HARDEE

BY EVH MFG CO

OPERATOR'S AND MAINTENANCE MANUAL

Disc Harrow

MODELS: D-18 / D-20 / D-21 / D-22 / D-23

TO THE PURCHASER:

The care you give your new Hardee Disc Harrow will greatly determine the satisfaction and service life you will obtain from your new harrow. By observing the instructions and suggestions in this manual, your harrow will serve you for many years.

As an authorized Hardee Dealer, we stock genuine Hardee parts, which are manufactured with the same precision and skill as the original equipment. Please use only approved replacement parts. Our factory-trained staff are kept fully informed of the most efficient methods of servicing Hardee equipment and are ready to assist you.

If you should require additional aid or information, contact us.

Your Authorized Hardee Dealer

OSHA requires that as a farm employer you should meet certain safety requirements. You should become familiar with and comply with those requirements. Be sure anyone who operates this equipment understands all safety related items. If this harrow is repainted, be certain new decals are ordered. Decals pertaining to personal safety must be replaced.

To insure efficient and prompt service, please provide the model number and serial number of your Hardee harrow in all correspondence or contacts.

TABLE OF CONTENTS

Assembly Instructions ..... **Page 3**
Wheel Hub Servicing ..... **Page 3**
Adjustment for Level Disking ..... **Page 4**
Scraper Adjustment ..... **Page 4**
Hydraulic Cylinder Installation ..... **Page 5**
Transport Lock ..... **Page 6**
Storage ..... **Page 6**
Maintenance ..... **Page 7**
Bearing & Spool Replacement ..... **Page 7**
Hydraulic Cylinder Repair ..... **Page 7**
Cautions !!! ..... **Page 8**
Extra Equipment ..... **Page 8**
Dual Wheel Attachment ..... **Page 8**
Feathering Blades ..... **Page 8**
Warning Lamps ..... **Page 8**

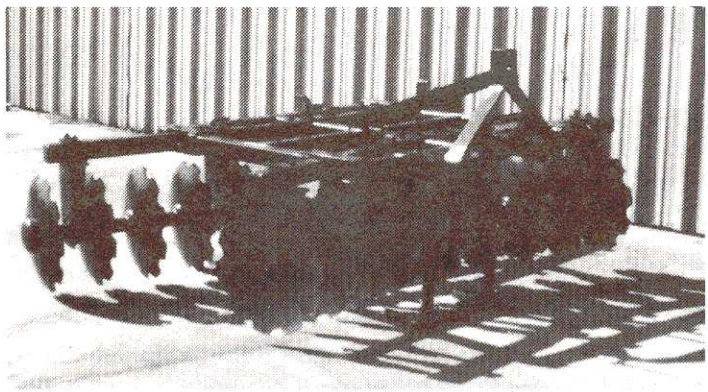
ASSEMBLY INSTRUCTIONS

The harrow is shipped from the factory with maximum pre-assembly in the following bundles:

- A: Main frame and pull tongue or lift hitch
- B: 2 or 4: 15 X 6-6 bolt wheels
- C: 1 - 2 1/2 X 16 hydraulic cylinders (D-19, D-22, D-23 only)
- D: Scrapers and bolts
- E: Hydraulic kit (D-19, D-22, D-23)
- F: Front gang - RH
- G: Front gang - LH
- H: Rear gang - RH
- I: Rear gang - LH

(Lift or Pull Type)

1. Place all bundles where they will be convenient. Arrange loose parts so they may be easily seen when needed. To insure good alignment of the units and parts, always insert all bolts leaving the nuts loose, tighten the nuts evenly to prevent misalignment, distortion, or binding. Be sure all bolts are tight, all cotter pins properly inserted.
2. Select clean level area for assembly. Place main frame on sturdy stands at least 30" high so front and rear gangs will clear frame.

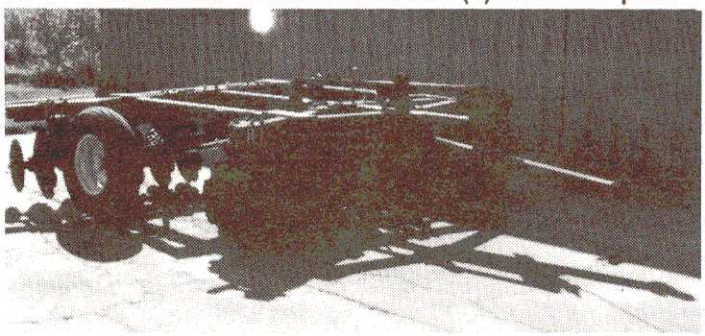


(Pull Type)

3. Mount tires on the wheels. Bolt the wheels to the hubs. Tighten bolts evenly to assure proper alignment of wheels. Consult the manufacturer for proper tire inflation pressure.

