

Model 690

Beet Harvester

OPERATORS MANUAL



273090 (C)
0993

TO THE OWNER

Congratulations on the purchase of your new Art's-Way 690 sugar beet harvester. You have selected a top quality machine designed and built with pride to give you many years of efficient, reliable service.

Many people have worked on the design, production, and delivery of this machine. The information in this manual is based on the knowledge, study and experience of these people through years of manufacturing specialized farming machinery. This manual is designed to provide you with important information regarding safety, maintenance and machine operation so you can get the best possible performance from your harvester.

Even if you are an experienced operator of this or similar equipment, we ask you to **read this manual before running this machine**. The way you operate, adjust, and maintain this unit will have much to do with its successful performance. Any further questions you may have about this piece of Art's-Way equipment should be directed to your local Art's-Way dealer.

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE

Art's-Way Manufacturing Co., Inc. is continually making product improvements. In doing so, we reserve the right to make changes or add improvements to our products without obligation for equipment previously sold. Because modifications to this machine may effect the performance, function and safety of its operation, **no modifications are to be made without the written permission of Art's-Way Manufacturing Co., Inc.**

In the interest of continued safe operation of the machine, pay particular attention to the safety alert symbol throughout this manual.

ART'S-WAY MANUFACTURING CO., INC. STATEMENT OF PRODUCT LIABILITY

Art's-Way Manufacturing Co., Inc. recognizes its responsibility to provide its customers with a safe and efficient product. Art's-Way makes every attempt to design and manufacture its products in accordance with all accepted engineering practices in effect at date of design. This statement should not be interpreted to mean that our products will protect against the user's own carelessness or failure to follow common safety practices as set forth in this manual, nor will Art's-Way be liable for any such act.

NOTICE TO THE CUSTOMER

The warranty for this machine appears on page 1 of this manual. The warranty registration form inserted in this manual must be completed and returned to the factory in order to establish proper warranty. Failure to comply will result in reduced warranty allowances.

This manual contains operating instructions for this machine only. It does not replace the manual(s) for any machine that it may be attached to or used with.

PARTS AND SERVICE

The wise purchaser of a new machine gives consideration to the following factors:

- A. ORIGINAL QUALITY**
- B. AVAILABILITY OF SERVICE PARTS**
- C. AVAILABILITY OF ADEQUATE SERVICE FACILITIES**

Art's-Way Manufacturing Co., Inc. has an excellent dealership network ready to answer any questions you may have about your sugar beet harvester. Parts for your machine may be ordered through our dealers. When placing a parts order, please have the model and serial number ready. This will allow the dealer to fill your order as quickly as possible.

For your convenience, we have provided this space for you to record your model and serial numbers and date of purchase, as well as your dealership name and address.

Owner's Name _____

Owner's Address _____

Purchase Date _____

Dealer's Name _____

Dealer's Address _____

Dealer's Phone No. _____

Building on a
Art's-Way
Tradition of Quality

SERIAL NO.

MODEL NO.

Manufactured By
Art's-Way Manufacturing Co., Inc.
Armstrong, IA

**ENTER SERIAL NUMBER & MODEL
NUMBER IN SPACE PROVIDED.**

(Serial Number Located on Left Front
Corner of the Main Frame)

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LIMITED WARRANTY

Art's-Way Manufacturing Co., Inc. warrants products it sells to be free from defects in material and workmanship for a period of one (1) year after the date of delivery to the first purchaser subject to the following conditions:

- **Art's-Way Manufacturing Co., Inc.** obligation and liability under this warranty is to repair or replace (at the company's option) any parts which upon manufacture were defective in material or workmanship.
- All parts and repairs under this warranty shall be supplied at an authorized **Art's-Way Manufacturing Co., Inc.** dealer or at the factory, at the option of **Art's-Way Manufacturing Co., Inc.**
- **Art's-Way Manufacturing Co., Inc.** warranty does not extend to parts and elements not manufactured by **Art's-Way Manufacturing Co., Inc.** and which carry the warranty of the other manufacturer.
- Transportation or shipping to an authorized dealer for necessary repairs is at the expense of the purchaser.
- **Art's-Way Manufacturing Co., Inc.** makes no other warranty expressed or implied and makes no warranty of merchantability or fitness for any particular purpose beyond that expressly stated in this warranty. **Art's-Way Manufacturing Co., Inc.** liability is limited to the terms set forth in this warranty and does not include any liability for direct, indirect, incidental or consequential damages or expense of delay and the Company's liability is limited to repair or replacement of defective parts as set forth herein the warranty.
- Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution or parts not approved by **Art's-Way Manufacturing Co., Inc.**, or any alteration or repair by other than an authorized **Art's-Way Manufacturing Co., Inc.** dealer which affects the product materially and adversely, shall void this warranty.
- No dealer, employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of **Art's-Way Manufacturing Co., Inc.** at its home office.
- Some states do not allow limitations on how long an implied warranty lasts or exclusions of, or limitations on relief such as incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

SAFETY FIRST

"A careful operator is the best insurance against an accident."

(National Safety Council)

Most accidents can be prevented if the operator fully understands how the machine functions and can anticipate situations which may produce problems and make necessary corrections before problems develop.

It is important that *all* individuals who will be operating the harvester read this Manual carefully, paying special attention to the safety instructions which are marked by this symbol:



The American Society of Agricultural Engineers has adopted this symbol as an universal **SAFETY ALERT SYMBOL** to identify areas of potential danger if the equipment is not operated correctly. *Please be alert whenever you see this symbol in the Manual or on your machine.*

Art's-Way Manufacturing Co., Inc. strives to make our equipment as safe as it can possibly be. The 690 Sugar Beet Harvester conforms to all applicable safety standards at time of manufacturing. A safety conscious equipment operator makes an effective accident-prevention program complete.

Safety features and instructions for the Art's-Way Model 690 Sugar Beet Harvester are detailed elsewhere in the Operators Manual. It is the responsibility of the harvester owner to ensure that all operators read and understand the manual before they are allowed to operate the machine. (*Occupational Safety and Health Administration (OSHA) regulation 1928.57*)

***Watch for these words on machine decals and in this Manual
to alert you to important safety messages:***

DANGER: Immediate and specific hazard which **will** result in severe personal injury or death if proper precautions are not taken.

WARNING: Specific hazard or unsafe practice **could** result in severe personal injury or death if proper precautions are not taken.

CAUTION: A reminder of good safety practices. Personal injury **could** result if proper procedures are not followed.



SAFETY GUIDELINES



Remember, A Careful Operator is the Best Insurance Against an Accident.



READ and Understand the Operators Manual and all the safety decals before operating the machine. Review safety instructions with all operators annually.

BEFORE OPERATING

Do not wear loose fitting clothing as it may catch in moving parts.

Make sure to install and/or secure all guards and shields, including the tractor power take-off master shield, before starting or operating the machine.

Be sure that the correct implement driveline parts are used and that they are properly secured.

Install safety chain when attaching machine to the tractor.

Clear the area of bystanders, especially children, when making repairs, adjustments or performing maintenance on the harvester.

Do not allow riders.

Put all tractor and machine controls in "neutral" and disengage PTO before starting (follow starting instructions according to your tractor manual).

Operate machine only while seated on the tractor seat.

Lower the lifter wheels when harvester is not in use.

Make sure the unit is adequately blocked before working on it.

DURING OPERATION

Keep hands, feet, hair and clothing away from moving parts.

Keep all shields and guards in place.

Keep all children and bystanders away from the machine while in operation.

Do not allow riders while machine is in operation.

Do not attempt to unclog, clean or adjust machine while it is running.

Before servicing, adjusting, repairing or unplugging the machine, stop the tractor engine, lower the machine to the ground, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.

Stay away from overhead power lines. Electrocutation can occur even without direct contact.

Keep all hydraulic lines, fittings and couplers tight and free of leaks. (see "Hydraulic Safety" section of this Manual).

MAINTENANCE SAFETY

Follow all operating, maintenance and safety instructions found in this Manual.

Before servicing, adjusting, repairing or unclogging the machine, stop the tractor engine, lower the machine to the ground, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.

Use only tools, jacks and hoists that are of sufficient capacity for the job.

Use support blocks or safety stands when changing tires or working under the machine.

Follow good shop practices of keeping service area clean and dry and using adequate light for the job at hand.

Before applying pressure to the hydraulic system, make sure all lines, fittings and couplers are tight and in good condition.

Relieve pressure from hydraulic circuit before servicing or disconnecting from tractor.

Make sure all shields/guards are in place and properly secured when maintenance work is complete.

HYDRAULIC SAFETY

Make sure all components in the hydraulic system are kept clean and in good condition.

SAFETY GUIDELINES

Replace any worn, cut, abraded, flattened or crimped hoses.

Do not make any temporary repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high pressure and temporary repairs may fail suddenly and create a hazardous situation.

Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to identify and isolate a leak. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop if hydraulic fluid penetrates the surface of the skin.

Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.

TRANSPORTATION SAFETY

Be sure to comply with all local regulations regarding transporting equipment on public roads and highways.

Make sure the SLOW MOVING VEHICLE (SMV) emblem and all lights and reflectors required by local highway and transportation authorities are in place, clean and clearly visible to all oncoming or following traffic.

Do not allow riders while transporting.

Make sure harvester is securely attached to the tractor and install a safety chain to the harvester.

Do not fail to latch the tractor brakes together.

Do not exceed 20 mph when transporting the harvester - reduce speed on rough roads and surfaces or when going down inclines.

Drive slowly when turning and always use turn signals on the tractor to indicate your turning intentions to other traffic.

The weight of the trailed machine should NEVER exceed the weight of the towing vehicle.

Check clearances carefully wherever machine is towed.

Always raise the lifter wheels before transporting.

Retract elevator into transport position before transporting harvester on the highway.

Stay away from overhead obstructions and power lines during transport. Electrocution can occur even without direct contact.

STORAGE SAFETY

Store the harvester in an area away from human activity.

Do not permit children to play on or around the stored machine.

Make sure the harvester is stored in an area with a firm and level base to prevent the machine from tipping or sinking into the ground.

TIRE SAFETY

Have a qualified tire dealer or repair service perform tire repairs.

Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

Follow proper procedures when mounting a tire on a rim to prevent an explosion which could result in serious injury.

Do not substitute tires of lesser road rating and capacity for the original equipment tires.

ASSEMBLY SAFETY

Use adequate manpower to perform assembly procedures safely.

Assemble the harvester in an area with sufficient space to maneuver the largest components and allow easy access to all sides of the machine.

Use only forklifts, lift cranes, jacks and tools with sufficient capacity for the loads.

Do not allow spectators in the working area.

Remember:

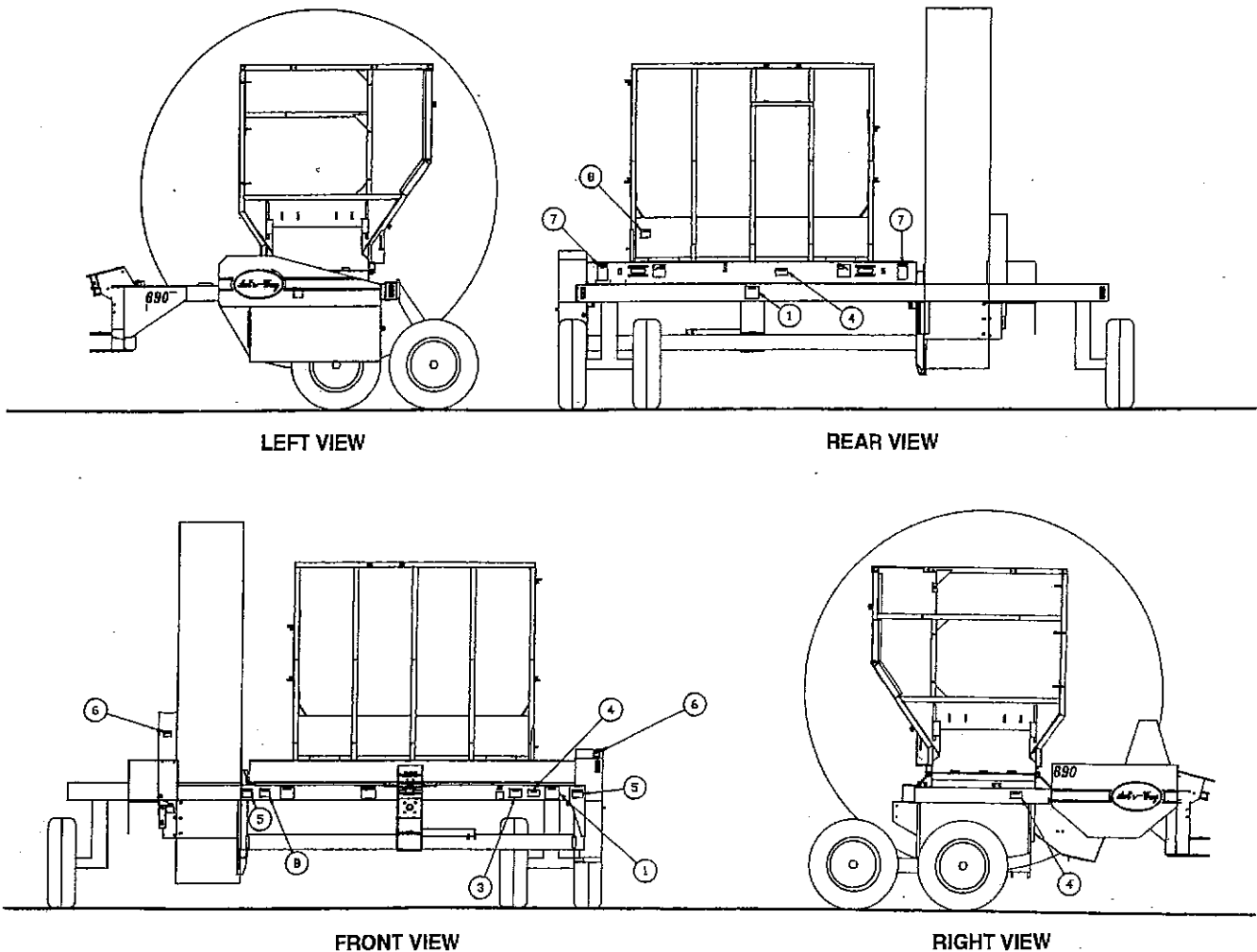
"The Best Operator is a Safe Operator"

SAFETY DECALS

The different types of safety decals for your 690 Sugar Beet Harvester are illustrated on the following pages. Please familiarize yourself with the appearance of each decal, the warning it describes, and the area where it is located on the machine. Refer to the diagrams below for decal locations. The six digit number after the description on page 6, is the part number of that decal.

