER, TO ASSURE CLEARANCE WITH THE GANGS GAUGE WHEEL.

ITEM	PART NO.	DESCRIPTION
1	23333	Mounting Bracket (Outside) C-S
	23119	Mounting Bracket (Inside) D-T
	23127	Mounting Bracket (Center) D-T
2	88383	5/8NCx7 GR5 Bolt
	88557	5/8NCx9 GR5 Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
3	23120	Coulter Pivot Bracket (Outside)
	23128	Coulter Pivot Bracket (Center)
4	88421	3/4NCx4-1/2 GR5 Bolt
	88130	3/4 Lock Washer
	88110	3/4NC Nut
5	23121	Coulter Yoke
6	23122	Extension Spring
7	23123	5/8 Eye Bolt
8	88126	5/8NC Nut
9	23124	Adjusting Screw
10	88104	1/2NC Nut
11	23125	Solid Coulter Blade
12	23090	* Hub
13	23091	* Bearing
14	23092	* Bearing Spacer
15	88550	* 1/4 Grease Fitting
16	23089	Hub Assembly (Includes Items W/*)
17	23093	Support Washer
18	88553	3/8NCx1-1/2 GR5 Bolt
	88362	3/8 Lock Washer
	88103	3/8NC Nut
19	88395	5/8NCx5 GR5 Bolt
	88369	5/8NC Lock Nut
20	23126	Mounting Plate

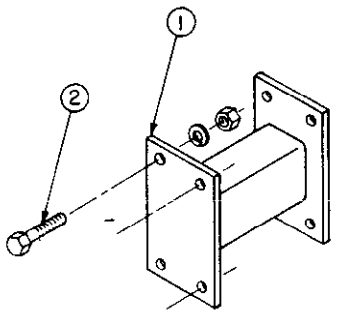
STABILIZER COULTER - OUTSIDE



STABILIZER COULTER - CENTER

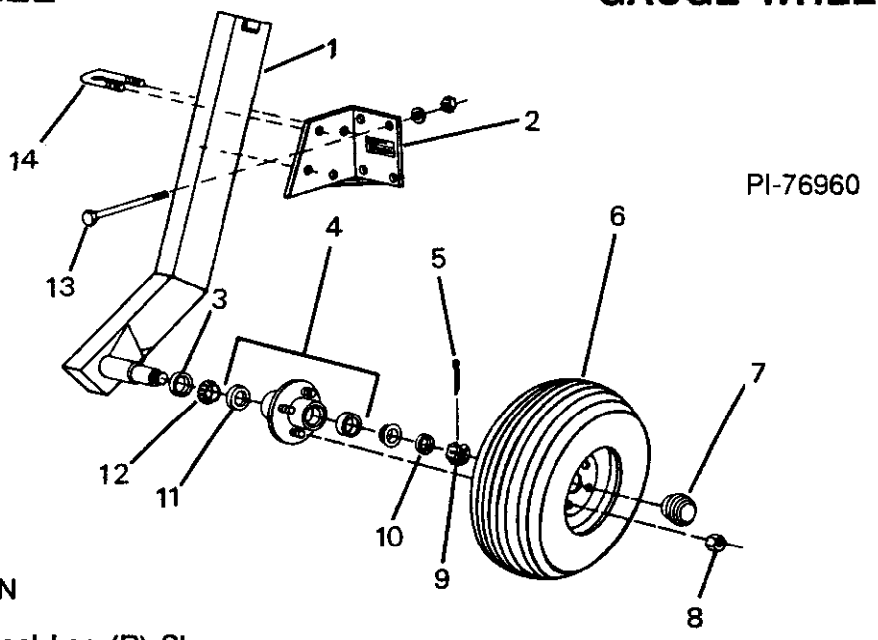


COULTER EXTENSION BRACKET



Item	Part #	Description	Qty.
1	23049	Extension Bracket	1
2	88294	Bolt, 5/8 NC x 2 GR 5	4
	88129	Lock Washer, 5/8	4
	88126	Nut, 5/8 NC	4