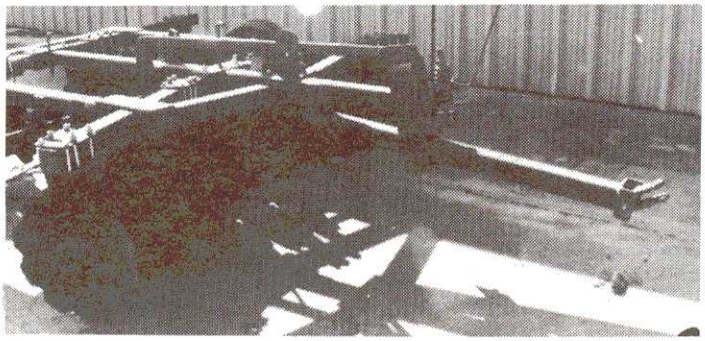
(Pull Type)

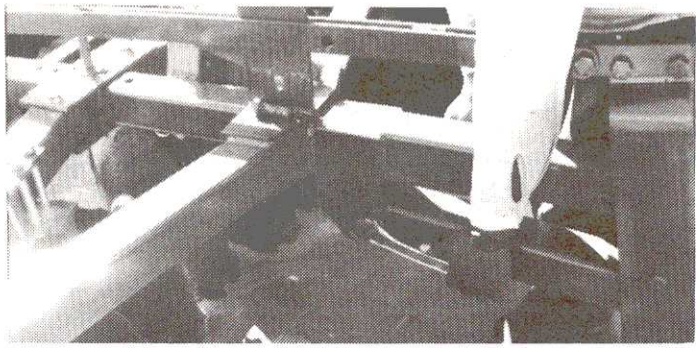
4. Attach axle to main frame with (3) three lock pins.



(Pull Type)

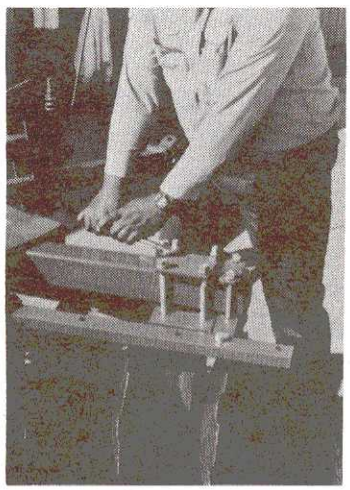
5. Attach pull tongue on main frame.





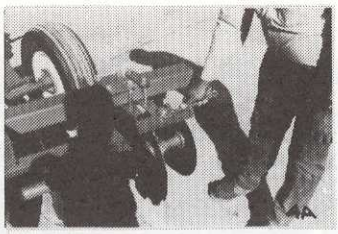
(Lift or Pull Type)

6. Attach front and rear gangs to main frame with gang tie plates. Bolt heads must be on bottom. Center gangs on main frame.



(Lift or Pull Type)

7. Attach scrapers to scraper bars. Scrapers should be 1/16" to 1/8" from blade. Rotate gangs to assure that scrapers are properly adjusted.



(Lift cr Pull Type)

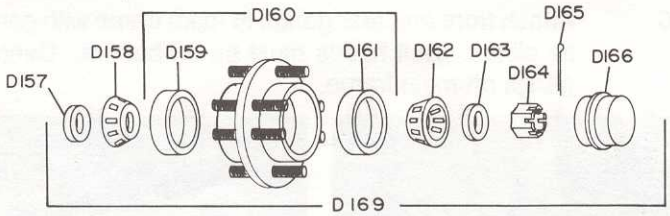
8. Attach the feathering blades to the rear gangs.
9. Check and retighten all bolts after initial field use.

LUBRICATION

Wheel Bearings: (Pull Type)

Wheel bearings should be repacked with grease and adjusted annually. Under extreme conditions they should be serviced more frequently. Check occasionally for excessive end play.