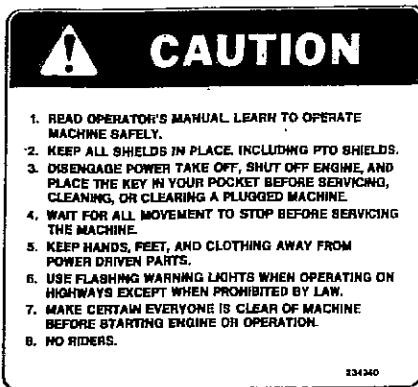
Safety awareness is the responsibility of each operator of the harvester. Keep safety decals and signs clean and legible and be sure that replacement parts display current safety decals and signs too. **Remember:** Always replace missing, damaged or illegible safety decals. New decals and signs are available from your Art's-Way dealer.

690 SAFETY DECAL LOCATIONS



Item	Qty.	Drawing No.	Description
1	2	234340	Decal, Caution-8 Instructions
3	1	E224071	Decal, Caution Shields
4	3	E224072	Decal, Warning Stand/Ride
5	2	E224032	Decal, Warning Hood
6	5	148190	Decal, Caution Shields-Protection
7	2	234360	Decal, Danger Rotating Rolls
8	2	234350	Decal, Danger Check Elec Clearance

SAFETY DECALS



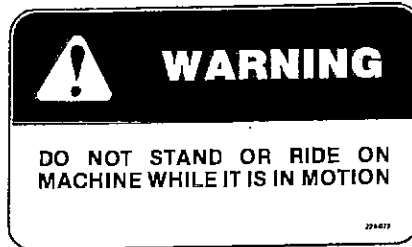
No. 1 - "CAUTION" - Lists 8 items to follow and observe while operating this machine. Part No. 234340.



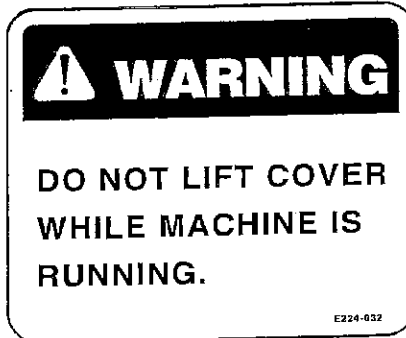
No. 2 - "DANGER" - Rotating driveline. Located on PTO. Part No. 268860.



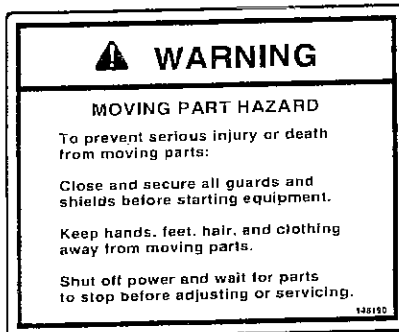
No. 3 - "CAUTION" - Keep hands away from all moving parts. Part No. E224071.



No. 4 - "WARNING" - Stay off machine when it is running. Part No. E224072.



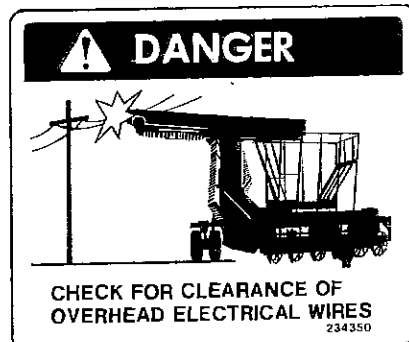
No. 5 - "WARNING" - Do not lift cover while in operation. Part No. E224032.



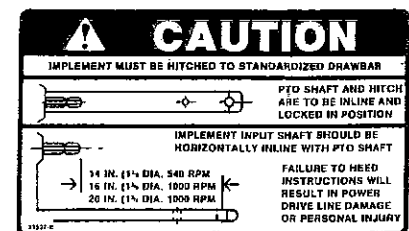
No. 6 - "CAUTION" - Moving Parts Hazard. Part No. 148190.



No. 7 - "DANGER" - Rotating Rolls. Part No. 234360.



No. 8 - "DANGER" - Check for clearance of overhead wires. Part No. 234350.



No. 9 - "CAUTION" - Implement must be hitched to standardized drawbar. Part No. 115370

NOTE: Keep all decals clean and free of dirt for maximum visibility. Replace any and all decals that are no longer legible. Read and obey all safety decals.

INTRODUCTION

This manual has been prepared to acquaint you with the proper assembly, operation, adjustment, service, and lubrication of the 690 beet harvester. Take time to better understand the efficient operation and care of your machine.

Whenever the terms "Left" and "Right" are used it should be understood to mean standing behind the machine and facing the direction of the forward travel.

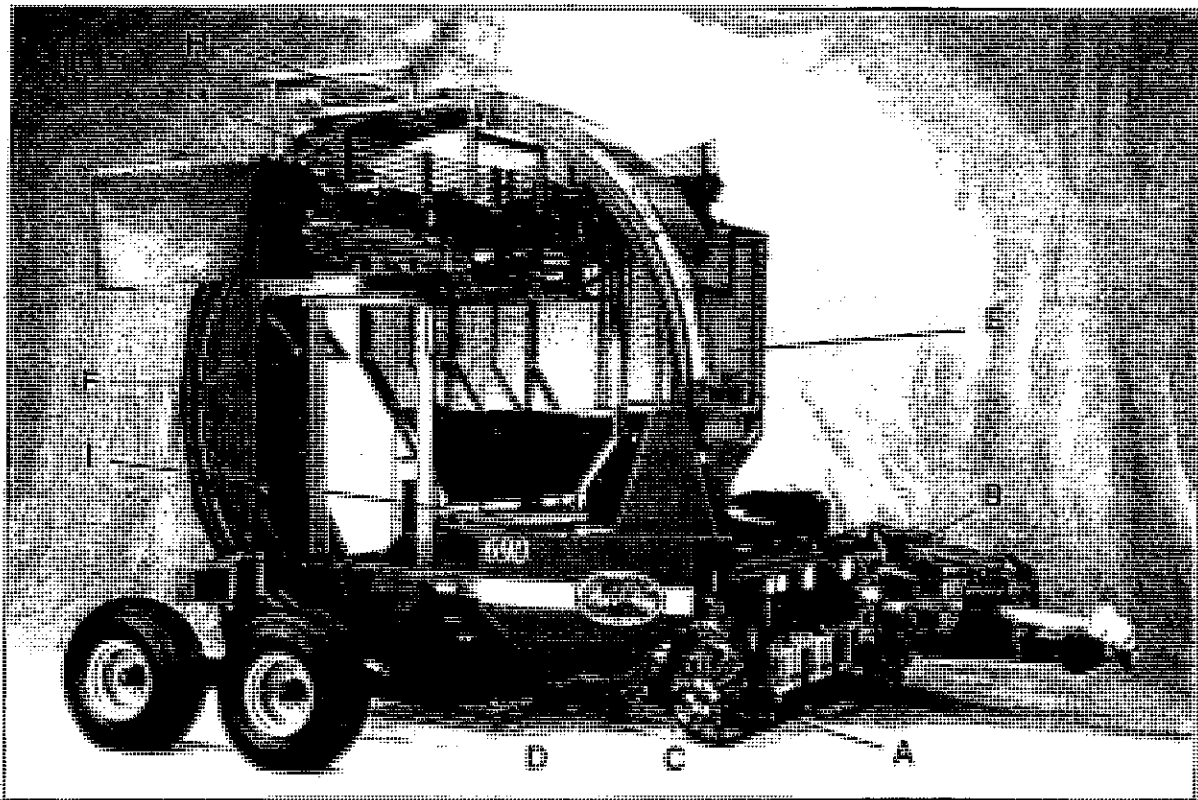


FIGURE 1 - BEET FLOW

BEET FLOW

The following is a step-by-step description of the beet flow through the beet harvester (see Figure 1):

The lifter wheels (A) penetrate the soil and lift the beets out of the ground.

The revolving steel/rubber paddles (B) at the rear upper quarter of the lifter wheels knock off dirt as they flip the beets onto the chain apron (C).

The forward section of the cleaning bed consists of hook chain. The separation between the chain links sifts out dirt as the beets are carried back to the grab roll cleaning area (D).

Three spiral grab rolls are paired with three smooth rolls which strip dirt, soil, and trash from the beets as they are moved into the wheel elevator (E).

The wheel elevator revolves at approximately 11 rpm, (at 1000 PTO rpm) carrying the beets up to the truck elevator until they reach the top and fall into the truck elevator (G). A stripper (H) clears the wheel of any rocks or beets that wedge between the rods.

The belted chain conveyor delivers the beets to a truck or the holding tank.

The tank bottom unloading conveyor (I) is actuated by a hydraulic motor - moving the beets onto the grab rolls, into the wheel elevator and onto the truck elevator.

PREPARING FOR FIELD OPERATION

REVIEW THE MACHINE

Generally review the machine for:

- Any loose bolts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation (see Figure 2).
- Hydraulic cylinders and hoses are properly installed.
- Electric wires and hydraulic lines are adequately secured to prevent damage.
- Oil level in gearbox up to fill plug.
- All shields and guards are in place.
- Proper installation of any options.
- Check tire pressure. Inflate implement tires to 45 psi and traction tires to 25 psi.

HITCHING TO THE TRACTOR

Adjust front and rear wheels of the tractor to fit desired row spacing.

Install hydraulic hose ends to match the tractor.

Position tractor near harvester hitch, attach lift cylinder hoses to the tractor outlets, activate cylinder and lift harvester hitch above tractor hitch (see Figure 2).

Set tractor drawbar at 16" from end of PTO to center of drawbar attaching hole for 1-3/8" and at 20" for 1-3/4"

PTOs. The driveline when hooked to tractor should measure between 58" and 68" between centers of universal crosses (see Figure 2).

Attach harvester to tractor with yoke weldment (A) and bolts provided. See Figure 3 for proper installation. The existing tractor clevis may be used if a 3" spacing can be maintained. If tractor drawbar mounting hole is larger than 1-1/4", a bushing should be installed.

NOTE: It is recommended to use additional support for the tractor drawbar. An optional drawbar support kit is available from your Art's-Way dealer - JBN140202.

Cycle lift cylinder (B) (See Figure 2), observe lift height. Reposition front bolt-on hitch (C) to obtain desired lift height.

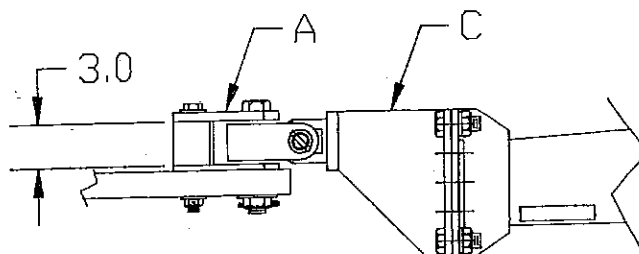


FIGURE 3 - HITCH INSTALLATION

Install safety chain from loop on harvester to tractor drawbar. Use proper support where required.

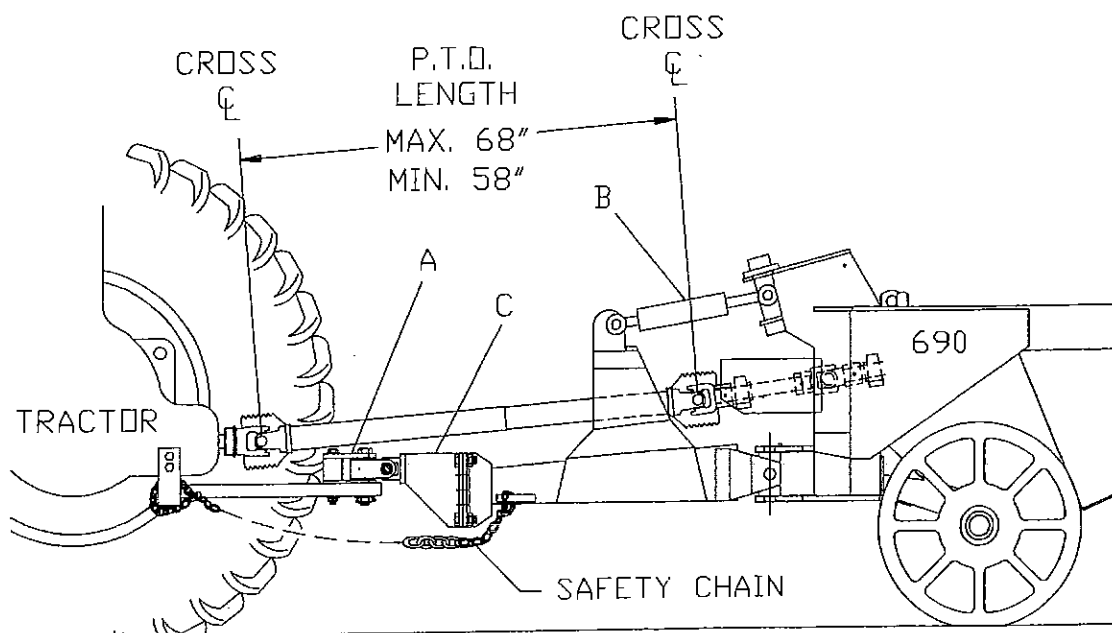


FIGURE 2 - HITCHING TO TRACTOR

PREPARING FOR FIELD OPERATION

Connect PTO driveline to 1000 RPM tractor PTO shaft. Note required PTO length.

Connect hydraulic hoses for steering hitch cylinder circuit and elevator, tank and row finder circuit to the tractor outlets. *For hydraulic schematics and plumbing instructions see pages 39-44.*

NOTE: With hitch pointed straight forward, adjust cylinder attaching bracket so the cylinder is in the center of it's stroke (offset for 28" row spacing).

Set flow divider for row finder valve to 3-5 on manual adjustment. (Set so steering cylinder responds as required). The remaining flow runs the truck elevator which has a preset flow control on the valve assembly. The tank unloading chain has a fixed ratio speed setting.

Lift harvester and cycle row finder cylinder.



CAUTION: Keep clear of machine as it shifts sideways. Move row finder arms from side to side. Harvester should move in the same direction as the tip of the arm.

Install control box in cab of tractor and connect the power cord to a suitable 12V power supply. See Figure 4 for direct connection of battery. Make sure a proper connection is made.

MUST BE HOOKED TO 12V POWER SOURCE.

12-VOLT SYSTEM

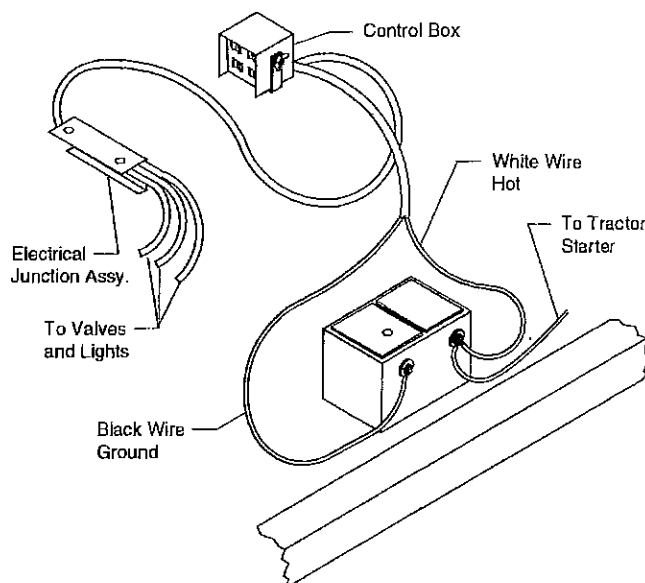


FIGURE 4 - CONTROL BOX POWER CONNECTION

Route main wiring harness through cab and connect to control box (see Figure 5). Connect valve wire to junction box. Also connect light wires if so equipped (see Figure 6). *No more than two lights per wire run from the junction box.* Bolt junction box in place and secure all wiring harnesses (see Figure 7).

NOTE: Four lights maximum - 200 watts maximum.

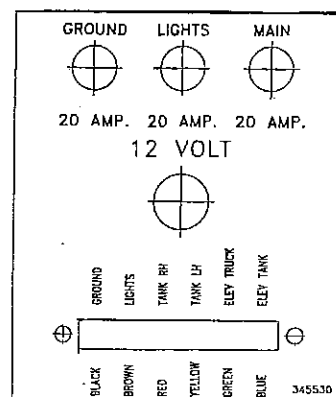


FIGURE 5 - CONTROL BOX DECAL

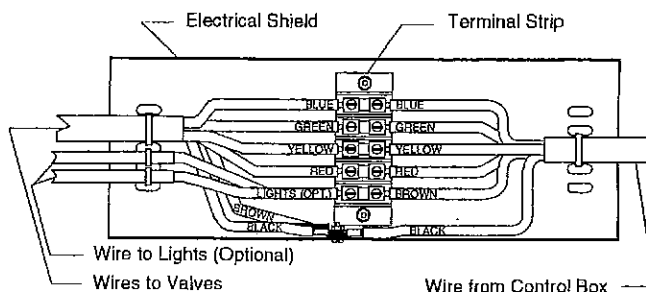


FIGURE 6 - JUNCTION BOX

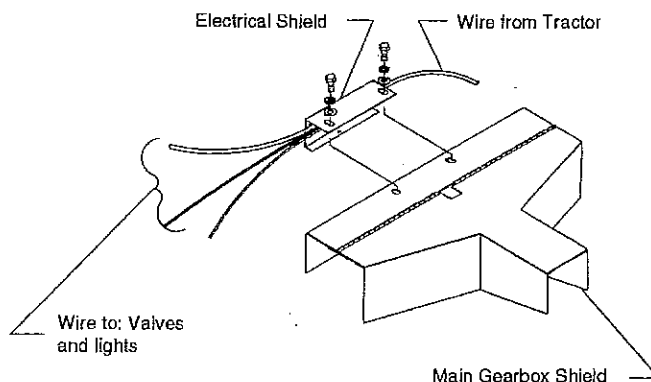


FIGURE 7 - ELECTRICAL JUNCTION ASSEMBLY

Route valve wire from junction box to valve assembly. Connect as shown (see Figure 8, page 10).

PREPARING FOR FIELD OPERATION

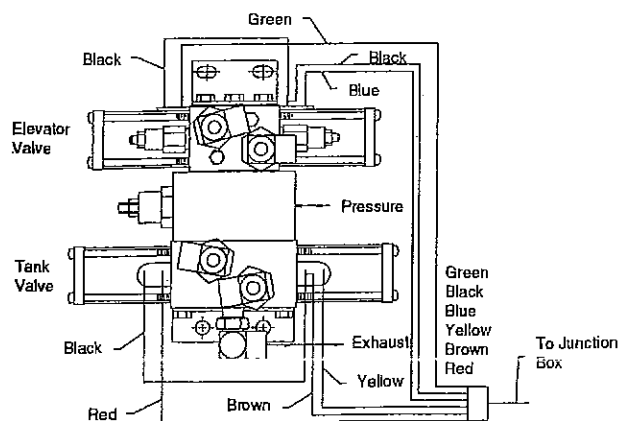


FIGURE 8 - VALVE ELECTRICAL CONNECTION

ADJUST ROW AND CARRIER WHEEL SPACING

Use Figure 9 to determine settings for lifter wheels. Make all measurements for setting lifter wheels from the centerline of the front of the machine to the pinch

point on the lifter wheels. Set all lifter wheels at exact row widths on either side of centerline.

After adjusting the lifter wheels, see Figure 9 to set the rear carrier wheels.

It is recommended that the left carrier wheel be set to run in the far left dug row. The right wheels may be set to run in a dug row (except for opening new lands or irrigated field). Steerable struts are usually set-up to straddle a row. Figure 9 shows the wheels straddling the row. If the wheel setting desired is different than Figure 9, subtract or add the appropriate half row space from the dimension given. Position the left carrier wheels first.

For harvesters equipped with a third carrier strut, it is recommended to raise the spindle support bracket one hole on the center strut. This is needed to prevent the harvester from pivoting on the center strut and affecting the lifter wheel penetration depth.

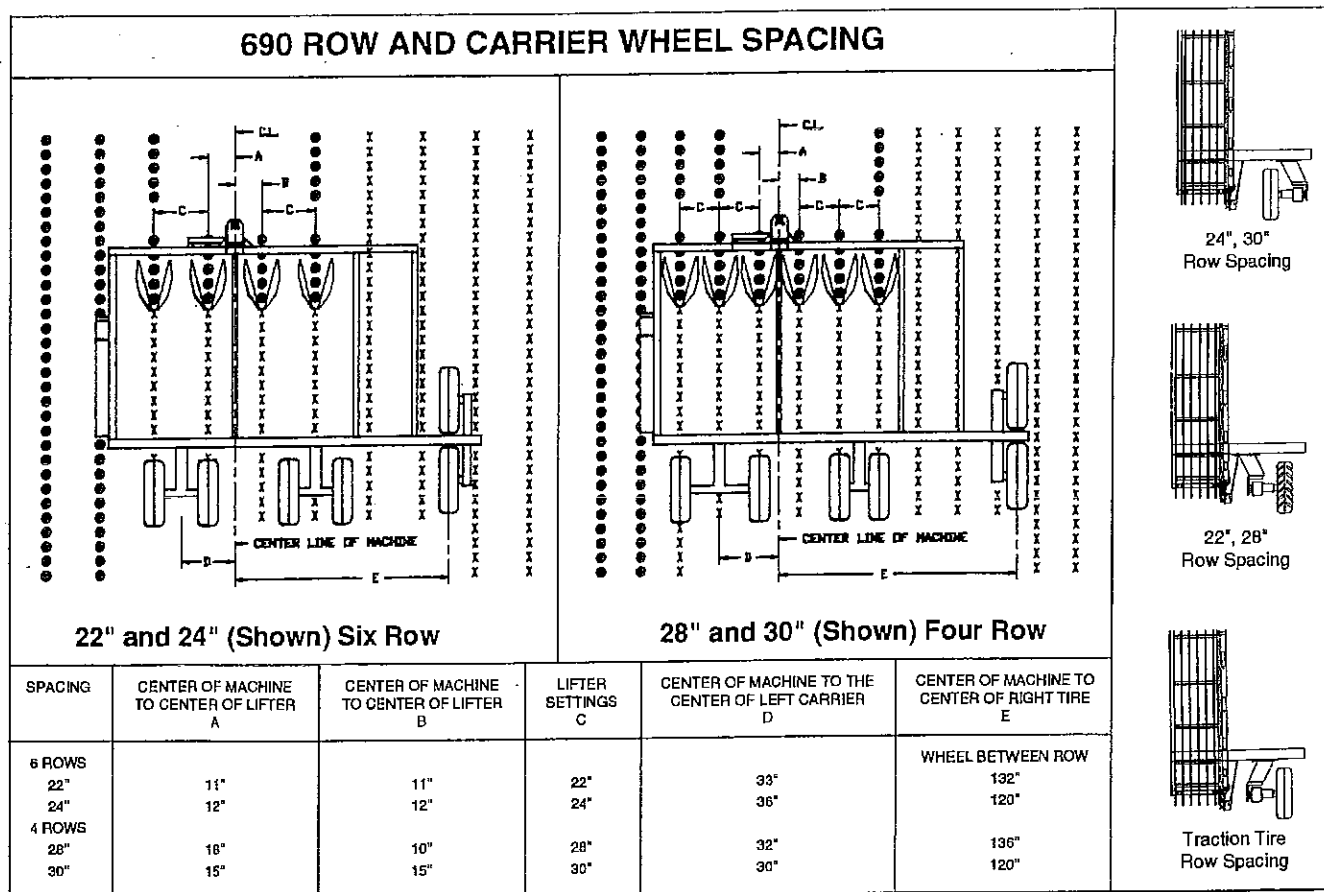


FIGURE 9 - ROW AND CARRIER WHEEL SPACING

PREPARING FOR FIELD OPERATION

STEERABLE CARRIER WHEELS

It is important that the harvester frame, in the digging position, run as level as possible, front to back and side to side. To adjust carrier wheels and steering mechanism see Figure 10:

1. Lift rear of harvester with a safe lifting device.
2. Remove steering tie rod (A) and steering cylinder (B) at one end.
3. Loosen the four (4) 1" x 8" bolts on each carrier strut (C), slide carrier struts to proper position and height for row spacing desired. Retighten bolts.

NOTE: On 22" and 24" row widths, the left carrier strut should be positioned over the second dug row from the left side of machine (when two carrier struts are used).

4. Set both carrier struts in straight ahead position (square to machine and parallel to each other).
5. Locate the steering cylinder bracket (D) in proper position on the left side of machine (on the center strut when a third carrier strut is used).

Be sure left carrier wheels are in straight ahead position (square to the machine). For a left turn, locate cylinder bracket (D) so that cylinder is fully retracted and pinned in hole 1. For a right turn, locate cylinder bracket (D) so that cylinder is fully extended and pinned in hole 2.

6. Install steering tie rod (A), adjust to proper length. To adjust length, remove screws from taper lock bushing (E) and loosen bushing. Slide tie rod to proper length. Replace screws in original position and tighten taper lock bushing (E). Install tie rod to steering arms.
7. To adjust right carrier wheels to run parallel to left wheels, loosen jam nuts (F) on both ends. Rotate center of tie rod until wheels are aligned. Tighten jam nuts.
8. For harvesters equipped with a third carrier strut, it is recommended to raise the center strut one mounting hole. This is needed to prevent the harvester from pivoting on the center strut and affecting the lifter wheel penetration depth.

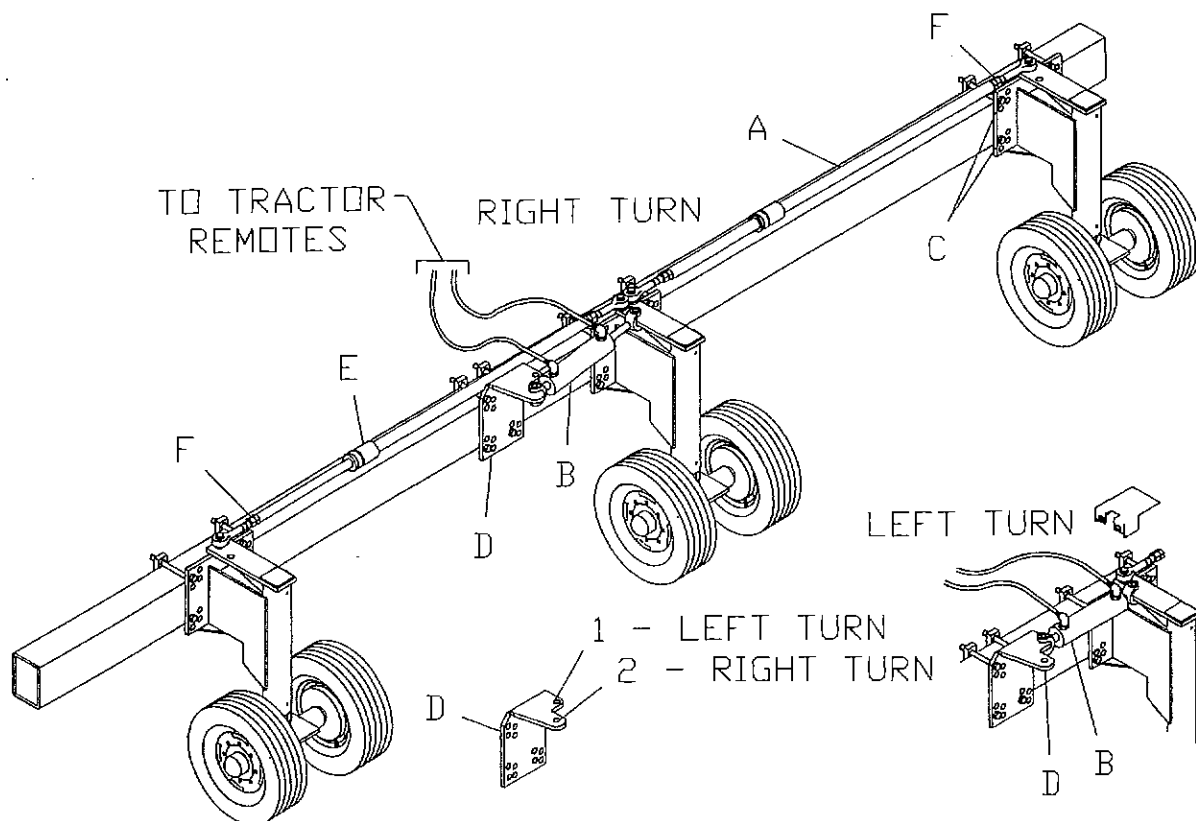


FIGURE 10 - STEERABLE CARRIER WHEELS

PREPARING FOR FIELD OPERATION

TEST RUN HARVESTER



CAUTION: Before test running harvester keep all children and bystanders away from the machine.

Run tractor at low RPM, slowly engage PTO. Check operation of machine at low RPM. Slowly increase RPMs to proper operating speed of 1000 RPM PTO.

Check operation, alignment and clearances of all moving parts. Make any necessary adjustments.



CAUTION: Keep well clear of moving parts. Be sure to shut off tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

Cycle tank and elevator drives and continue to run machine for 10 to 15 minutes. After running is complete, re-check machine for any loose hardware and re-check drives.

TRANSPORTING



CAUTION: Use of flashing warning lights and turn signals is recommended when towing this equipment on public roads unless prohibited by state or local regulations. An implement safety lighting kit is available from your Art's-Way dealer.

1. Tractor hitch *must be* securely installed.
2. Attach safety chain from tractor to tongue of harvester (see figure 2, page 8).



CAUTION: A safety chain will help control drawn equipment should it accidentally separate from the drawbar while transporting. Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

3. Know the transport height and width of your harvester. With truck elevator in retracted position, transport height is 14' and the width is 21' 6".
4. Turn hand wheel to move truck elevator to the **RETRACTED** position. The hinged elevator sides *must be down* to assure that elevator is completely retracted. Make sure to install hand wheel locking pin.
5. Harvester weighs approximately 7.5 tons *empty* and up to 12 tons when loaded. Transport empty, if possible.
6. Raise lifter wheels.
7. Never transport harvester faster than 20 mph.
8. Harvester is equipped with a SMV emblem, two (2) red reflectors mounted on rear and two (2) amber reflectors mounted on left side. Keep them clean and visible at all times.

FIELD OPERATIONS AND ADJUSTMENTS



CAUTION: Keep well clear of moving parts. Be sure to shut off tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

The 690 Beet Harvester is designed for simplicity and trouble free operation. Art's-Way Manufacturing Co., Inc. has provided a wide range of adjustments on this machine to allow the best operation in all operating conditions. It is essential that *all adjustments* be set for your operating conditions. Continual review during harvest must be done for optimum performance. When field or crop conditions change, re-check your harvesting operation and adjustments. The following explains the operation and adjustment of the machine. See your dealer if questions arise.

BASIC CONTROLS

Beets are diverted to the tank or truck by a hydraulic motor (A). The tank is unloaded by use of hydraulic motor (B) (see Figure 11) on the tank unloading chain.

To *load directly into the truck* activate the switch labeled elevator to the truck position, which will start the hydraulic motor (A) at the end of the truck elevator.

To *fill the holding tank* activate the switch labeled elevator to the tank position, which will start the hydraulic motor (A) at the end of the tank elevator.

NOTE: A built-in time delay has been incorporated to soft-shift the elevator chain.

To *empty the holding tank*, the motor at the end of the truck elevator (A) *must be* activated first to convey beets into the truck (beets may be recirculated back into tank to remove extreme mud, do not lift beets while recirculating) then activate the motor on tank conveyor (B). Beets are conveyed from the tank onto grab rolls where they go up the wheel elevator and into the truck. When tank is empty, turn off the tank conveyor switch.

The tank drive is capable of unloading to the left side of the tank for extra cleaning in muddy conditions.

OPERATING SPEED

Recommended ground speed is 4-1/2. Adjust speed to your conditions.

The 690 is equipped with a *constant velocity* PTO. It is *not* necessary to *shut off* the PTO for a '*normal*' turn. However, in tight turns shut off the PTO. Engage PTO only with tractor at low RPM and "run-up" to full RPM gradually.

Be sure tractor drawbar is set so that PTO driveline runs at the length specified (see Figure 2, page 8).

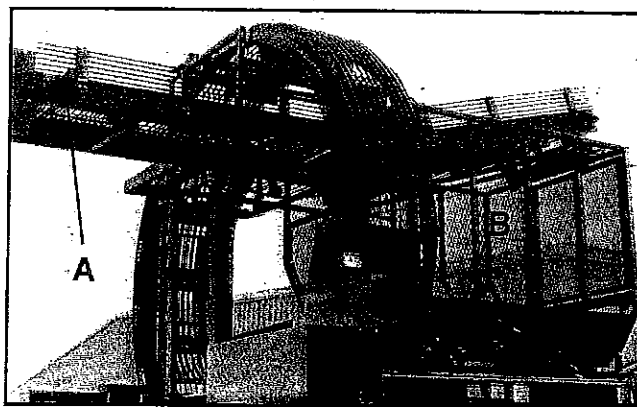


FIGURE 11 - BASIC CONTROLS

MACHINE LEVELING

It is important that the harvester frame, in the digging position, runs as level as possible, front to back and side to side (see Figure 12) while in the digging position.

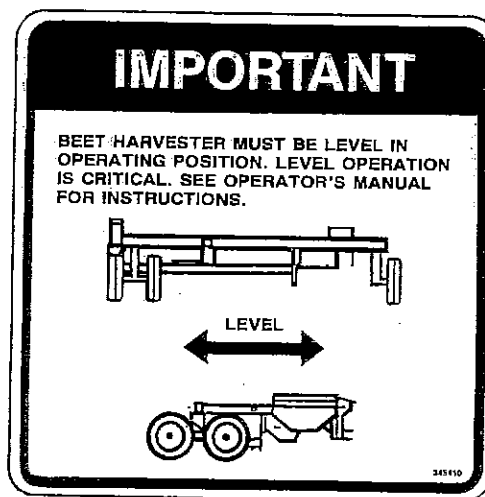


FIGURE 12 - MACHINE LEVELING

FIELD OPERATIONS AND ADJUSTMENTS

For harvesters equipped with a third carrier strut, it is recommended to raise the spindle support bracket one hole on the center strut. This is needed to prevent the harvester from pivoting on the center strut and affecting the lifter wheel penetration depth.

To level machine on left side, move spindle support bracket (A) (see Figure 13) up or down on oscillating struts. To level machine on right side, use 3/4" spacers (B) provided to raise or lower machine as required (see Figure 14).

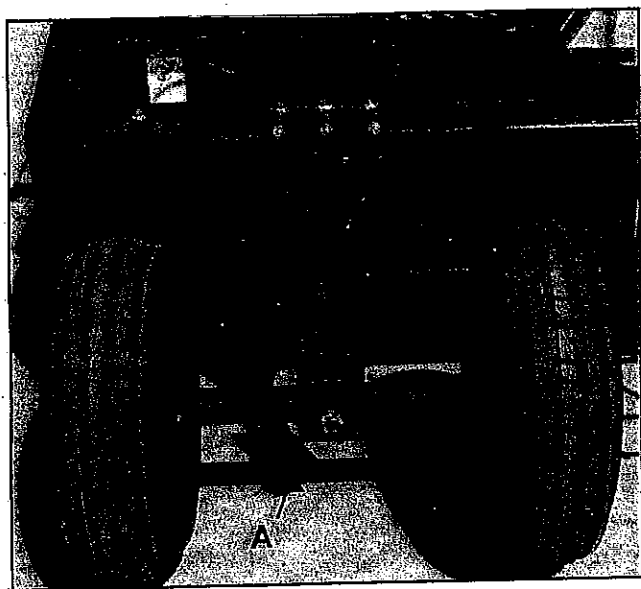


FIGURE 13 - OSCILLATING CARRIER WHEEL

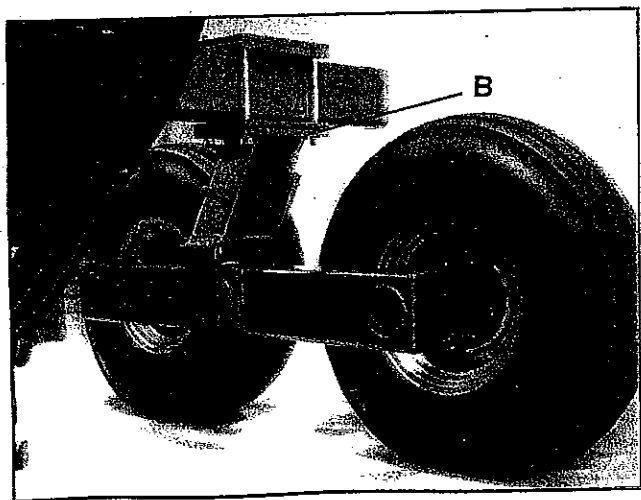


FIGURE 14 - WALKING BEAM CARRIER WHEELS

Set the front hitch of harvester (see Figure 15) so maximum lift for transport is maintained and still allows lowering into ground as far as necessary. Move the bolt-on hitch (A) to best position.

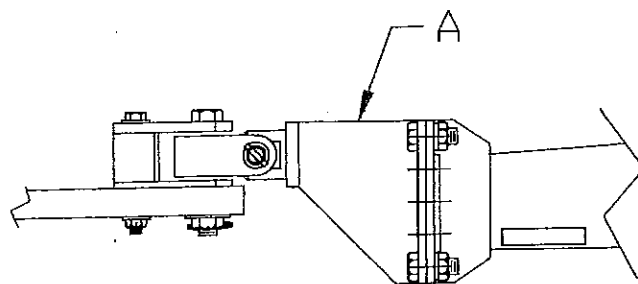


FIGURE 15 - FRONT HITCH ADJUSTMENT

For steerable wheel adjustment, move entire strut up or down as required (see Figure 10, page 11 for instructions).

LIFTER WHEEL SPACING

Make sure lifter wheels are located at proper row widths, *measured at pinch point*, to prevent slicing of beets and breaking tails of beets.

To adjust lifter wheel row widths (see Figure 16), loosen strut mounting bolts (A), paddle bolts (B), and the bolts holding the barriers (C). Slide all to proper row spacing (see Figure 9, page 10 for dimensions). Tighten all bolts equally. Be sure all bolts are torqued correctly (see torque guide on page 47).

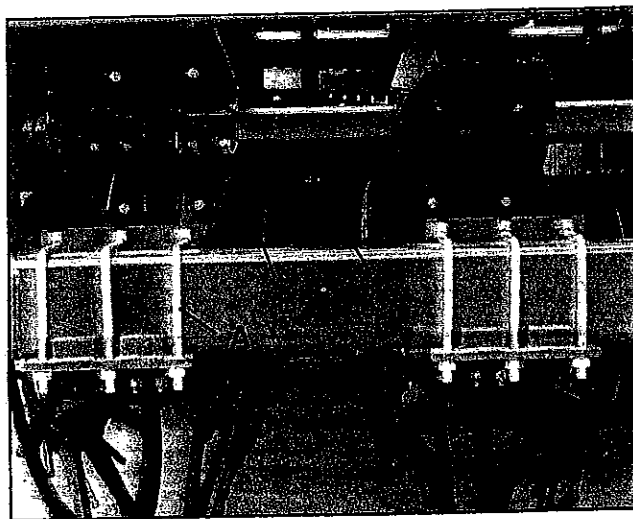


FIGURE 16 - LIFTER WHEEL SPACING

PINCH POINT

The lifter wheels may be moved out for larger beets, or in for smaller beets and soil conditions, by inserting or removing spacers between the lifter wheel and hub (see Figure 17, page 15). Extra spacers are available from your Art's-Way dealer.

FIELD OPERATIONS AND ADJUSTMENTS



FIGURE 17 - LIFTER WHEEL WIDTH

OPERATING DEPTH

Lifter wheels should be set to dig approximately 2" to 3-1/2" deep. Set lifter wheels to run as shallow as possible to prevent lifting excessive amounts of dirt and to reduce power requirements. Extremely hard ground may require going deeper to prevent breaking tails of the beets. Set a stop on the lift cylinder to help maintain proper digging depth.

PROCEDURE FOR FINDING CORRECT DEPTH

1. Be sure harvester is not digging across guess rows between planter rounds.
2. Begin digging as deep as necessary to keep from breaking beet tails.
3. Raise lifter wheels gradually until beet tail breakage occurs.
4. Lower lifter wheels about 1/4".
5. Set lift cylinder stop to maintain this depth.

FLOTATION OF LIFT CYLINDER

In rocky conditions, it is strongly recommended that the lift cylinder be allowed to float in the running position. To do this, the cylinder depth must be set with stops. If your tractor has a valve with float position, connect lift cylinder to this circuit and make sure control lever is in float position when the harvester is in the ground. If your tractor does not have a float valve,

a single hose must be plumbed to the lift side of the lift cylinder and the other side of the cylinder equipped with a breather to allow air to enter and escape. Consult your Art's-Way dealer for the best method to accomplish this.

IMPORTANT

ROWFINDER ADJUSTMENT IS CRITICAL. SEE OWNER'S MANUAL FOR ADJUSTMENT.

- 1) FEELER ARMS SUPPORT SHAFT (A) SHOULD BE PARALLEL TO HARVESTER FRAME (B) BY ADJUSTING PLATE (C).
- 2) REMOVE CLEVIS PIN (D) AND ADJUST HEX SO CLEVIS PIN INSTALLS FREELY WITH VALVE IN CENTERED POSITION.
- 3) SET DEPTH AND SPACING OF FEELER ARMS ACCORDING TO FIELD CONDITIONS.
- 4) LOOSEN BOLTS (E) AND ALIGN FEELER ARMS TO CENTERLINE OF THE LIFTER WHEELS.

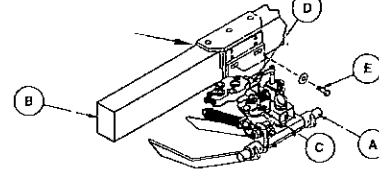


FIGURE 18 - ROW FINDER ADJUSTMENT

ROW FINDER OPERATION

The optional row finder helps keep your harvester on the rows. The feeler arms (A) (see Figure 19, page 16) rest astride the row (B) and follow the line of beets - sensing any change in the direction of the row or the position of the harvester. Sideward movement of a feeler arm actuates the hydraulic valve (C), which controls oil flow to the beet harvester steering cylinder.

The steering cylinder extends or retracts as determined by the action of the feeler arms - steering the harvester back onto the row. A manually controlled hydraulic override function allows the operator to steer the harvester - which is particularly helpful when entering rows.

Be sure row finder hoses are connected properly. To check, lift the front of machine, engage hydraulic circuit.



CAUTION: Keep clear of machine as it shifts sideways. Move row finder arms from side to side. Harvester should move in the same direction as the tip of the arms.

FIELD OPERATIONS AND ADJUSTMENTS

The row finder is adjustable to beet size, bed height, operating depth and soil conditions. Correct adjustment of the row finder and a good understanding of the importance of each adjustment will provide maximum satisfaction during field operation.

Beets *must be* harvested in the same multiple as they were planted.

Make the following adjustments as necessary to meet crop and field conditions before taking the machine to the field.

NOTE: Be sure to raise harvester when backing up so row finder is not damaged.

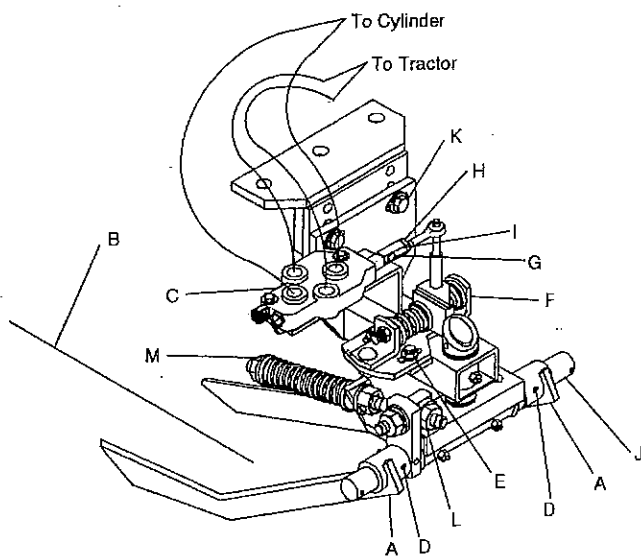


FIGURE 19 - ROW FINDER

1. FEELER ARM SPACING (See Figure 19)

The arms should be set so the largest beets will just pass through the opening, between the tips of the arms, without touching either arm. To adjust arms, remove spring pins (D), set both arms the same distance from center line of row for desired width setting, then reinstall spring pins.

2. FEELER ARM CENTERING (See Figure 19)

The horizontal shaft (J) in row finder must be parallel with the front of the harvester frame to function accurately. Remove pin (G) and loosen nuts (E), slide plate (F) until shaft is parallel with frame. Tighten nuts.

The hydraulic control valve must be centered each time the shaft is adjusted. Loosen nut (H), adjust nut

(I) until pin (G) can be inserted freely through nut (I) and valve spool. Tighten the lock nut (H) and check to be sure the link pin is still free.

The feeler arms must be centered with the gap between the lifter wheels to function accurately. Do this by loosening bolts (K) and sliding the entire assembly in the mounting slots until centered. Tighten bolts.

3. ROW FINDER HEIGHT (See Figure 19)

Set row finder height in correct relationship to the lifter wheel working depth to assure proper function.

Example: If lifter wheels will work at a depth of 3", the bottom edges of the feeler arms should be about 3" above the rims of the lifter wheels.

The feeler arms should ride along the surface of the ground or just slightly penetrating the surface.

To change the height of the row finder more than 1", remove the four (4) bolts (K) attaching the row finder frame to the support plate. Bolt the row finder to the holes which provide the desired operating height. Tighten bolts.

NOTE: For less than 1" height adjustments, raise or lower the feeler arm by adjusting nut (L).

4. FEELER ARM DOWN PRESSURE (See Figure 19)

The down pressure of the row finder is factory set. If beet crowns are *below* ground surface, add down pressure so row finder arms penetrate the soil. To increase down pressure, turn lock nut (M) to compress spring.

5. STEERING CYLINDER (See Figure 19)

The row finder controls the operation of the steering cylinder, unless overridden with the tractor control lever.

The harvester can be operated without a steering cylinder or row finder if a screw jack or stiff member is used to hold the hitch rigid.

The main frame attaching bracket of the steering cylinder can be moved left or right to enable use of the full stroke of the cylinder, if the tongue has to be offset for 28" rows.

FIELD OPERATIONS AND ADJUSTMENTS

To do this - set the cylinder in the center of its stroke, loosen the U-bolts on the bracket, then move the tongue to the desired offset and re-tighten the U-bolts.

FLEX STRUTS

In rocky conditions, flex lifter wheel struts are recommended. The struts are mounted with flex cushions which help absorb the shock loads when large rocks are hit, allowing the strut to roll up over the rock. The lifter wheels are also protected by cushions that allow the wheels to open up when a rock is wedged into the pinch point. Set the flex strut cushions at 2-7/8", including a washer on the longer cushions and at 1-1/8", including both washers on the shorter cushions. Set the lifter wheel cushions at 1" including the washer (see Figure 20).

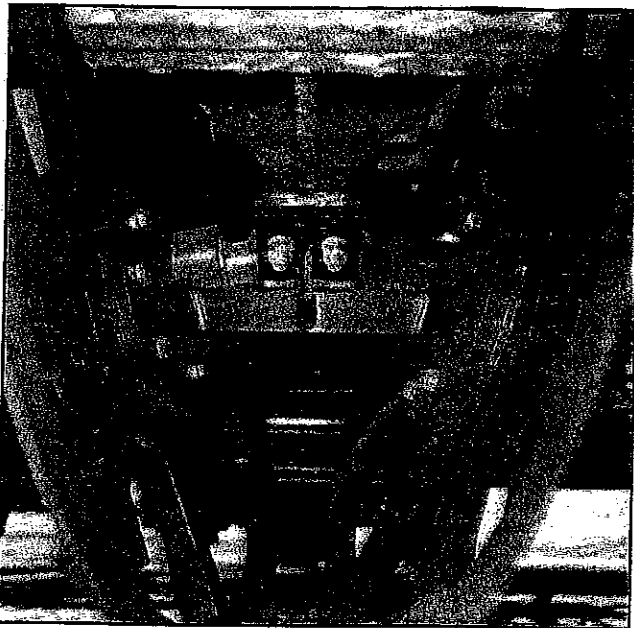


FIGURE 20 - FLEX LIFTER WHEEL STRUTS

SCRAPERS

Wheel scrapers keep dirt and trash from building up on the lifter wheel hubs (see Figure 20).

Check scrapers frequently and clean off accumulated mud and trash.

PADDLE SHAFT SLIP CLUTCH

Prior to each seasons use, it is recommended to loosen the slip clutches - allow them to slip - then tension springs to proper setting.

The paddle shaft is protected by a slip clutch (A) (see Figure 21). The four (4) springs (B) set the tension of this clutch. The setting recommended is 2-3/8" actual length of springs. Be sure all four springs are the same length. *Keep jaws free of grease.*

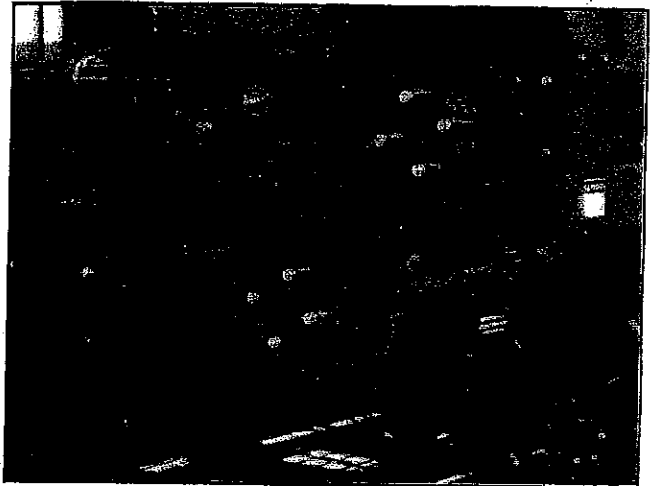


FIGURE 21 - RIGHT HAND DRIVES
(Shield removed for clarity)

PADDLE SHAFT PADDLES AND BARRIERS

The rubber paddles may be removed if desired (except on flex struts). If removed, lower paddle shaft to lower set of bearing holes to keep paddle tips in their correct relationship.

Adjust the split paddles outward to just clear lifter wheels when machine is running. In this position, the paddles help keep the lifter wheels clean.

In rocky conditions, some space must be left to prevent rocks from wedging.

Be sure paddles are spiraled around the paddle shaft so adjacent paddles contact beets at 90° intervals. This avoids excessive shock loads to the paddle shaft and drives.

When flex lifter wheel struts are used, the paddle shaft bearings must stay in the *top* holes and rubber paddles (B) (see Figure 22, page 18) are attached to the steel paddles. With the paddle shaft in the top holes, the lifter wheel struts can flex without hitting the paddle shaft. The rubber paddles are added to bring the active tips of the paddles to the desired positions.

To adjust barriers (see Figure 22, page 18), loosen bolts (A), center barriers between lifter wheels, tighten bolts.

FIELD OPERATIONS AND ADJUSTMENTS

The rubber flaps (C) above the paddles should be centered on the paddle clusters (D) and should be routed over the round tube to be effective.

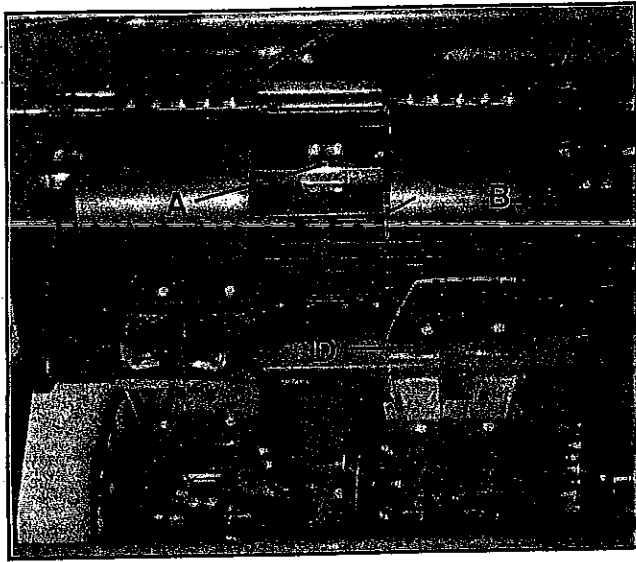


FIGURE 22 - BARRIER ADJUSTMENT
(Shield removed for clarity)

CLOSE-UPS ATTACHMENTS

Optional wheel close-ups (A) are available to prevent small beets from falling out between the lifter wheel spokes. Slots are provided in close-ups to allow rotating them out of the way when conditions warrant (see Figure 23).

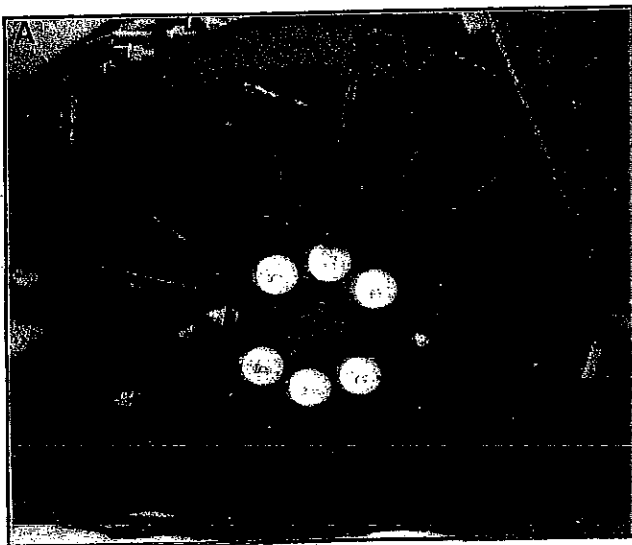


FIGURE 23 - CLOSE-UPS

ROCK CUSHIONS - ATTACHMENTS

Optional cushions (B) (see Figure 23) are available (standard on flex struts) that allow the lifter wheels to spread apart when rocks are pinched between the wheels. The cushions are recommended where many small (baseball size) rocks are in the field. If large rocks are also present, the addition of flex struts is recommended.

BED DRAPER CHAIN

The bed draper chain (see Figure 24) is tensioned by loosening two pillow block bearings (A) immediately behind outside lifter wheels. Adjust both sides equally with take-up bolt (B), so the draper chain sags approximately 1". Make certain tension is equal on right and left hand sides. If end of adjustment is reached, loosen draper chain and remove a link.

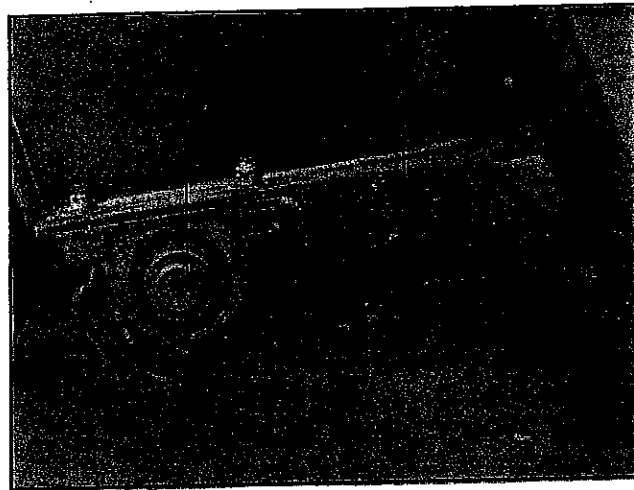


FIGURE 24 - BED DRAPER CHAIN

The bed chain drive, #60H roller chain (see Figure 25, page 19), is protected with a friction clutch (A). The clutch is set by tightening all of the bolts snug and loosening each bolt two revolutions. Readjust as necessary by turning each bolt in 1/4 turn increments until bed chain will carry the load.

NOTE: All bolts must be adjusted to the same setting.

NOTE: Rust and weather can cause clutches to stick between harvest seasons. Prior to harvest, release all spring tension and allow clutch to slip. Readjust as directed above.

FIELD OPERATIONS AND ADJUSTMENTS

GRAB ROLL DRIVE BELTS

The primary grab roll belt drive (B) and final grab roll belt drive (C) (see Figure 25) are tensioned by spring loaded idlers. These should be tightened so springs (D) are compressed to 5-1/4" for primary and 4-1/2" for final drive. These must be further tensioned if any belt slippage occurs.

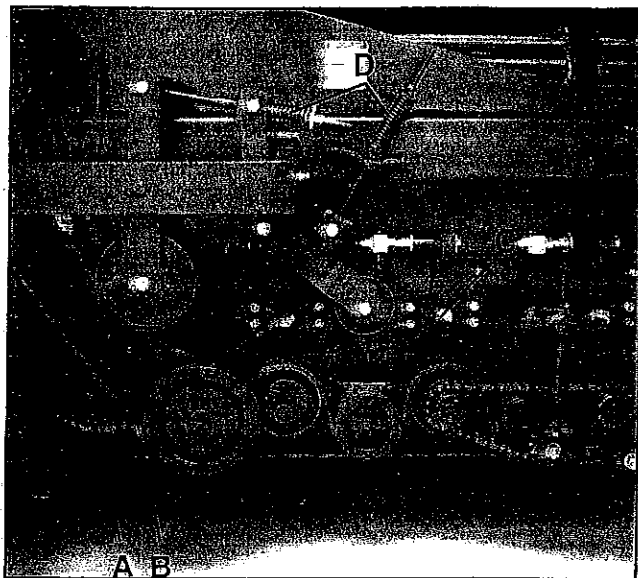


FIGURE 25 - LEFT HAND DRIVES
(Shield removed for clarity)

GRAB ROLL SPACING

The grab rolls are designed to move the beets to the elevator and to provide additional cleaning.

The grab rolls at the drive end can be set in two positions.

1. #4 (smooth) grab roll in a raised position, which results in a more aggressive cleaning action. (depending on soil type.)
2. #4 (smooth) grab roll in a lowered position, which results in a less aggressive cleaning action. (depending on soil type.)

The machine is set up in the aggressive configuration. A lowered position belt is available for changing the configuration if field conditions require.

Protection against rock damage to the grab rolls is provided by flex cushioned arms (see Figures 26 & 27) on the drive and discharge ends, allowing the grab rolls to

move when rocks enter the grab roll bed. Set flex cushion at 2-3/4" including washer on drive end. Set flex cushion at 2-13/16" including washer on discharge end.

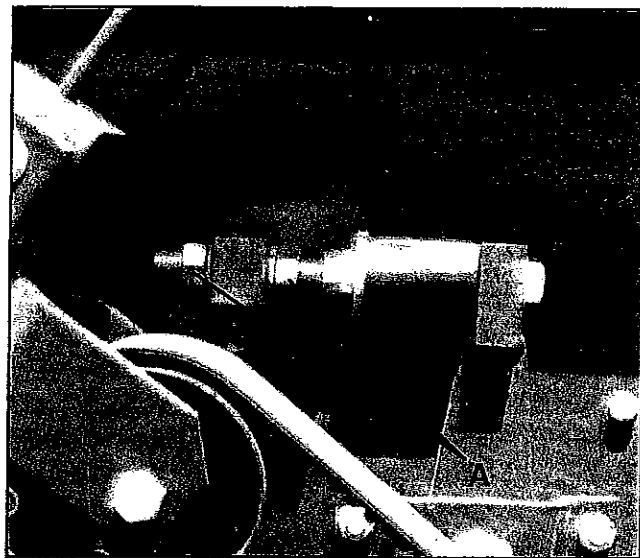


FIGURE 26 - DRIVE END ADJUSTMENT
(Shield removed for clarity)

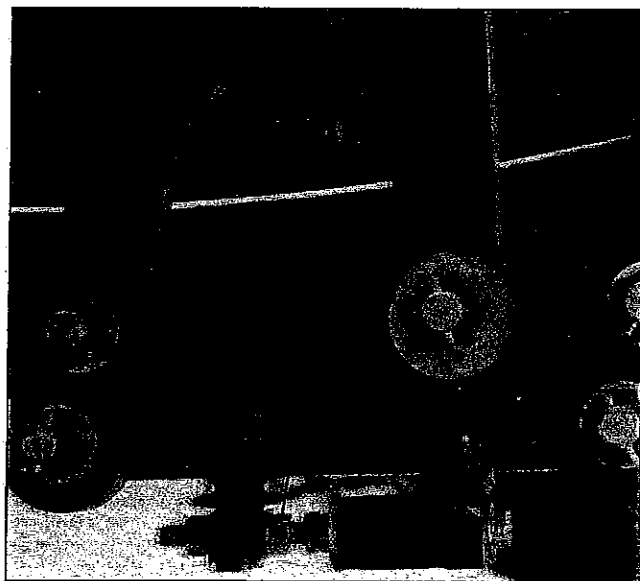


FIGURE 27 - DISCHARGE END ADJUSTMENT

1" grab roll arm bolts should be checked occasionally for tightness, torque to 760 ft-lb.

Grab roll pairs should normally be spaced so that they nearly touch on drive end and are a 1/4" wider, up to maximum distance (for large beets) apart on the discharge end.

FIELD OPERATIONS AND ADJUSTMENTS

IMPORTANT: Do not run rolls narrower at discharge end than at drive end, excessive power will be required. Beet damage will occur.

When additional cleaning action is required in heavy and/or muddy-soil conditions or in extremely heavy trash, increase space between grab rolls at the drive and discharge end.

NOTE: Always maintain at least 1/4" more gap at the discharge end.

To maximize cleaning and reduce loss, increase spacing for larger beets and reduce spacing for small beets. To adjust loosen nuts (A) (see Figures 26 & 27, page 19) on adjusting bolt and adjust grab roll to desired spacing. Retighten nuts. Do not space too wide, beets could pull through grab rolls.

An additional flap is installed to help hold the beets on the grab rolls longer for more cleaning.

HOLDING TANK CONVEYOR DRAPER CHAIN

To adjust draper chain in tank conveyor (see Figure 28), loosen bracket bolts (A). Using take-up bolts (B), tension both sides equally so draper chain just clears guides under tank. Reinstall and tighten bolts. If discharging out left side of tank check tension frequently.



FIGURE 28 - TANK CHAIN TENSIONING

TANK CONVEYOR DRIVE

Adjust chain tension with idler sprocket (see Figure 29).

In muddy conditions, the tank drive is capable of unloading to the left side of the harvester. Be sure the draper chain is tensioned correctly to prevent sagging when tank is loaded.

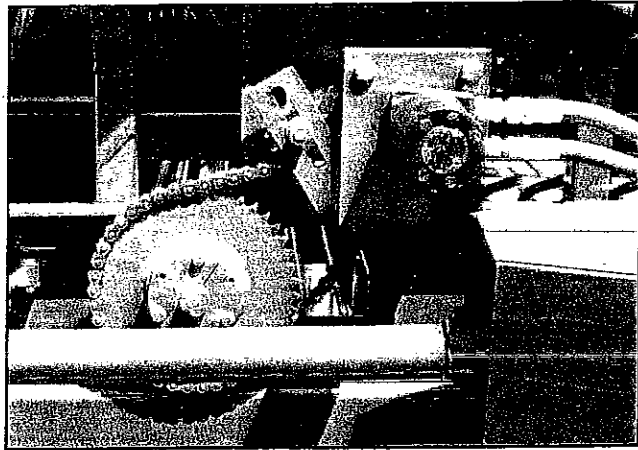


FIGURE 29 - TANK CONVEYOR DRIVE
(Shield removed for clarity)

HOLDING TANK GATE

A sliding gate (A) is provided in the tank discharge opening. This can be raised or lowered to vary the beet discharge rate from the tank for various beet sizes and operating conditions (see Figure 30).

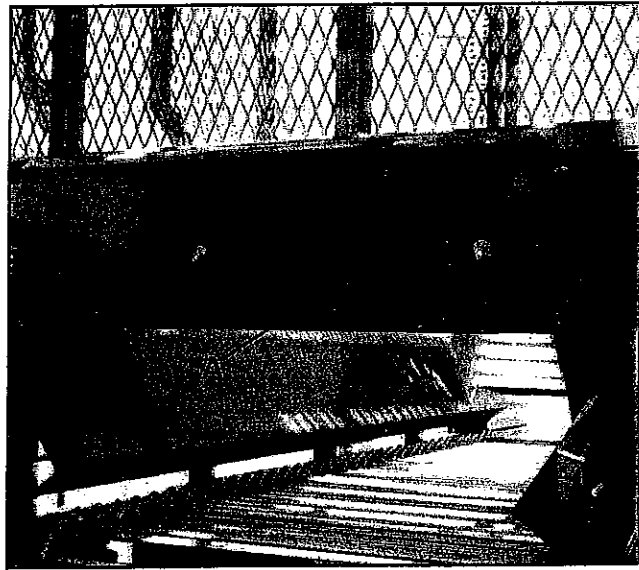


FIGURE 30 - TANK DISCHARGE GATE

HOLDING TANK DOOR

An access door (A) (see Figure 31, page 21) is provided in the holding tank. This door is opened by loosening latches (B) and moving them outward to release door.

FIELD OPERATIONS AND ADJUSTMENTS



FIGURE 31 - ACCESS DOOR IN HOLDING TANK



WARNING: Keep clear of door when latches are moved. Beets inside a loaded tank will forcefully push the door open.

WHEEL ELEVATOR DRIVE SLIP CLUTCH

Prior to each seasons use, it is recommended to loosen the slip clutch - allow it to slip - then tension springs to proper setting.

The wheel elevator is protected by a slip clutch (C) (see Figure 21, page 17). The four (4) springs (D) set the tension of this clutch. The setting recommended is 2-3/8" actual length of springs. Be sure all four (4) springs are the same length. *Keep jaws free of grease.*

WHEEL ELEVATOR

The wheel elevator (A) (see Figure 32) revolves at approximately 11 rpm at 1000 PTO rpm. The beets are carried up to the truck elevator as the wheel revolves in the direction of travel. The retainer (B) holds the beets in the wheel until they get to the top and fall into the truck elevator. The stripper (see Figure 34, page 22) keeps trash and wet soil from building up between rods. Optional rubber mud flaps can be installed to keep stones from wedging and reduce chances of soil build-up.

The wheel elevator must turn easily and the chain tension must be adjusted properly. The retainer must be

adjusted properly for minimum beet loss and the stripper rods must be centered to clear the wheel rods.

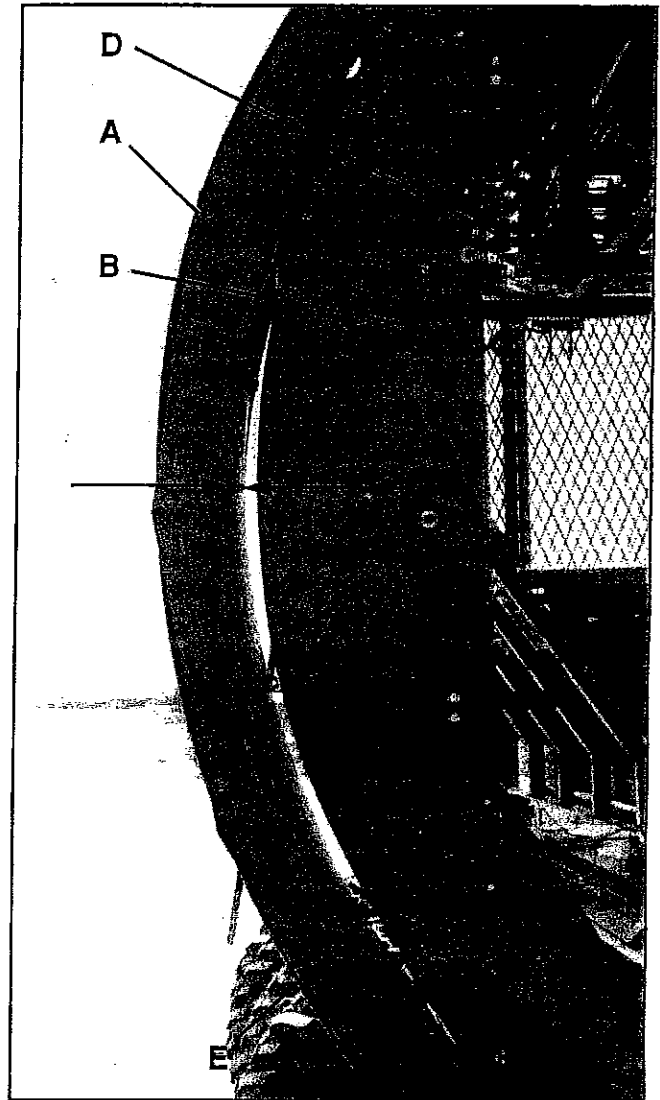


FIGURE 32 - WHEEL ELEVATOR

WHEEL ELEVATOR DRIVE - TIGHTENING CHAIN

Loosen jam nut (A) (see Figure 33, page 22) and turn adjusting nut (B). Check this adjustment by pulling the chain *away from* the rear of the wheel elevator. A distance between 1/2" and 1-1/2" indicates proper chain tension (see arrows, Figure 32).

IMPORTANT: Do not tighten the chain too tight or friction will drive the elevator; then the chain will not feed into the slot properly. Do not remove links to tighten. Replace chain if tightener sprocket cannot sufficiently tighten chain.

FIELD OPERATIONS AND ADJUSTMENTS

Set dampener spring length to 6-3/4" by loosening jam nut (C) (see Figure 33) and turning adjusting nut (D).

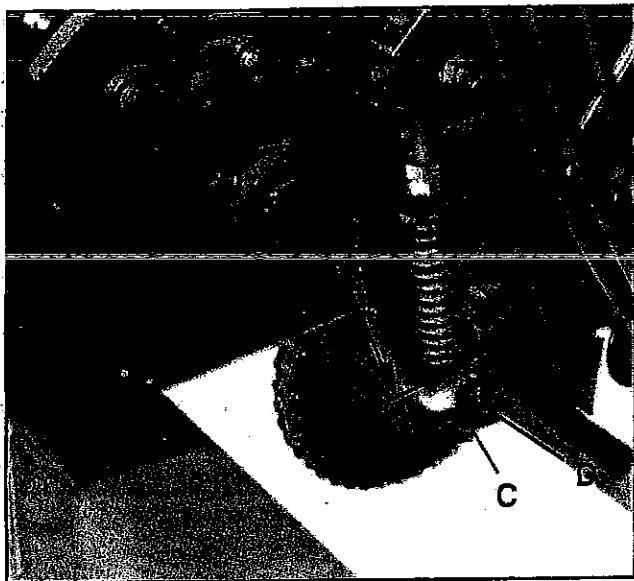


FIGURE 33 - WHEEL ELEVATOR DRIVE
(Shield removed for clarity)

ADJUSTING WHEEL ELEVATOR - ALIGNMENT

Operate the elevator until the chain connector link is positioned near the drive shaft for easy removal. Loosen jam nut (A) and turn adjusting nut (B) until maximum chain slack is obtained, then disconnect chain (see Figure 33).

Lay one end of the chain over the other and wire them together so the wheel can be manually turned.

Turn the wheel and check the idlers for rotation. If they do not turn or are not aligned with the wheel, replace them or use washers to align them. Also check the chain tightener sprocket for alignment with the chain. Use washers if necessary at the forward end of the tightener sprocket pivot arm (where the grease fitting is located).

The wheel is guided by four (4) rollers at the top of its travel and one (1) roller mounted on the frame. The one (1) left-hand rear roller is not adjustable. The other two (2) left-hand rollers are adjustable, all must be free to revolve. The two (2) right-hand rollers are adjustable and also *must be* free to revolve. Replace them or free them so they revolve.

Then loosen and slide the right-hand rollers away from the wheel. Turn the wheel through one or two revolu-

tions. Position the rollers closer to the wheel so they clear the drive band by 1/8" at its closest point.

STRIPPER

The stripper is an adjustable device fitted with several replaceable coil spring tines which help to keep the elevator clear of trash and soil build-up. The stripper rods (A) (see Figure 34) must be centered between the wheel elevator rods so they do not make continuous contact. Adjust rod tips at an angle where they do not interfere with the cross tube weldments, but still help deflect the beets downward into the truck conveyor.

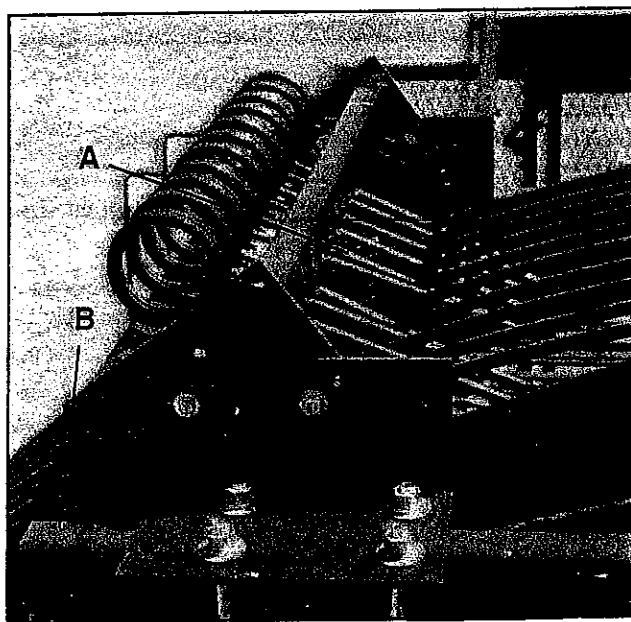


FIGURE 34 - STRIPPER/STRIPPER ADJUSTMENT

ALIGNMENT

Turn the wheel elevator through one or two complete revolutions and slide stripper supports (B) (see Figure 34) right or left to eliminate interference.

Bend the wheel elevator rods, if necessary, *only after* adjusting stripper support. Pay particular attention to the wheel elevator joints.

WHEEL ELEVATOR FLAP

Optional rubber flaps can be installed on each cross tube inside the wheel elevator. Rubber flaps help reduce soil build up and keep stones from wedging in the pocket area.

FIELD OPERATIONS AND ADJUSTMENTS

RETAINER

The retainer and rods keep the beets from falling out of the wheel elevator on the way up. The retainer frame must be centered right-and-left and front to back with the wheel elevator. The distance between the retainer and the wheel elevator must be the same at the top (D) (see Figure 32, page 21) as it is at the bottom (E) (see Figure 32, page 21). Make this adjustment at the top attaching point. Make sure the retainer does not make contact with the truck elevator.

The retainer rod assembly is able to give, so larger beets don't get damaged. Field adjustment is dependent on beet size and tonnage. The spring adjusting nuts (A and B) (see Figure 35) are used to adjust the spring tension. Loosening the stop nuts will decrease the tension.

An additional set of holes (C) (see Figure 35) are provided for the spring bracket, if required for big beets.

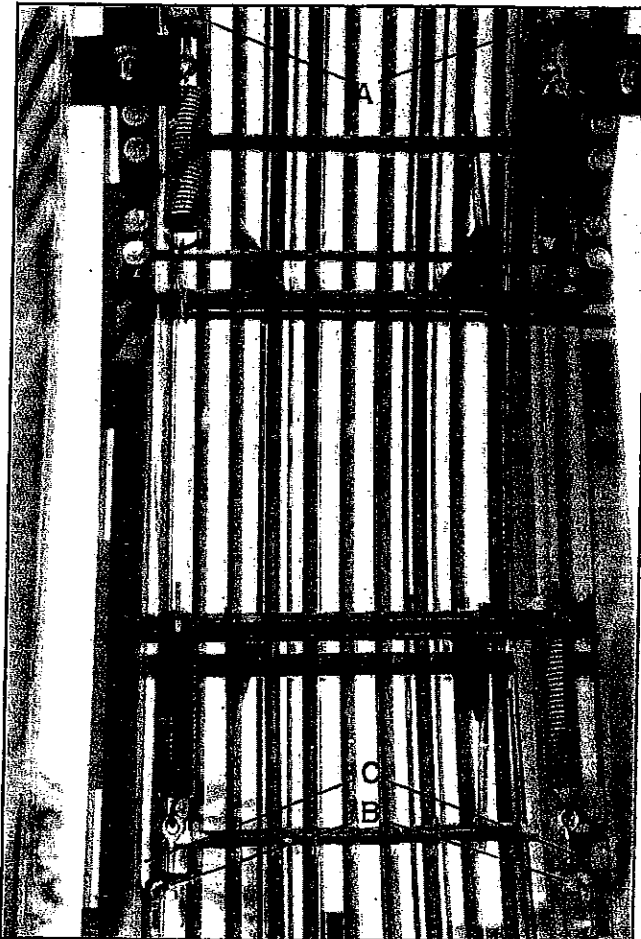


FIGURE 35 - RETAINER

TRUCK ELEVATOR

The truck elevator moves beets to the truck or tank by using an electro-hydraulic valve and hydraulic motor. The direction is changed by operating the electric switch on the control box in the tractor.

NOTE: A time delay has been incorporated to soft-shift the elevator chain.

The elevator has two locations to adjust the height for various truck side heights. The elevator also has two positions for row spacing and truck location. For adjustments see pages 31 & 32, elevator assembly.

The belted chain tension is adjusted by loosening nuts (B) then loosening nuts (A). Turn outer nut (A) counterclockwise to increase tension, or clockwise to decrease tension. Tighten nuts (see Figure 36). The belt should be 1" to 2" above the 5" support roller near the bolted joint of the conveyor when empty.

IMPORTANT: Keep chain tension equal on both sides of conveyor so chain will run straight and wear uniform.

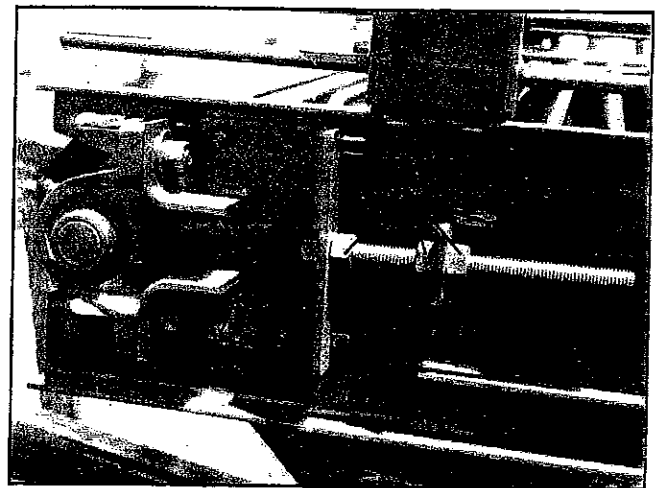


FIGURE 36 - BELTED CHAIN TENSIONING

TRUCK ELEVATOR POSITIONING CHAIN

Loosen lock nut (A) (see Figure 37, page 24), idler bolt (B) and turn adjusting nut (C) clockwise to increase chain tension. Adjust both chains equally so the elevator moves in and out easily. Tighten both nuts.

NOTE: Over tightening the positioning chains will make the elevator hard to move in and out.

FIELD OPERATIONS AND ADJUSTMENTS

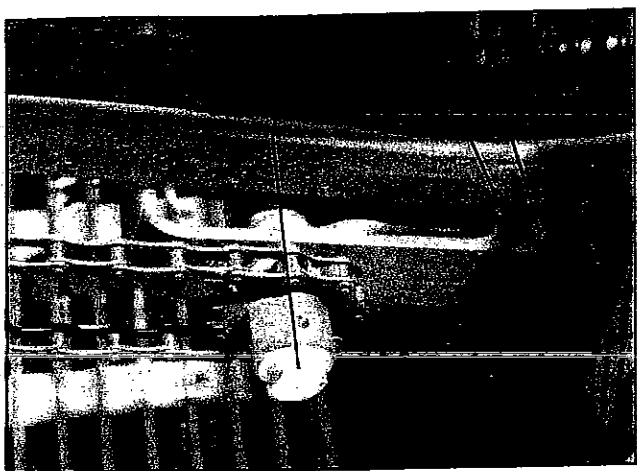


FIGURE 37 - POSITIONING CHAIN TENSIONING

The hand wheel (A) (see Figure 38) moves the truck elevator out for field operation or in for transport. The locking pin (B), when installed, prevents the conveyor from moving unintentionally. Clear 2" x 2" tracks of trash and other build-up before retracting truck elevator.

Turn the adjusting nut (C) clockwise to tighten the drive chain.



FIGURE 38 - HAND WHEEL ADJUSTING

ROLLER CHAIN DRIVES

Roller chain drives are tensioned by moving idler sprockets in slots. Check roller chains frequently and tension so approximately 20 lbs. force deflects chain 1/2" to 1".

Also, frequently check sprocket alignment. If more wear appears on one side of a sprocket realign sprockets.

TIRE PRESSURE

Frequently check tire pressures. Equal pressure should be maintained in all tires. Figure 39 lists recommended pressure for tires used on 690 Beet Harvester.

11.00-16 - 12 PLY	- 45 PSI RECOMMENDED - 50 PSI MAXIMUM
13.50X16.1 - 6 PLY	- 25 PSI RECOMMENDED - 30 PSI MAXIMUM

FIGURE 39 - TIRE PRESSURE

MOUNTING TIRES



CAUTION: Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death. Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Have it done by your dealer or a qualified tire repair service.

When seating tire beads on rims, never exceed 36 psi or maximum inflation pressures specified by tire manufacturers for mounting tires. Inflation beyond this maximum pressure may break the bead, or even the rim, with dangerous explosive force. If both beads are not seated when the maximum recommended pressure is reached, deflate, reposition tire, relubricate bead, and reinflate.

Detailed agricultural tire mounting instructions, including necessary safety precautions, are also available from the Rubber Manufacturers Association and from tire manufacturers.

FIELD OPERATIONS AND ADJUSTMENTS

TIGHTENING WHEEL BEARINGS

Raise wheel and remove the hub cap (see arrow in Figure 40). Remove the cotter pin from the castle nut and tighten until there is a slight drag on the bearing, while turning the wheel; then back off the nut one slot, insert and spread cotter pin. There should be a slight drag on the bearing following the adjustment. Replace hub cap.

LUG NUTS

Tighten all lug nuts to 130 ft-lbs (175N m).

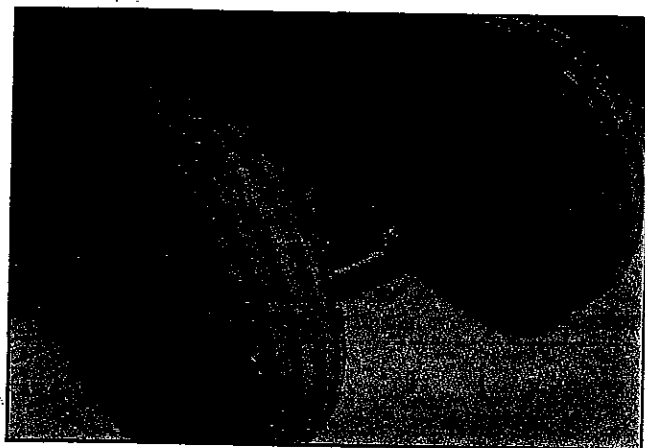


FIGURE 40 - CARRIER WHEEL BEARINGS

LUBRICATION

Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant. Failure to lubricate results in reduced efficiency, premature wear and breakdown and needless and costly replacement of parts.



CAUTION: Disengage drive, shut off tractor and place key in pocket before lubricating the machine.

LUBRICATE ACCORDING TO THE FOLLOWING SCHEDULE:

EVERY 10 HOURS, One, two or three pumps for B - G
(Letters correspond with illustration below)

- A. CV PTO - CV Portion requires 20-30 pumps each time it is greased
- B. PTO U-joints & slip tube (zerk exposed at 68").
- C. Row finder.
- D. Swivel pins for lift & steering hydraulic cylinders.
- E. Tongue pivot tube and hitch bolt.
- F. Belt tightener pivots.
- G. U-joints on gearbox drive shafts.

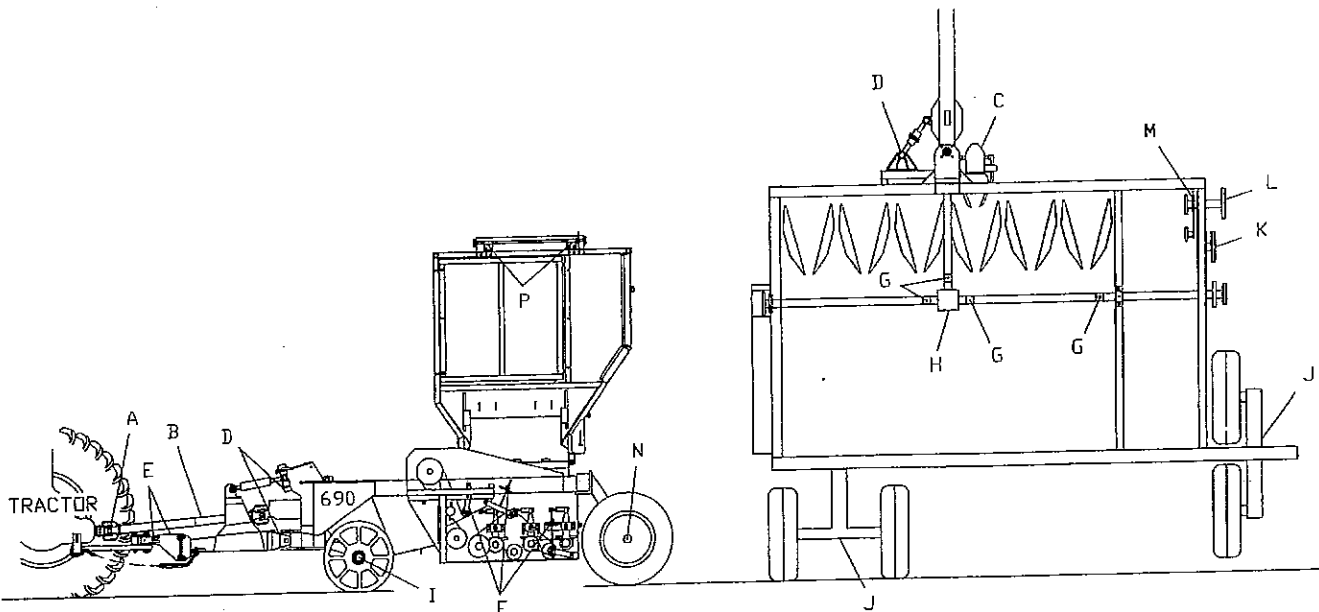
EVERY 50 HOURS

- H. Gearbox. Fill to check plug with SAE 90W gear oil.
- I. Lifter wheel hubs - grease through zerk.
- J. Oscillating and walking beam wheels pivot.
- K. Paddle shaft slip clutch.
- L. Wheel elevator slip clutch.
- M. Wheel elevator drive idler arm.

EVERY 500 HOURS OR ONCE A SEASON

- N. Carrier wheel bearings - clean and repack.
- O. Roller chain - remove, clean and soak in oil.
- P. Track bushings.
- Q. Change gearbox oil.

NOTE: Pillowblock and flange bearings: These are sealed bearings. Lubricate sparingly, seal damage may result. One or two pumps every 20 hours maximum. Diesel fuel squirted on seals at the end of the season will help to keep seals soft and flexible



STORAGE

Proper storage of your harvester will greatly lengthen the service life and make it easier to place it back into service at the beginning of the next season.

PREPARING HARVESTER FOR STORAGE

1. Store harvester in a dry place.
2. Squirt diesel fuel on seals of bearings prior to washing with power washer.
3. Clean harvester thoroughly.
4. Clean drive chains and brush with heavy oil to prevent rust.
5. Lubricate harvester. Grease threads of adjusting bolts. Run harvester briefly to distribute grease.
6. Remove belt tension.
7. Scrape and repaint all worn parts or coat with light oil to prevent rust.
8. Block up harvester to remove load from tires. **DO NOT** deflate tires. If stored outside, remove wheels and tires and store in a cool, dark, dry place.
9. Place a plank under lifter wheels so they do not sink into ground if harvester is not stored on a hard surface.
10. List the replacement parts needed before next season and order early. Your dealer can give better service in the off season. Replacement parts can be installed in your spare time - no delay at time of need.
11. If hydraulic cylinders remain on the harvester and cylinder rods are extended, apply grease to exposed rod end.

REMOVING HARVESTER FROM STORAGE

1. Replace wheels if they were removed and remove blocking.
2. Inflate implement tires to 45 psi (traction tires to 25 psi).
3. Clean harvester thoroughly.
4. Check drive and conveyor chains making certain they have proper tension.
5. Clean slip clutches. Check and adjust spring lengths as necessary.
6. Retension belt drives.
7. Lubricate harvester; then run at half speed for 10-15 minutes listening for any unusual noises. Stop harvester and check bearings for over heating or excessive looseness. Recheck chain tension.
8. Review safety and operating instructions in this manual.
9. Inspect all connections and make certain that hardware is tight and cotter pins are in place.
10. If cylinders were stored on machine and cylinder rods were extended and coated with grease, clean grease from exposed rods.
11. Make sure all shields are in place and properly fastened.

TROUBLESHOOTING

Trouble	Possible Cause	Possible Remedy
Pulls too hard	Machine dirty - Not lubricated	Clean and lubricate machine
	Lifter wheels running too deep	Do not run lifter wheels deeper than necessary
	Tractor too small	Use larger tractor
	Grab roll spacing wrong	Adjust grab rolls
Gear case runs hot, leaks oil	Machine dirty - Not lubricated	Clean and lubricate machine to avoid overload
	Lubricant viscosity too light for climate	If weather is hot and problem persists, change to No. 140 gear lube
Hard to keep on rows	Lifter wheel strut assemblies are not set properly with rows	Make sure lifter wheel strut assemblies match the rows
	Machine straddling the guess row	Make sure you are not straddling the guess row
	Conditions suitable for utilization of row finder	Install row finder for automatic tongue steering
Can't dig deep	Tractor drawbar not set properly	Make sure tractor drawbar is not higher than 15"
	Front hitch in wrong hole setting	Adjust front hitch to proper holes
	Improper cylinder being used	Use correct depth control cylinder
	Machine running uneven	Level machine by adjusting carrier wheels
Premature wear of roller chains	Improper lubricant or infrequent intervals	Lubricate chains with proper oil and more frequently
Loses small beets	Conditions suitable for utilization of closeups	Install closeups
	Ground speed too slow	Increase ground speed - this may help get the beets to the paddles and onto the cleaning bed
	Lifter wheels too far apart	Space wheels closer together
	Front of primary conveyor too far back	Add chain link and move forward
Breaks tails off beets	Lifter wheels not running deep enough	Running lifter wheels deeper
	Lifter wheel strut assemblies not spaced properly	Make sure lifter wheel strut assemblies are spaced to fit rows
	Not steering properly	Steer more accurately or install a row finder
	Lifter wheels too narrow, pinch point is too tight	Space wheels farther apart

TROUBLESHOOTING

Trouble	Possible Cause	Possible Remedy
Beets slicing	Row finder not adjusted correctly	Adjust centering of row finder arms
		Adjust down pressure
	Harvester positioned over guess row	Dig on planted row only
	Lifter wheels too narrow, pinch point is too tight	Space wheels farther apart
	Replanted beets	
	Tractor moving beets	Check tire size and spacing
Loads too many clods	Lifter wheels set too deep	Run lifter wheels shallower, if possible, without breaking tails
	Grab rolls not set wide enough	Set grab rolls for wider gap
	Very dry soil conditions	Irrigate field
		Space lifter wheels closer together
Beets plugging cleaning bed	PTO speed too slow	Increase PTO speed to 1000 rpm
	Ground speed too fast	Decrease ground speed
	Small beets	Space grab rolls closer together
Excessive trash or dirt in truck	Cleaning areas plugged with trash and/or stones	Remove stones and trash
	Cloddy, stony field conditions	Space grab rolls farther apart
	Improper operation or adjustment	Correct operating procedures or adjustments

ROW FINDER

Lifter wheels moving away from beets	Hydraulic hoses incorrectly connected	Check connections at valve and tractor outlets
Lifter wheels not tracking properly	Feeler arms not centered	Center feeler arms
Lifter wheels jump off rows too easily	Not enough down-pressure	Increase down-pressure or lower row finder
	Row finder arms too high	Lower arms
	Drawbar mounting hole greater than 1-1/4"	Insert bushing

ASSEMBLY OF BEET HARVESTER



CAUTION: While working on the machine be sure to work safely. Be sure to use adequate blocking. Use adequately rated lifting devices. Make sure parts are secured before working under or near them.

NOTE: A hoist or lift truck is necessary to assemble the beet harvester.

Set the frame on a level area to assemble. Set the lifter wheels on a board so they do not penetrate into soft ground.

SETTING CARRIER WHEEL SPACINGS

Raise the rear frame bar with a jack or hoist. Use Figure 9, page 10, to determine settings for carrier wheels. It is recommended that the left oscillating carrier wheel be set to run in the far left dug row. The left wheels may also be set to run straddling the dug rows, depending on field conditions. If the wheel setting desired is different than Figure 9, page 10, add or subtract the appropriate half row spacing from the dimension given. Position the left carrier wheels first. Adjust height of carrier wheels by moving spindle support bracket (A) (see Figure 41) so machine runs parallel to ground at digging depth (2" to 3-1/2").

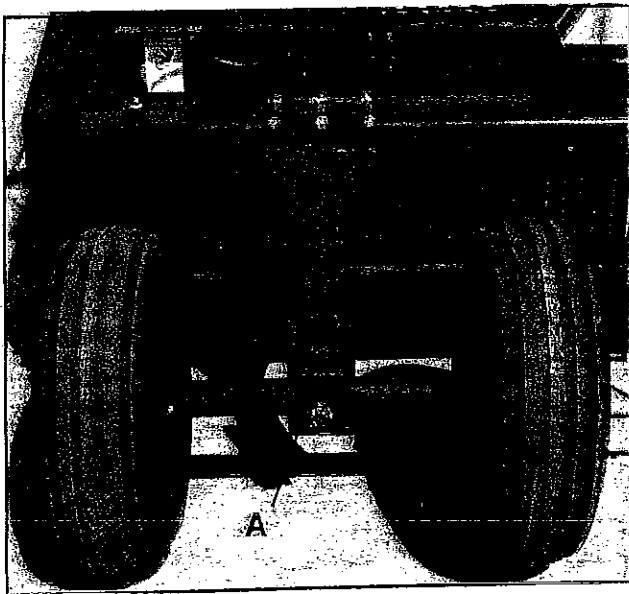


FIGURE 41 - OSCILLATING CARRIER WHEEL

For harvesters equipped with a third carrier strut, it is recommended to mount the spindle support bracket one hole on the center strut. This is needed to prevent

the harvester from pivoting on the center strut and affecting the lifter wheel depth.

Now position the right walking beam carrier wheels according to Figure 9, page 10. Use two, one or no leveling plates (B) depending on field conditions, to adjust height of walking beam so machine runs parallel to ground at digging depth (see Figure 42). The right wheels can be positioned one of two different ways, depending on row spacing. The support can also be moved several inches on the bar, within each one of the positions (see Figure 9, page 10). For steerable wheel assembly see Figure 10, page 11.

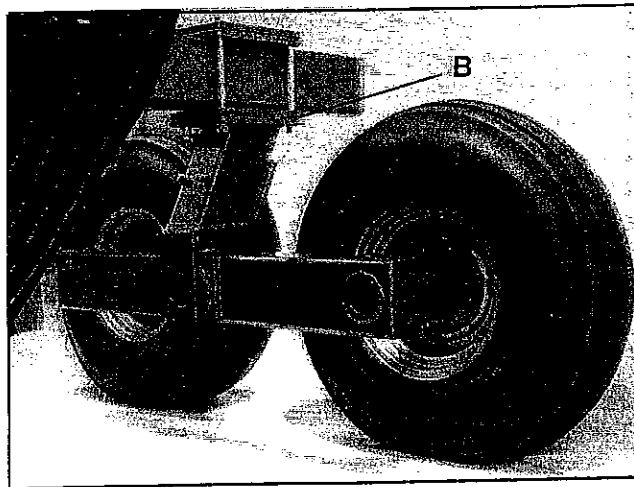


FIGURE 42 - WALKING BEAM CARRIER WHEEL

NOTE: Machine should be parallel to the ground, front to back and side to side when operating in the field, adjust carrier wheels accordingly.



CAUTION: The walking beam carrier wheels and support weigh approximately 500 pounds. Use proper equipment and be careful when removing.

NOTE: Torque specification for wheel mounts is 130 ft-lbs. Recheck after first day of use, or road transport to the farm.

For traction tires, a 3" wheel strut extension is added (bolted to A, Figure 41) to give more clearance from the tires to the frame on the left side of the harvester. For the right side, the walking beam should be assembled as shown in Figure 10, page 11. To change the walking beam remove the axle bolt lock nut. Remove the four (4) plate support bolts; then remove the plate

ASSEMBLY OF BEET HARVESTER

and shims. Slide the walking beam off the axle and turn around.

IMPORTANT: *If the bearing seals are damaged, make sure to replace them.*

Install the plate and shims. Install the axle lock nut. Tighten the nut enough to seat the bearings. Back off until the walking beam wobbles slightly, then tighten a quarter turn.

WHEEL ELEVATOR ASSEMBLY

Install the square wear plates on the wheel with the 5/16" x 7/8" carriage bolts and 5/16" flange nuts provided. The plate is on the inside of the wheel and the carriage bolt head is to the outside of the wheel. Assemble the first half of the wheel using a hoist or lift truck. