

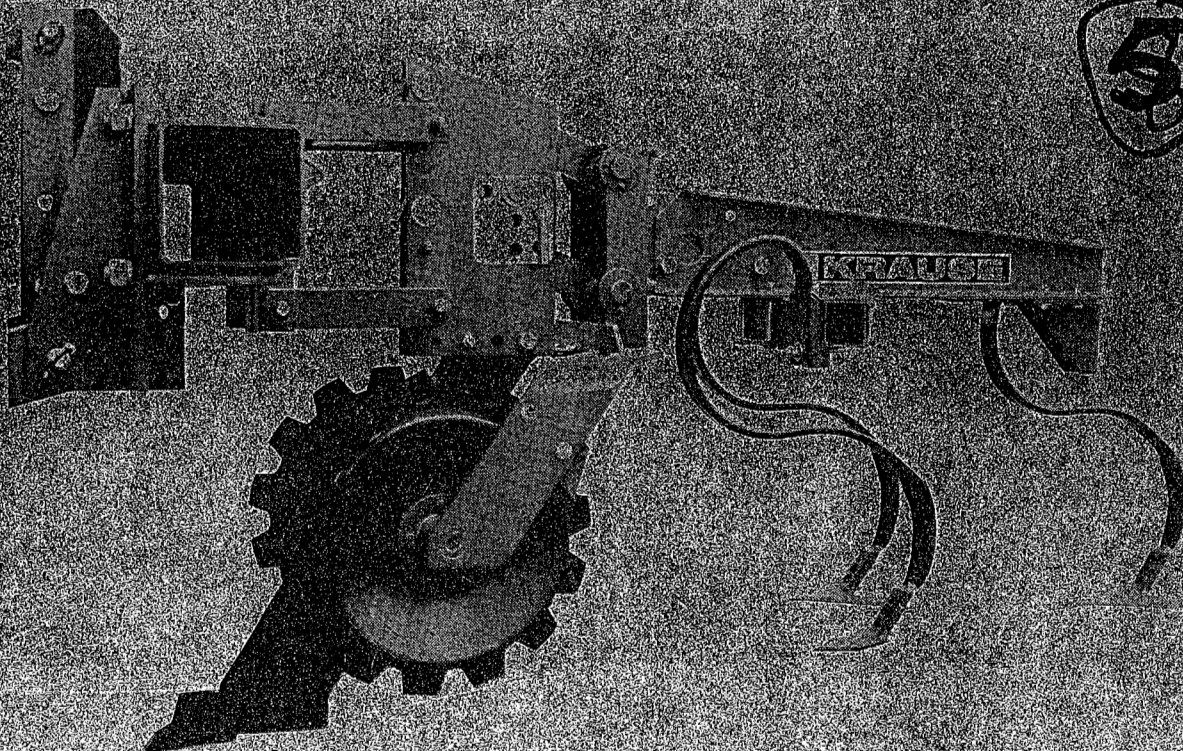
MASTER COPY

IF YOU NEED A BOOK, THE PRINTER'S
ASSISTANT WILL MAKE YOU A COPY !!

DO NOT TAKE FROM FILE

OWNER'S MANUAL

4650
With Serial
No. 1221 On



ROW CROP SUB-SOIL CULTIVATOR

MODELS

4654-OR3, 4654-OR4, 4656-OR3,
4656-OR4, 4658-OR3.

KRAUSE

305 SOUTH MONROE STREET HUTCHINSON, KANSAS 67501

Revised
2/91

Warranty

KRAUSE PLOW CORPORATION Hutchinson, Kansas

The Krause Plow Corporation, Hutchinson, Kansas, expressly warrants each new product manufactured by it to be free from defects in material and workmanship under normal use and service for a period of one year after delivery to the original retail purchaser or first user of the product.

Krause's obligation under this warranty is limited to repairing and/or replacing, at its option, any part or parts within the applicable one year period, as set out above, which shall be returned by the owner or any Krause authorized dealer to the factory and which upon examination shall disclose to Krause's satisfaction to be defective.

Krause may, at its option, elect to grant adjustments in the field through an authorized representative and may thereby elect to waive the requirement that parts be returned to Krause's factory.

A new warranty period is not established for replacements. Replacements are warranted for the remaining portion of the one year original warranty period. The repair or replacement of defective parts under this warranty will be made without charge to the owner except for transportation.

Krause does not warrant disc blades, tires, chisel shanks, hydraulic cylinders, accessories and other parts not manufactured by it, but supplied with or as a part of its products. Krause will, however, obtain and pass on any adjustments provided by the manufacturers of such parts under these manufacturer's warranties.

The provisions of this warranty do not apply to any product or parts which have been subject to misuse, negligence or accident, or which have been repaired or altered outside of Krause's factory in any way so as in the judgement of Krause to affect adversely its performance and reliability. Neither does this warranty apply to normal maintenance service and parts, or to normal deterioration due to wear and exposure.

To the extent allowed by applicable law, this warranty is expressly in lieu of other warranties, expressed or implied, in fact or by law, including any implied warranty of merchantability or fitness for a particular purpose. The remedies of repair or replacement as set forth are the only remedies under this warranty. Krause disclaims any obligations or liability for loss of time, inconvenience, commercial loss or direct, consequential, special or incidental damages. This warranty is in lieu of any other obligation or liability of Krause of any nature whatsoever by reason of the manufacture, sale, lease or use of such products and Krause neither assumes, nor authorizes anyone to assume for it, any other obligation or liability in connection with such products.



**4650 SERIES ROW CROP SUB-SOILER
DEALER PREDELIVERY CHECK SHEET
TO BE CHECKED BY DEALER**

CUSTOMER _____ DATE _____

ADDRESS _____ COUNTY _____

DEALER _____

ADDRESS _____ COUNTY _____

MODEL NUMBER _____ SERIAL NUMBER _____

DEALER CHECK:

1. _____ Gang frames are level and at the correct height.
2. _____ Row spacings of gangs are correct for row widths to be cultivated.
3. _____ Sweeps are set correctly.
4. _____ Gangs have been greased and work freely.
5. _____ 3-Point hitch brackets are in the correct location and tightened properly.
6. _____ Attachments are installed correctly.
7. _____ All decals are in place.
8. _____ Customer review sheet is filled out and signed.

DELIVERED BY _____ DATE _____

4650 SERIES ROW CROP SUB-SOILER

CUSTOMER REVIEW SHEET

CUSTOMER _____ DATE _____

ADDRESS _____ COUNTY _____

DEALER _____

ADDRESS _____ COUNTY _____

MODEL NUMBER _____ SERIAL NUMBER _____

1. _____ Owner's manual provided.
2. _____ Warranty card filled out and mailed.
3. _____ Review safety warnings and cautions as listed in this owner's manual.
4. _____ Review recommended maximum road speed and width for implement.
5. _____ Review the field operational speeds, horsepower, depth, and rock conditions.
6. _____ Explain the depth control system including how to set the individual gang gauge wheels.
7. _____ Explain that this unit will add a considerable weight to the rear of the tractor in the raised position. Sufficient front end ballast must be added to the tractor for safe operation. (See operating information under "PREPARING THE TRACTOR FOR OPERATION")
8. _____ Explain the importance of maintaining the tool through proper lubrication, checking the bolts to see that they are tight, and through the replacement of worn or broken parts.

DEALER _____ DATE _____

CUSTOMER _____ DATE _____

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4650 ROW CROP CULTIVATOR SPECIFICATIONS

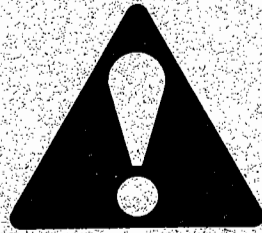
MODEL	ROWS	SPACING	TOTAL GANGS	NUMBER SHANKS	CENTER TOOL BAR LENGTH	LENGTH
4654-OR3	4	28" - 30"	5	13	136"	-----
4654-OR4	4	36" - 40"	5	21	176"	-----
4656-OR3	6	28" - 30"	7	19	194"	-----
4656-OR4	6	36" - 40"	7	31	254"	-----
4658-OR3	8	28" - 30"	9	25	254"	-----

TRANSPORT WIDTH

MODEL	TRANSPORT WIDTH
4654-OR3	----- 11' - 4"
4654-OR4	----- 14' - 8"
4656-OR3	----- 16' - 2"
4656-OR4	----- 21' - 2"
4658-OR3	----- 21' - 2"

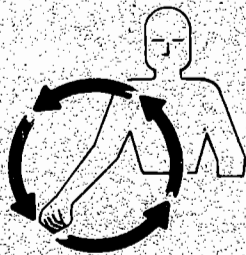
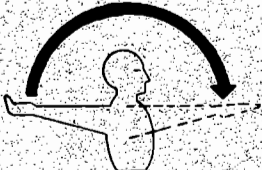

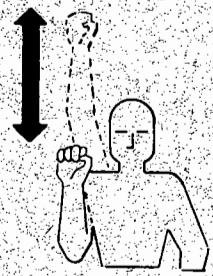
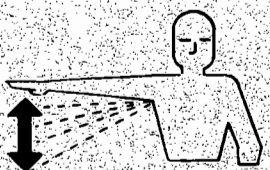
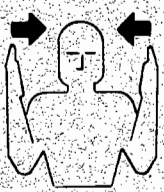



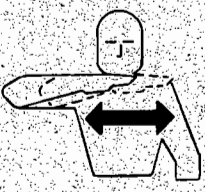
OPERATING SECTION

SAFETY ALERT SYMBOL



BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY. THIS SYMBOL IDENTIFIES IMPORTANT SAFETY MESSAGES. CAREFULLY READ THE MESSAGE THAT FOLLOWS.

TEN MOST COMMON HAND SIGNALS USED IN THE FIELD

 <p>START THE ENGINE</p>	 <p>MOVE OUT OR TAKE OFF</p>	 <p>MOVE TOWARD ME</p>	 <p>SPEED IT UP</p>	 <p>SLOW IT DOWN</p>
 <p>THIS FAR TO GO</p>	 <p>STOP</p>	 <p>RAISE THE EQUIPMENT</p>	 <p>LOWER THE EQUIPMENT</p>	 <p>STOP THE ENGINE</p>

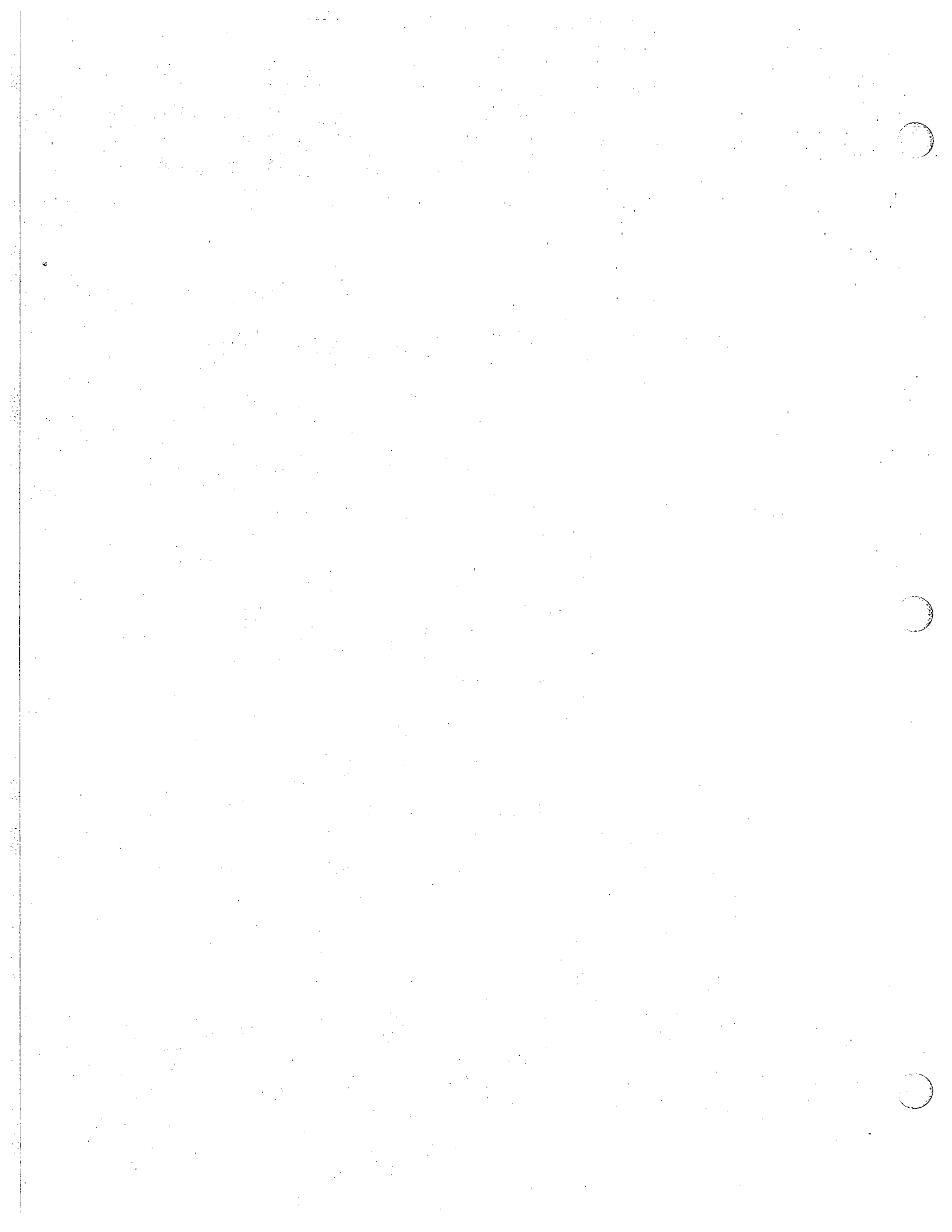
SAFETY FIRST



WATCH FOR THIS SYMBOL AND
CAREFULLY READ THE MESSAGE.

1. Read and understand the owner's manual before operating the machine.
2. Be sure safety decals and reflectors are clean and in place.
3. Do not climb or walk on gangs, frames, or tires.
4. Never position yourself under any portion of implement unless the entire unit is lowered to the ground.
5. Stop engine and set parking brake before leaving operator's position to adjust, lubricate, clean or unclog the machine.
6. Do not stand between the implement and tractor unless the tractor brakes are locked and engine is shut off.
7. Use a Slow-Moving-Vehicle (SMV) emblem when transporting.
8. Do not road an implement over 15 miles per hour on the best surface conditions. Reduce speed when going up or down hills or when approaching ditches or corners.
9. Make sure there is sufficient ballast on the front of the tractor for safe operation. See "Preparing Tractor For Operation".

Elimination of the hazards listed above should not be construed as providing guarantees that the equipment will meet or exceed all standards or regulations or will be completely safe to all personnel. The operator should inspect and review the implement after it is in his possession for adequacy in safety for the function for which it will be used.



OPERATING INSTRUCTIONS



READ ALL OF THE SAFETY DECALS ON THE IMPLEMENT AND REVIEW THE SAFETY FIRST SUGGESTIONS ON THE BACK COVER OF THIS MANUAL TO REFRESH YOUR MEMORY. WATCH FOR THE SAFETY SYMBOL AND READ THE INFORMATION. THIS IS FOR YOUR OWN PROTECTION.

PREPARING THE TRACTOR FOR OPERATION

Read your tractor owner's manual. It will describe safe methods of operation. Make sure your tractor has proper added ballast, and that its hydraulic system is full of oil and working properly. Check tractor brakes and warning lights, and make sure they are in working order.

IMPORTANT: THE 3-POINT MOUNTED CULTIVATOR WILL ADD A CONSIDERABLE AMOUNT OF WEIGHT BEHIND THE REAR AXLE OF YOUR TRACTOR. CALCULATE THE WEIGHT OF YOUR MODEL OF CULTIVATOR INCLUDING ALL ACCESSORIES. REFER TO YOUR TRACTOR OWNER'S MANUAL AND DETERMINE THE 3-POINT LIFT CAPACITY AND THE BALLAST REQUIRED FOR THE FRONT OF YOUR TRACTOR. ADD THE NECESSARY FRONT BALLAST AND CHECK INFLATION PRESSURES OF ALL TIRES ON THE TRACTOR BEFORE HITCHING TO THE CULTIVATOR.

Set the tractor wheels for the desired row spacing so the wheels are centered between the rows.

Place the sway blocks in the widest setting to prevent cultivator side sway during transport.

ATTACHING THE CULTIVATOR TO THE TRACTOR

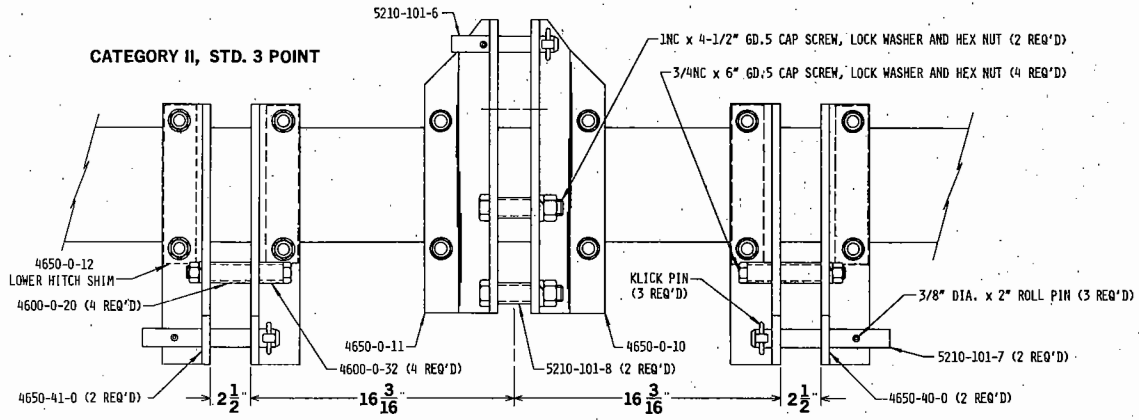


CAUTION: DO NOT ALLOW ANY PERSON TO STAND BETWEEN THE TRACTOR AND IMPLEMENT WHILE BACKING INTO POSITION. SUDDEN LOSS OF CONTROL COULD CAUSE SERIOUS INJURY OR DEATH TO A PERSON CAUGHT BETWEEN THE TRACTOR AND THE IMPLEMENT. TELL YOUR HELPER TO WAIT UNTIL YOU GIVE HIM THE SIGNAL THAT THE TRACTOR IS IN PARK OR NEUTRAL AND THAT THE HAND BRAKE IS SET AND THE ENGINE IS SHUT OFF.

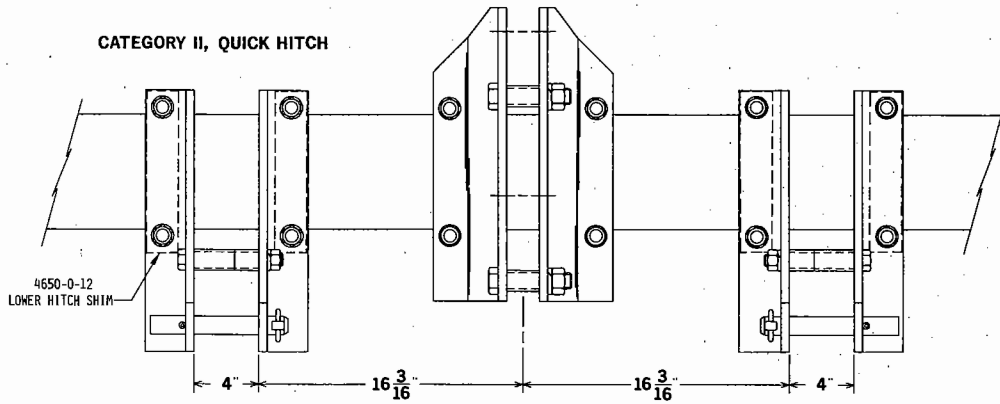
Before attaching cultivator to tractor, be sure the hitch pins and spacers are completely assembled to match the tractor. See page O3.

NOTE: The lower hitch bracket legs may have to be turned inward or outward to allow room for the rolling shield assembly on certain spacings. See Assembly Section for models affected.

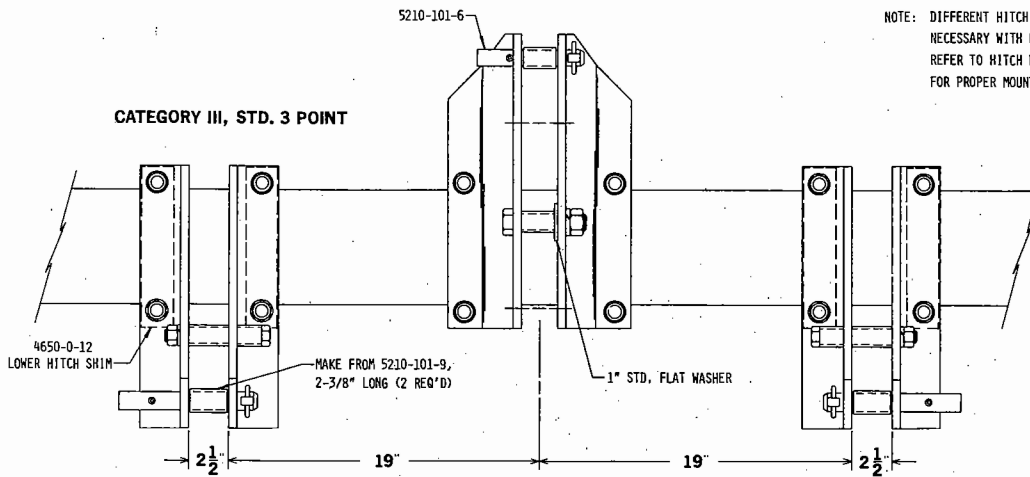
CATEGORY II, STD. 3 POINT



CATEGORY II, QUICK HITCH

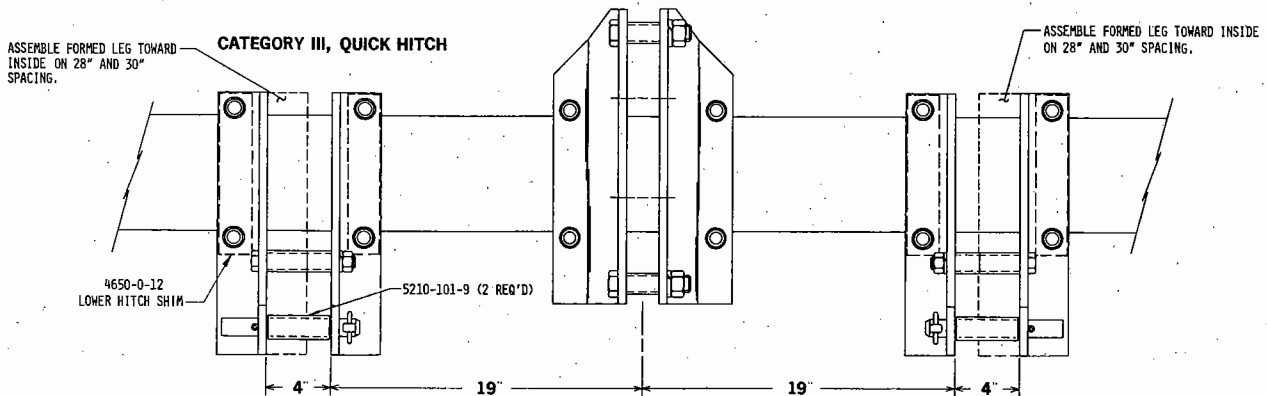


CATEGORY III, STD. 3 POINT



NOTE: DIFFERENT HITCH MOUNTING MAY BE NECESSARY WITH ROLLING SHIELDS. REFER TO HITCH PLACEMENT PAGE FOR PROPER MOUNTING.

CATEGORY III, QUICK HITCH



TRACTOR WITHOUT QUICK-COUPLER

Back tractor and position draft links in front of and in line with hitch pins. Stop engine and set brakes. Extend draft links and adjust length of lift links to enable installation of hitch pins. Install pins and secure with klick pins. Adjust length of center link and pin into place.

TRACTOR WITH QUICK COUPLER

Lower coupler to allow jaws to pass under cultivator mast spacer and hitch pins. Back tractor, raise coupler to firmly seat coupler jaws, then lock latch levers. Be sure the spring-loaded latches in the lower coupler jaws are extended above hitch pins.

DETACHING THE CULTIVATOR FROM THE TRACTOR

Lower cultivator onto a level surface. Loosen center link as necessary to remove load from the hitch. Release pressure from center link and remove pin before removing lower hitch pins.

On Quick Coupler hitches, simply release Quick Coupler latch levers and detach tractor from the cultivator.

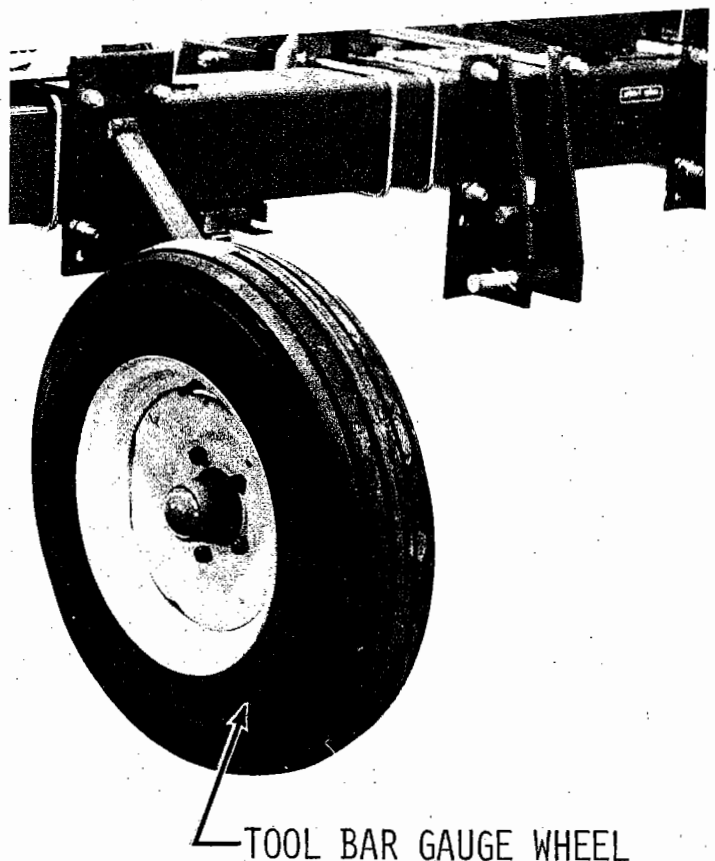
LEVELING THE FRAME

Adjust the lift links to level the cultivator from side to side. Set the tractor depth stop so that there is 24 inches between the tool bar frame and the ground.

(Further adjustment may be necessary, see "Tool-Bar Height" on pg. O3 of this manual)

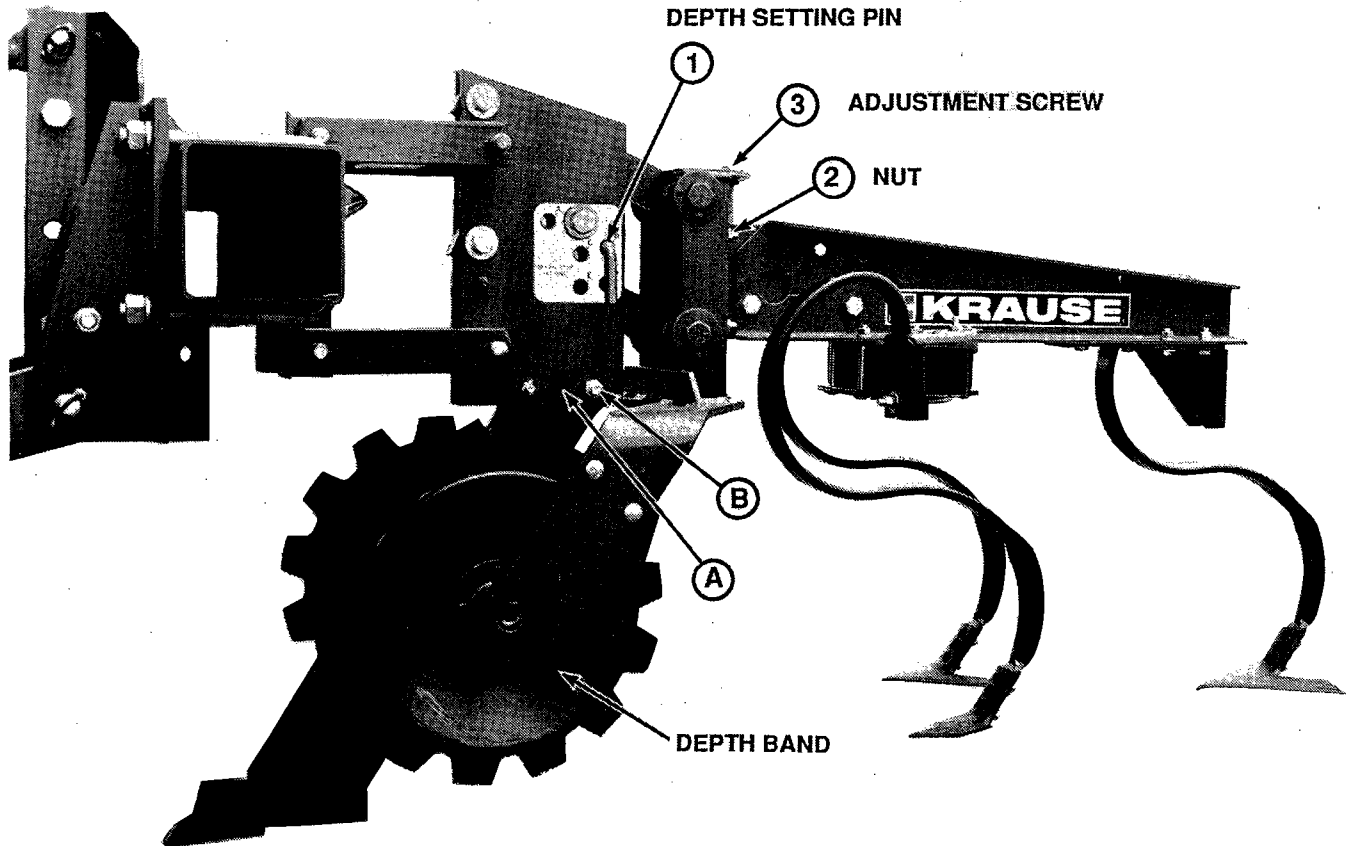
Adjust the center link until all of the cultivator sweeps are level from front to rear with unit resting on the ground.