To disassemble the hub, you should remove the dust cap by prying around it. Remove the cotter pin, slotted nut and flat washer. Then carefully remove the hub and bearings from the spindle. Inspect all parts for wear and replace if necessary, (Illustration 1)



(ILL. No. 1)

Use the following procedure when repairing or servicing wheel hubs:

1. Clean all parts that are to be reused.
2. Carefully inspect the metal case on the grease seal. Discard seal if case is bent or damaged. Check seal lips for cuts, tears or excessive wear. Seal must fit snugly on extended inner race of bearing.
3. Carefully inspect both sets of bearing cones. Bearings bore and rollers must be smooth and free of nicks and scratches. Replace cones if damaged.
4. Inspect hub to make sure that hub bolt holes have a full thread. Bearing cups must be smooth and free of surface blemishes. Cups must be removed from the hub and replaced if damaged. Cups should be fully pressed into the hub and rest squarely against the shoulder inside the hub. Severely damaged hubs should be replaced.
5. Threads on spindle must be in good condition. Bearing cone seats must be smooth and free of blemishes. Bearing cones must fit squarely on spindle.
6. Flat washer, slotted nut, cotter pin and hub caps must be in good condition. Replace if worn or damaged.

To re-assemble the hub, repack each bearing cone with grease and fill the hub cavity 1/3 full of grease. Place inner bearing assembly in hub, press grease seal into the hub, and carefully reinstall the hub on the spindle. Install the outer bearing assembly into the hub, and replace the flat washer and slotted nut, tighten the slotted nut to seat the bearings until the hub binds when rotated.

Back the slotted nut off the nearest slot. Rotate the hub five or six revolutions in each direction to seat all parts. Retighten the slotted nut while rotating the hub. When the hub binds, back the slotted nut off to the nearest slot and secure with a cotter pin. Install dust cap and remount wheel on hub.

OPERATING INSTRUCTIONS

Adjustment for Level Disking: (Lift or Pull Type)

It is recommended that the tractor be operated at a speed best suited for soil conditions. High-speed disking will sometimes result in excessive lateral movement of the soil. This may leave an uneven surface behind the disk harrow known as "ridging" and "furrowing."

When disking in a cover crop or where the land is to be reworked, an uneven surface is not objectionable. If the land is to be bare through the winter, furrows and ridges will reduce soil washing. They will help catch and hold moisture, resulting in more water being absorbed by the soil.

Center Ridge: (Lift Type)

If a ridge of soil is left behind the center of the harrow, decrease the weight on the rear gangs by shortening upper link (3rd arm), decrease the angle of the rear gangs, or move the gangs farther apart, or do a combination of the three.

Center Furrow: (Lift Type)

If a furrow is left behind the center of the harrow, increase the weight on the rear gangs by lengthening the upper link (3rd arm), increase the angle of the rear gangs, or move the gangs closer together, or do a combination of the three.

Outer Ridges of Furrows: (Lift Type)

If ridges or furrows are left behind at the outer ends of the harrows, change the weight on the rear gangs by adjusting the length of the upper link (3rd arm) or change the front gang cutting angle.

Feathering Blades: (Lift or Pull Type)

The use of feathering blades with smaller disks will move the excess soil back which is thrown out by the front gangs at high

speed. By using the feathering blades the outside furrows are partially filled giving a more uniform job of disking.

Ground Speed & Adjustments: (Lift or Pull Type)

Where it is necessary to have a level job of disking, the following factors must be considered:

1. Tractor Speed
2. Hitch Adjustment
3. Disk Gang Angle Adjustment
4. Gang Lateral Adjustment

Tractor Speed: (Lift or Pull Type)

Speeds above 5 mph may result in forming of ridges and furrows. The lateral adjustment of the rear gangs, and the use of rear gang feathering blades help to overcome this problem.

Operating Procedure: (Pull Type)

Disk as deep as necessary to do a thorough job, but do not try to disk to an excessive depth. In most conditions the Hardee harrow has sufficient weight for good penetration. In other conditions you have a little more weight than you really need. For these conditions, your harrow should be equipped with flotation tires. 9.5L x 15 or 11L X 15 tires will be adequate for most conditions.