NON-FOLD GAUGE WHEEL



PI-76960

ITEM	PART NO.	DESCRIPTION
1	29600	40" Gauge Wheel Leg (R) Shown
	29599	40" Gauge Wheel Leg (L)
	29601	40" Gauge Wheel Assy (R) Shown
	29602	40" Gauge Wheel Assy (L) (Includes Hub & Bearing Assembled)
2	23118	Gauge Wheel Mount (R) Shown
	23117	Gauge Wheel Mount (L)
3	23108	Seal
4	23115	4 Bolt Hub Assy W/Cups
5	88560	1/8x1-1/4 Cotter Pin
6	23111	Wheel Assembly (Includes Items W/*)
	23110	* 8x7 4 Bolt Rim
	30261	* 18x9:50 4Ply Tire
	30785	* Valve Stem Assembly
7	23112	Dust Cap
8	23113	Wheel Bolt Nut
9	88300	3/4 Slotted Nut
10	88548	3/4 Flat Washer
11	23114	Cup
12	23109	Cone Bearing
13	88383	5/8x7 GR5 Bolt
14	23107	5/8 U-Bolt

Gauge wheels are used in pairs, with one mounted on each side of the cultivator.

NOTE: BE SURE TO POSITION GAUGE WHEEL LEG SO THAT THE TIRE WILL RUN IN-LINE WITH A GANG ASSEMBLY.

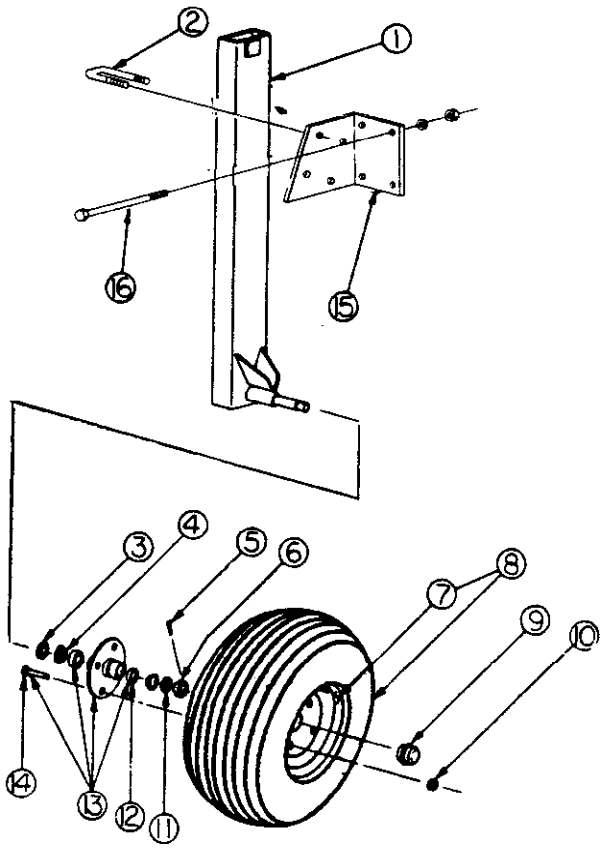
The optional non-fold gauge wheels are mounted adjacent to the cultivator gang, with the hardware shown.

CAUTION

Gauge Wheel will not always clear tractor cabs when cultivator is folded. Use caution when selecting a mounting location.

FLAT-FOLD GAUGE WHEEL

ITEM	PART NO.	DESCRIPTION
1	23106	Gauge Wheel Arm (D-T)
	26793	40" Gauge Wheel Leg (C-S , W-T)
2	23107	5/8 U-Bolt
	88129	5/8 Lock Washer
	88126	5/8NC Nut
3	23108	Seal
4	23109	Cone Bearing
5	88560	1/8x1-1/4 Cotter Pin
6	88300	3/4NF Slotted Nut
7	23110	Wheel
8	23111	Wheel Assembly
9	23112	Dust Cap
10	23113	Wheel Bolt Nut
11	88548	3/4 Flat Washer
12	23114	* Cup
13	23115	4 Bolt Hub Assembly (Includes Items W/*)
14	23116	* Wheel Bolt
15	23117	Gauge Wheel Mount (LH) (DT, C-S)
	23208	Gauge Wheel Mount (LH) (W-T)
	23118	Gauge Wheel Mount (RH) (DT, C-S) (Shown)
	23183	Gauge Wheel Mount (RH) (W-T) (Shown)
16	88557	5/8NCx9 GR5 Bolt (DT,C-S)
	88129	5/8 Lock Washer
	88126	5/8NC Nut
	88402	3/4NCx9 GR5 Bolt (W-T)
	88130	3/4 Lock Washer
	88110	3/4NC Nut



FOR 8 ROW UNITS WITH 30" SPACING AND FOR UNITS WHERE THERE IS MINIMAL CLEARANCE BETWEEN THE TRACTOR CAB, THE GAUGE WHEELS SHOULD BE MOUNTED TO THE CENTER TOOL BAR ADJACENT TO THE HINGES. WHEN THE GAUGE WHEELS ARE MOUNTED TO THE CENTER TOOL BAR THE WINGS MUST BE RUN IN THE RIGID POSITION FOR FIELD USE.