The optional tool bar gauge wheel, mounting plate should normally be attached through the center set of holes as shown in the photo to the right.



DEPTH SETTING / SUB-SOIL SHANKS

The depth of each sub-soil shank is changed by moving Pin 1 in holes A through E (on the decal). Position A (on the decal) is the maximum depth setting (approximately 12"), while position E (on the decal) is the minimum depth setting (approximately 5"). Raising the unit out of the ground will relieve any pressure from the pin, allowing the pin to be moved to the desired adjustment hole setting. See the photograph below.



- (A)** SUB-SOIL SHANK IN FRONT POSITIN FOR INCREASED TRASH FLOW.
- (B)** ASSEMBLE SHANK IN REAR POSITION FOR BETTER SMALL PLANT AND ROOT PROTECTION.

CULTIVATOR SHANKS

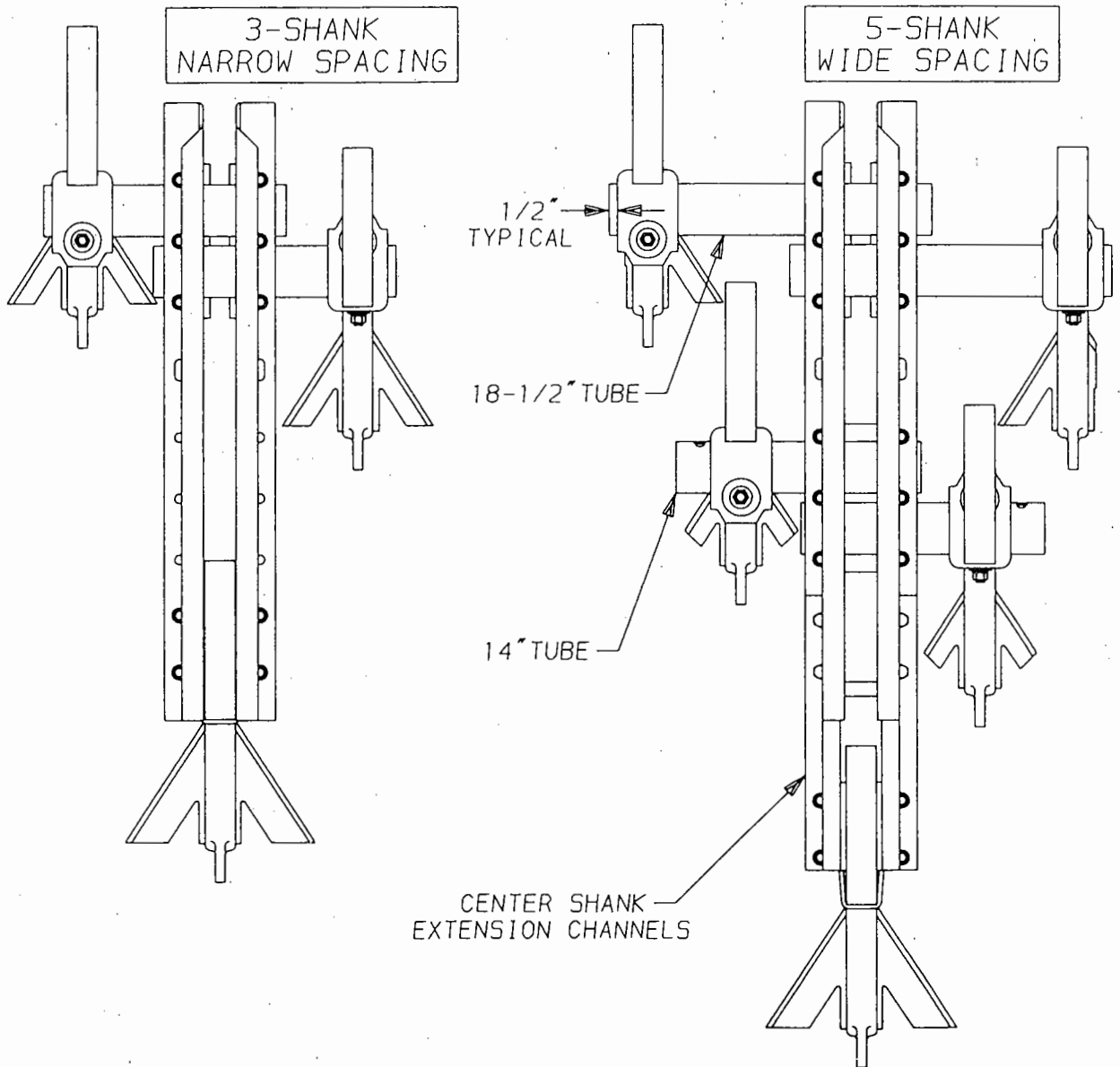
After the sub-soil shanks have been set to the desired depth, the cultivator shanks should be adjusted in relation to the depth band. The adjustment is made by backing off Nuts 2 and turning Adjustment Screw 3, up or down to the desired depth.

It may be necessary to set shanks following the tractor wheels to a lower depth to maintain a uniform cultivating depth.

See the photograph above.

GANG SHANK PLACEMENT

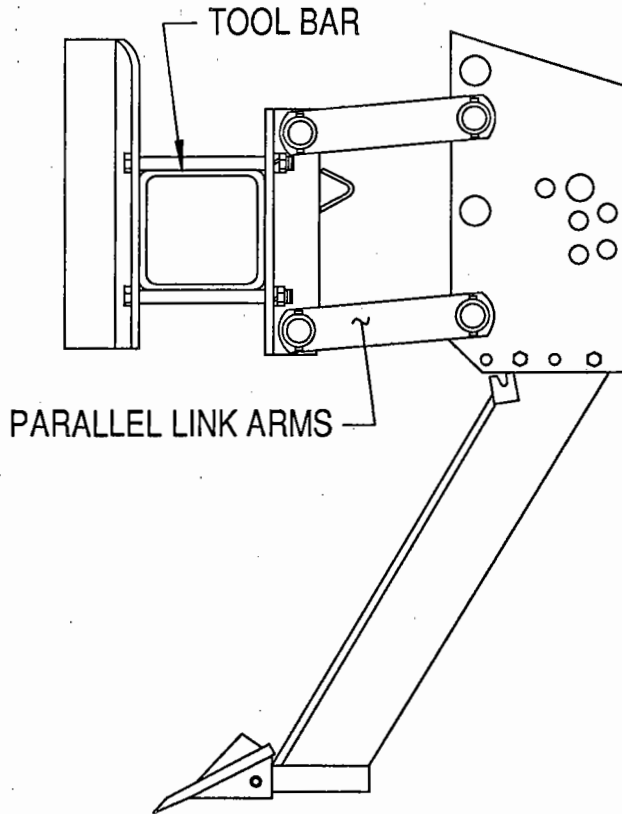
See pages A13 to A21 for shank locations and suggested sweep sizes for the various spacings of row crop sub-soil cultivators.



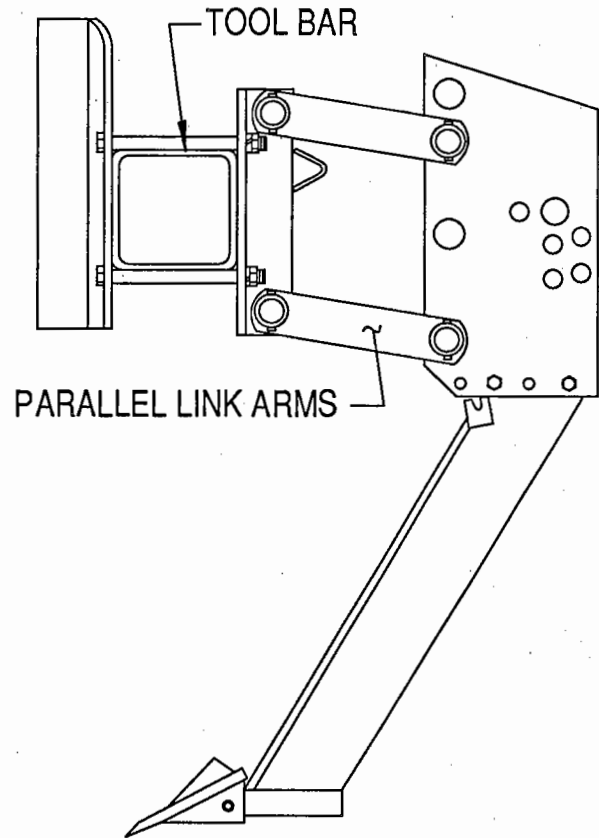
TOOL BAR HEIGHT

After sub-soil shanks are set to the desired depth, lower the unit to the ground and pull forward until shanks are at their maximum depth. Check tool bar height to make sure the parallel link arms are parallel to the ground or sloping slightly upward from the tool bar. (See illustration below)

IMPORTANT: INCORRECT SETTING MAY CAUSE EXCESSIVE HEAVING OF SOIL AND POSSIBLE CROP DAMAGE.



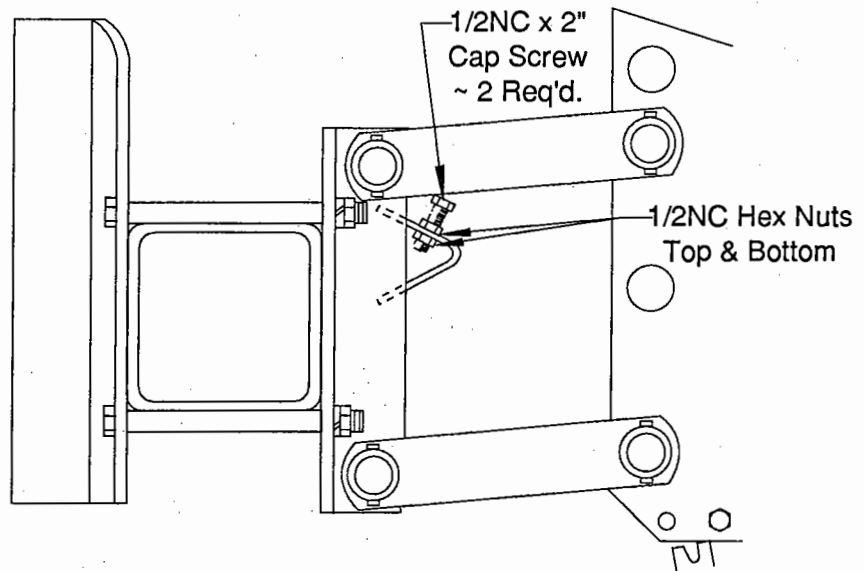
CORRECT



INCORRECT

ROAD CLEARANCE

Two 1/2NC x 2" Hex Cap Screws can be added to each Mounting Weldment Stop to Increase the amount of road clearance if your tractor 3-Point doesn't raise high enough.

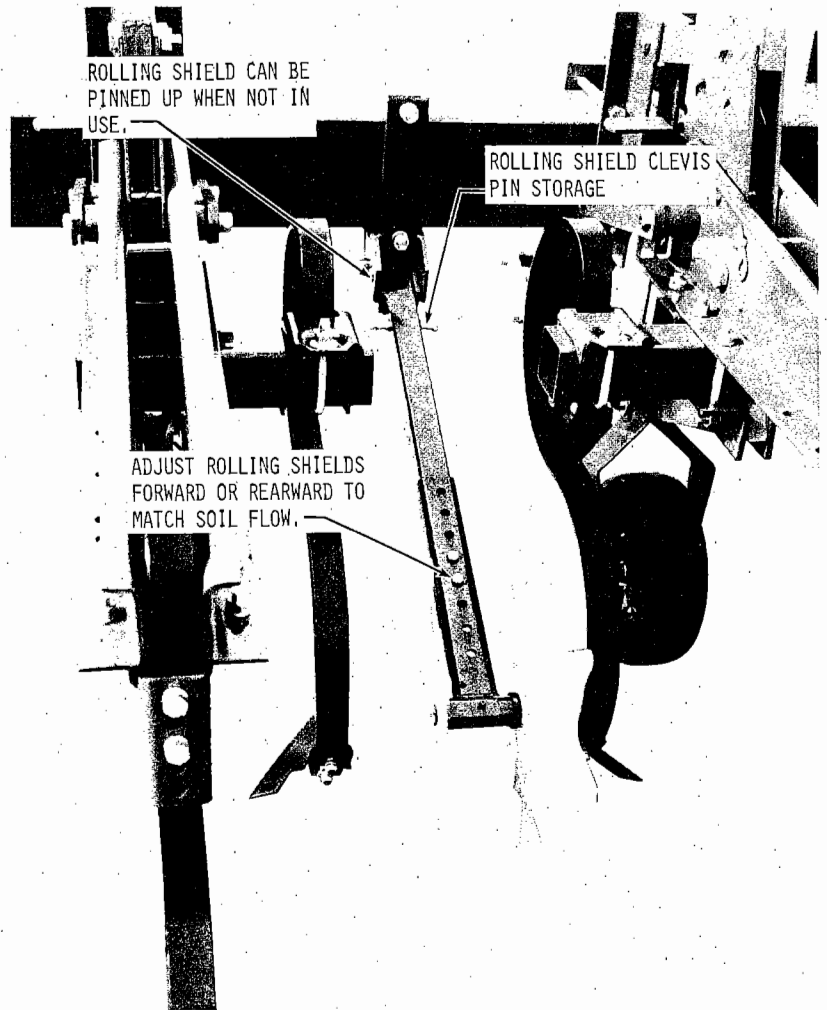


ROLLING SHIELDS

Make sure that each rolling shield is mounted precisely on the desired row spacing.

Adjust the rolling shield forward or rearward by removing the two 3/8" Bolts in the arm and relocating to the desired position.

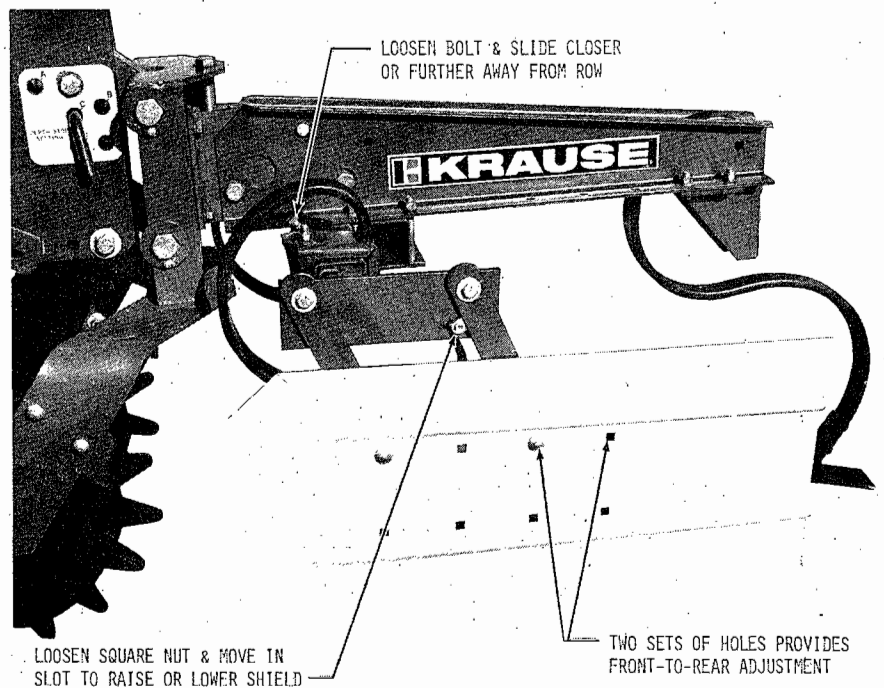
NOTE: The shanks on either side of the rolling shield should be in alignment.



OPEN TOP SHIELDS

There are three basic adjustments that can be made to position the shields.

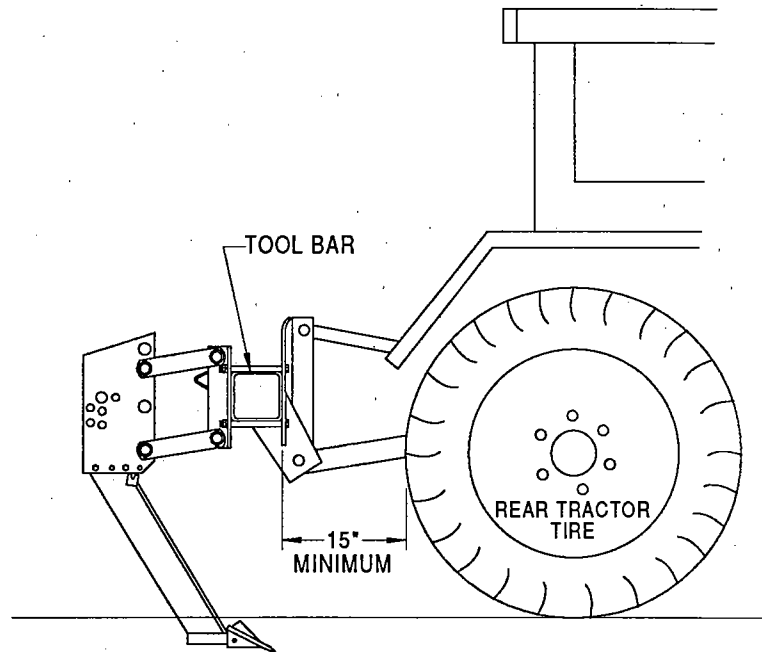
See the photo to the right.



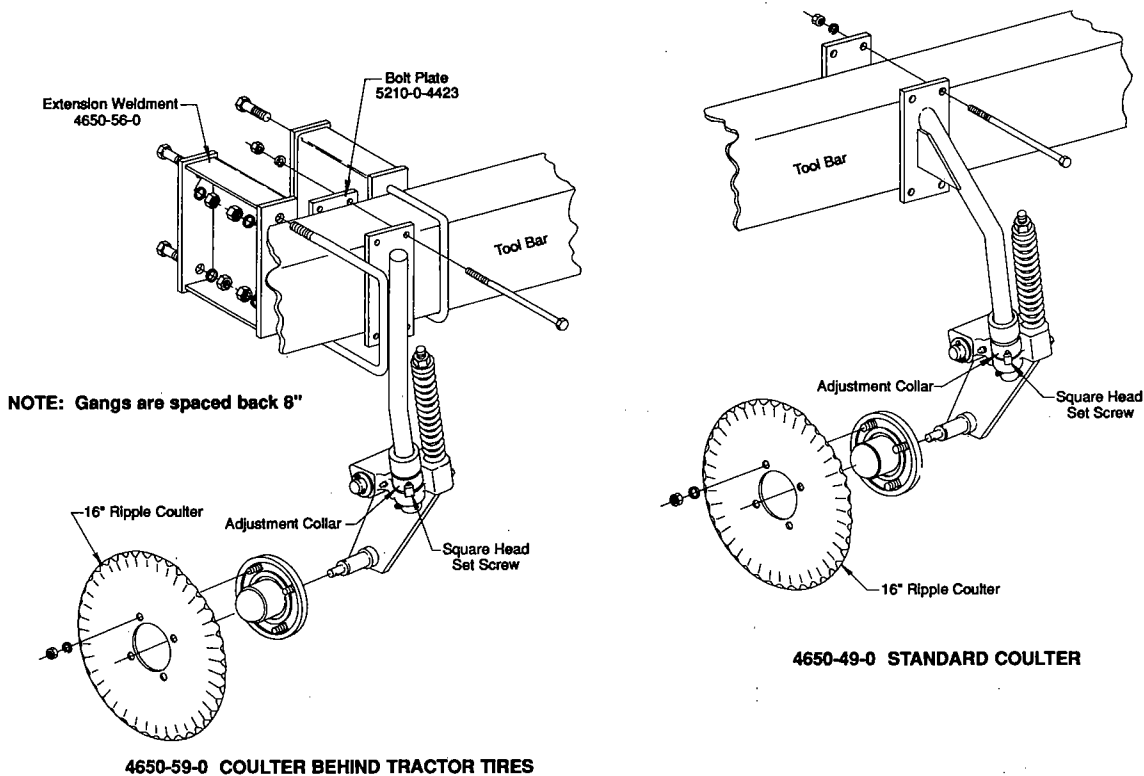
COULTER ATTACHMENT

A Coultter Attachment (4650-49-0) Accessory is available to improve the ability of the row crop sub-soil cultivator to run in heavier trash conditions.

NOTE: This coultter assembly cannot be attached at all gang locations. There must be a minimum of 15" between the tractor tires and tool bar before a standard coultter can be assembled. Also, the coultter cannot run in the same row with a tool bar gauge wheel on a narrow row spacing.



In most conditions, a coultter is not required behind the tractor tires because the trash has been compressed leaving stems cracked and broken: however, the coultter is required sometimes in damp or green growing weeds or grasses. A special coultter group (4650-59-0) is available behind the tractor tires which moves the coultter and gang back 8".



There are two methods to adjust the coultter depth:

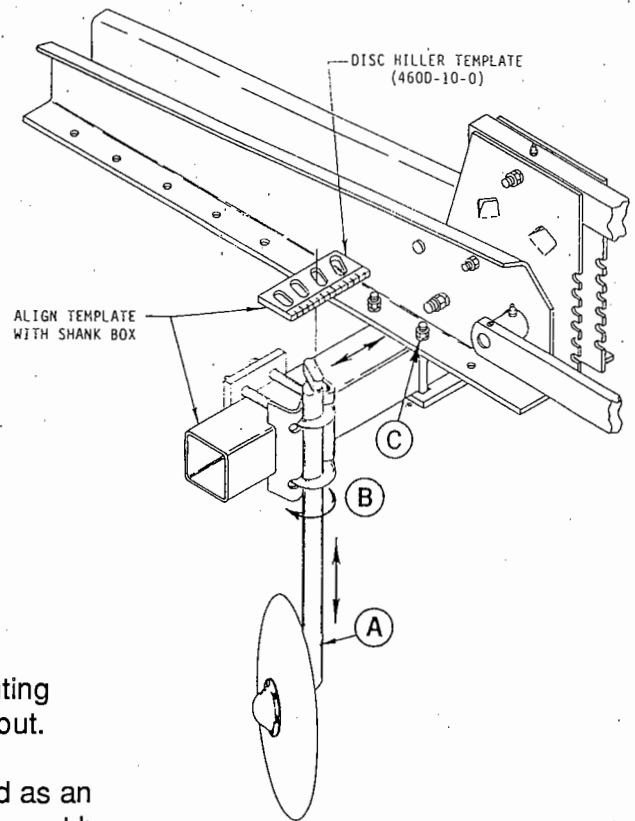
1. The tool bar height may be changed by resetting the 3-Point lever stop in the tractor.
2. Each coultter depth may be changed by loosening the set screw in the adjustment collar and moving the assembly up or down.

DISC HILLER

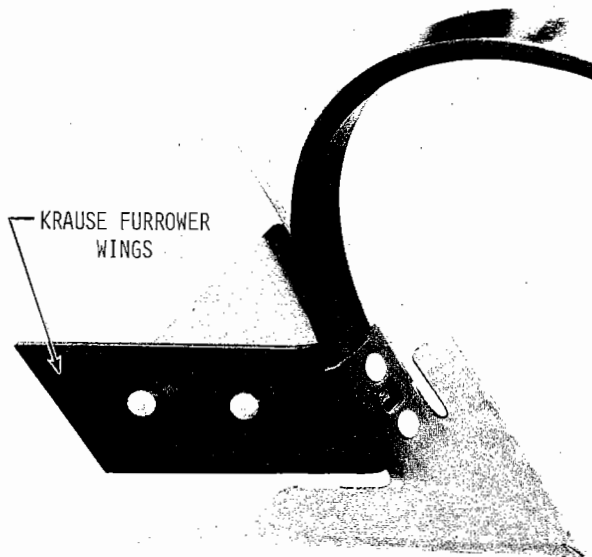
The Disc Hiller is an option or accessory depending on row spacing or hiller assembly locations. It can be used to move soil toward or away from the planted row.

See pages P14 and A17-A21 for more detailed information on assembly and disc location.

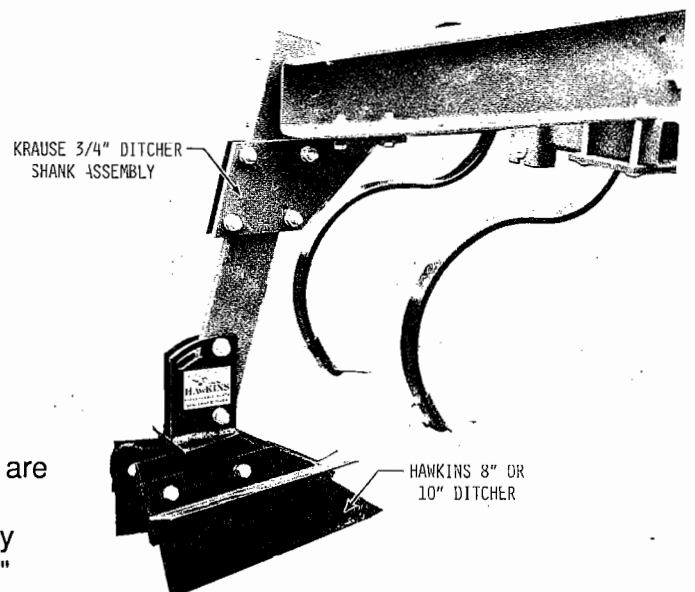
- The disc hiller depth can be adjusted by loosening the nuts on the U-Bolts and sliding the shaft up or down.
- Disc angle can be changed by rotating the hiller shaft in the U-Bolts.
- The Disc Hiller can be moved toward or away from the row by loosening the mounting tube bolts and sliding the frame box in or out.
- A Disc Hiller template has been developed as an aid to set the disc hillers. The angle can be set by positioning the template over the end of the hiller shaft and aligning the template with the shank box. The scale on the side of the template can be used to set the depth consistently.



FURROWER & DITCHER ATTACHMENTS



Krause furrower wings can be added to the back side of the rear K-Tine shank if moderate furrows are desired. These are recommended for moving soil around plants and for making shallow furrows to catch and hold water.



In flood irrigation, more aggressive ditchers are recommended to form a deeper furrow. An optional Krause 3/4" ditcher shank assembly can be combined with a HAWKINS 8" or 10" ditcher to satisfy this requirement.

POSSIBLE REMEDIES FOR FIELD PROBLEMS

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
CULTIVATOR TRACKING TO THE RIGHT -----	Slight Misalignment Of Subsoil Shanks To The Right -----	Remove lower 3-Point hitch shims on right side and add them behind the left side lower hitch brackets.
CULTIVATOR TRACKING TO THE LEFT -----	Slight Misalignment Of Subsoil Shanks To The Left -----	Remove lower 3-Point hitch shims on left side and add them behind the right side lower hitch brackets

SERVICING

GENERAL MAINTENANCE

All bolts should be checked and tightened after the first half day of operation and periodically thereafter.

LUBRICATION

The initial lubrication of all grease fittings will assure long life and satisfactory performance from the implement. Use a multi-purpose type grease at all grease zerk locations after each 24 hours of operation. Points of lubrication include: gang pivot points and tool bar gauge wheel hubs.

WHEEL BEARINGS

Once a year, clean and repack wheel bearings. Replace seals each time bearings are removed. Replace any worn or damaged parts. Repack bearings with a high quality wheel bearing grease. After repacking, replace the hub with seal and rear bearing already assembled. Use light oil on seal surface and use extreme care when pushing seal over the spindle. Install front bearing, flat washer, and slotted hex nut. Tighten nut while turning hub until there is resistance to rotation. Then back off nut 1 to 2 notches until the hub turns freely without end play. Install a new cotter pin and the hub cap.

STORAGE

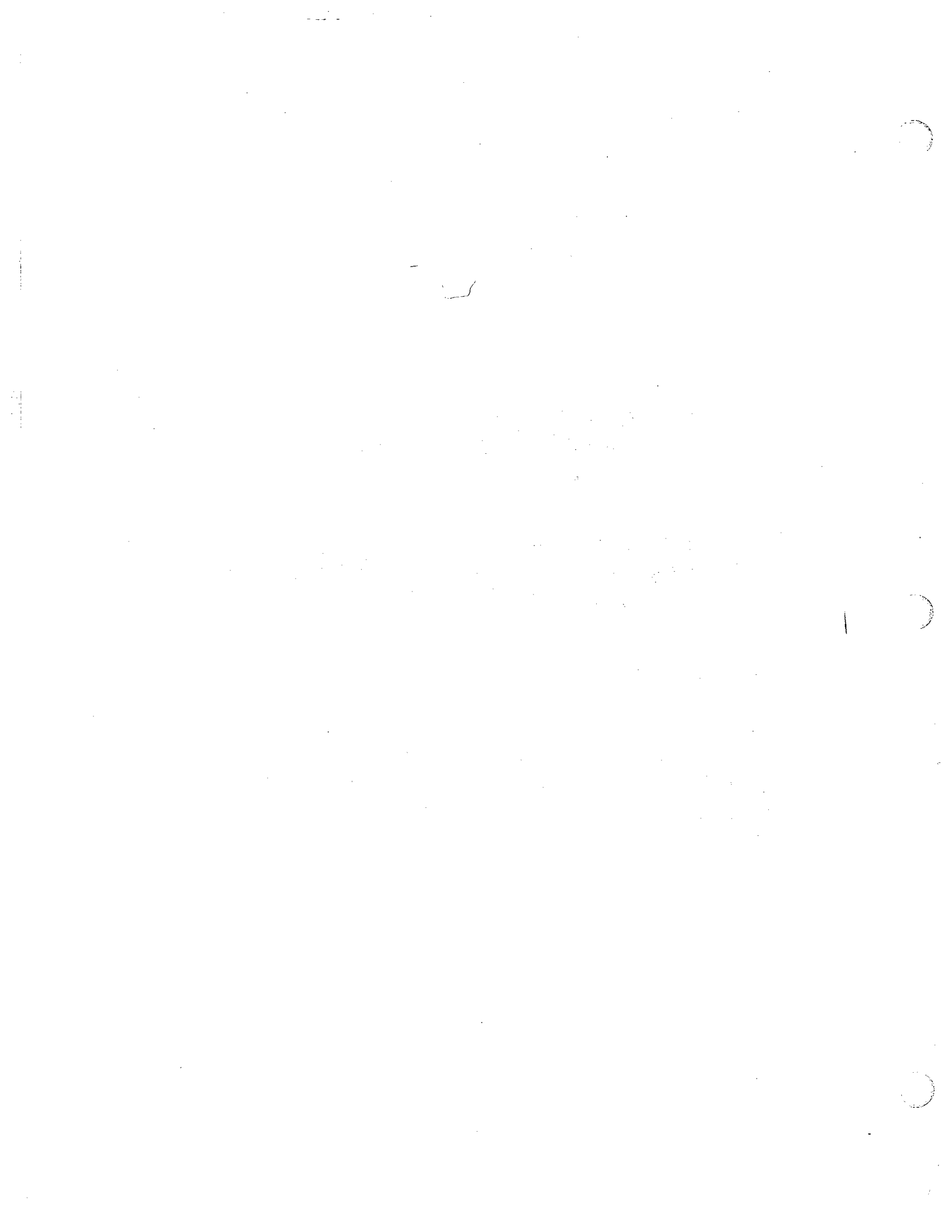
Select a level area, and set the implement down on blocks to prevent sweeps and points from settling into the ground. Coat sweeps with rust preventative. Inspect for worn or damaged parts and replace as needed.