(Lift or Pull Type)

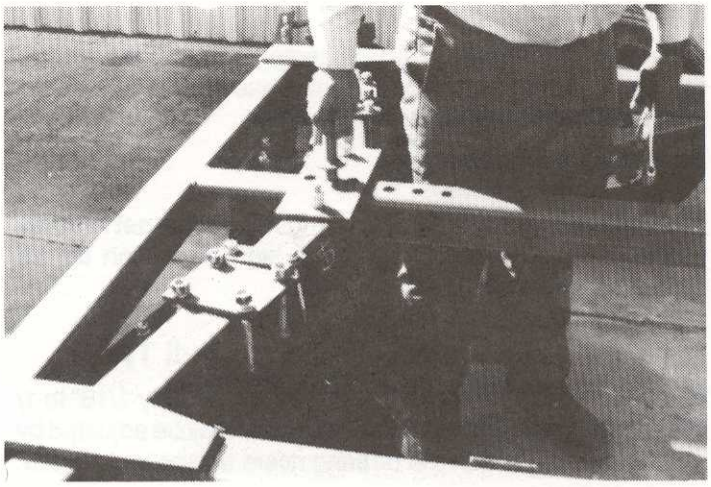
You should never allow soil to "bulldoze" ahead of or flow over the spacer spools. Cutting depth should be controlled to avoid this situation. Maintaining proper cutting depth will have the following advantages:

1. Increase gang bearing life.
2. Reduce strain on harrow frame and related parts.
3. Reduce load on tractor engine and drive train.
4. Lower fuel consumption due to less load on tractor engine.
5. Reduce wheel slippage and rear tractor tire wear due to lower load.
6. Increase tractor travel speeds due to less rear slippage.

By properly controlling cutting depth, gang bearing life will be increased with more acres covered per day at a lower cost.

DISK ANGLE ADJUSTMENT (Lift or Pull Types)

Front and Rear Gangs: (Lift or Pull Type)



Warning!! Lower or block elevated components before servicing or when leaving the machine unattended, elevated component can fall causing serious injury.

Gang Lateral Adjustment: (Lift or Pull Type)

General:

The front and rear gangs are adjustable laterally to compensate for soil conditions and tractor speed. As an initial setting, it is recommended that the front gangs should be adjusted so that bumper washers are centered on harrow frame and clear each other by 3/8 to 1/2 inch; and the rear gangs are approximately 28 inches apart, measured from front edge of disk blades.

Ridging: (Lift Type)

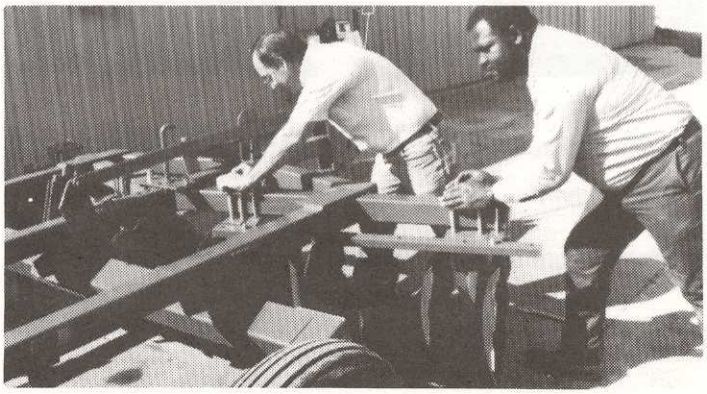
Make adjustments as needed after the harrow is placed in operation. When a ridge of soil is left behind the center of the harrow, the rear gangs should be set out. Weight on the rear gangs can be decreased by shortening the upper link (3rd arm).

Furrowing:

When a furrow is formed behind the center of harrow, the rear gangs should be set in. Weight on the rear gangs needs to be increased by lengthening the upper link (3rd arm).

Adjustment: (Lift or Pull Type)

To adjust the front and rear gangs laterally, loosen the bolts securing the gang to the main frame and slide gangs in or out for adjustments needed.