FLAT-FOLD GAUGE WHEEL
(STANDARD EQUIPMENT)

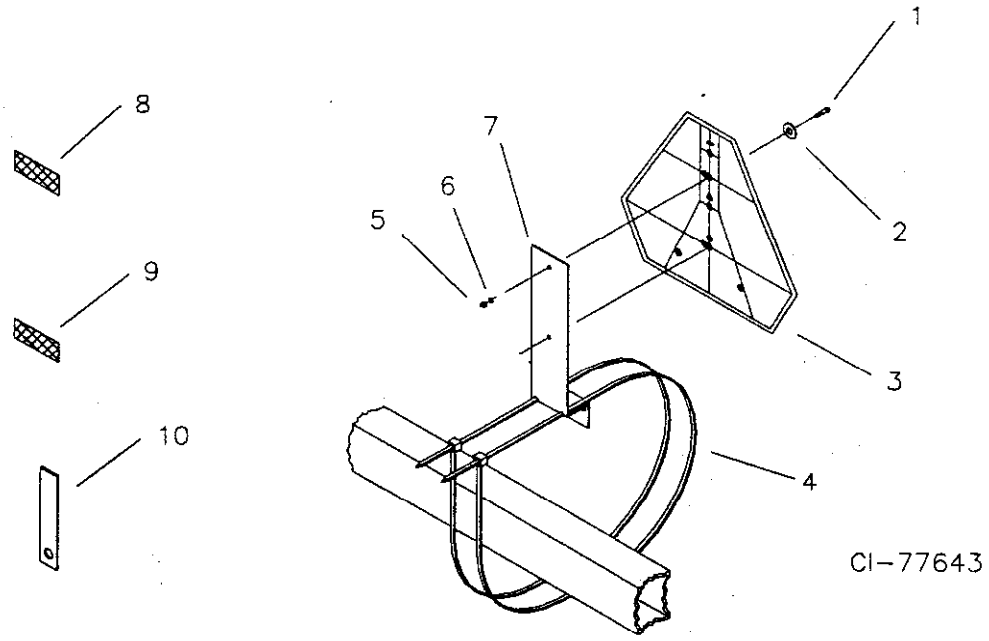
The standard flat-fold gauge wheels are mounted in-line with the cultivator gang, using the hardware shown.

NOTE: SELECT A MOUNTING LOCATION WHICH WILL ALLOW THE GAUGE WHEELS TO CLEAR THE TRACTOR CAB WHEN THE CULTIVATOR IS FOLDED.

NOTE: NON-FOLDING IMPLEMENTS ALSO HAVE TWO REFLECTOR MOUNTING BRACKETS (Item 10). THE REFLECTOR MOUNTING BRACKETS ARE USED WHEN THE GANGS ARE PLACED AT THE ENDS OF THE TOOL BAR (i.e. 6-30" ROWS) NOT ALLOWING ROOM ON THE TOOL BAR FOR THE REFLECTORS.

THE TWO RED REFLECTORS ARE TO BE MOUNTED ON THE REAR OUTSIDE CORNERS OF THE TOOL BAR. (HINGE AREA FOR FLAT-FOLD UNITS)

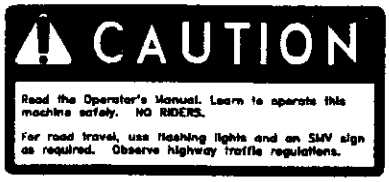
THE AMBER REFLECTOR IS MOUNTED ON THE FRONT LEFT OUTSIDE CORNER OF THE TOOL BAR. (HINGE AREA FOR FLAT-FOLD UNITS)



ITEM	PART NO.	DESCRIPTION
	41345	SMV Kit (Includes Items W/*)
1	88351	* 1/4NCx3/4 Bolt
2	88261	* 1/4 Flat Washer
3	30651	* SMV Emblem
4	33096	* Tie Wrap
5	88172	* 1/4NC Nut
6	88262	* 1/4 Lock Washer
7	41359	* SMV Bracket
8	22371	Red Reflector
9	22372	Amber Reflector
10	23050	Reflector Bracket

COMPONENTS

1



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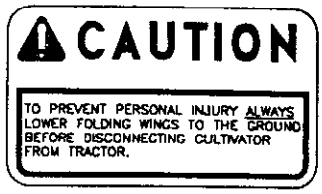