REPAIR PARTS

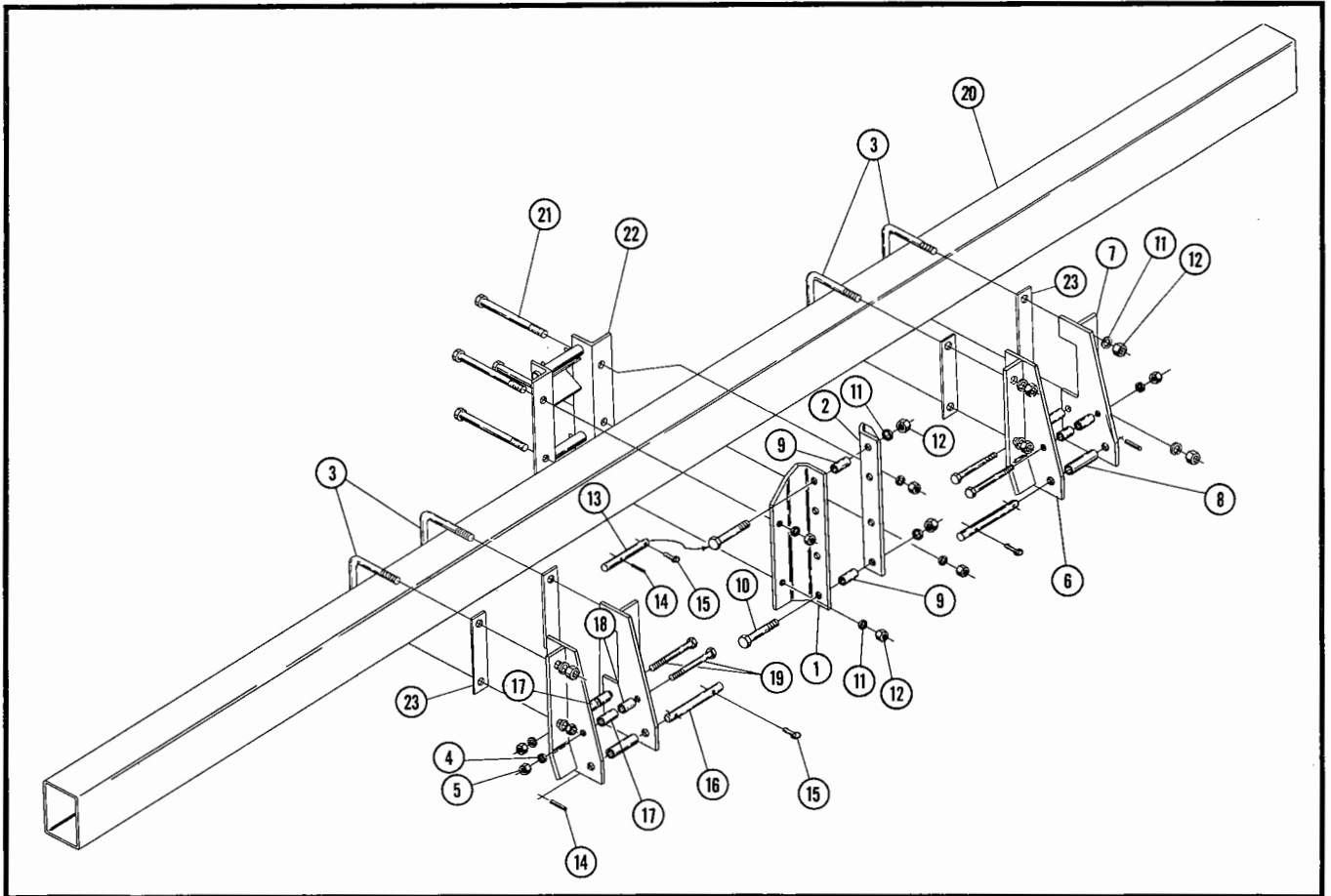
Refer to the Assembly Section of this book when repairing or replacing parts, and follow the same procedure used when assembling a new unit. Reverse this procedure for disassembly. The Parts Section of this manual will show a breakdown of assemblies, location of parts, and part numbers. Krause Parts were developed and tested for these units, therefore, it is recommended that Krause replacement parts be used.

PARTS SECTION

THE FOLLOWING ILLUSTRATED PARTS SECTION HAS BEEN COMPILED TO REFLECT PART NUMBERS REQUIRED TO ORDER PARTS, AND TO SUPPORT THE ASSEMBLY SECTION FOR DIMENSIONS AND DESCRIPTIONS OF ALL PARTS, BOLTS, PINS, ETC. THE OPERATOR CAN ALSO IDENTIFY PART NAMES TO CLARIFY PROPER OPERATIONAL STEPS.



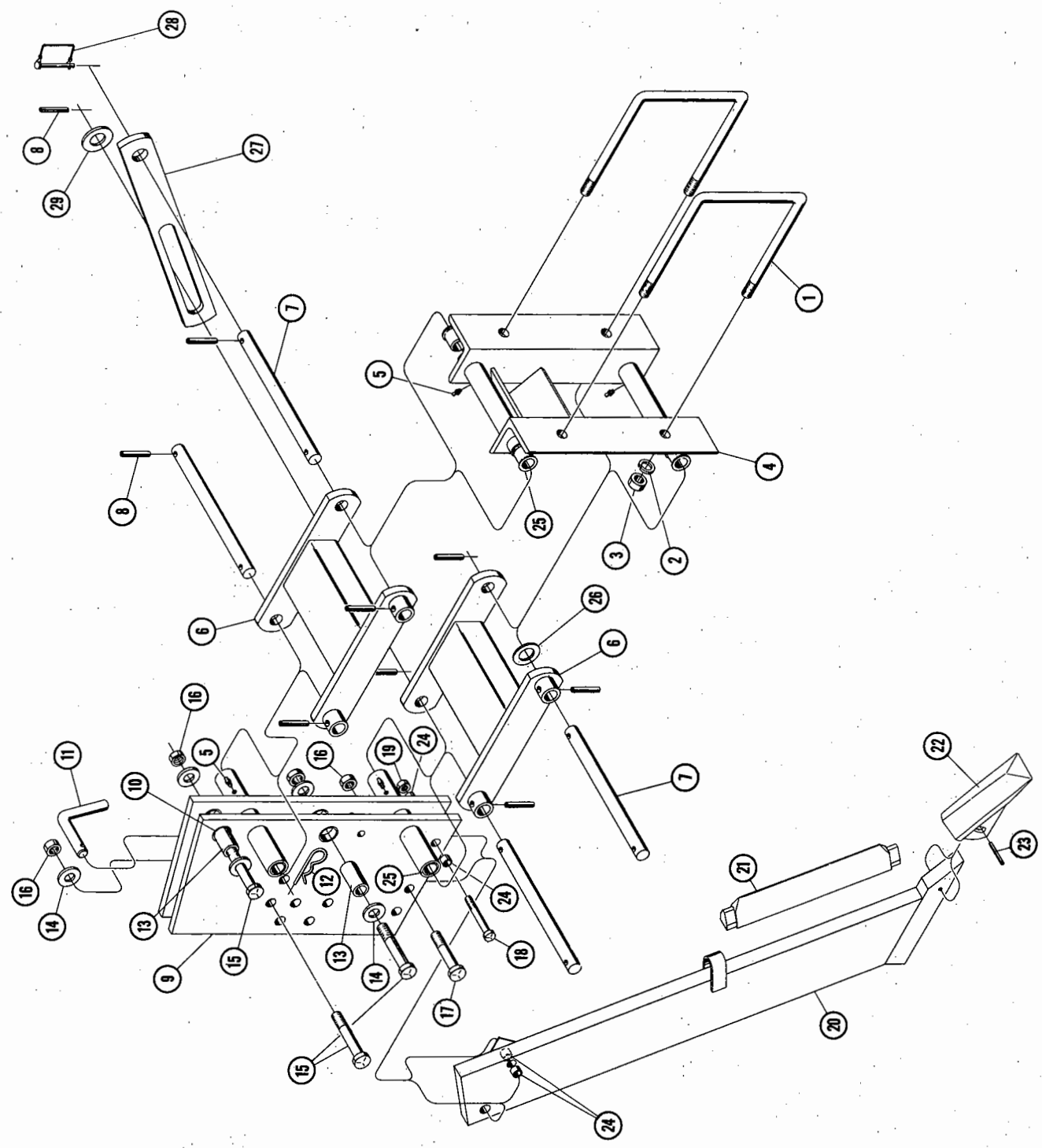
3-POINT MAST AND TOOL BAR

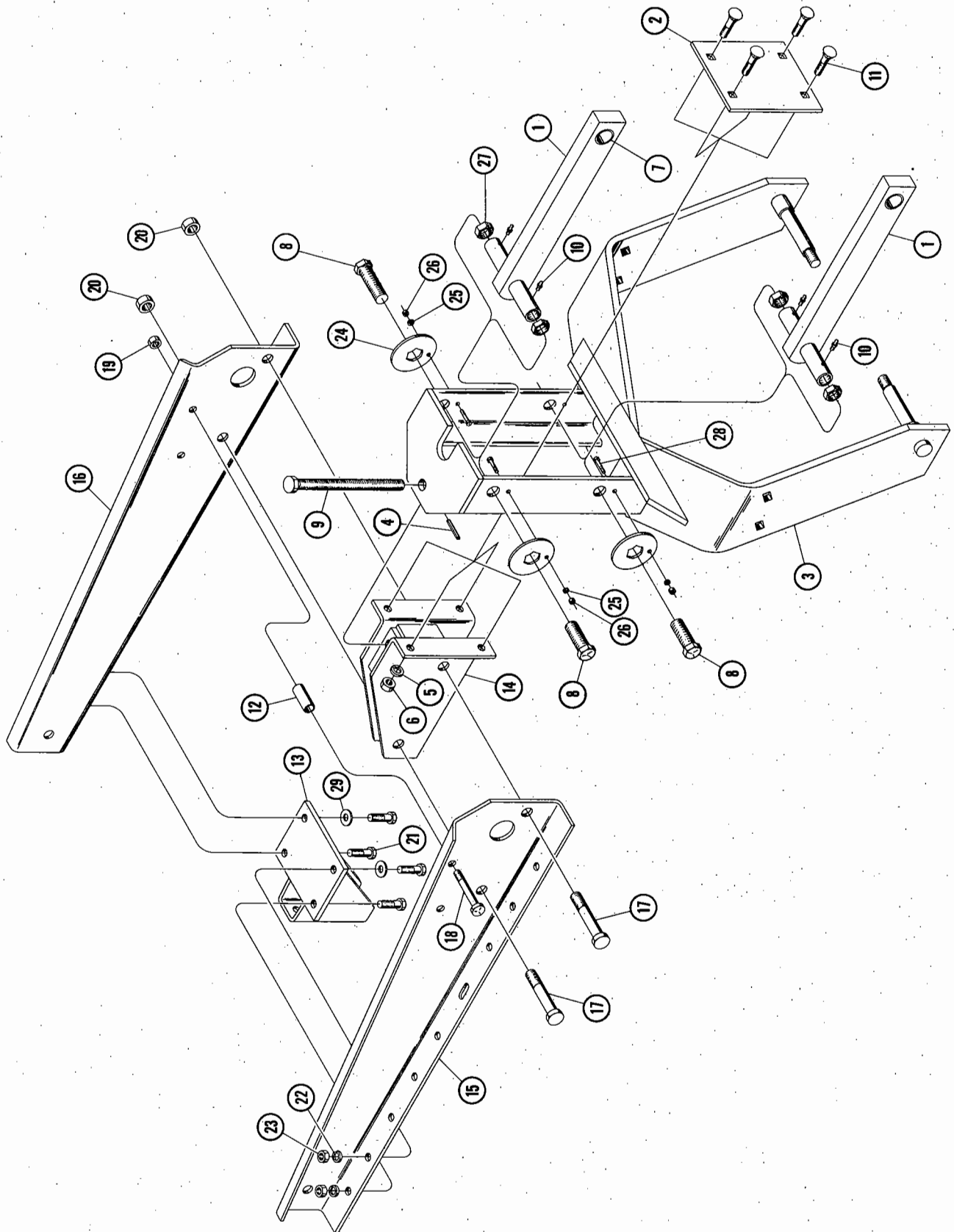


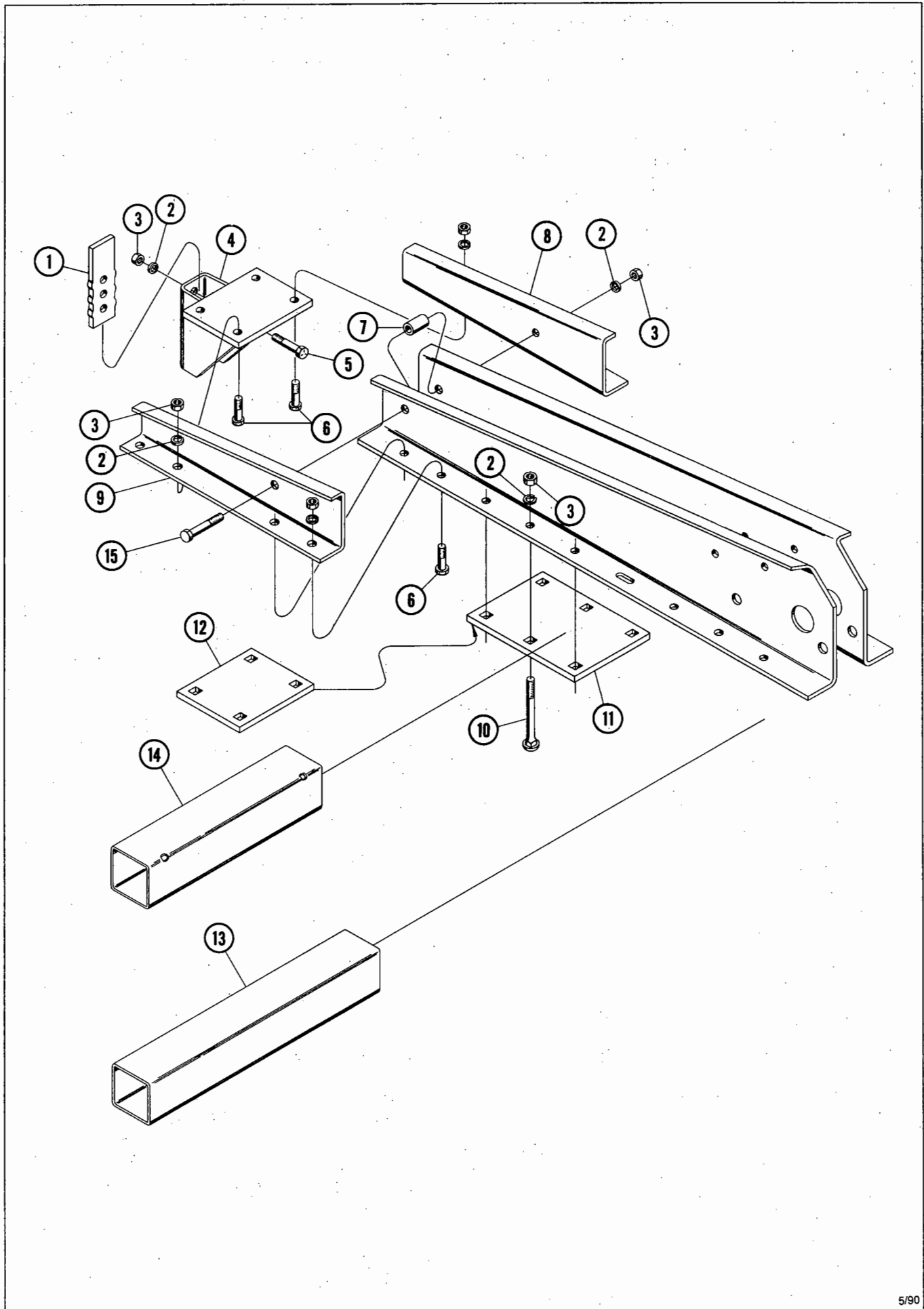
FOR MODELS - ALL

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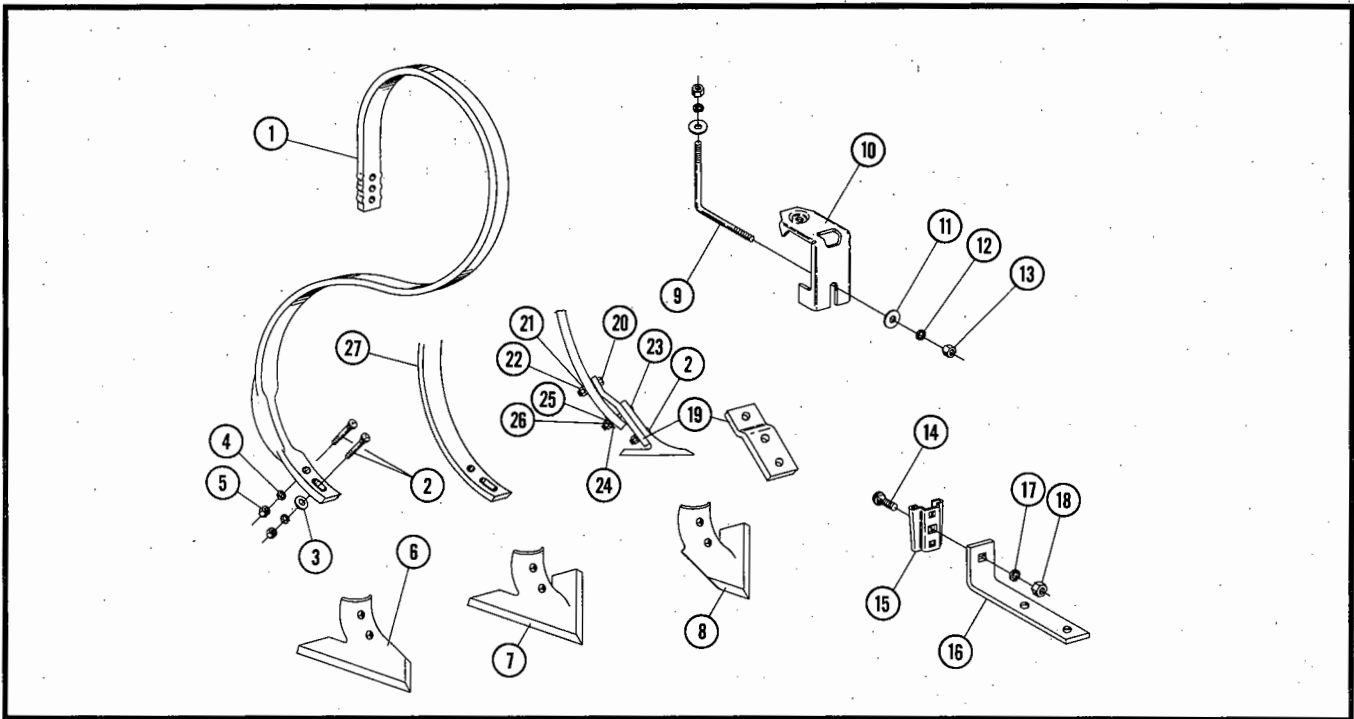
ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	4616-0-11	Top Hitch - Right	1
2	4616-0-10	Top Hitch - Left	1
3	61-206	1" DIA. U-Bolt	4
4	64-112	3/4" STD. Lock Washer	4
5	63-112	3/4NC Hex Nut	4
6	4616-41-0	Bottom Hitch - Right	2
7	4616-40-0	Bottom Hitch - Left	2
8	5210-101-9	Bushing - Hitch	2
9	5210-101-8	Bushing - Top Link	2
10	62-481	1NC x 4-1/2" GRADE 5 Cap Screw	2
11	64-118	1" STD. Lock Washer	14
12	63-117	1NC Hex Nut	14
13	5210-101-6	Pin - Top Link (For STD. Hitch)	1
14	60-615	3/8" DIA. x 2" Roll Pin	3
15	60-102	Klick Pin	3
16	5210-101-7	Pin - Hitch	2
17	4600-0-20	Long Spacer	4
18	4600-0-32	Short Spacer	4
19	62-210	3/4NC x 6" GRADE 5 Cap Screw	4
20	4656-1-0	Tool Bar 194" Long (Used for Model 4656-0R3)	1
	4658-1-0	Tool Bar 254" Long (Used for Models 4656-0R4 & 4658-0R3)	1
21	62-262	1NC x 9-1/2" GRADE 5 Machine Bolt	4
22	4650-34-0A	Center Mounting Weldment	1
23	4650-0-12	Lower Hitch Shim	4







K-TINE SHANK & LAMP BRACKET

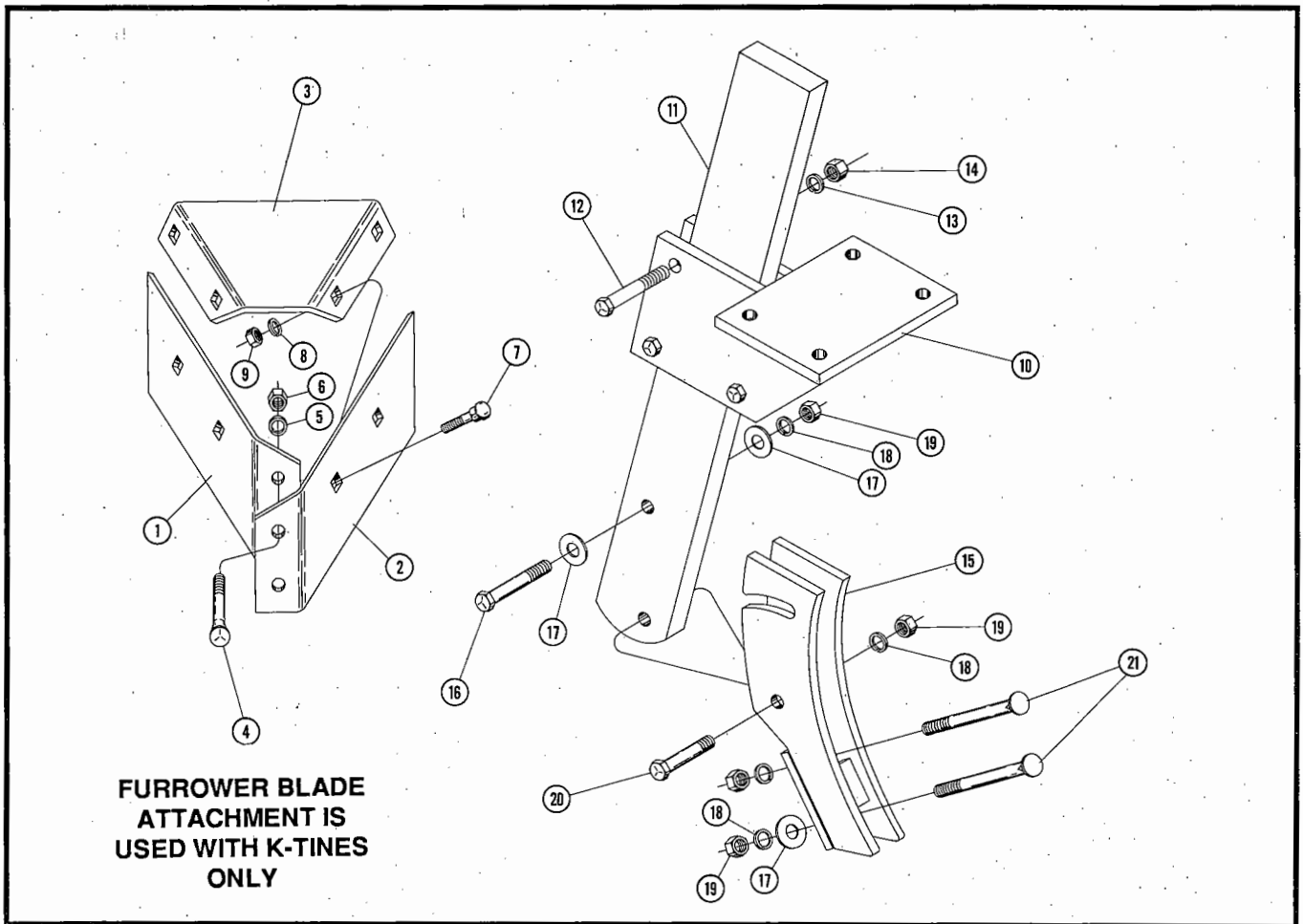


FOR MODELS - ALL

11/90

ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	31-167	21" Edge-On K-Tine Shank 55 Degree	1
2	62-317	7/16NC x 1-1/2" GRADE 5 #3 Plow Bolt	2
3	64-106	7/16" STD. Flat Washer	1
4	64-105	7/16" STD. Lock Washer	2
5	63-104	7/16NC Hex Nut	2
6	33-150	55 Deg. Sweep - Right Half	1
7	33-153	55 Deg. Sweep - 6"	1
	33-149	55 Deg. Sweep - 10"	1
	33-163	55 Deg. Sweep - 12"	1
8	33-151	55 Deg. Sweep - Left Half	1
9	61-202	1/2" DIA. L-Bolt	1
10	4600-0-9	K-Tine Clamp	1
11	64-108	1/2" STD. Flat Washer	2
12	64-107	1/2" STD. Lock Washer	2
13	63-106	1/2NC Hex Nut	2
	4606-59-0	Lamp Bracket Assembly	1
14	62-131	7/16NC x 1" Carriage Bolt	1
15	74-144	Socket Lamp Bracket	1
16	4606-59-1	Lamp Bracket	1
17	64-105	7/16" STD. Lock Washer	1
18	63-104	7/16NC Hex Nut	1
	4100-10-0	Shank Extension and Bolt Assembly	1
19	4100-0-9	Shank Extension	1
20	62-407	7/16NC x 1-1/2" GRADE 5 Cap Screw	1
21	64-105	7/16" STD. Lock Washer	1
22	63-104	7/16NC Hex Nut	1
23	62-406	3/8NC x 2-1/4" GRADE 5 #3 Plow Bolt	1
24	64-104	3/8" STD. Flat Washer	1
25	64-103	3/8" STD. Lock Washer	1
26	63-102	3/8NC Hex Nut	1

FURROWER BLADE & DITCHER SHANK ASSEMBLY

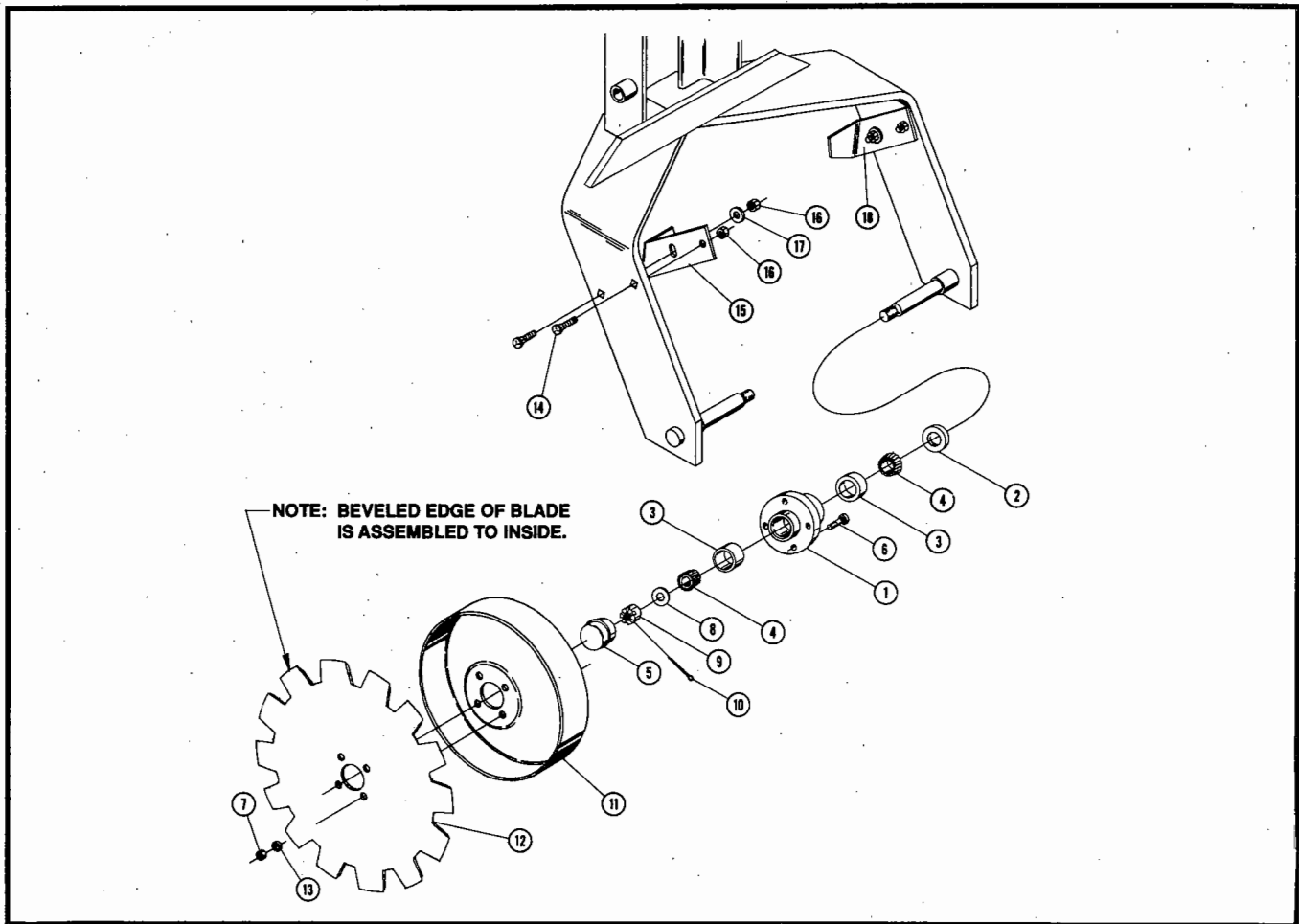


FOR MODELS - ALL

11/90

ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	4650-0-42	Right Furrower Blade	1
2	4650-0-41	Left Furrower Blade	1
3	4650-0-43	Blade Brace	1
4	62-132	7/16NC x 2-1/4" #3 GRADE 5 Plow Bolt	2
5	64-105	7/16" STD. Lock Washer	2
6	63-104	7/16NC Hex Nut	2
7	62-366	3/8NC x 1" Carriage Bolt	4
8	64-103	3/8" STD. Lock Washer	4
9	63-102	3/8NC Hex Nut	4
	4650-37-0	Ditcher Shank Assembly	1
10	4650-38-0	Shank Mounting	1
11	4650-37-1	Ditcher Shank	1
12	62-372	1/2NC x 2-1/2" GRADE 5 Cap Screw	4
13	64-107	1/2" STD. Lock Washer	4
14	63-106	1/2NC Hex Nut	4
	4650-46-0	3/4" Foot Piece Assembly	1
15	4650-52-0	3/4" Foot Piece Weldment	1
16	62-551	1/2NC x 2-1/4" GRADE 5 Cap Screw	1
17	64-108	1/2" STD. Flat Washer	3
18	64-107	1/2" STD. Lock Washer	4
19	63-106	1/2NC Hex Nut	4
20	62-343	1/2NC x 2" GRADE 5 Cap Screw	1
21	62-524	1/2NC x 3-1/4" #3 Plow Bolt	2