(Lift or Pull Type)

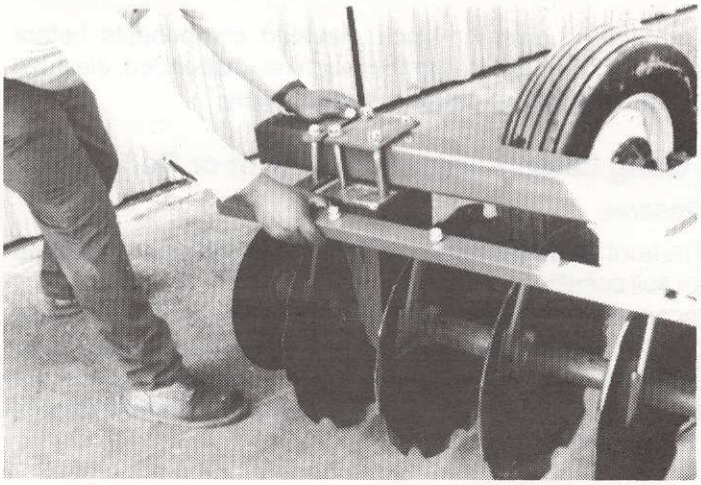
Slide the gangs either toward the center or toward the outside of the harrow until the desired position has been obtained. Be sure to retighten the bolts.

(Lift or Pull Type)

It is recommended that the rear gangs should be set in at low tractor speeds (below 5 mph) and set out at high tractor speeds. 5 to 6 mph).

Scraper Adjustment: (Lift or Pull Type)

Scrapers should be adjusted to run approximately 1/16" to 1/8" from disk blade. The entire scraper bar may be adjusted by a move laterally within the bearing risers as shown in figure.



Hydraulic Lift Cylinder Installation: (Pull Type)

Attach rod end to axle flange and other end to cylinder mount on main frame as shown below.

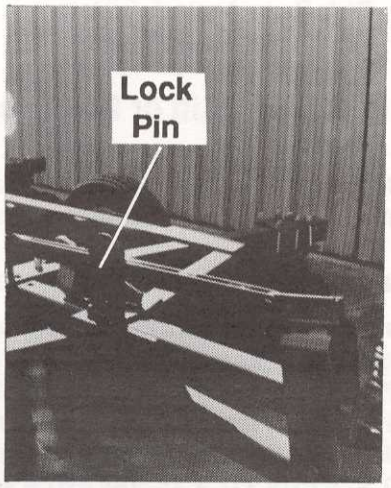
Use the hydraulic lift cylinder to control depth of cut.

Caution: Before attaching cylinder to disk, stroke cylinder to full length several times to allow oil to fill cylinder and hoses. Otherwise cylinder may drop load when first used.

Transport Lock Safety: (Pull Type)

Caution: Always secure for transport by using transport lock pin.

Prior to transport, raise harrow and lock in transport position by securing transport pin, as shown in figure, to keep disk blades clear of road surface when transporting. To do so, raise unit with cylinder until transport bar hole lines up with transport flange, insert pin, and cotter key.



Storage: (Lift or Pull Type)

Proper storage will add to the life of your disk harrow, and assure its being in good condition for the next session.

The following procedure is recommended:

- Clean off all foreign matter and thoroughly lubricate the harrow.
- Repaint the harrow where the original paint has worn off.
- Coat the disk blades and hydraulic cylinder rods with a good rust preventative.
- Tighten loose bolts and replace any damaged or missing parts.
- Store in a dry place, with the gangs resting on boards to remove weight from the tires.
- Carefully rotate each gang and check for worn or damage blades, bent gang shafts, worn scrapers, damage bearings and other parts which may need replacing.

Maintenance:

1. ***Keep all bolts tight. (Lift or Pull Type)***
   - A. Check before placing in service.
   - B. Visually inspect all bolts daily.
   - C. Check after first 50 hours or one week's operation.
   - D. Check before and after each session.

2. ***Keep wheel bearings properly adjusted. (Pull Type)***

   A. Check them often.

   B. Clean and repack each season or every 300 hours.

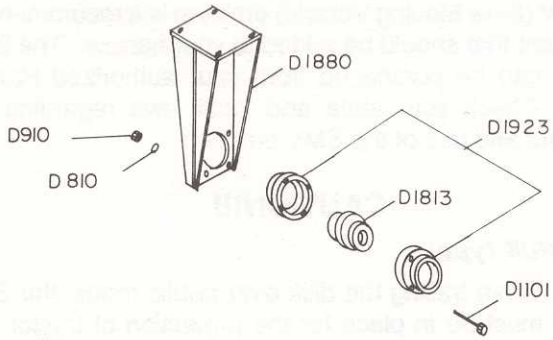
   C. Replace worn or damaged parts.