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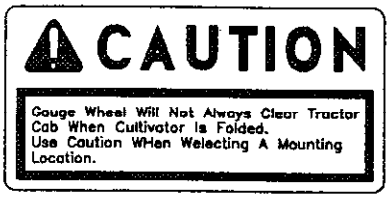

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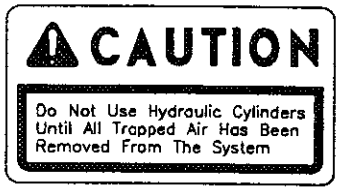

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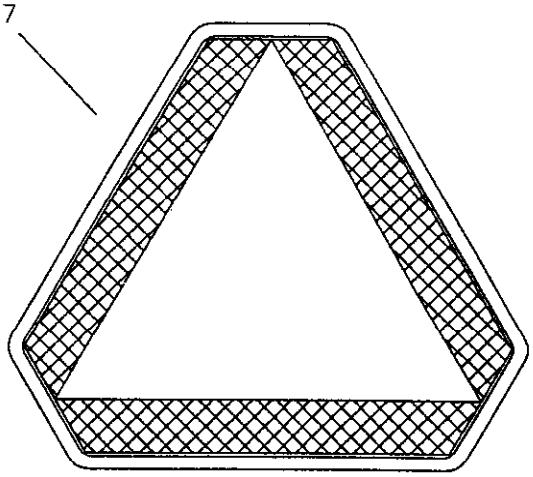


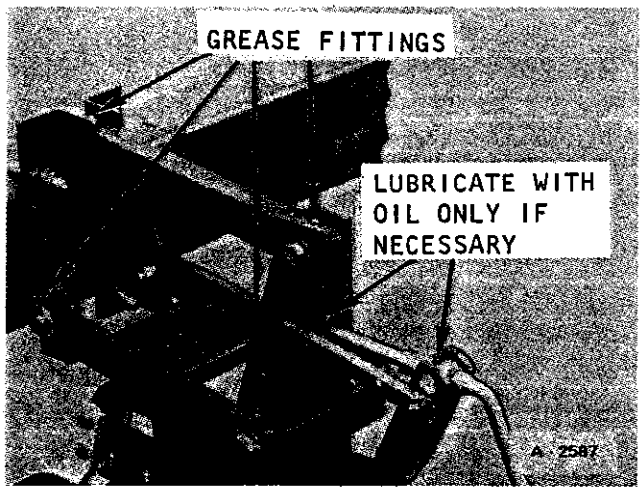
ITEM	PART NO.	DESCRIPTION
1	18300	1-3/4 x 20 Wil-Rich Decal
2	23325	Caution Decal
3	31927	Caution Decal
4	31944	Caution Decal
5	31942	Caution Decal
6	23326	Warning Decal
7	30651	SMV Emblem

LUBRICATION

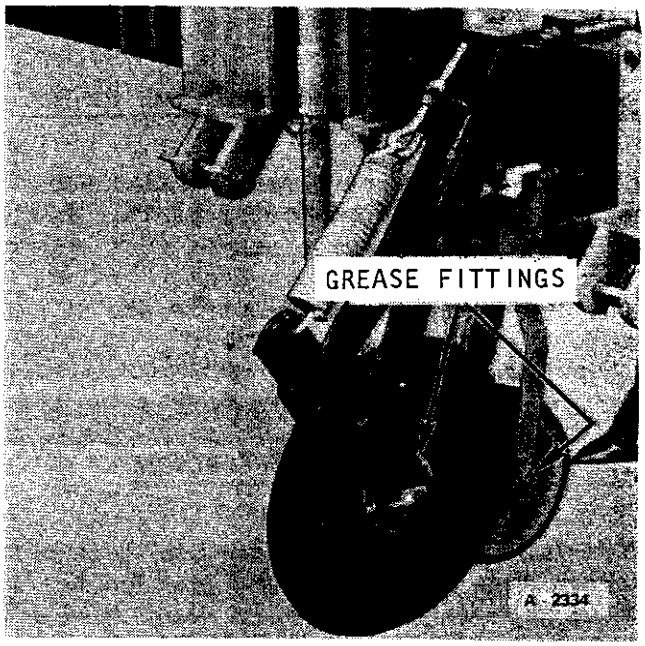
The tool bar and gangs can be positioned as shown making the grease fittings more accessible for lubricating.