DEPTH WHEEL ASSEMBLY

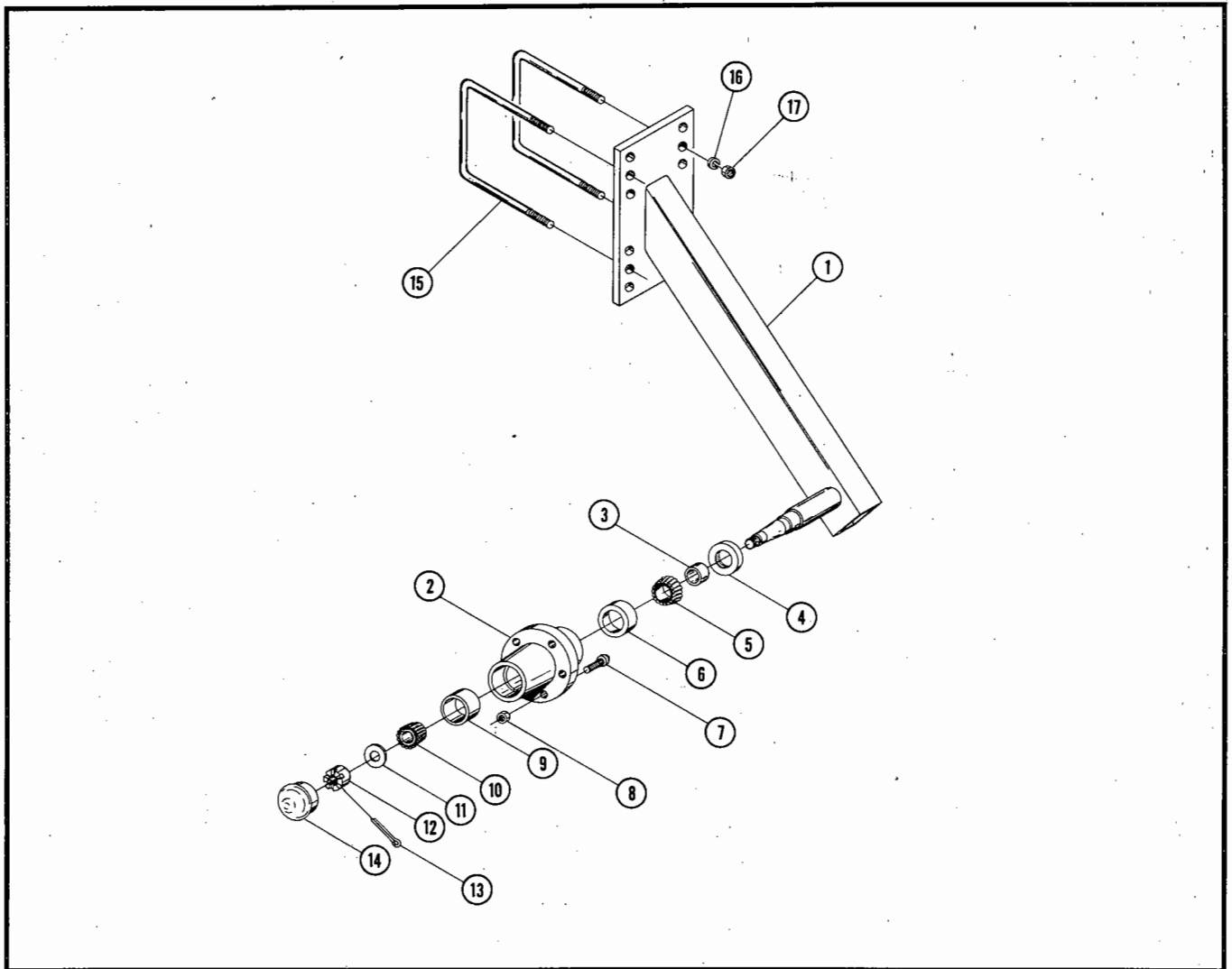


FOR MODELS - ALL

11/90

ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	4650-33-1	Hub Casting	1
2	42-130	Seal	1
3	41-218	Cup	2
4	41-120	Cone	2
5	52-308	Hub Cap	1
6	62-286	1/2NF x 1-5/8" Wheel Bolt	4
7	63-209	1/2NF Lug Nut	4
8	64-168	3/4" SAE Heat Treated Flat Washer	1 / Hub
9	63-201	3/4NF Slotted Hex Nut	1 / Hub
10	60-723	1/8" DIA. x 1-3/4" Cotter Pin	1 / Hub
11	4650-55-2	Depth Band	2 / Gang
12	30-207	Notched Coulter Blade	2 / Gang
13	64-107	1/2" STD. Lock Washer	4
14	62-474	1/2NC X 1-1/2" GRADE 5 Carriage Bolt	4
15	4650-0-8	Left Wheel Scraper	1
16	63-108	1/2NC Self Locking Nut	4
17	64-108	1/2" STD. Flat Washer	2
18	4650-0-9	Right Wheel Scraper	1

GAUGE WHEEL ASSEMBLY

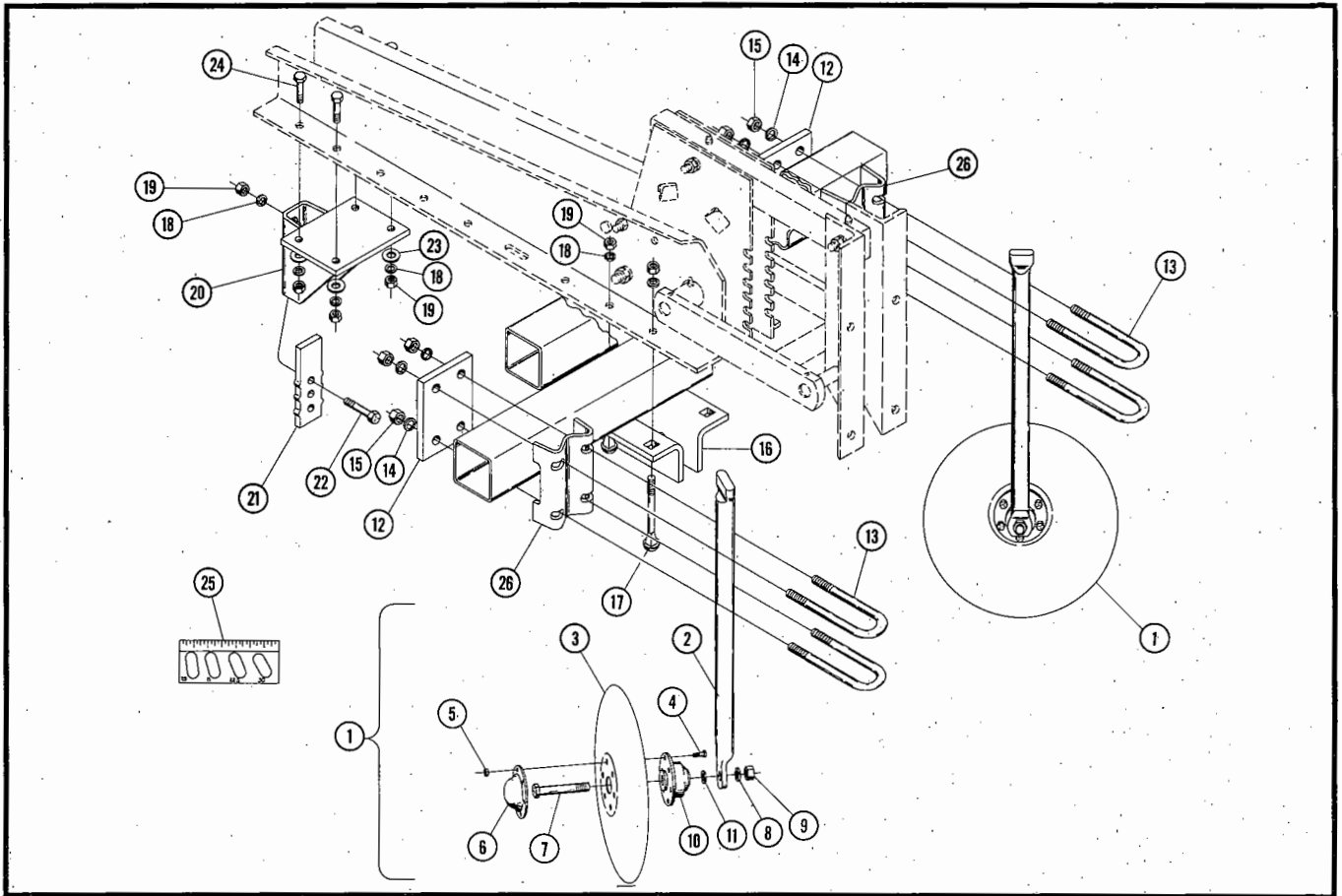


FOR MODELS - ALL

11/90

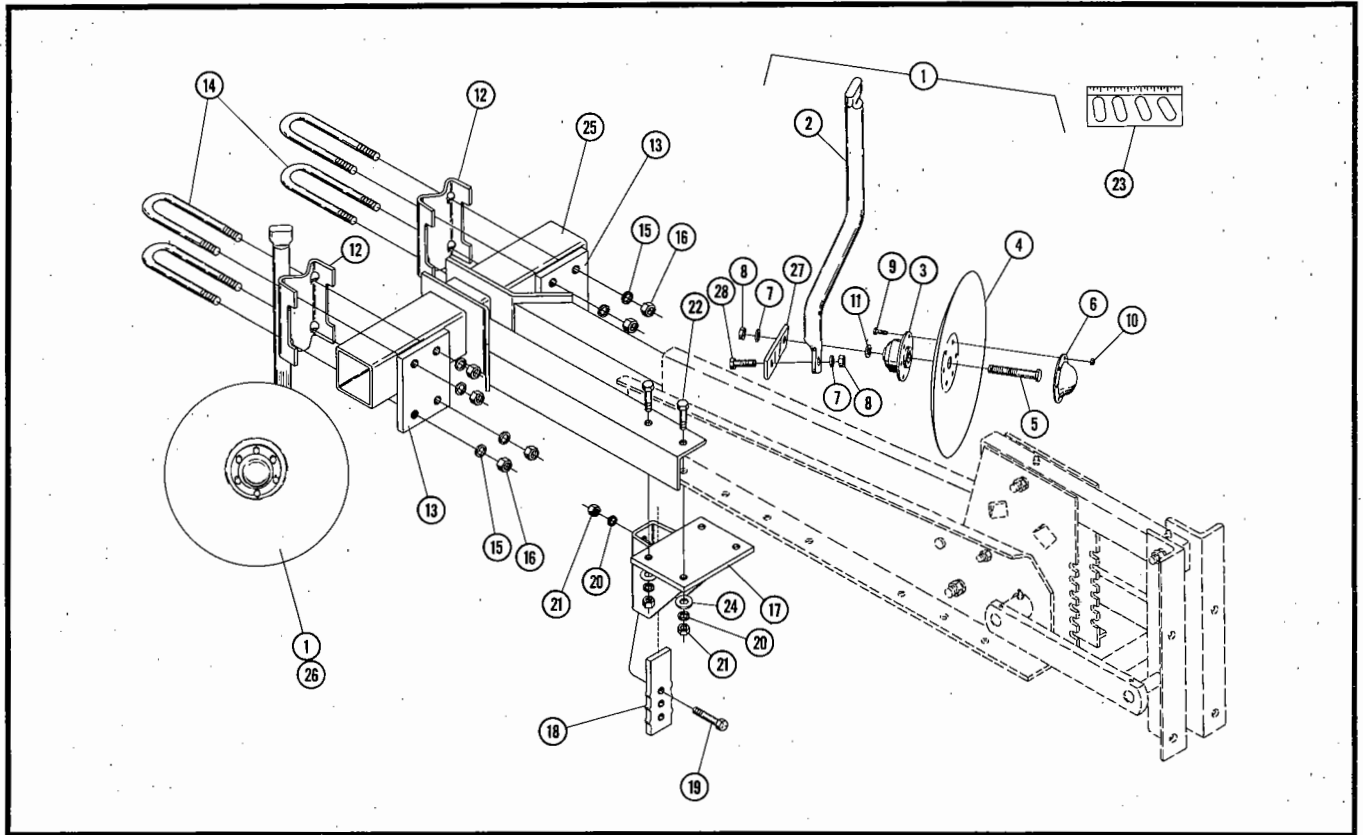
ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
	4600-50-0A	Right Gauge Wheel and Hub Assembly	1
	4600-51-0A	Left Gauge Wheel and Hub Assembly	1
1	4600-52-0A	Right Wheel Arm Weldment (Shown)	1
	4600-53-0A	Left Wheel Arm Weldment (Opposite)	1
2	49-104	Hub Casting	1
3	53-111	Wear Sleeve	1
4	42-115	Seal	1
5	41-112	Cone - Rear	1
6	41-208	Cup - Rear	1
7	62-286	Wheel Bolt	5
8	63-209	1/2NF Lug Nut	5
9	41-215	Cup - Front	1
10	41-117	Cone - Front	1
11	64-161	3/4" Heat Treated Flat Washer (Black)	1
12	63-201	3/4NF Slotted Hex Nut	1
13	60-725	5/32" DIA. x 1-1/2" Cotter Pin	1
14	52-305	Hub Cap	1
15	61-204	5/8" DIA. U-Bolt	2
16	64-109	5/8" STD. Lock Washer	4
17	63-109	5/8NC Hex Nut	4

CONVENTIONAL DISC HILLER ASSEMBLY



ITEM	PART NUMBER	PART DESCRIPTION	11/90 QUANTITY
1	4600-25-0A	Conventional Disc Hiller Assembly	2
2	4600-25-1A	Conventional Disc Arm	2
3	30-206	16" Disc Blade	2
4	62-502	1/4NC x 5/8" GRADE 5 Cap Screw	12
5	63-101	1/4NC Self Locking Nut	12
6	4600-25-2	Disc Bearing Cap	2
7	62-176	5/8NC x 3-1/2" GRADE 5 Cap Screw	2
8	64-109	5/8" STD. Lock Washer	2
9	63-109	5/8NC Hex Nut	2
10	40-153	Bearing Disc Galnge	2
11	64-152	Machinery Bushing	2
12	4604-51-2	Bolt Plate	2
13	61-209	5/8" DIA. U-Bolt	4
14	64-109	5/8" STD. Lock Washer	8
15	63-109	5/8NC Hex Nut	8
16	4600-0-18	Mounting Angle	2
17	62-482	1/2NC x 4-1/2" GRADE 5 Carriage Bolt	6
18	64-107	1/2" STD. Lock Washer	11
19	63-106	1/2NC Hex Nut	11
20	4600-34-0	Shank Mount Weldment	1
21	31-151	Shank Reinforcement Plate	1
22	62-343	1/2NC x 2" GRADE 5 Cap Screw	1
23	64-108	1/2" STD. Flat Washer	4
24	62-136	1/2NC x 1-1/2" Cap Screw	4
25	4600-10-0	Disc Hiller Template (includes #74-341 Decal)	1
26	4604-51-1	Disc Mounting Clamp	2

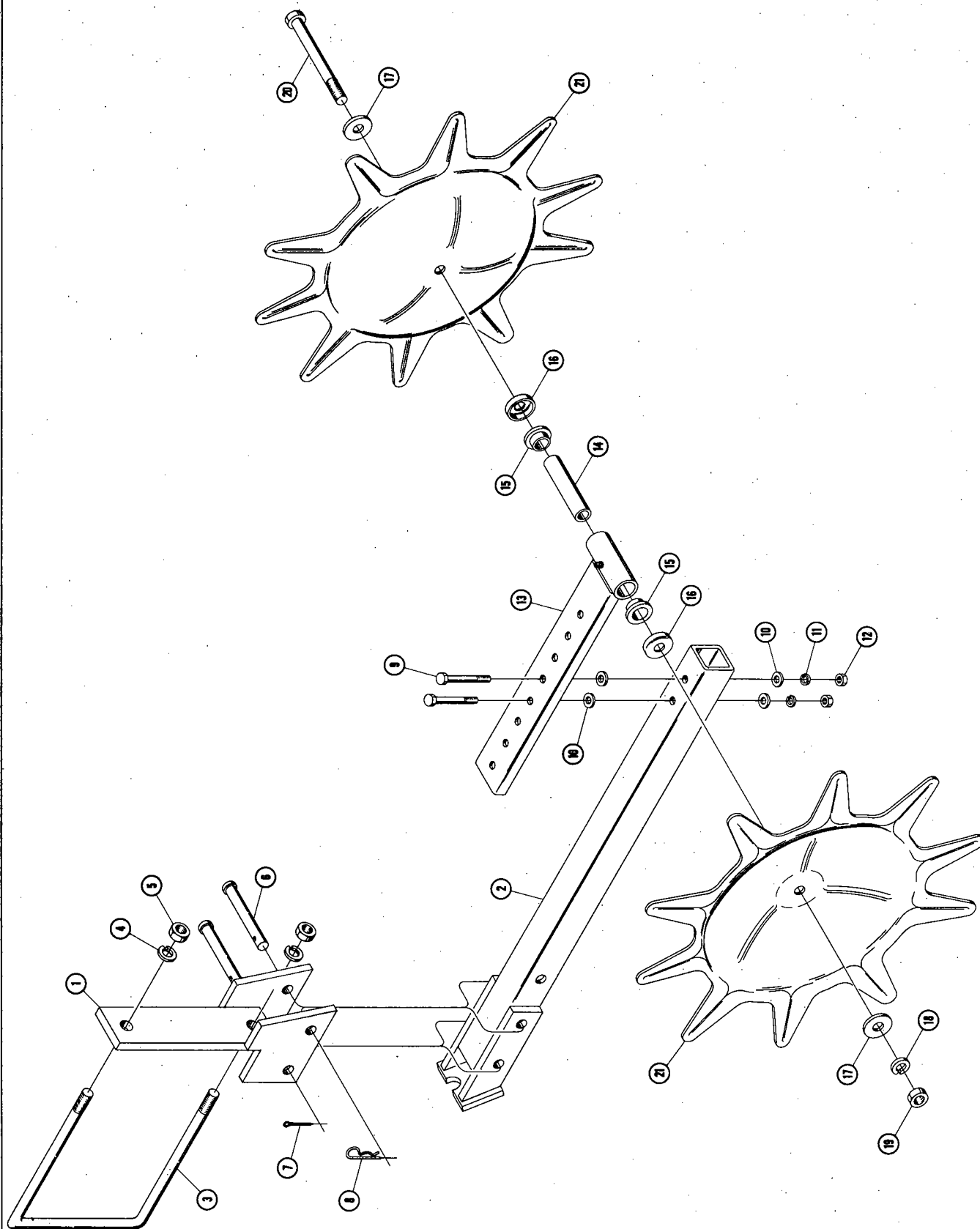
CENTER REAR DISC HILLER ASSEMBLY

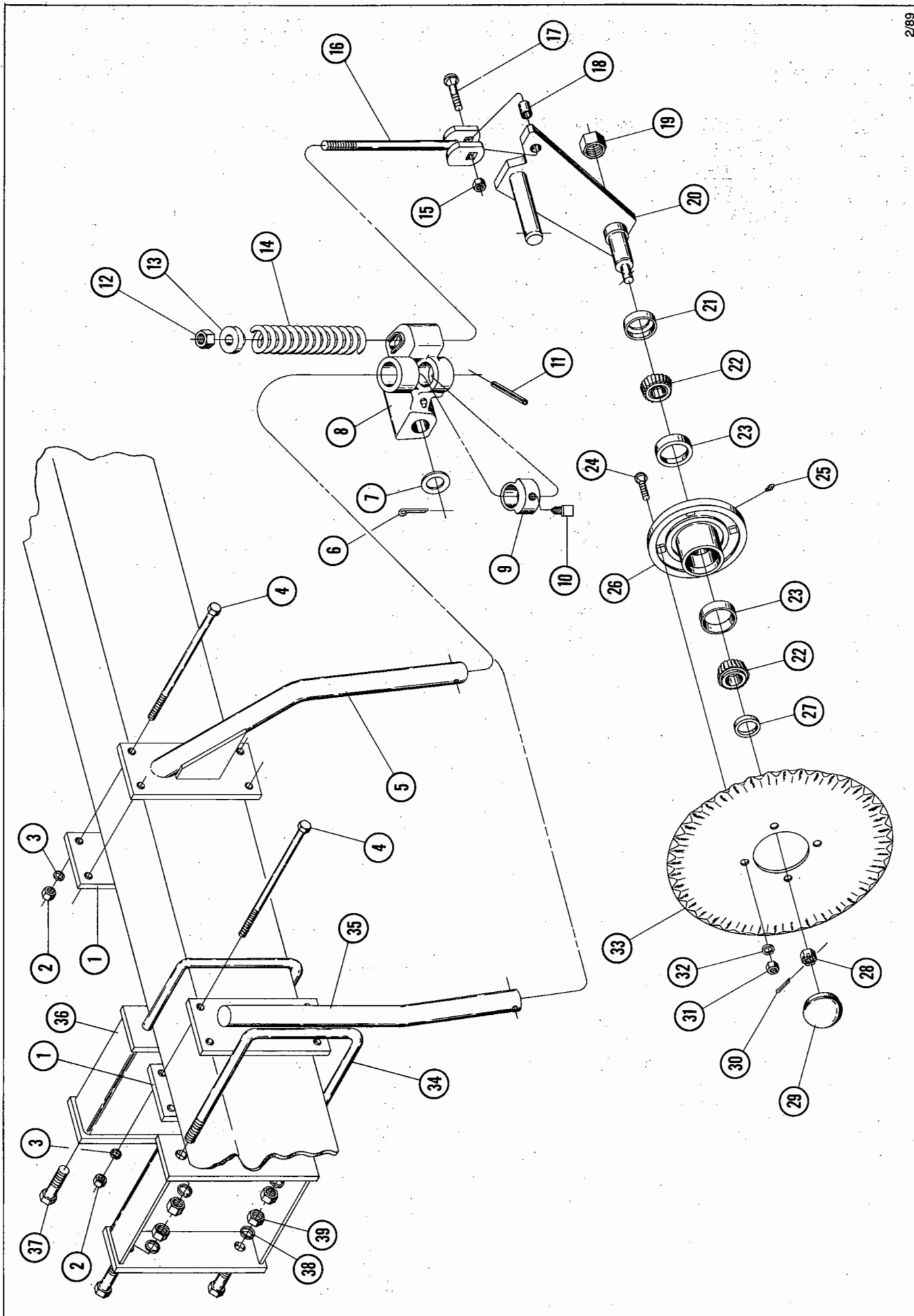


FOR MODELS -

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ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	4600-24-0	Center Rear Disc Hiller Assembly	2
2	4600-24-1	Rear Center Disc Arm	2
3	40-153	Bearing Disc Flange	2
4	30-206	16" Disc Blade	2
5	62-176	5/8NC x 3-1/2" GRADE 5 Cap Screw	2
6	4600-25-2	Disc Bearing Cap	2
7	64-109	5/8" STD. Lock Washer	2
8	63-109	5/8NC Hex Nut	2
9	62-502	1/4NC x 5/8" GRADE 5 Cap Screw	6
10	63-101	1/4NC Self Locking Nut	6
11	64-152	Machinery Bushing	1
12	4604-51-1	Disc Mounting Clamp	2
13	4604-51-2	Bolt Plate	2
14	61-209	5/8" DIA. U-Bolt	4
15	64-109	5/8" STD. Lock Washer	8
16	63-109	5/8NC Hex Nut	8
17	4600-34-0	Shank Mount Weldment	1
18	31-151	Shank Reinforcement Plate	1
19	62-343	1/2NC x 2" GRADE 5 Cap Screw	2
20	64-107	1/2" STD. Lock Washer	6
21	63-106	1/2NC Hex Nut	6
22	62-136	1/2NC x 1-1/2" Cap Screw	4
23	4600-10-0	Disc Hiller Template with Decal (#74-341)	1
24	64-108	1/2" STD. Flat Washer	4
25	4600-28-0	Rear Disc Hiller Extension Weldment	1
26	4600-26-2	Right Tilt Bracket	1
27	4600-26-1	Left Tilt Bracket	1
28	62-169	5/8NC x 2" GRADE 5 Cap Screw	1





COULTER ASSEMBLY

FOR MODELS - ALL

11/90

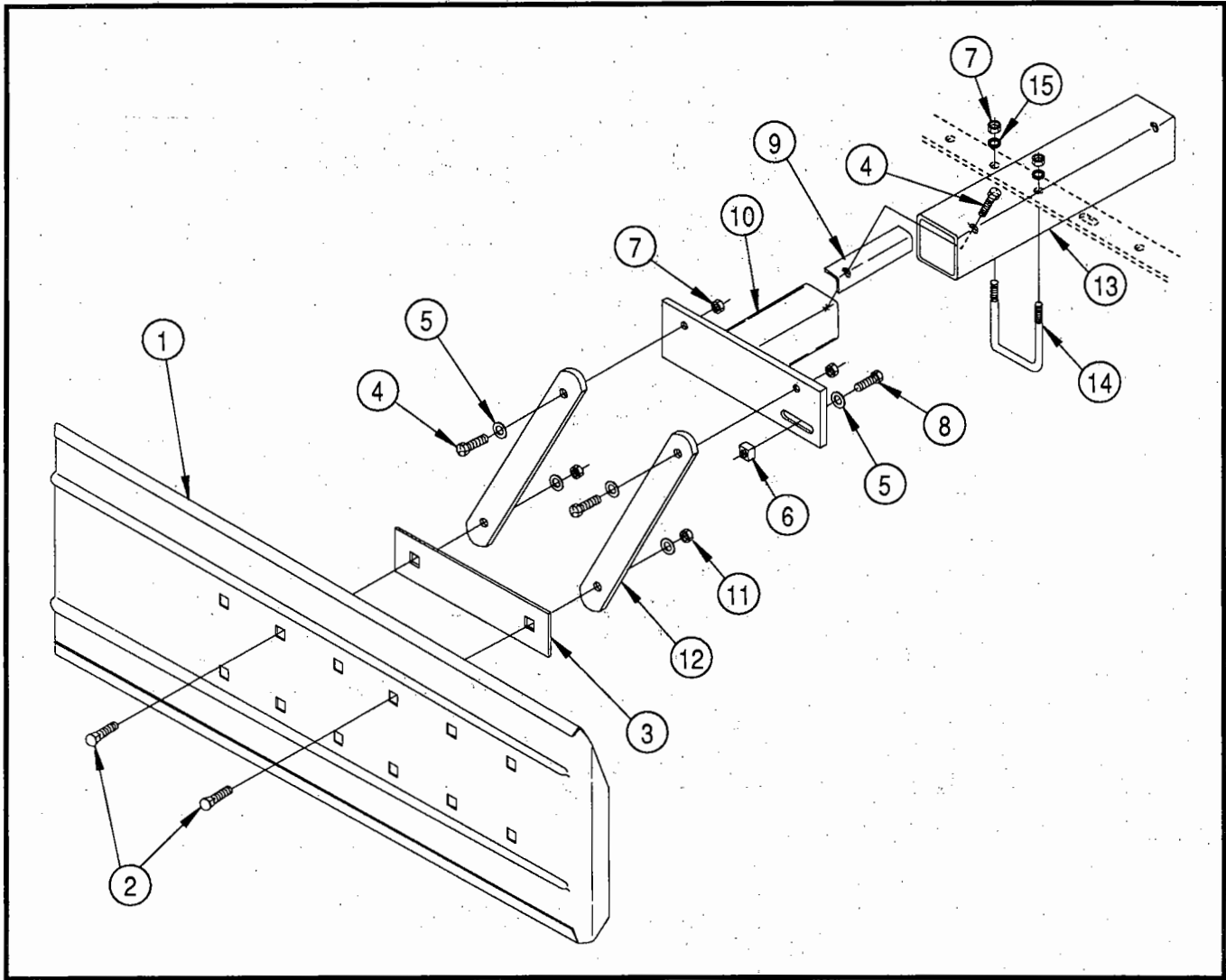
ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
	4650-48-0	Coulter Assembly (Standard Mount)	1
	4650-59-0	Coulter Assembly (Used behind tractor tires)	1
* 1	5210-0-4423	Plate	1
* 2	63-106	1/2NC Hex Nut	4
* 3	64-107	1/2" STD. Lock Washer	4
* 4	62-440	1/2NC x 8-1/2" Cap Screw	4
5	4650-47-0	Coulter Weldment	1
6	60-706	7/32" DIA. x 2" Cotter Pin	1
7	64-127	1-1/4" SAE Flat Washer	1
8	5210-442-1	Coulter Housing Casting	1
9	5210-442-4	Swivel Stop	1
10	62-473	5/8NC x 1" Square Head Cut Point Set Screw	1
11	60-617	3/8" DIA. x 2-1/2" Roll Pin	1
12	63-114	3/4NC Self Locking Nut	1
13	5210-442-5	Spring Cap	1
14	76-175	Spring - Compression	1
15	63-107	1/2NC Self Locking Nut	1
16	5210-443-0	Stud Weldment	1
17	62-500	1/2NC x 2-1/4" GRADE 5 Carriage Bolt	1
18	5210-442-2	Wear Sleeve	1
19	63-304	1-1/4NC Black Jam Nut	1
20	5210-444-0	Coulter Arm Assembly	1
^ 21	42-125	Seal	1
22	41-117	Cone	2
23	41-215	Cup	2
24	62-474	1/2NC x 1-1/2" GRADE 5 Carriage Bolt	4
25	65-101	1/8NPT Zerk	1
26	5210-445-1	Coulter Hub Casting	1
27	64-160	Special Washer	1
28	63-210	5/8NF Slotted Hex Nut	1
29	52-301	Hub Cap	1
30	60-724	1/8" DIA. x 1-1/4" Cotter Pin	1
31	63-106	1/2NC Hex Nut	4
32	64-107	1/2" STD. Lock Washer	4
* 33	30-198	Ripple Flute Coulter Blade	1
* 34	61-190	U-Bolt	2
+ 35	4650-57-0	Coulter Arm Weldment	1
+ 36	4650-56-0	Extension Weldment	2
+ 37	62-421	3/4NC x 2" GRADE 5 Cap Screw	4
+ 38	64-112	3/4" STD. Lock Washer	4
+ 39	63-112	3/4NC Hex Nut	4