   D. In disassembling and re-assembling the wheel hub assemblies, take care not to damage the grease seal lips. In re-assembly, to seat the bearings, carefully tighten the hex nut until the hub drags. Rotate the hub to help seat the bearings cups and cones. Retighten the hex nut until the hub drags, then back off the hex nut to the nearest slot and secure with cotter pin.

3. ***Do not run with loose disk blades. Keep gang bolts tight! (Lift or Pull Type)***

4. ***Keep scrapers properly adjusted 1/16" to 1/8" from blades. (Lift or Pull Type)***

5. ***Disk Blade, (Illustration 2) bearing and spool replacement. (Lift or Pull Type)***



(ILL. No. 2)

   A. Remove the bolts that hold the bearing flanges to the bearing riser.

   B. Raise the harrow and roll the disk gang away from the frame.

   C. Remove the gang nut lock plate.

   D. Remove the gang hex nut from the end of the axle shaft.

   E. Slide off the bearing spools, spacers and blades.

   F. Avoid thread damage.

   G. Install new blades.

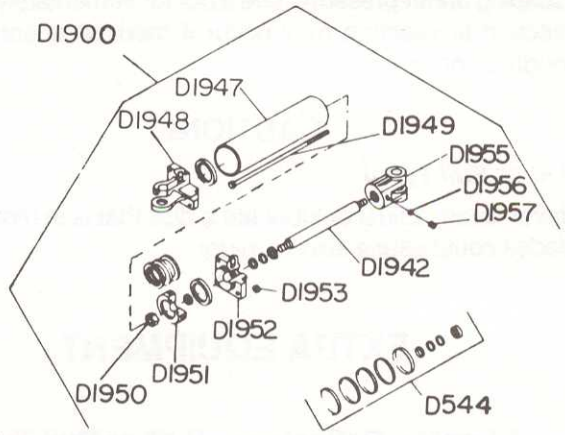
   H. To replace bearing, remove all flangette bolts, clean flangettes, check flangettes for wear. Check flangettes on new bearing. They must be tight enough to hold bearing snug. Discard flangettes if not in good condition.

   I. Reinstall bearing spools, spacers, and blades.

   J. Install gang shaft hex nut.

   K. Rotate gang to be sure it turns freely. The bearings must be in proper alignment to prevent unnecessary wear. Bearing risers must be properly spaced to prevent bearing preload.

6. ***Hydraulic Cylinder Repair: (Illustration 3) (Pull Type)***



(ILL. No. 3)

   A. Remove hoses and fittings from cylinder.

   B. Remove cylinder from harrow and clean the outside of the cylinder.

   C. Disassemble cylinder by rotating cap on rod end of cylinder. Use a spanner wrench to remove cap.

   D. Pull cylinder rod to slip rod, gland and piston out of barrel.

   E. Remove nut on end of rod then slide piston and gland off rod. Use care to avoid damaging rod when removing nut.

   F. Carefully clean and inspect all parts for wear or damage. Small nicks, scratches or blemishes on the rod and the inside of the barrel should be smoothed with fine steel wool or emery cloth.

   G. Remove all "O" rings, seals and "U" cups from piston and gland. Carefully replace all seals with new parts.

   H. Assemble cylinder using care to prevent damage to "O" rings, seals and "U" cups.

   I. Replace cylinder on harrow and attach hoses.

(Pull Type)

Check cylinder for leaks by applying pressure to butt end of cylinder before attaching hose to rod end of cylinder. Oil will flow from port on rod end of cylinder if piston seals are not sealing properly. Attach hose to end of cylinder and apply pressure to check for gland or rod seal leaks.

CAUTION!!!

(Lift or Pull Type)

Hydraulic systems are highly pressurized. Escaping hydraulic oil, even an invisible pinhole leak, can penetrate body tissues

causing serious injury. Use a piece of wood or cardboard when looking for leaks — Never use the hands or other parts of the body. Relieve hydraulic pressure before disconnecting circuits. When re-assembling, make absolutely certain that all connections are tight. If you should be injured by hydraulic oil escaping under pressure, see a doctor immediately. Serious infection or reaction may occur if medical attention is not sought at once.

CAUTION!!!

(Lift or Pull Type)

Never clean, adjust or lubricate a disk that is in motion. Disk blades could cause severe injury.