Lubricate ALL grease fittings after each 10 hours of operation (to include rolling shields when so equipped). More frequent lubrication may be required under severe conditions to prevent excessive wear of moving parts.

Units equipped with the adjustment crank; use light oil, fuel oil, or graphite to lubricate threads and trunion of the adjustment crank only if necessary. If lubrication is necessary, frequent cleaning of threads is recommended.



Danish tine and C-shank shown. Wro-till is the same except there are 8 grease fittings.



GAUGE COULTER (WRO-TILL)

The gauge coulters are packed at the factory and should be greased once every 25 hours. Use a good grade of multi-purpose gun grease.

DISK HILLER (WRO-TILL)

The disk hillers are packed at the factory and should be greased once every 100 hours. Use a good grade of multi-purpose gun grease.

NOTE: BE CAREFUL NOT TO OVERGREASE. TOO MUCH GREASE PRESSURE CAN DO DAMAGE OR BREAK THE SEALS.

WHEEL BEARINGS

Inspect wheel bearings before the using season. Repack wheel bearings once each year with high quality wheel bearing grease. Remove any excess play in the wheel by tightening the slotted nut on the spindle.

BOLTS AND NUTS

Periodic checks should be made to assure that all nuts and bolts remain securely tightened. Loose hardware is lost or bent and can cause excessive wear on parts. Replace any bent or broken bolts as soon as they are discovered.

SERVICE AT THE BEGINNING OF THE SEASON

Clean off any dirt or grease that may have accumulated on moving parts. This will prevent abrasive action that could cause excess wear. Thoroughly inspect the implement for loose parts and adjust as necessary.

SERVICE AT THE END OF THE SEASON

When work is completed for the season, clean the implement thoroughly to remove dirt and trash which would hold moisture and cause rusting. Paint all parts which have chipped or require repainting. Inspect the implement for worn or broken parts. See your dealer during the off season, so that parts or service can be obtained when the machine is not needed in the field. Store the implement under cover with all parts in good operating condition.

When units equipped with hydraulic cylinders are stored with the cylinder rod extended, apply a film of grease to the rod to reduce the possibility of corrosion.

When storing the cultivator outside for a prolonged period of time, the cultivator should be set on a concrete floor or on boards to keep the sweeps and disks from contacting the ground. The shovels, spikes, sweeps, gauge coulters and disk hillers should be cleaned and greased after each growing season (if stored outside) to prevent them from rusting.

WARRANTY

The only warranty Wil-Rich gives and the only warranty the dealer is authorized to give is as follows:

We warrant products sold by us to be in accordance with our published specifications or those specifications agreed to by us in writing at time of sale. Our obligation and liability under this warranty is expressly limited to repairing, or replacing, at our option, within 12 months after date of retail delivery, any product not meeting the specifications. ***We make no other warranty, express or implied and make no warranty of merchantability or of fitness for any particular purpose.*** Our obligation under the warranty shall not include any transportation charges or costs or installation or any liability for direct, indirect or consequential damage or delay. If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. Any improper use, operation beyond rated capacity, substitution of parts not approved by us, or any alteration or repair by others in such manner as in our judgment affects the product materially and adversely shall void this warranty. ***No employee or representative is authorized to change this warranty in any way or grant any other warranty.***

Wil-Rich reserves the right to make improvement changes on any of our products without notice.

When warranty limited or not applicable: Warranty on hoses, cylinders, hubs, spindles, engines, valves, pumps or other trade accessories are limited to the warranties made by the respective manufactures of these components. Rubber tires and tubes are warranted directly by the respective tire manufacturer only, and not by Wil-Rich.

Warranty does not apply to any machine or part which has been repaired or altered in any way so as in the our judgment to affect its reliability, or which has been subject to misuse, negligence or accident.

A Warranty Validation and Delivery Report Form must be filled out and received by Wil-Rich to initiate the warranty coverage.

WARRANTY CLAIMS PROCEDURE

1. The warranty form must be returned to Wil-Rich within fifteen (15) working days from the repair date.

2. Parts returned to Wil-Rich without authorization will be refused. The parts must be retained at the dealership for ninety (90) days after the claim has been filed. If the Service Department would like to inspect the parts, a packing slip will be mailed to the dealer. The packing slip must be returned with the parts. The parts must be returned prepaid within thirty (30) days of receiving authorization. After the parts are inspected and warranty is verified, credit for the return freight will be issued to the dealer.

3. Parts that will be scrapped at the dealership will be inspected by Wil-Rich Sales Representatives, District Sales Managers or Service Representatives within the ninety (90) day retaining period.