* Not Included in coulter assembly

^ Includes spindle part # 5210-444-3

+ Used for 4650-59-0 Assembly only

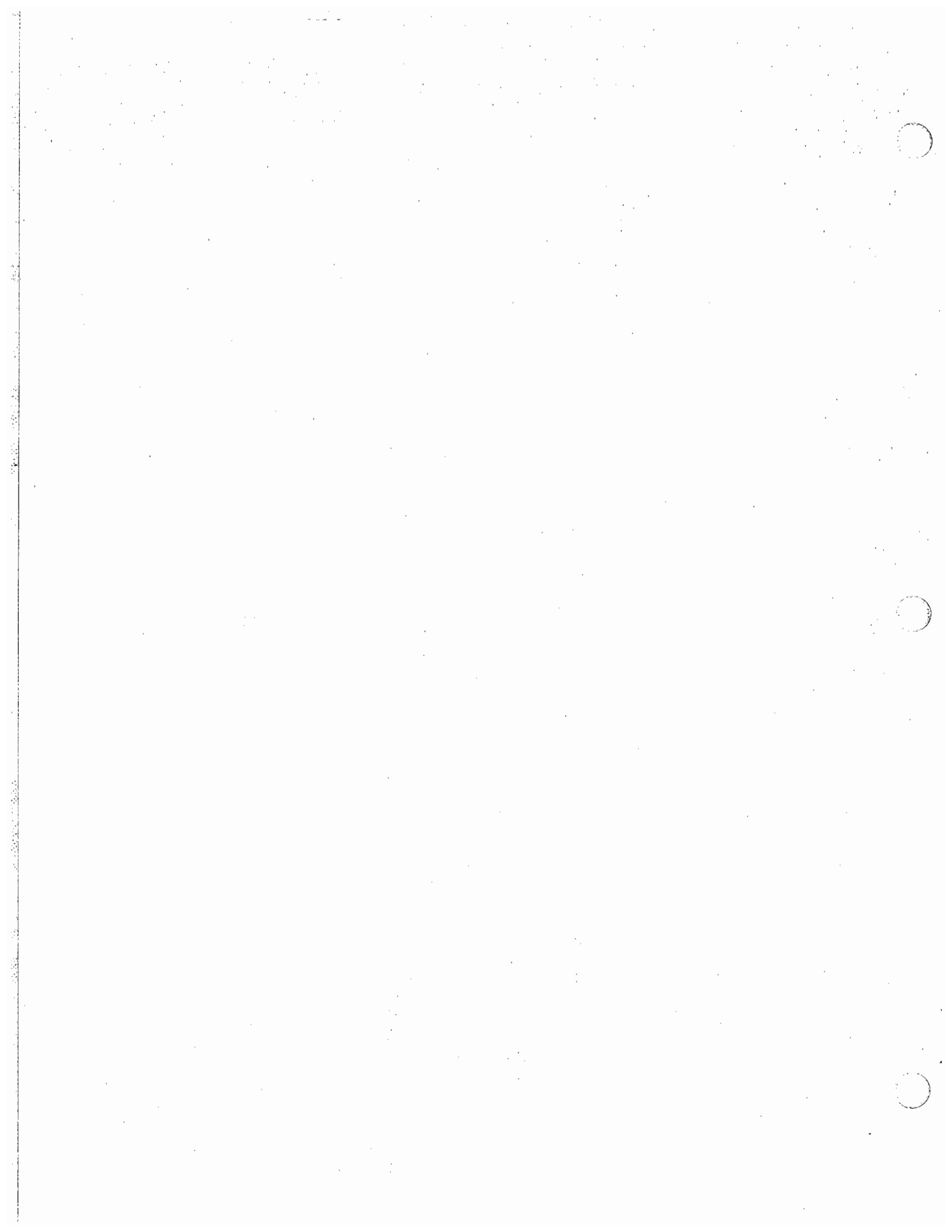
OPEN TOP SHIELD ASSEMBLY



FOR MODELS - ALL

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ITEM	PART NUMBER	PART DESCRIPTION	QUANTITY
1	4650-0-34	Open Top Shield (3 Ft.)	1
	4650-0-37	Open Top Shield (4 Ft.) Shown	1
2	62-442	1/2NC x 1-1/2" Carriage Bolt	2
3	4650-0-36	Bolt Plate	1
4	62-420	1/2NC x 1-1/4" GRADE 5 Cap Screw	3
5	64-108	1/2" STD. Flat Washer	5
6	63-159	1/2NC Square Nut	1
7	63-106	1/2NC Hex Nut	4
8	62-300	1/2NC x 1" GRADE 5 Cap Screw	1
9	4650-0-38	Adjustment Angle	1
10	4650-50-0	Left Mounting Weldment	1
	4650-51-0	Right Mounting Weldment	1
11	63-108	1/2NC Nylon-Top Lock Nut	2
12	4650-0-35	Shield Arm	2
13	4600-0-37	Mounting Tube	1
14	61-210	1/2" DIA. U-Bolt	2
15	64-107	1/2" STD. Lock Washer	4



ASSEMBLY SECTION

THE FOLLOWING SECTION ILLUSTRATES A GENERAL METHOD FOR THE ASSEMBLY OF THIS SERIES KRAUSE TILLAGE TOOL. YOU MUST KNOW THE MODEL NUMBER OF THE UNIT BEING ASSEMBLED WHENEVER MAKING REFERENCE TO THIS SECTION. THE FOLLOWING PICTURES AND DRAWINGS WILL SHOW BOLTS, PINS, NUTS AND ETC., WITH THE DESCRIPTIVE SIZE AND LENGTHS IN THE ACCOMPANYING PARAGRAPH AND A PARTS LISTING REFERENCE PAGE NUMBER. IF ANY DIFFICULTY SHOULD BE ENCOUNTERED DURING THE ASSEMBLY, RECHECK THE ILLUSTRATIONS, ASSEMBLY STEPS AND PART LIST DRAWINGS.

PROPER BOLT USE

OVER TORQUED BOLTS is probably one of the most frequent causes for bolt breakages. MAXIMUM TIGHTNESS DOES NOT MEAN MAXIMUM STRENGTH. A bolt in a stretched condition due to over torsioning is more subject to failure under a heavy load or shock than a bolt that is correctly tightened. Torque hand wrench or torque adjustable impact wrenches should be used. If standard wrenches are used, try to refrain from using "cheater bars." Cheater bars increase the risk of over torsioning. When torqued properly, bolts and their joining members will give longer, more satisfying service.

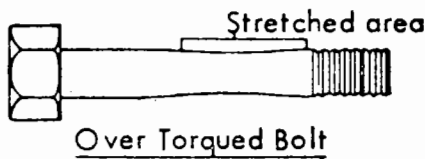
The following table lists the torque requirements for bolts with coarse threads. Torque values for plated or oiled bolts are unpredictable due to the lubricating effect and require slightly less torque than black bolts.

RECOMMENDED TORQUE VALUES IN FOOT POUNDS

For S.A.E. Grade 2 and Grade 5 coarse thread cap screws and bolts shown are suggested MAXIMUM for fasteners, carrying only the residue oil of the manufacturer.

BOLT SIZE	BLACK BOLTS		PLATED or OILED BOLTS	
	GRADE 2	GRADE 5	GRADE 2	GRADE 5
3/8"	19	32	16	24
7/16"	30	50	24	40
1/2"	45	72	34	58
5/8"	86	150	68	118
3/4"	150	250	120	200
7/8"	140	360	105	280
1"	220	560	175	450
1-1/8"	260	700	205	560
1-1/4"	380	980	300	780
1-1/2"	580	1200	460	960

TIE ROD TIGHTENING TORQUE	
1-1/2" Dia. Rods _____	600 Ft. Lbs
1-3/4" Dia. Rods _____	800 Ft. Lbs
2" Dia. Rods _____	1200 Ft. Lbs



Incorrect use of GRADED bolts is another problem. Generally two grades are used on Krause tools, Grade 2 and Grade 5. Grade 2 bolts are used in low stress areas or for shear bolts to protect more expensive parts. Grade 5 bolts are approximately 60-150% stronger than Grade 2 and are used in higher-stress areas. It is very important that these bolts are used in the proper locations as recommended

ASSEMBLY

STUDY THE NAMES AND LOCATIONS OF THE PARTS AND FAMILIARIZE YOURSELF WITH THE ROW CROP CULTIVATOR BEFORE STARTING THE ASSEMBLY. READING THE STEP BY STEP INSTRUCTIONS THAT FOLLOW WILL BE HELPFUL.

SAFETY



READ ALL OF THE SAFETY NOTATIONS IN THE ASSEMBLY INSTRUCTIONS FOR YOUR OWN PROTECTION. ACCIDENTS CAN BE PREVENTED BY RECOGNIZING THE CAUSE OF AN ACCIDENT BEFORE IT CAN HAPPEN.

ASSEMBLY

Select an area for the assembly that will be large enough to accommodate the completed row crop cultivator. The surface of the work area should be as level as possible. Use the proper hand tools to insure proper bolt tightness. Refer to the preceding page titled "Proper Bolt Use" for the recommended torque values of different sizes of bolts.

PART LOCATIONS

FRONT - The front of the frame can be determined by the location of the name plate that has been attached to the front side of the tool bar.

RIGHT and LEFT sides can be established by standing behind the frame and looking toward the front, or the direction of travel.

ASSEMBLY STEPS

Shown here is one method of assembly that can be accomplished with a small crew of assemblers. Each step of assembly is accompanied with a photograph or illustration with part names and bolt sizes listed.



WARNING: ALWAYS ATTACH CHAINS SECURELY. IF A CHAIN WOULD BREAK, THE RECOIL ACTION COULD CAUSE THE LOOSE END TO WHIP IN ANY DIRECTION AND INJURE ANY PERSON STANDING NEARBY.

PROOF LOAD RATING OF THE CHAIN MUST EQUAL OR EXCEED 5 TIMES THE WEIGHT BEING LIFTED.

MODEL NUMBERS

Know the model number of the row crop cultivator being assembled. Use the model number whenever referring to the assembly, parts listing pages or placement drawings. The number is stamped on the NAME PLATE which is located on the front side of the tool bar.

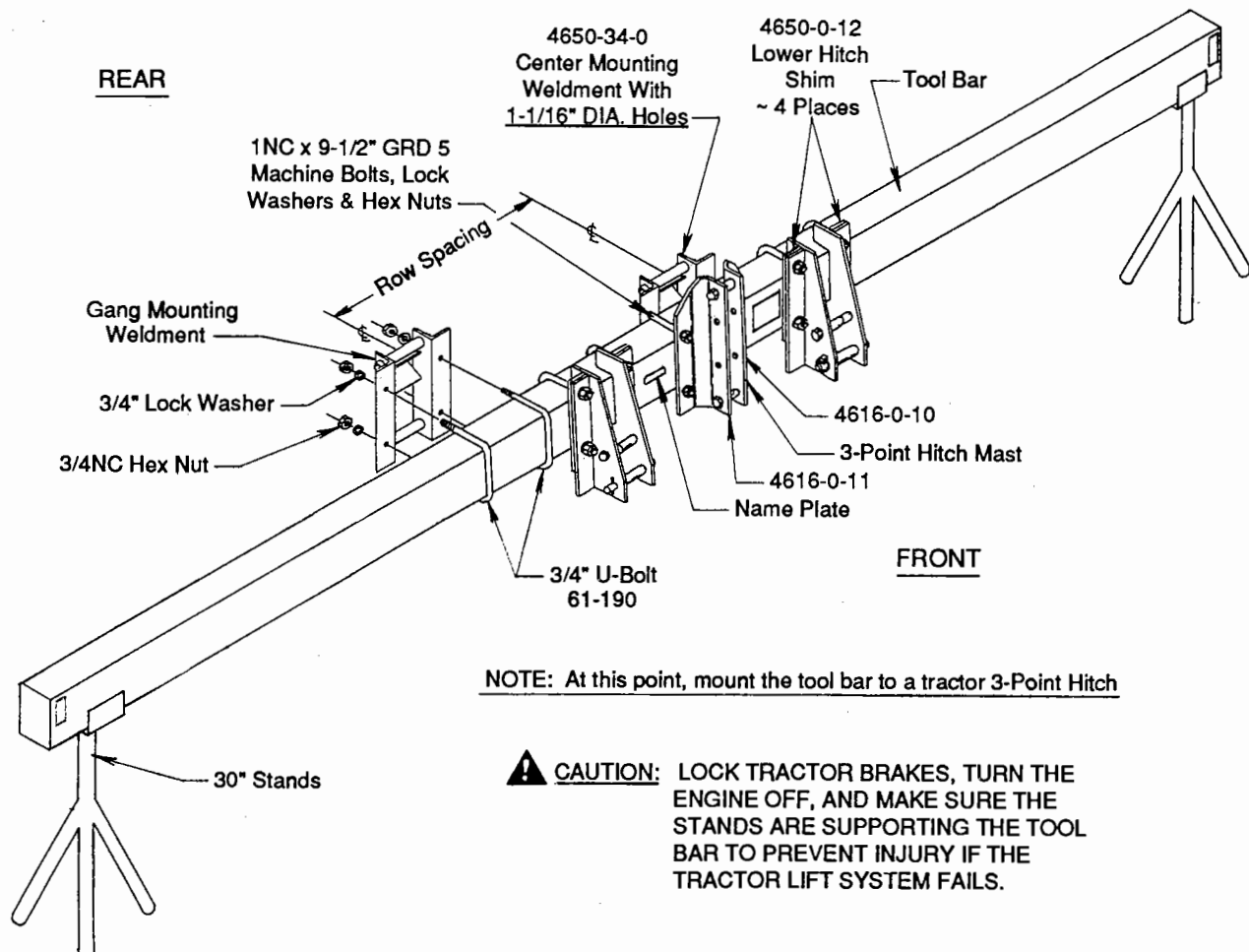


I. 3-POINT HITCH AND GANG MOUNTING WELDMENT ASSEMBLY

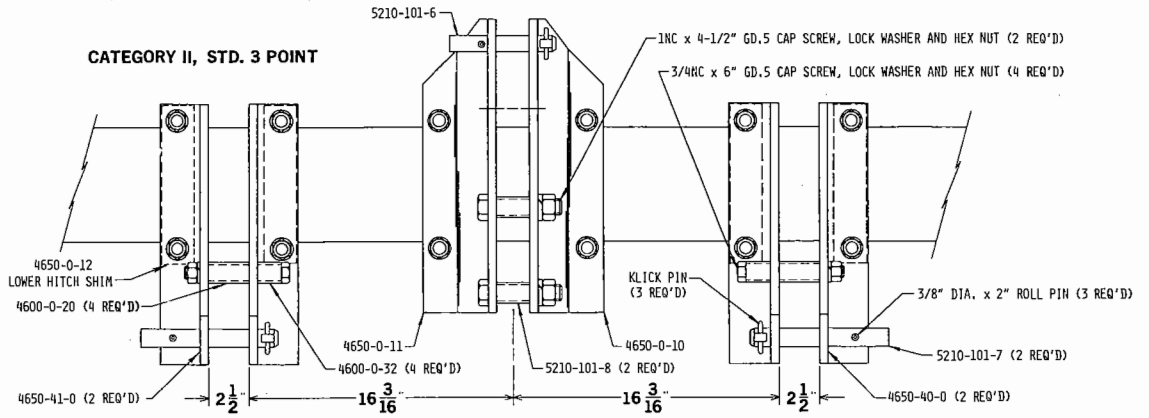
1. Support each end of the tool bar with stands approximately 30" high. The name plate is located on the front side of the tool bar.
2. Locate the centerline of the tool bar and attach the center mounting weldments (4650-34-0) and the right and left top hitch plates (4616-0-10 & 4616-0-11). Fasten them with 1NC x 9-1/2" GRADE 5 Machine Bolts, Lock Washers and Hex Nuts.

Refer to pages A4 and A5 for 3-Point Hitch Assembly of Category II or III, standard or quick hitch, with or without rolling shields.

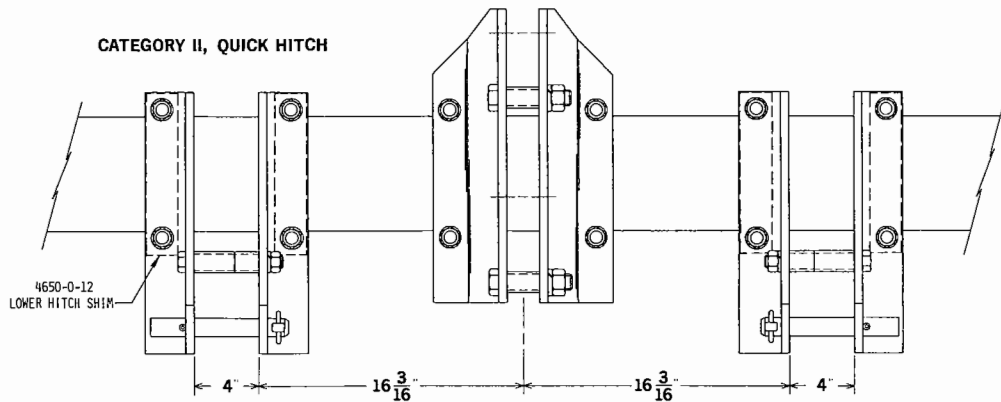
NOTE: Assemble a SHIM (4650-0-12) between each lower hitch bracket and the tool bar. See the illustration below.



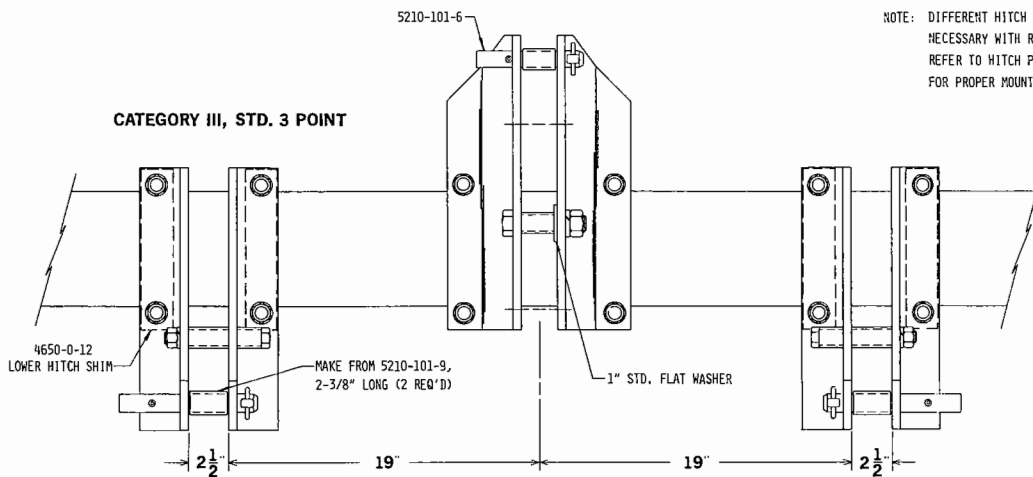
CATEGORY II, STD. 3 POINT



CATEGORY II, QUICK HITCH

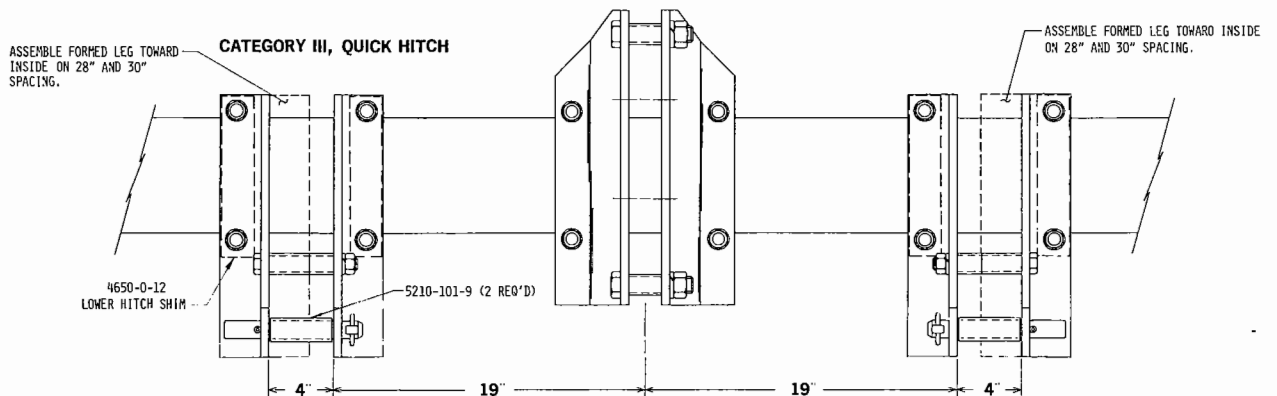


CATEGORY III, STD. 3 POINT



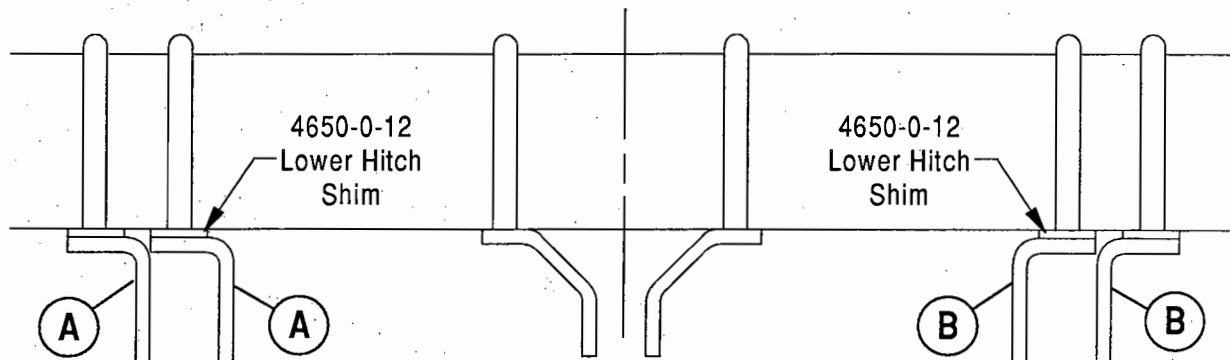
NOTE: DIFFERENT HITCH MOUNTING MAY BE NECESSARY WITH ROLLING SHIELDS. REFER TO HITCH PLACEMENT PAGE FOR PROPER MOUNTING.

CATEGORY III, QUICK HITCH

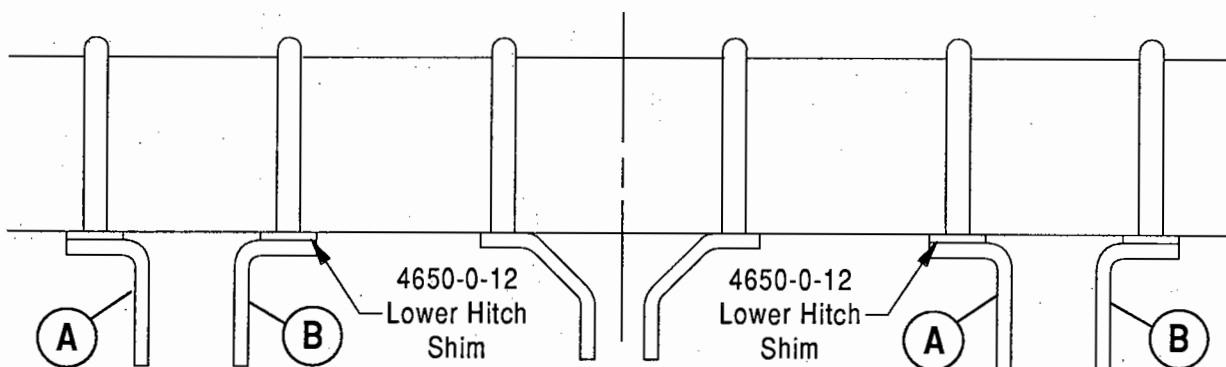


HITCH PLACEMENT WITH ROLLING SHIELDS

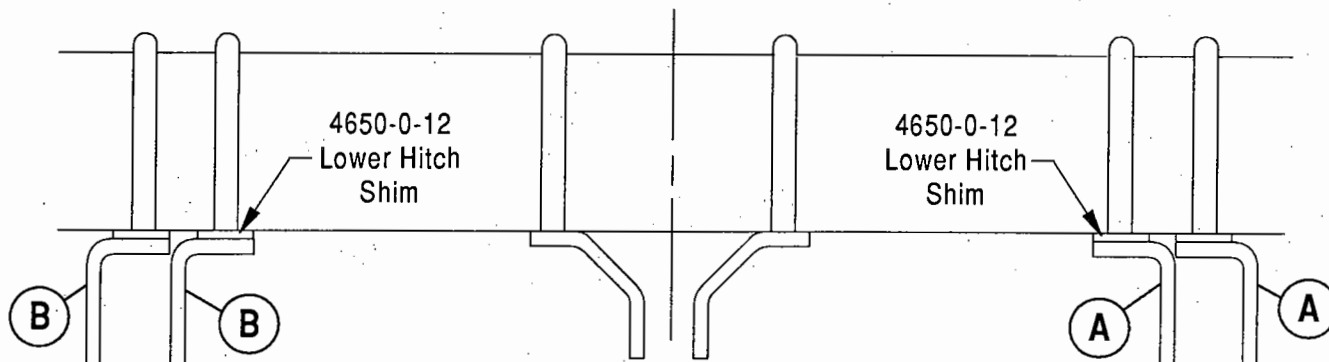
28", 30" SPACING WITH CATEGORY II QUICK HITCH
 28", 30" SPACING WITH CATEGORY II STD. 3-POINT
 36" SPACING WITH CATEGORY III QUICK HITCH
 36" SPACING WITH CATEGORY III STD. 3-POINT



36", 38", 40" SPACING WITH CATEGORY II QUICK HITCH
 36" SPACING WITH CATEGORY II STD. 3-POINT
 28", 30", 38", 40" SPACING WITH CATEGORY III QUICK HITCH
 28", 30", 38", 40" SPACING WITH CATEGORY III STD. 3-POINT



38", 40" SPACING WITH CATEGORY III STD. 3-POINT



IMPORTANT: MOUNT THE TOOL BAR TO A TRACTOR 3-POINT HITCH AND SUPPORT TOOL BAR AT EACH END WITH A STAND. (See CAUTION below page A3 illustration)

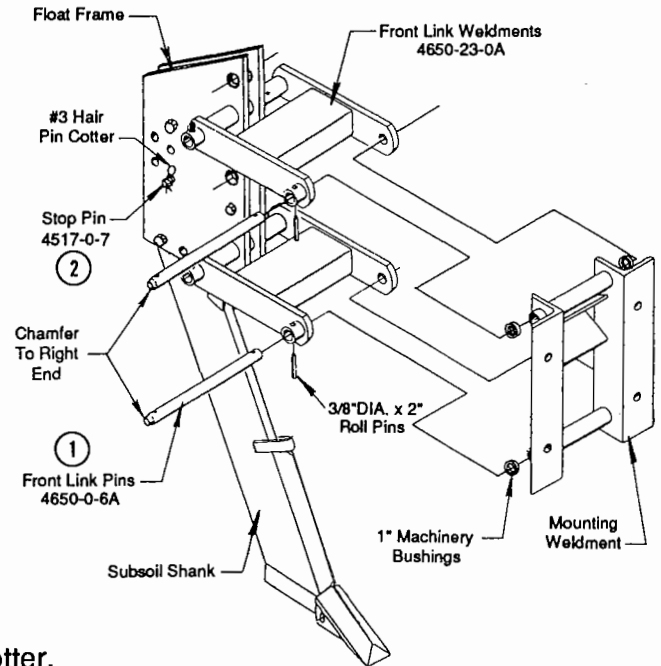
- Measuring from the center gang mounting weldment, mark the location of the remaining gangs based on the desired row spacing.
- Assemble remaining mounting weldments (4650-22-0A) to the tool bar with 3/4" U-Bolts (61-190), 3/4" Lock Washers and 3/4NC Hex Nuts. NOTE: Unless the Half Row Regular Cultivator Option is ordered, the outer end gangs will be sub-soil cultivator gangs.

II. FLOAT FRAME ASSEMBLY

- Attach the front link weldments (4650-23-0A) to the mounting weldments with Front Link Pins (4650-0-6A) and 3/8" DIA. x 2" Roll Pins.

NOTE: Use 1" Machinery Bushings (64-164) as needed to eliminate any side play.

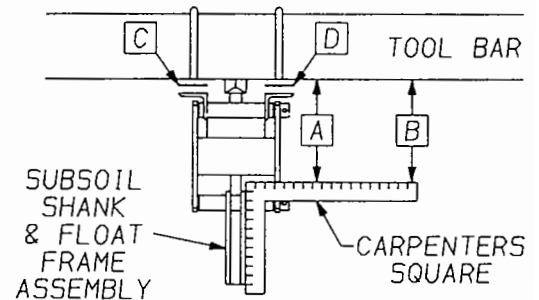
- Insert a Stop Pin (4517-0-7) through holes in Float Frame and retain it with a #3 Hair Pin Cotter.



EXACT ALIGNMENT OF EACH SUBSOIL SHANK IS NECESSARY FOR PRECISE TRACKING BEHIND THE TRACTOR.

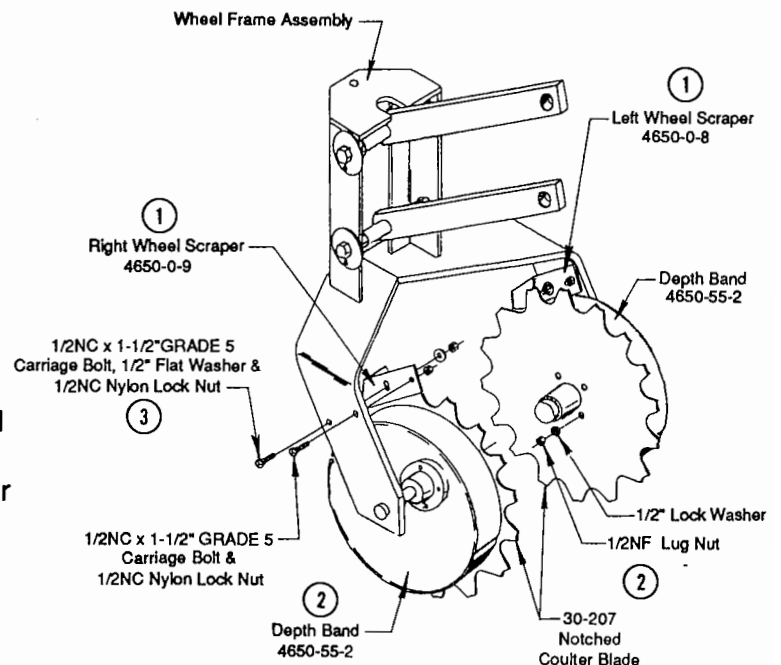
SUBSOIL GANG ALIGNMENT PROCEDURE:

- Check to see if each subsoil shank is perpendicular to the tool bar using a carpenter's square and a tape measure.
- If "A" is shorter than "B", add a shim (# 4650-0-5) at "C".
- If "B" is shorter than "A", add a shim (#4650-0-5) at "D".

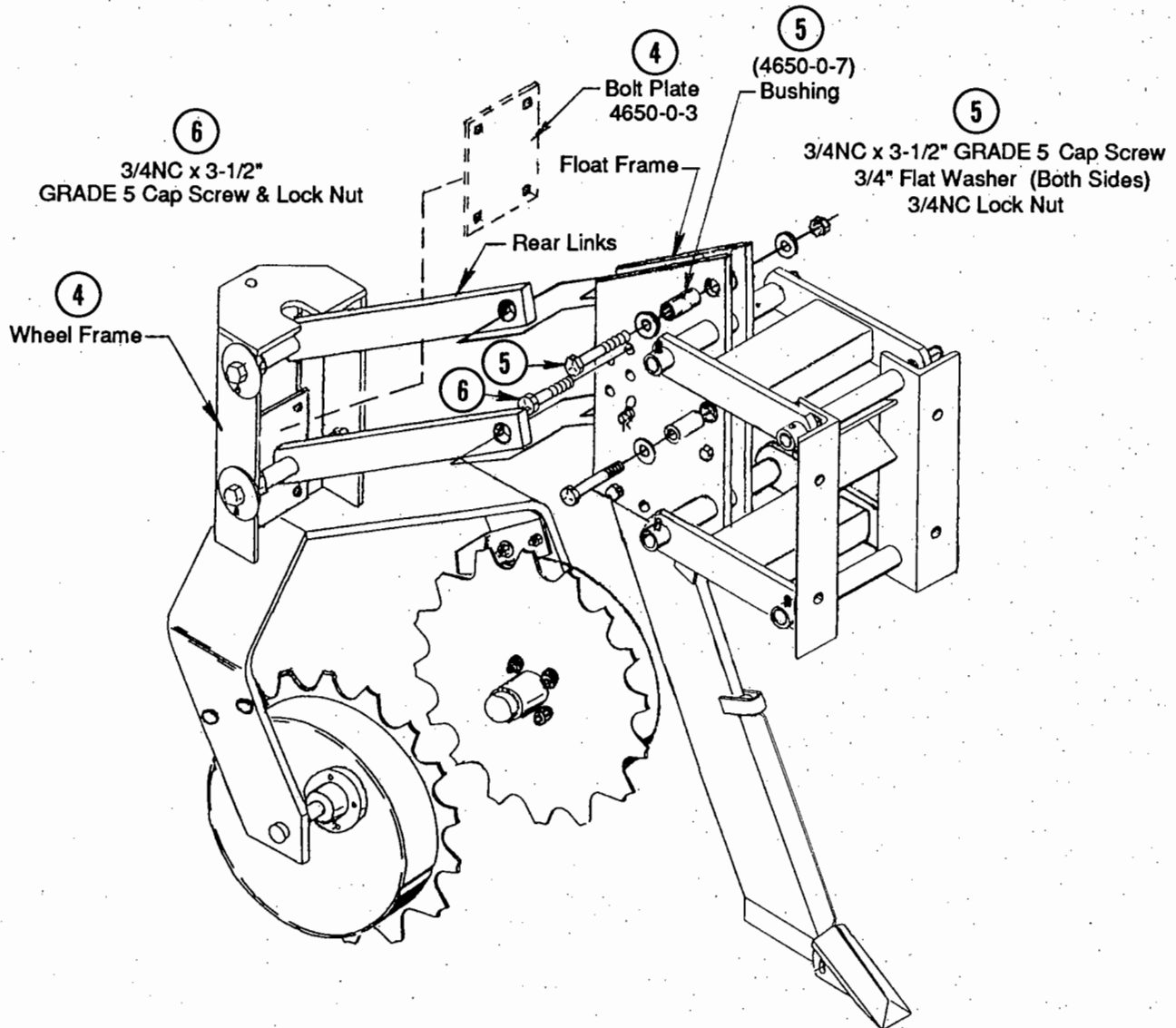


III. WHEEL FRAME & DEPTH WHEEL ASSEMBLY

- Fasten the Left Scraper (4650-0-8) and Right Scraper (4650-0-9) to the wheel arms, but do not tighten the bolts.
- Remove the hub lug nuts, slide the Depth Band (4650-55-2) and Notched Coulter Blade (30-207), and fasten them in place with a 1/2" Lock Washer and an inverted Lug Nut.
- Adjust scrapers to approximately 1/8" from the depth band and tighten.



4. Insert a Bolt Plate (4650-0-3) between the rear links and the wheel frame angles.
5. Slide the rear links into the Float Frame and fasten them in place with a 3/4NC x 3-1/2" GRADE 5 Bolt, TWO 3/4" Flat Washers, a bushing (4650-0-7), and a 3/4NC Lock Nut.



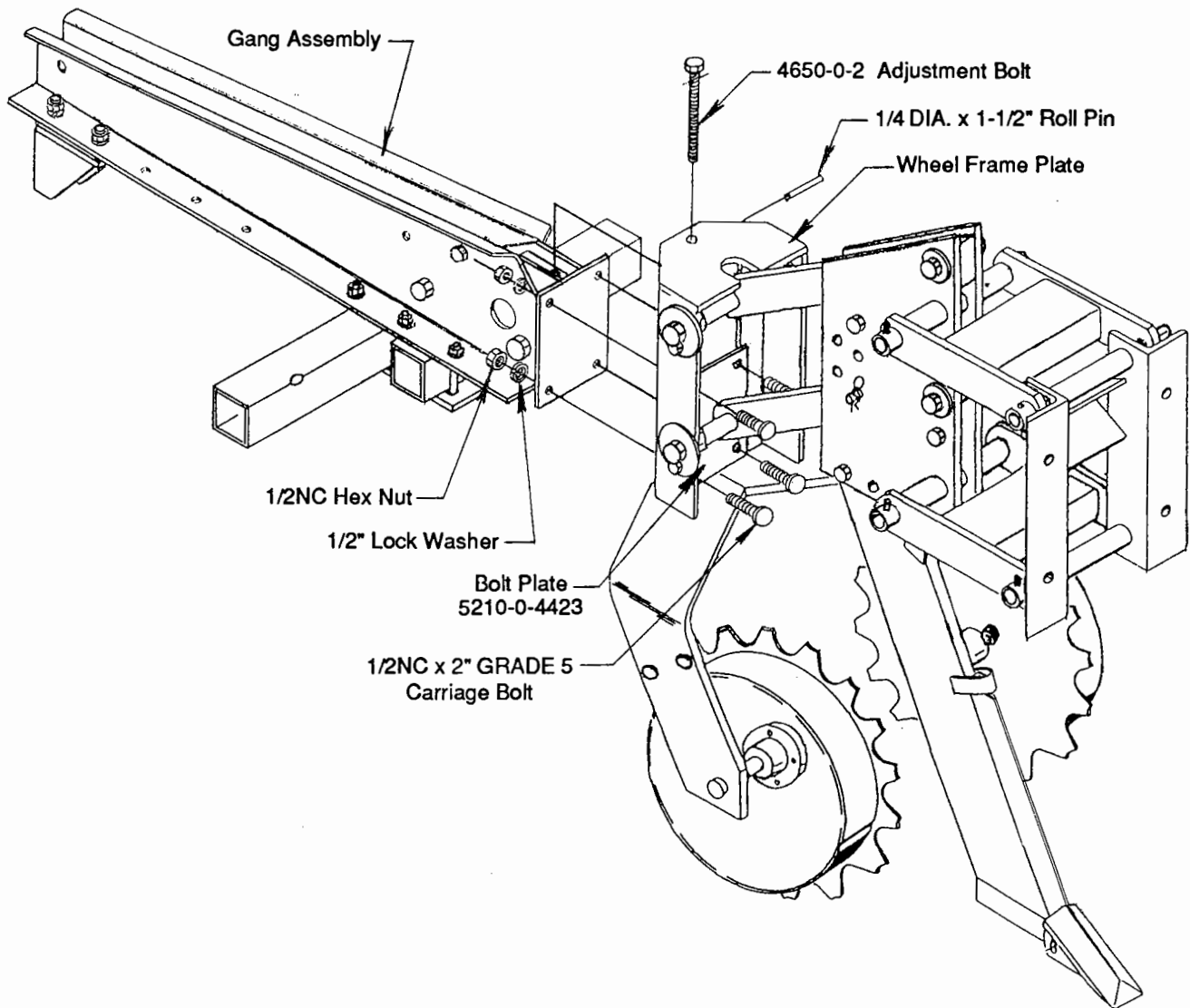
6. Insert a 3/4NC x 3-1/2" GRADE 5 Cap Screw into the Top Center Float Frame hole and secure it with a 3/4NC Self Locking Nut.

NOTE: Tighten the lock nut to remove side play in the rear links, but make it loose enough to allow the links to move up and down.

IV. GANG ASSEMBLY

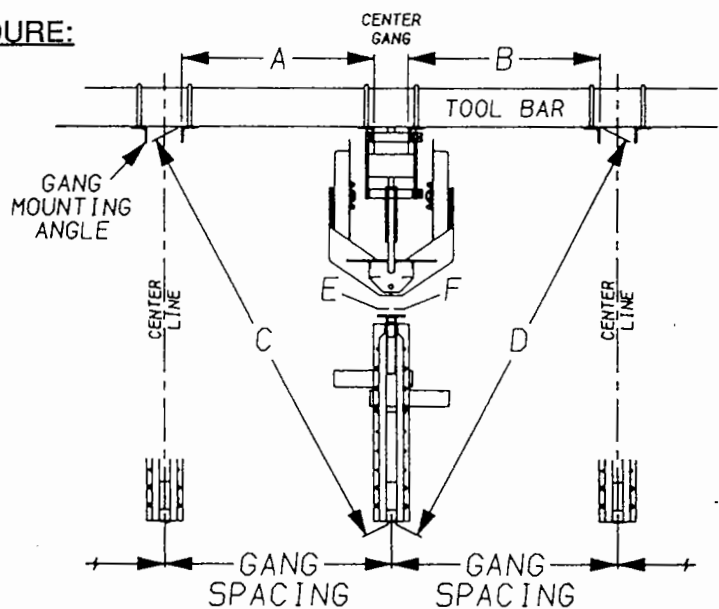
1. Fasten the front of the Gang Assembly to the Bolt Plate (4650-0-3) with FOUR 1/2NC x 2" GRADE 5 Carriage Bolts, 1/2" Lock Washers, and 1/2NC Hex Nuts, but do not tighten.
2. Screw the Adjustment Bolt (4650-0-2) through the Wheel Frame Plate and into the threaded hole in the Gang Assembly.

3. Adjust the gang up until it is in the center of the adjustment range and tighten the 1/2NC Hex Nuts.
4. Drive a 1/4" DIA. x 1-1/2" Roll Pin through the adjustment bolt just under the wheel frame plate.



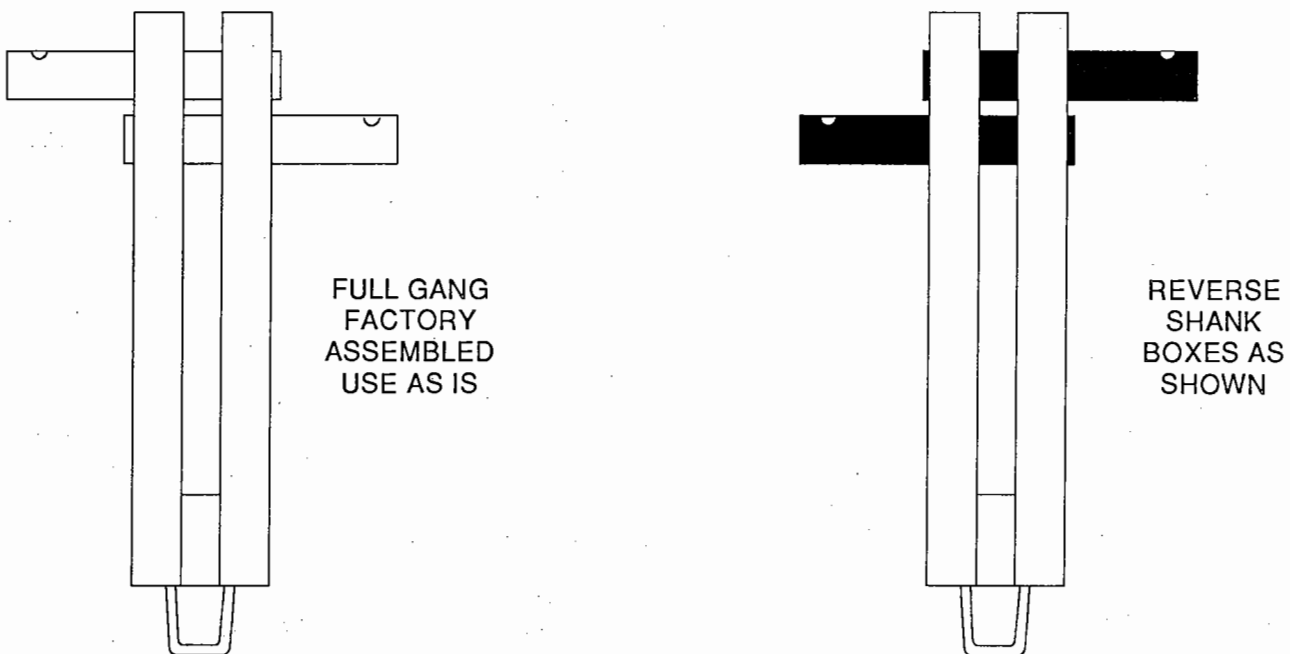
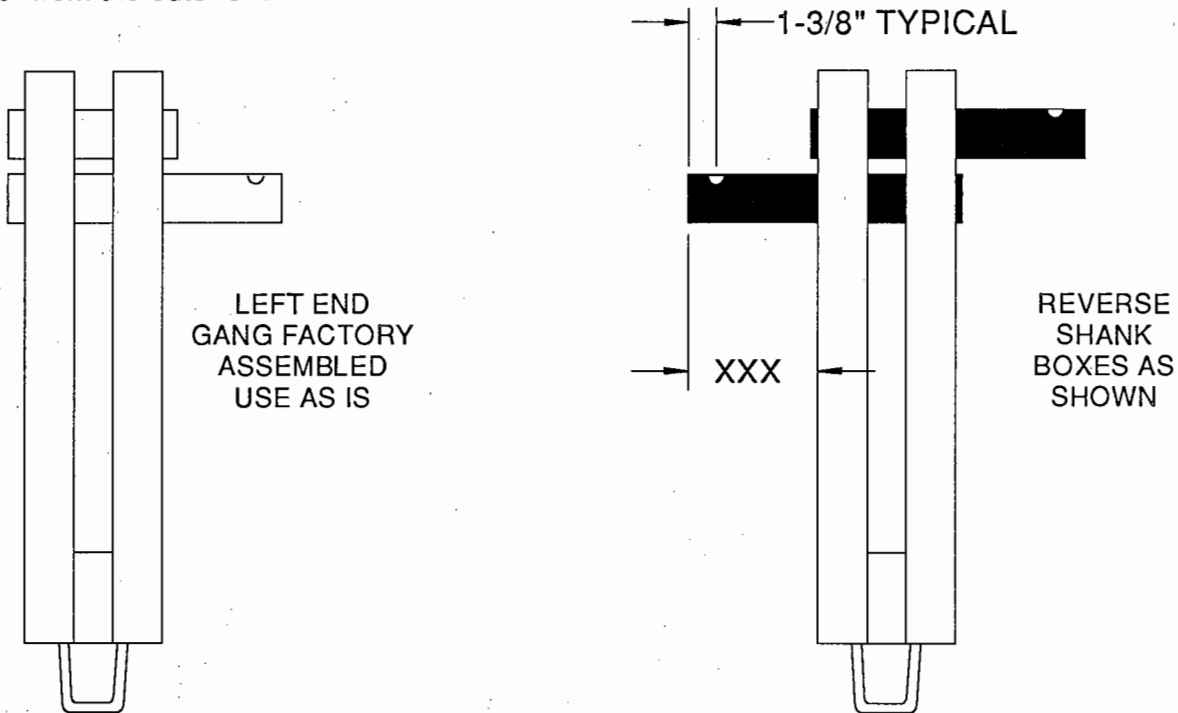
CULTIVATOR GANG ALIGNMENT PROCEDURE:

1. Align Center Gang Assembly.
 - a) Make sure that length **A** and **B** are the same.
 - b) Measure length **C** and **D**.
 - c) If **C** is shorter than **D**, add a shim (part # 4650-0-364), at **E**.
 - d) If **D** is shorter than **C**, add a shim (part # 4650-0-364), at **F**.



For maximum trash flow, the shank boxes on every other gang need to be reversed from factory assembled position as shown on the placement pages starting on page A13.

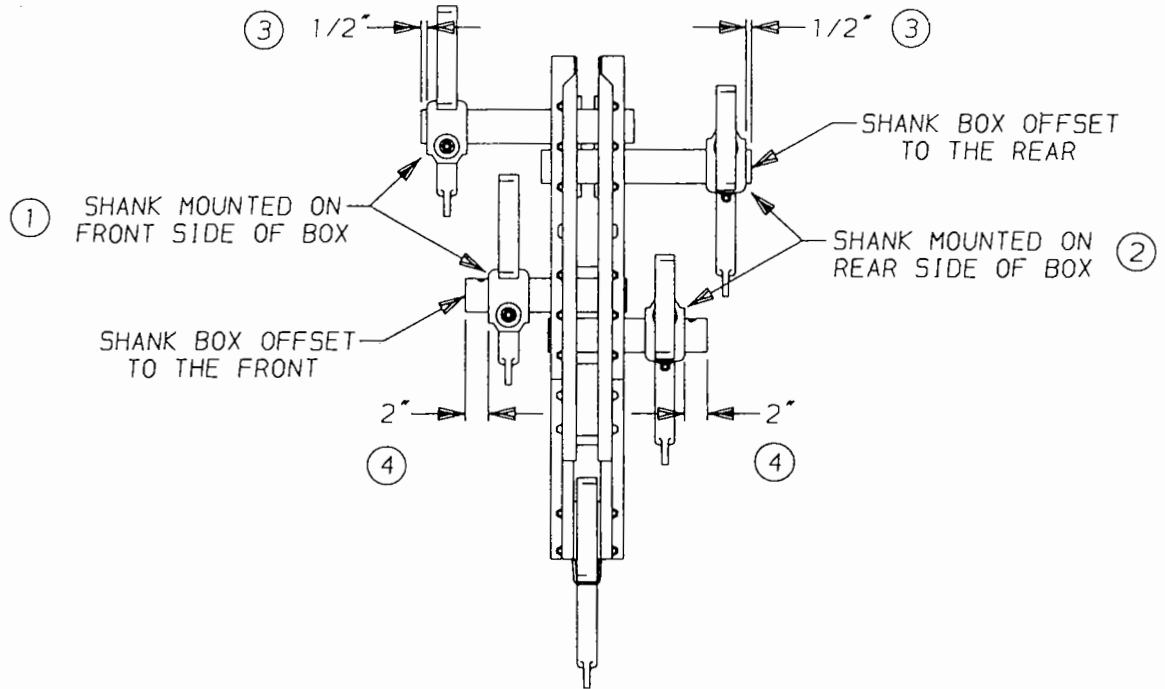
- a. Start at the left end.
- b. The left end gang is not changed except for dimension adjustment.
- c. The next full gang should be reversed as shown below.
- d. To provide for open top shields assemble all shank boxes with the hole on the front side, 1-3/8" from the outer end.



NOTE: See placement pages A13 - A21 for shank box dimensions and suggested sweep sizes.

V. K-TINE PLACEMENT

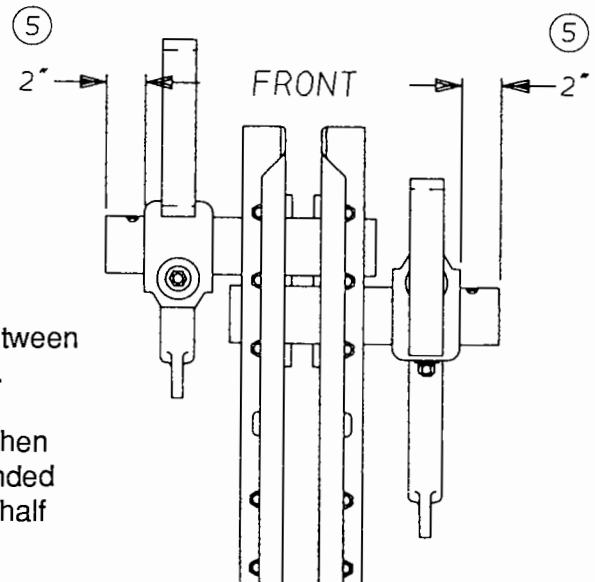
1. Mount the K-Tine on the front side of the shank box if the shank box is offset to the front. (See illustration below.)



2. Mount the K-Tine on the back side if the shank box is offset to the rear.
3. The front K-Tine Clamps are positioned 1/2" from the end of the shank box except on the narrow spacing with open top shields.

2" ON FRONT SHANK BOXES ON
28" & 30" ROW GANGS EQUIPPED
WITH OPEN TOP SHIELDS

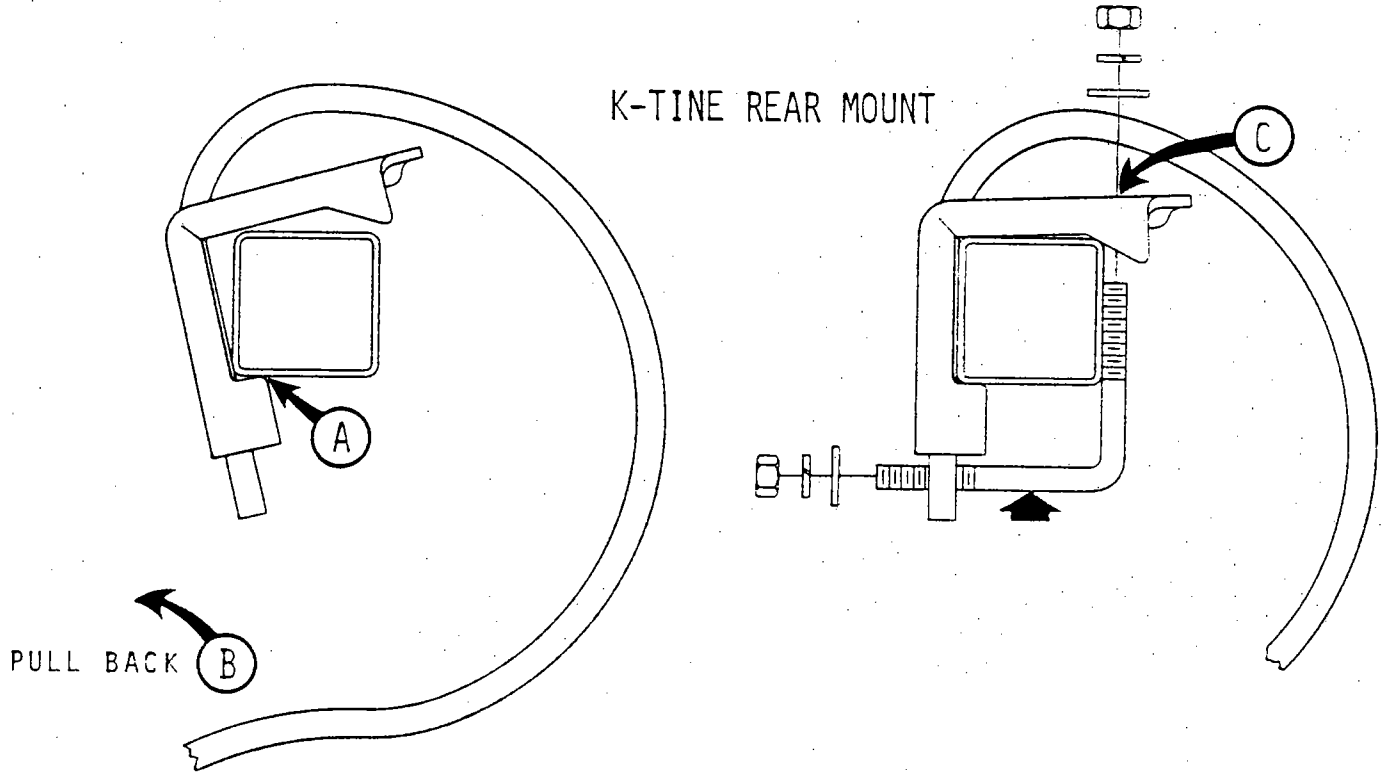
4. The middle row of shanks are positioned 2" from the end of the shank box.
5. On 28" and 30" Row Gangs equipped with open top shields, the front K-Tine Clamps are positioned 2" from the end of the shank box which uncovers the shield hole and also allows for better trash flow between the open top shield and the shank next to it.



NOTE: If tilling closer to the rows is desired when using open top shields, it is recommended that a full sweep be used instead of a half sweep next to the row.

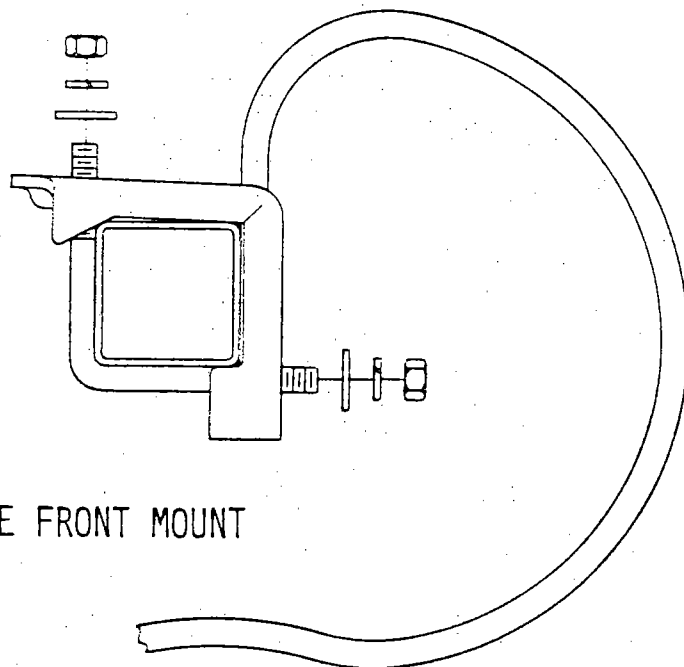
V. K-TINE SHANK AND SWEEP ASSEMBLY

1. Mount the K-Tine Shank by placing shank through the slot in the shank clamp and locating the assembly against the lower rear section of the mounting beam A . Hold the assembly tight against the beam and pull back on the shank B . Sometimes the clamp may need to be tapped toward the mounting beam before the clamp seats properly.
2. Allow the shank to drop down in the holder and assemble the L-Bolt in the shank end first, then pull up on the shank and place L-Bolt through front hole in the shank clamp C . Tighten the top nut first.

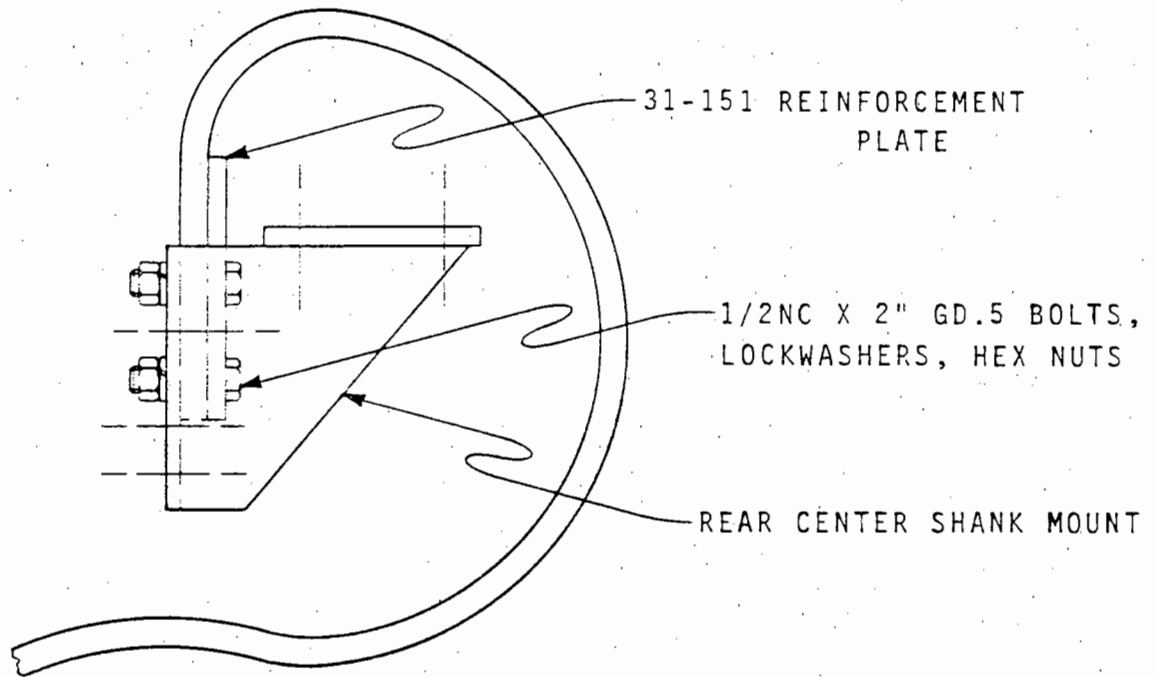


3. Steps 1 and 2 describe the K-Tine REAR MOUNT. The K-Tine FRONT MOUNT is assembled by reversing the shank clamp.

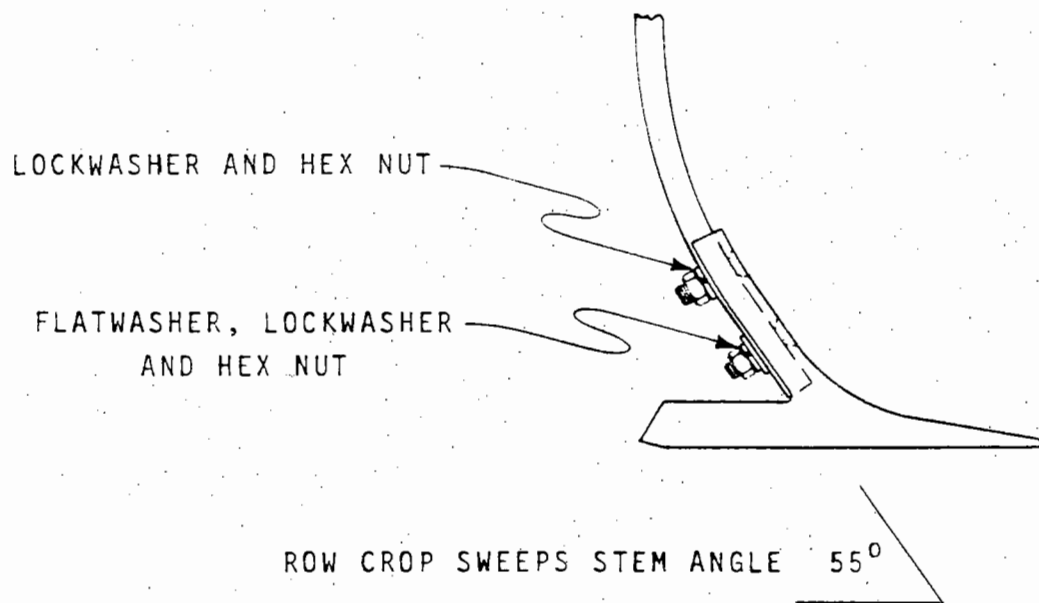
K-TINE FRONT MOUNT



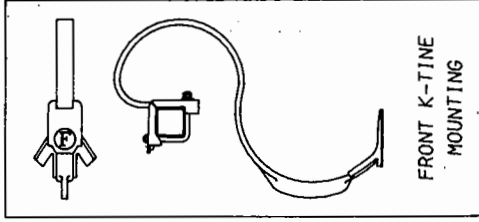
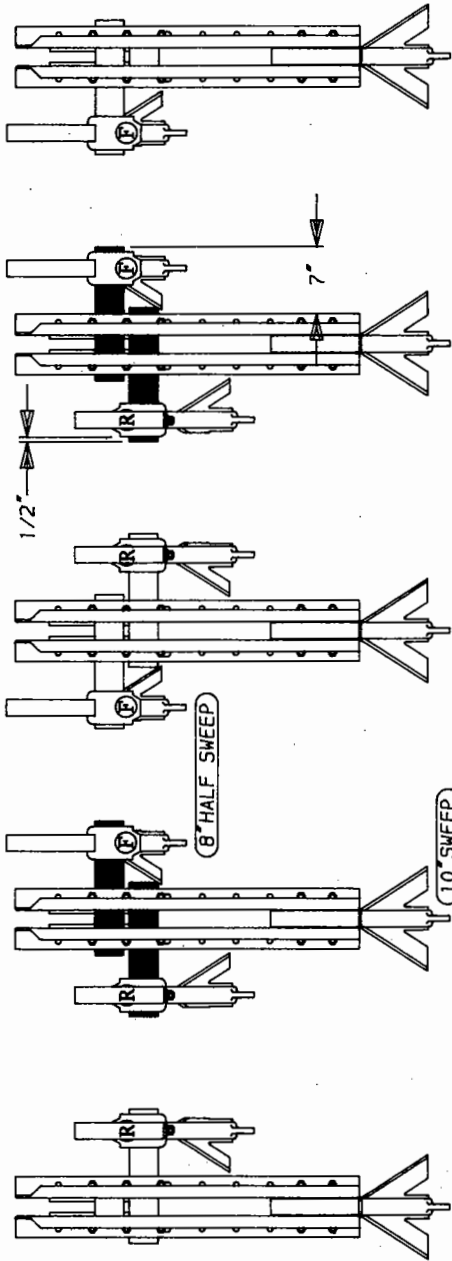
4. Assemble the rear K-Tine with a 31-151 Reinforcement Plate and TWO 1/2NC x 2" GRADE 5 Bolts, Lock Washers and Hex Nuts.



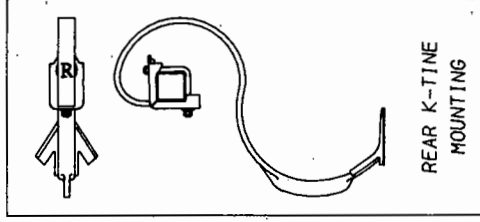
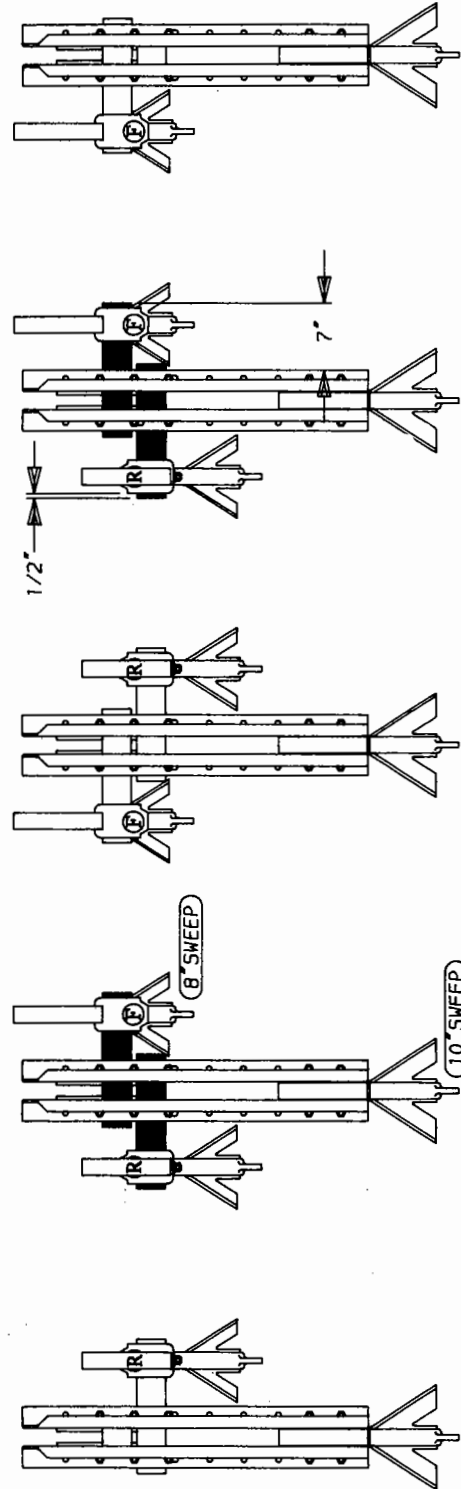
5. Attach each sweep with 3/8NC GRADE 8 Plow Bolts as shown in the illustration below.



28' & 30' GANG SPACING 3 SHANK STD.

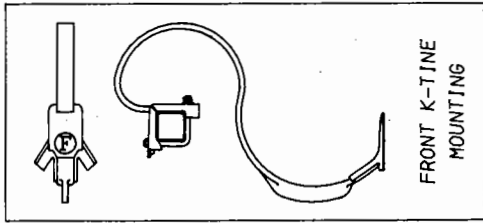
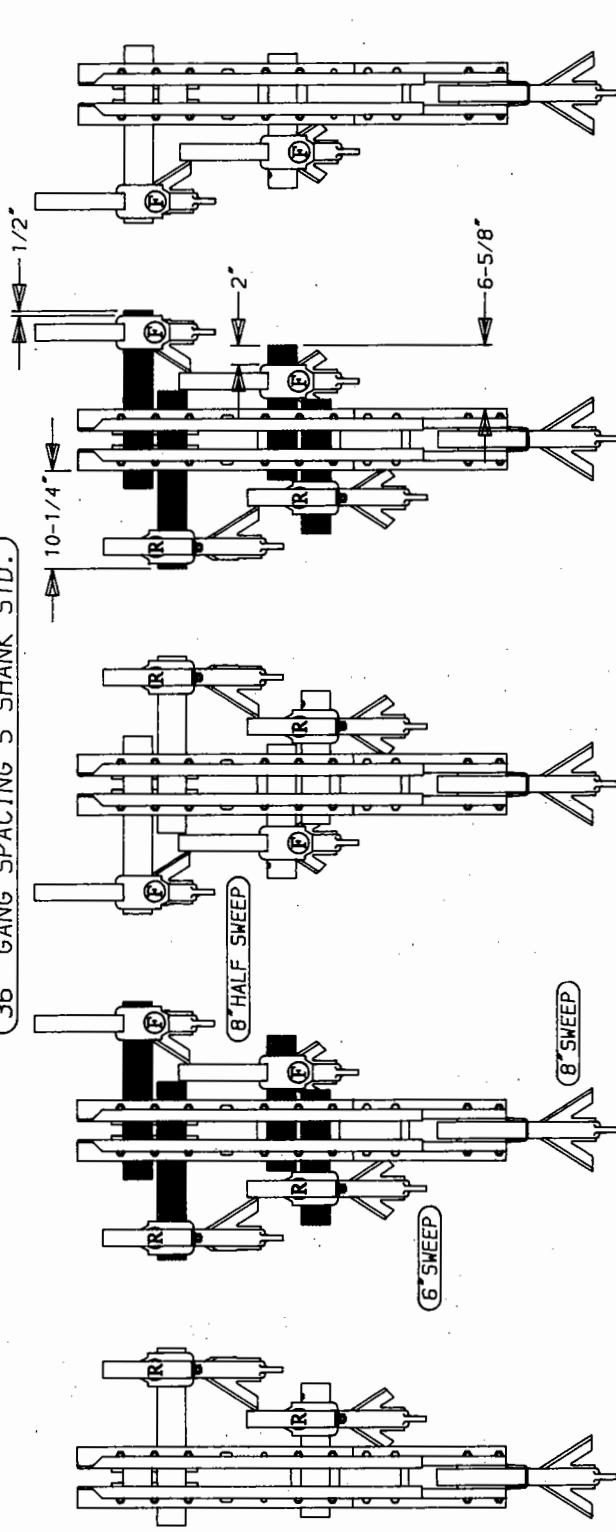


36' GANG SPACING-3 SHANK OPTION

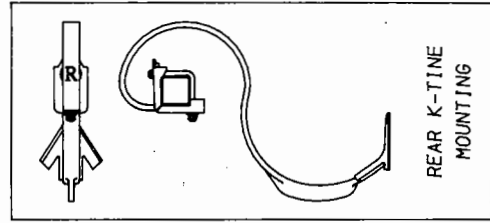
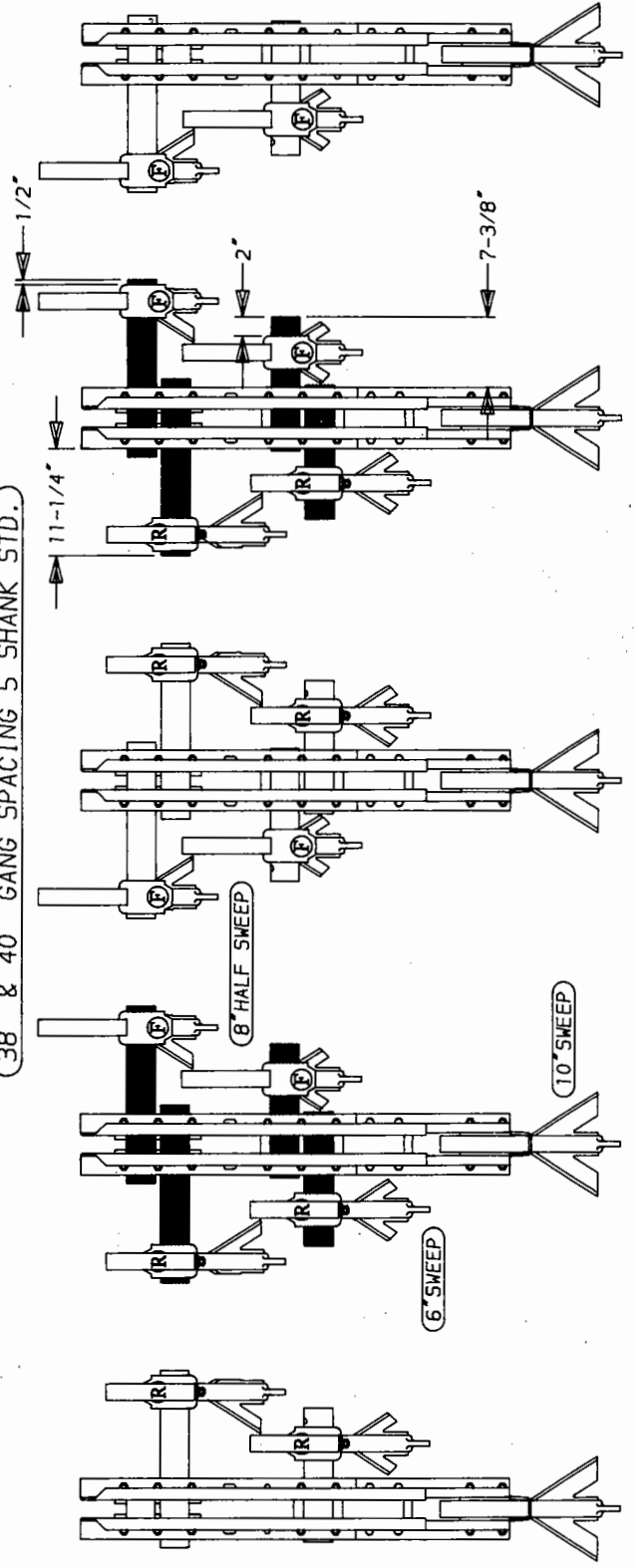


NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

36" GANG SPACING 5 SHANK STD.

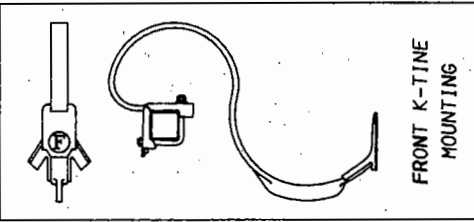
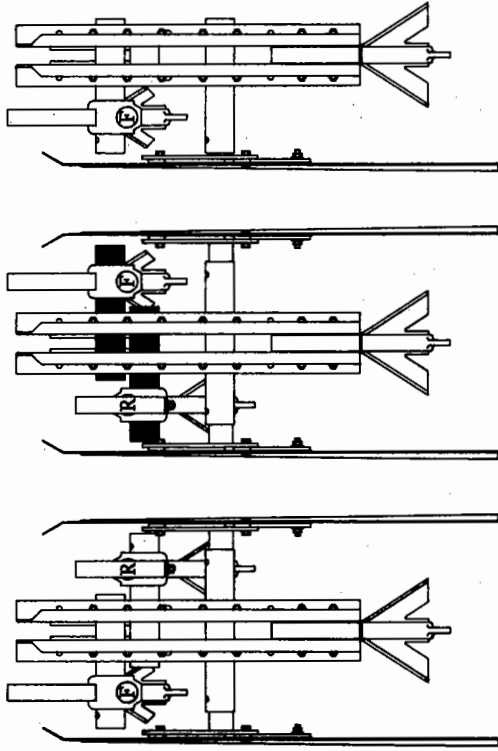
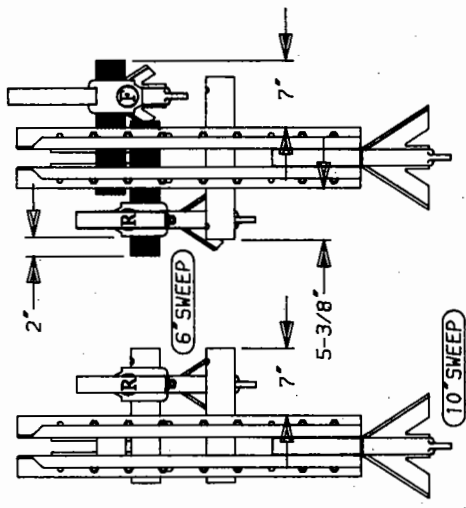


38" & 40" GANG SPACING 5 SHANK STD.

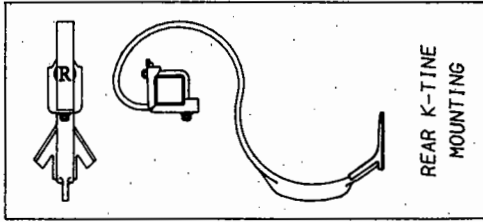
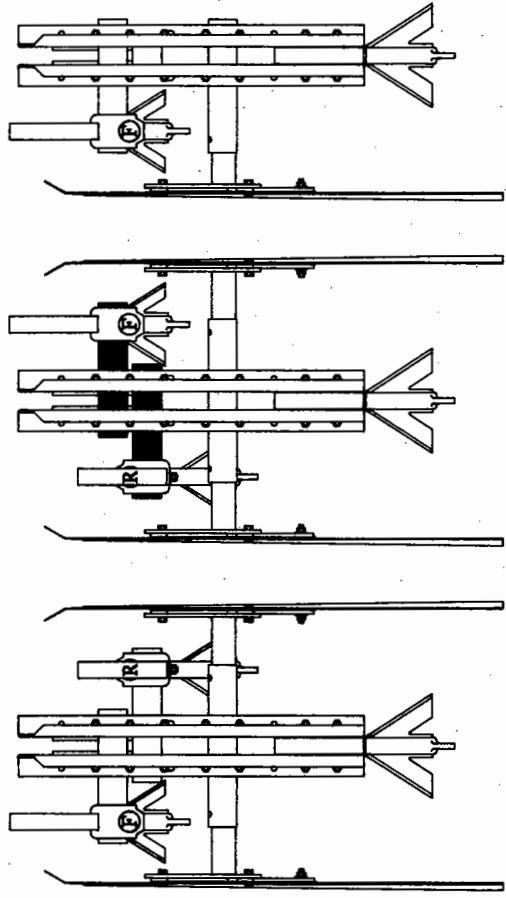
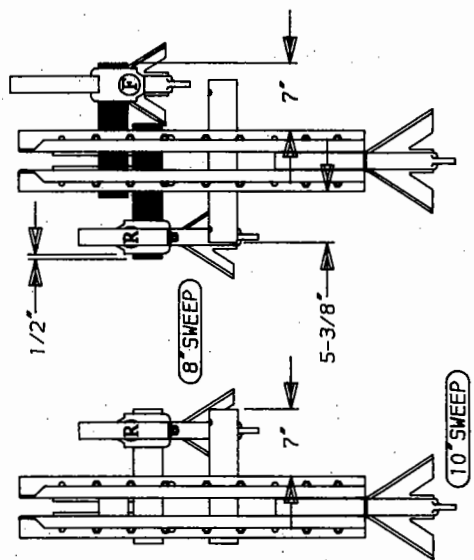


NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

28' & 30' GANG SPACING WITH 4' OPEN TOP SHIELD

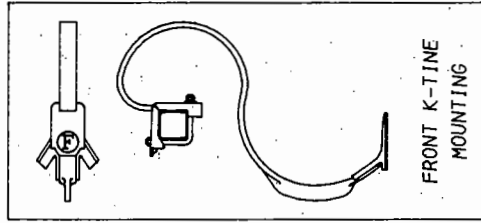
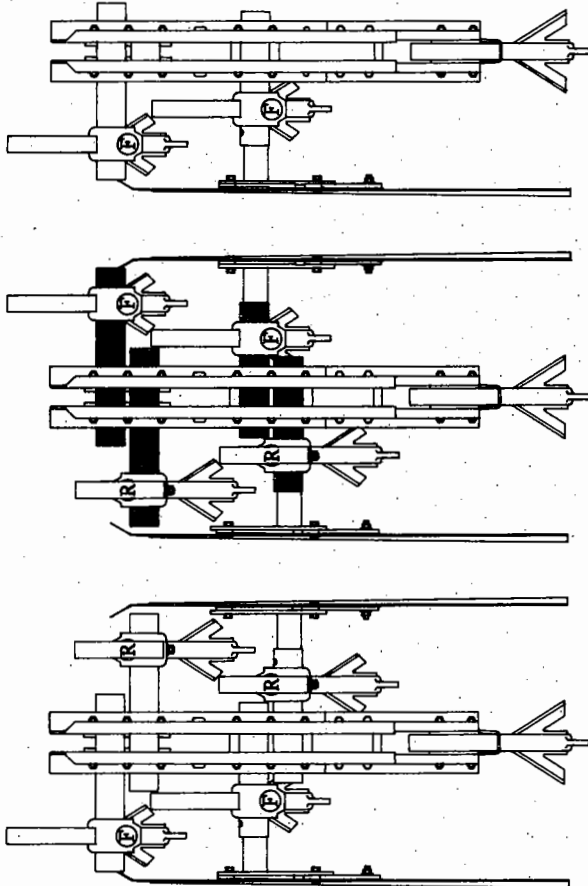
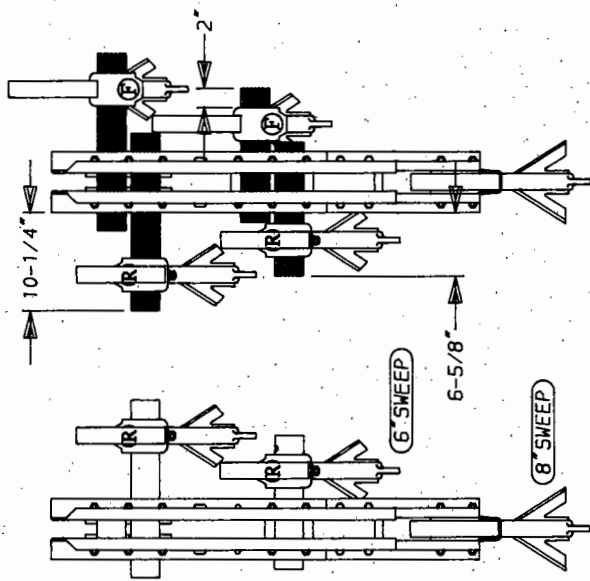


36' GANG SPACING-3 SHANK OPTION WITH 4' OPEN TOP SHIELD

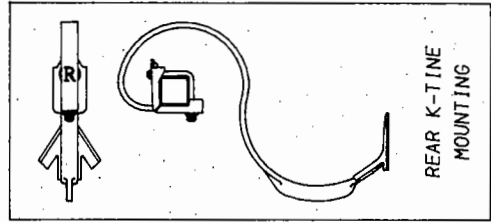
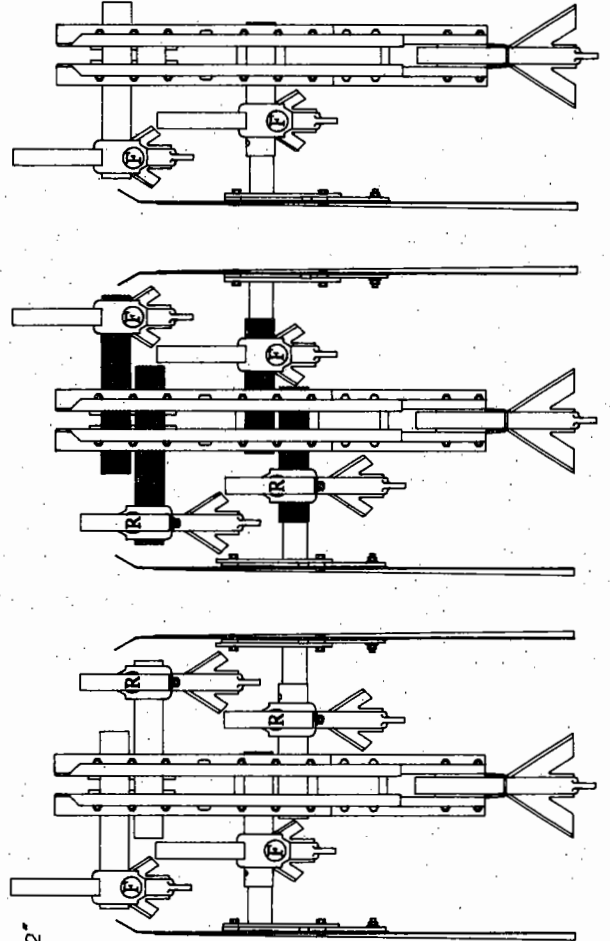
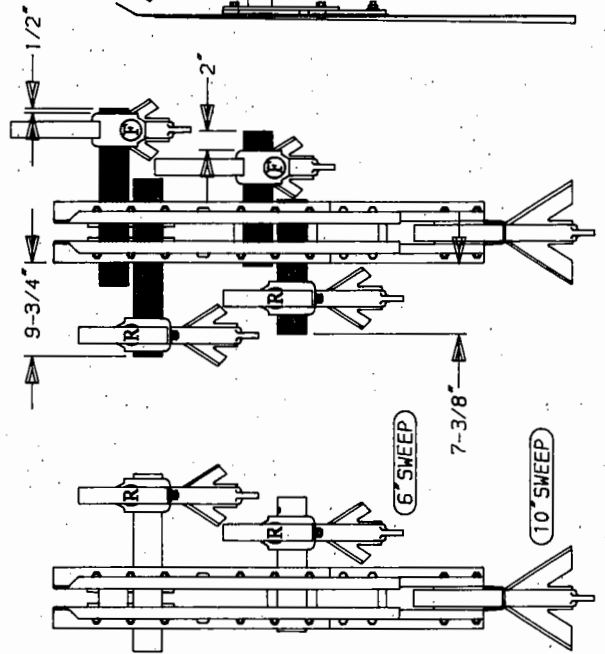


NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

36" GANG SPACING WITH 4' OPEN TOP SHIELDS

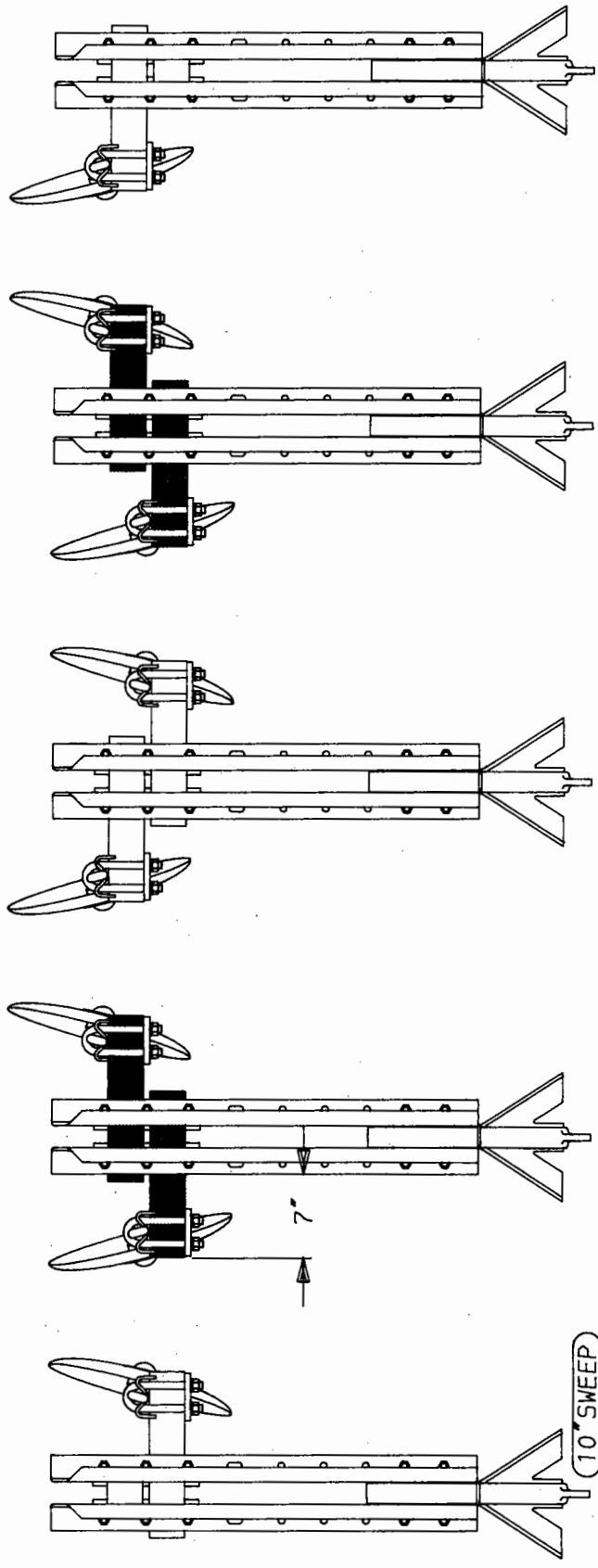


38" & 40" GANG SPACING WITH 4' OPEN TOP SHIELDS



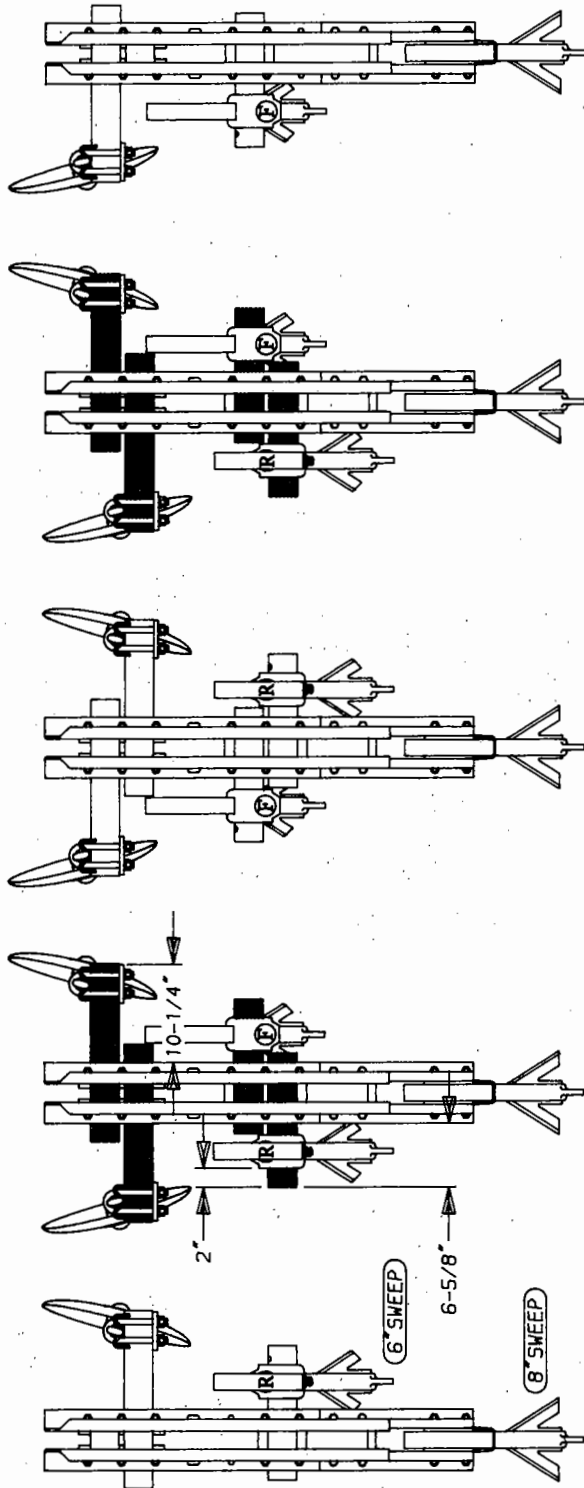
NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

28" & 30" GANG SPACING WITH DISC HILLER

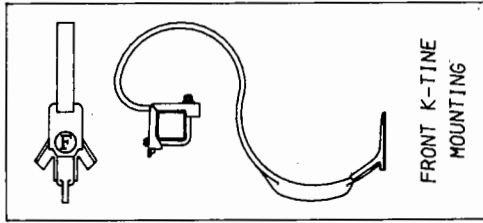
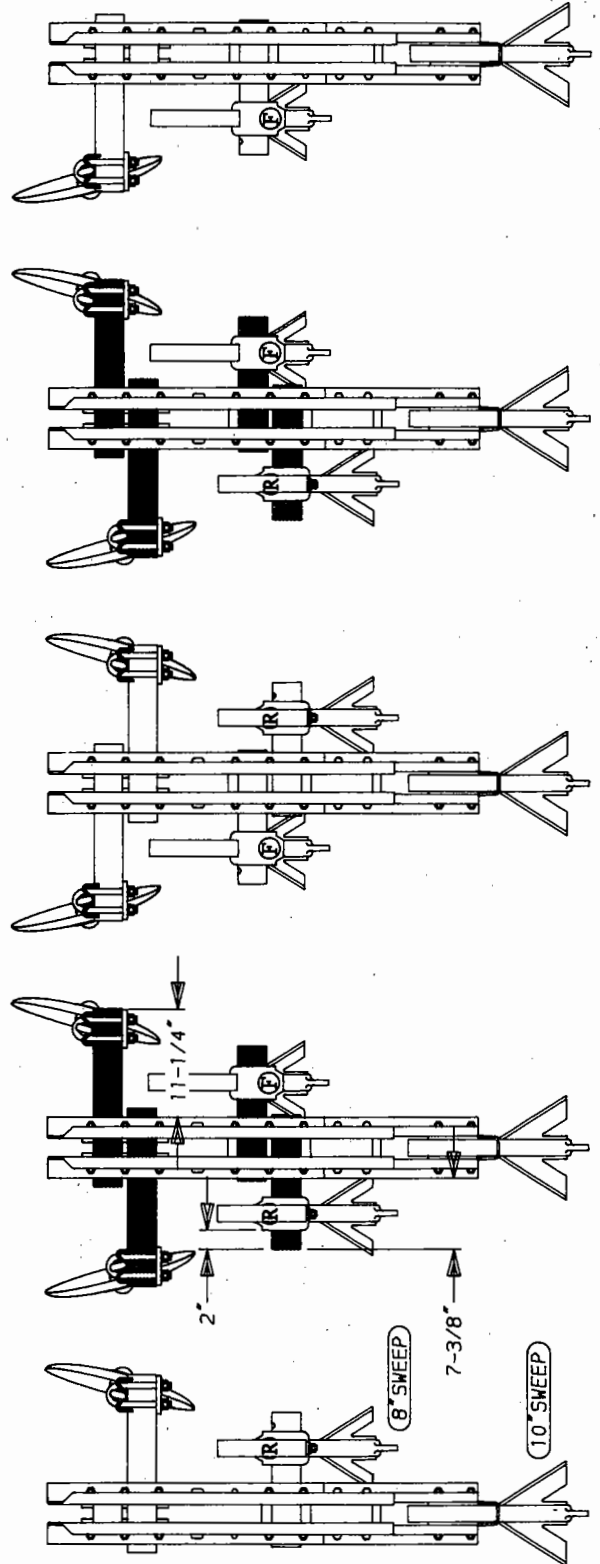


NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

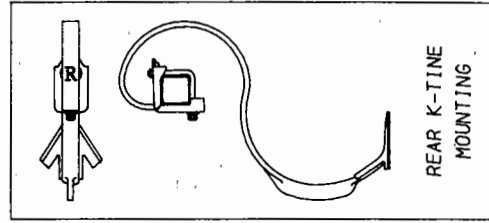
36" GANG SPACING WITH DISC HILLERS



38" & 40" GANG SPACING WITH DISC HILLERS



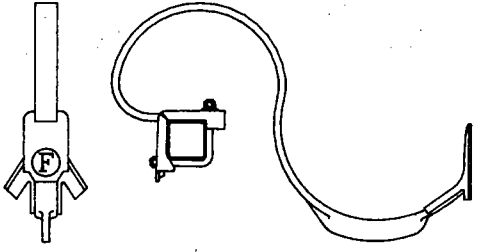
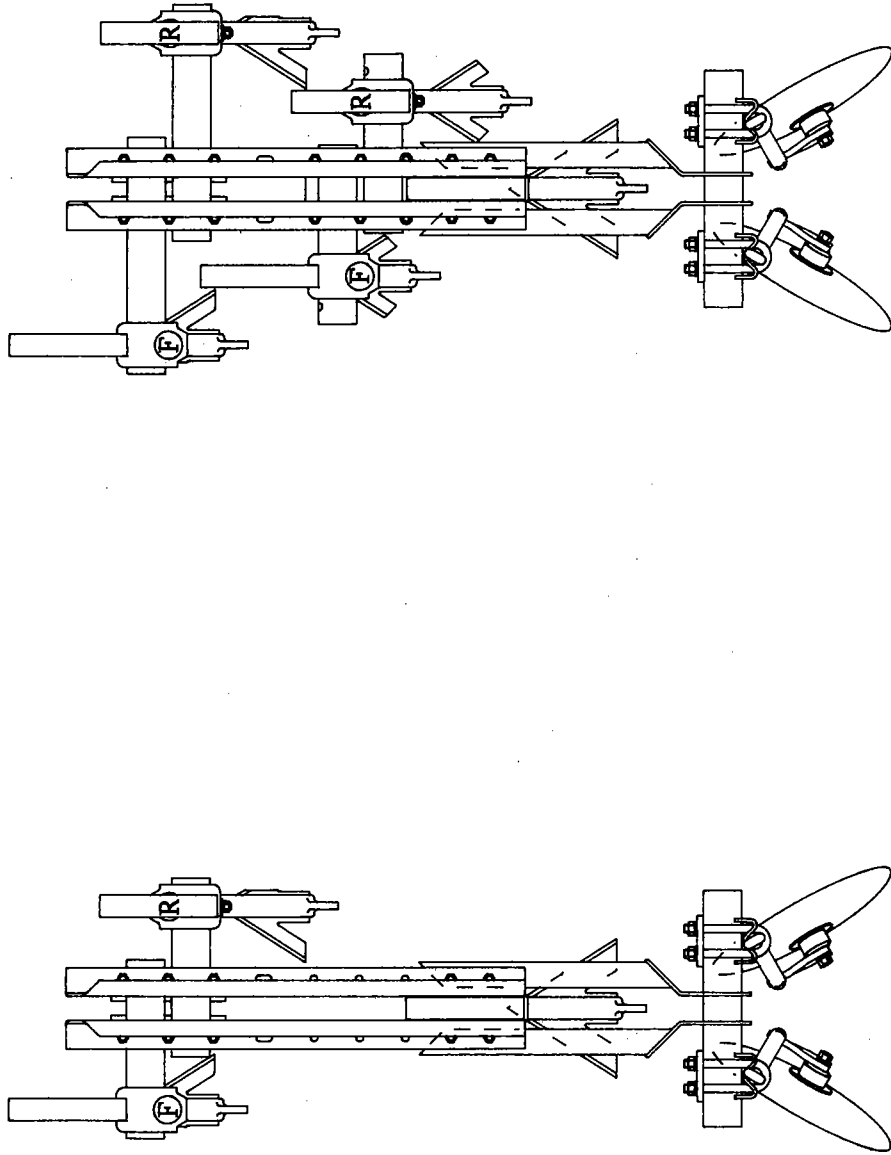
FRONT K-TINE MOUNTING



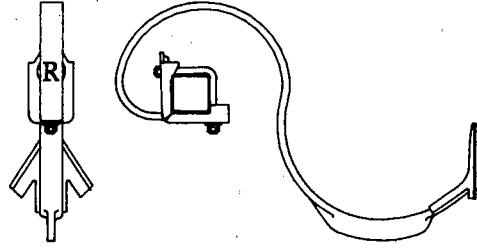
REAR K-TINE MOUNTING

NOTE: SWEEP SIZES ARE ONLY RECOMMENDATIONS

3 & 5 SHANK STD. GANG WITH REAR CENTER DISC HILLER



FRONT K-TINE
MOUNTING

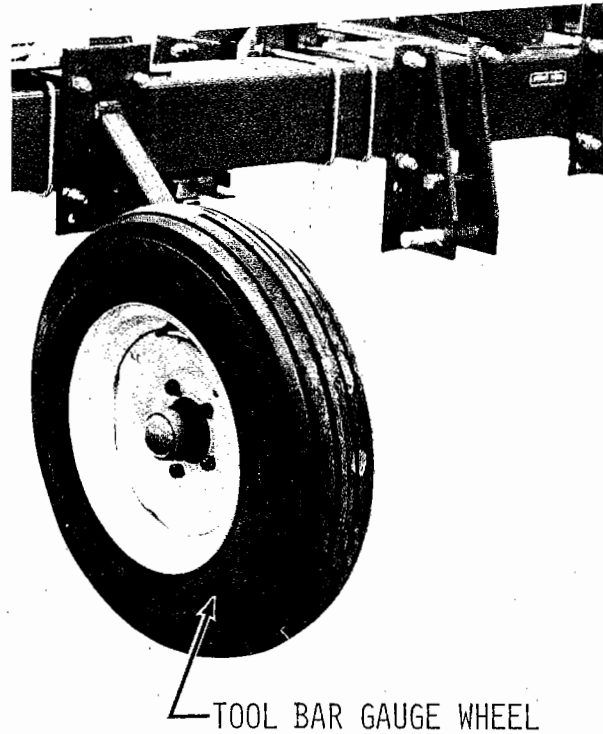


REAR K-TINE
MOUNTING

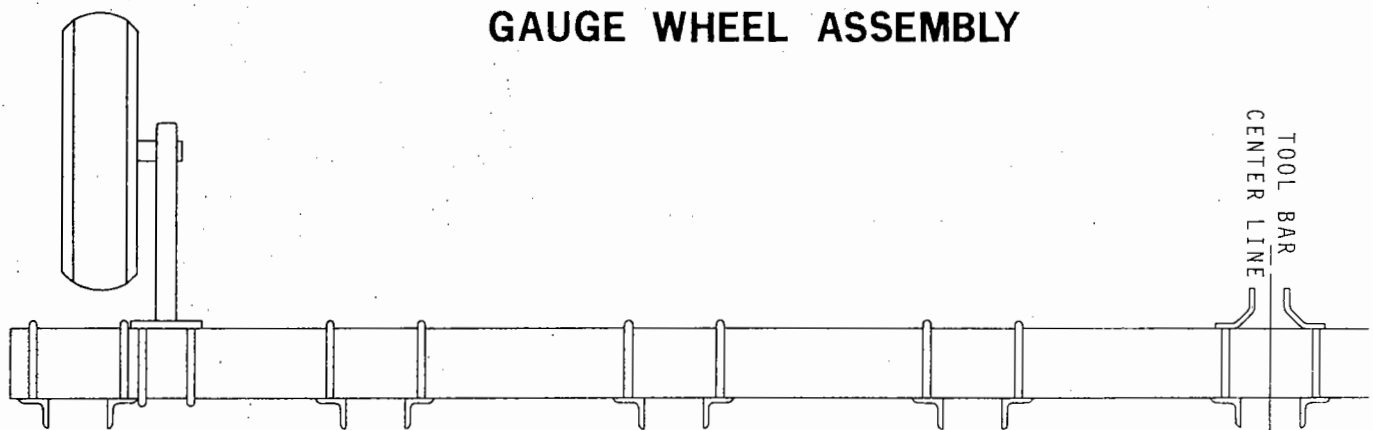
REFER TO PLACEMENT PAGES A13 THRU A16 FOR SHANK LOCATIONS AND SWEEP SIZES 11/90

VII. TOOL BAR GAUGE WHEELS

1. Refer to the placement pages in the back of this owner's manual for your model of row crop cultivator to find the one showing the correct locations of the right and left tool bar gauge wheels.
2. Mount the gauge wheel assemblies to the tool bar with (61-204) 5/8" DIA. U-Bolts.



GAUGE WHEEL ASSEMBLY LOCATIONS

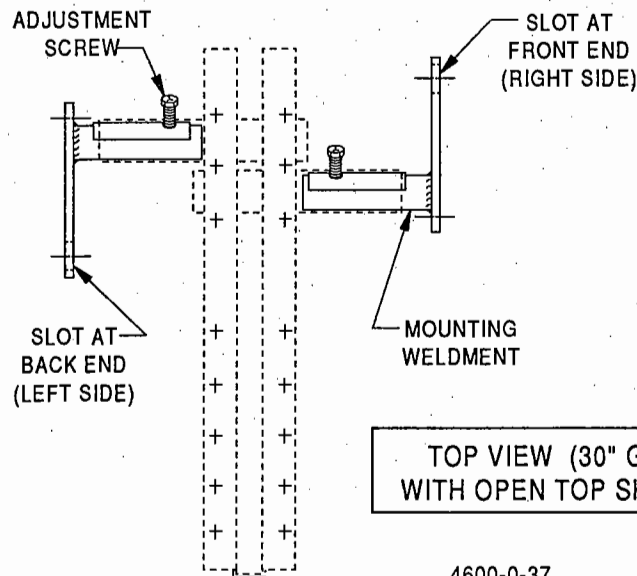


VIII. DECALS AND REFLECTORS

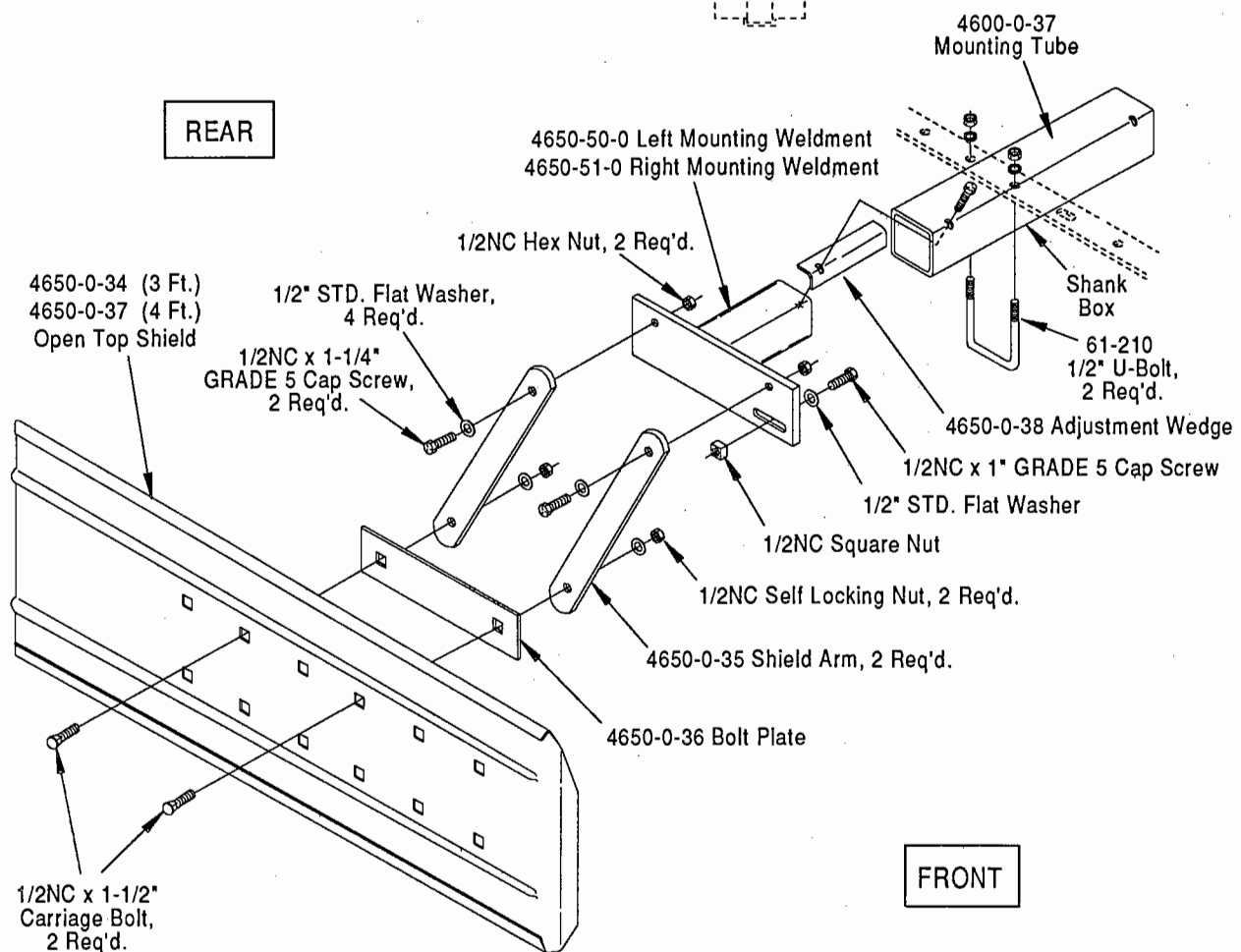
The decals are important to the safety of the operators and to others and must be attached at the proper locations. Some decals are applied at the factory; however, these locations should be checked (see page P22). Make sure that the decals have not been damaged during shipment, and if so, replace them using the parts drawing for the proper locations.

IX. OPEN TOP SHIELDS

1. Open Top Shields can be added to each side of the cultivator gangs to protect plants. Begin assembly by inserting the Adjustment Angle into the end of the shank box. Screw a 1/2NC x 1-1/4" GRADE 5 Cap Screw through the hole in the Adjustment Angle. Slide the Mounting Weldment inside the shank box and lock it into place by tightening the 1/2" Adjustment Screw.



TOP VIEW (30" GANG WITH OPEN TOP SHIELDS)



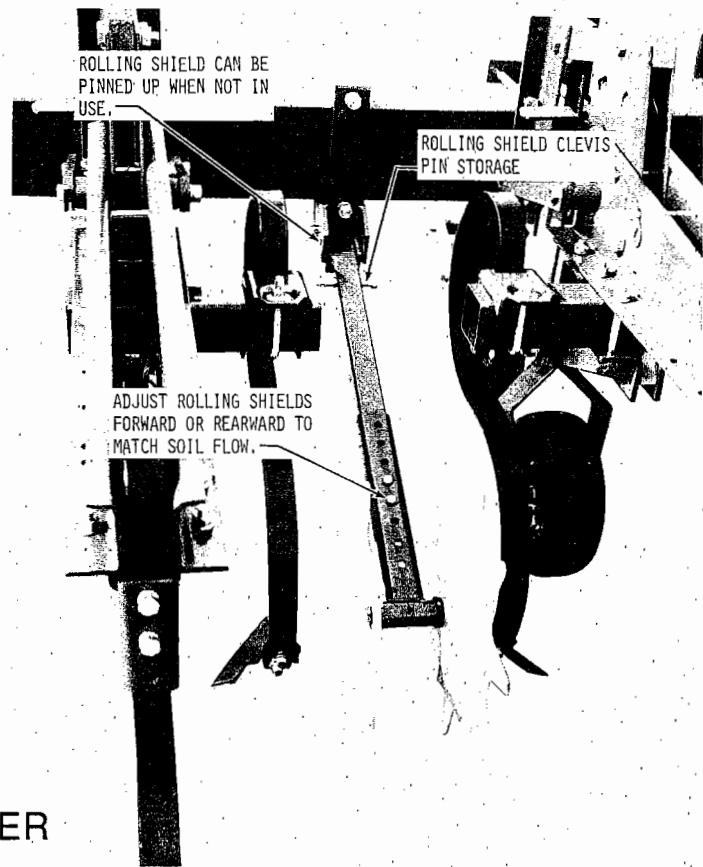
NOTE: The Mounting Weldment is reversed on the right side which places the slot toward the front.

2. Assemble the remainder of the shield as illustrated above.

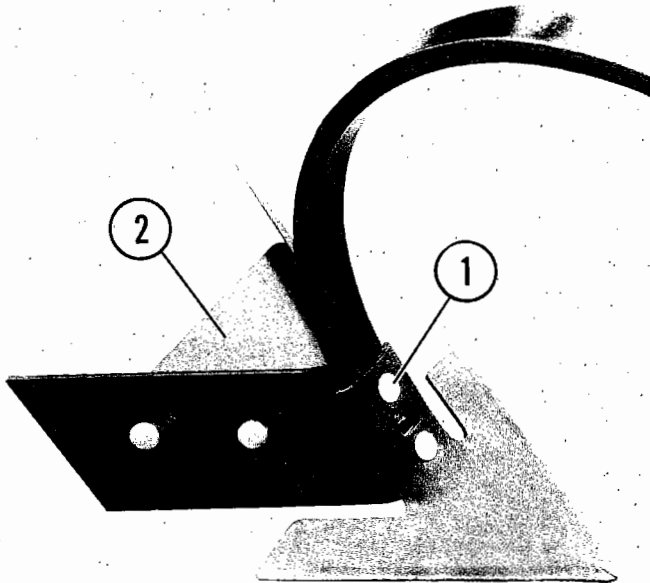
IMPORTANT: TIGHTEN THE 1/2" BOLTS IN THE SHIELD ARMS ENOUGH TO PREVENT THE SHIELD FROM MOVING SIDWAYS; HOWEVER, THE 1/2" BOLTS SHOULD BE LOOSE ENOUGH TO LET THE SHIELD RAISE AND LOWER FREELY.

X. ROLLING SHIELDS

1. Rolling Shields can be added between the gangs to protect small plants. Remove the U-Bolt from the bracket and fasten it over the tool bar.
2. Check to be sure that the rolling shields are precisely set on the desired row spacing.

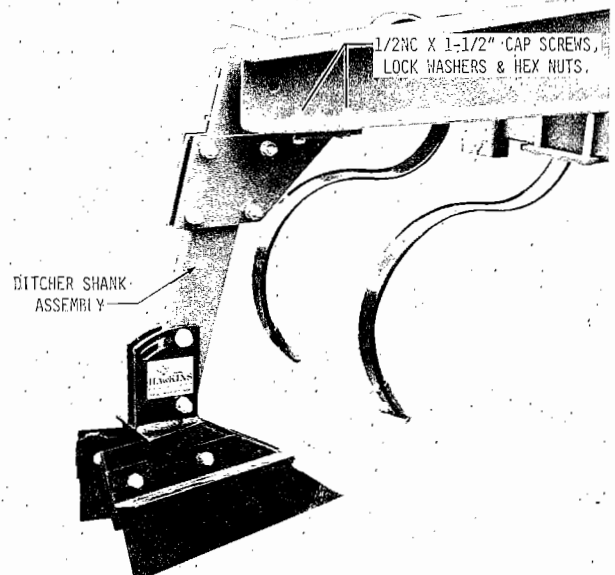


XI. FURROWERS AND DITCHER ATTACHMENTS



1. Fasten furrower wings to back side of rear K-Tine shank with 7/16NC x 2-1/4" GRADE 5 Plow Bolts, Lock Washers and Hex Nuts. (Note: Right blade assemblies behind left blade.)
2. Fasten the center blade brace to each furrower wing using FOUR 3/8NC x 1" Carriage Bolts, Lock Washers and Hex Nuts. See the photo to the left.

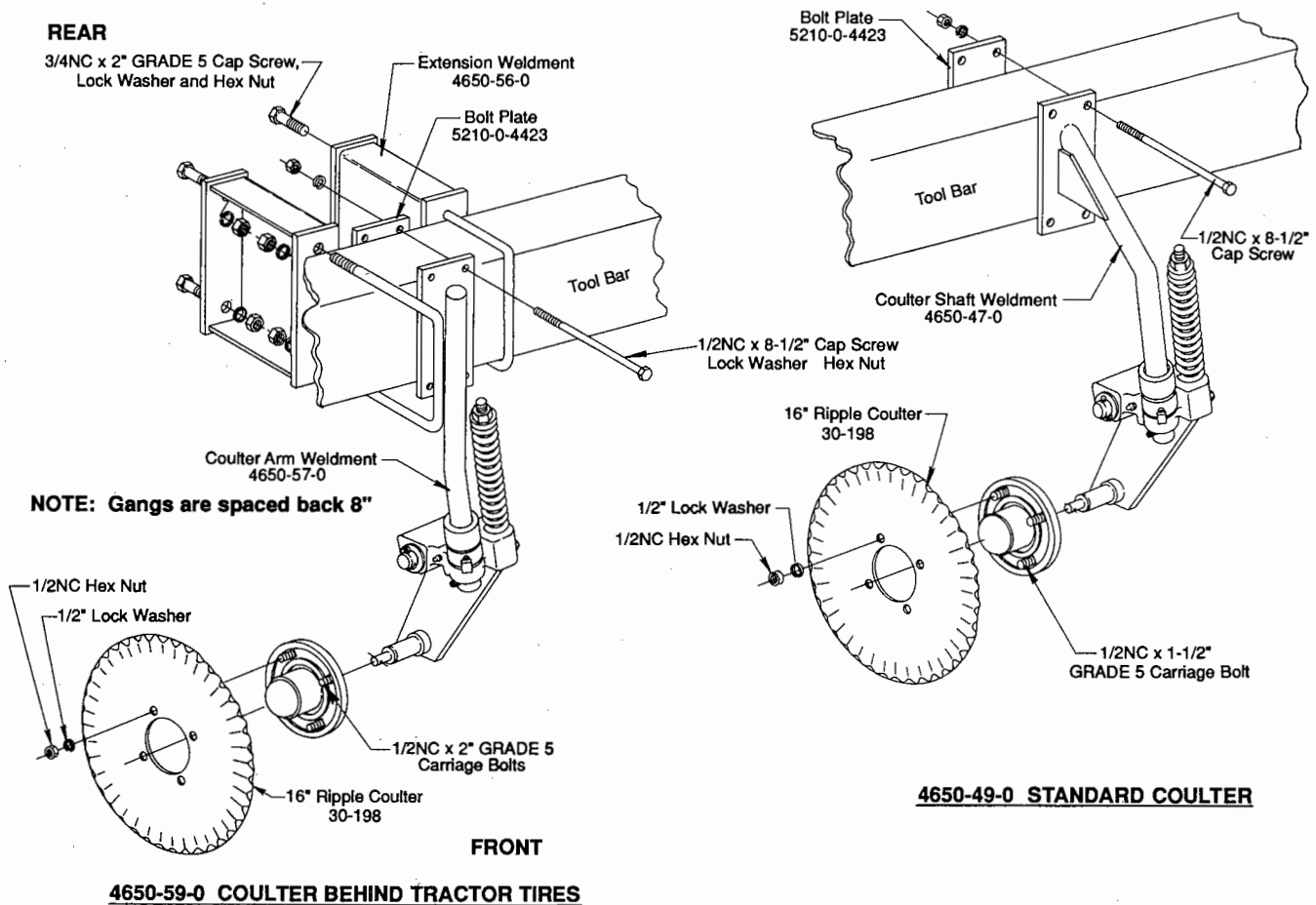
3. The Ditcher Shank Assembly replaces the rear K-Tine shank mount weldment. Remove FOUR 1/2NC x 1-1/2" Cap Screws, and attach the Ditcher shank to the gang channels. The 3/4" shank is designed to fit an 8" or 10" HAWKINS DITCHER.



XII. COULTER ATTACHMENT (4650-49-0 & 4650-59-0) ACCESSORY

1. A coulters blade assembly is available to improve the ability of the row crop subsoil cultivator to run in heavier trash conditions.

NOTE: The standard coulters assembly (4650-49-0) cannot be assembled at all gang locations. There must be a minimum of 15" between the tool bar and the tractor tire before a standard coulters can be assembled. A coulters cannot run in the same row with a tool bar gauge wheel on a narrow spacing. If a coulters is required behind the tractor tires, a coulters group (4650-59-0) can be used which moves the coulters and gang 8" to the rear.



2. Fasten the coulters shaft assembly (4650-48-0) to the tool bar ahead of the subsoil gang with a bolt plate (5210-0-4423), FOUR 1/2NC x 8-1/2" Cap Screws, 1/2" Lock Washers and 1/2NC Hex Nuts as shown above.
3. Attach the 16" Ripple Coulters (30-198) to the hub with FOUR 1/2NC x 1-1/2" GRADE 5 Carriage Bolts, 1/2" Lock Washers and Hex Nuts.