EXTRA EQUIPMENT

Warning Reflectors: (Lift or Pull Type)

Attach the reflector with both red and amber reflective surfaces as near as possible to the extreme left rear part of the harrow. Mount the reflector so the red reflective surface is visible from the rear and the amber surface visible from the front.

Attach the other reflector as near as possible to the extreme right rear part of the harrow with the red reflective surface visible from the rear.

CAUTION!!!

(Lift or Pull Type)

When transporting farm implements on public roads after dusk, it is the responsibility of the operator to provide lighting and reflectors on the rear of the implement in accordance with your state law.

CAUTION!!!

(Lift or Pull Type)

When transporting machinery over public roads, comply with your local and state laws regarding length, width and lighting.

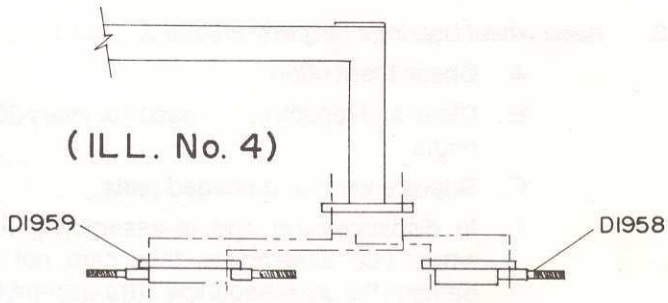
CAUTION!!!

(Lift or Pull Type)

Be sure the area is clear of any personnel before safely driving tractor with disk attached.

Dual Wheel Attachment: (Pull Type)

A dual wheel attachment is available for harrows with single wheels, this attachment consists of removing the single spindle plate from the axle leg and replacing it with a dual spindle plate. The dual and single spindle are the same other than one is dual and one is single. Use the same bolts, washers, and nuts for each. See Illustration 4.



Bolt the wheels to spindles, and tighten wheel bolts evenly to assure proper alignment of wheels.

NOTE: Be sure to use same size tires on all four wheels so that main frame remains level.

Feathering Blades: (Lift or Pull Type)

Feathering Blades are available for the rear gangs to fill and level the furrow left by the front gang outer disk blades.

SMV Emblem: (Lift or Pull Type)

The SMV (Slow Moving Vehicle) emblem is a recommended attachment that should be added to your harrow. The SMV emblem can be purchased from your authorized Hardee dealer. Check your state and local laws regarding the placement and use of the SMV emblem.

CAUTION!!!

(Lift or Pull Type)

Caution, when trailing the disk over public roads, the SMV emblem must be in place for the protection of tractor and motor vehicle operators.

Warning Lamp: (Lift or Pull Type)

Caution, when transporting farm implements on public roads after dusk. It is the responsibility of the operator to provide lighting and reflectors on the rear of the implement in accordance with your state law.

LIMITED WARRANTY

This is to certify that EVH Manufacturing Company warrants this new implement to be free of defects in material and workmanship under normal use and service for a period of 12 months for Standard Use and 90 days for Commercial Use from the original date of delivery to the original purchaser with exceptions of items listed below.

Parts Warranted	Duration
Gearboxes **(STANDARD USE)**	3 Years from date of delivery
Hydraulic Pump & Motor **(STANDARD USE)**	3 Years from date of delivery
Gearboxes **(COMMERCIAL USE)**	90 Days from date of delivery
Hydraulic Pump & Motor **(COMMERCIAL USE)**	90 Days from date of delivery

Our obligation under this warranty shall be limited to repair or replacement of any part or parts of this implement which in our judgment shows evidence of such defect and provided further that said part or parts shall be removed and returned by the owner at the owner's expense to EVH Manufacturing Company, Loris, SC, through an authorized dealer, transportation prepaid, free and clear of liens or encumbrances. **This warranty shall not include normal wear items.**

Changes or alterations to the implement made without the written authorization of the manufacturer will render this warranty void.

This warranty does not obligate this company to bear any labor costs in replacement of defective parts.

EVH Manufacturing Company reserves the right to make changes or improvements in its equipment at any time, with the express understanding that such changes or improvements do not impose any obligation of the company to install such changes or improvements on implements previously manufactured.

This warranty is void unless registration card is returned to us within thirty (30) days of date or purchase.

EVH Manufacturing Company

HARDEE

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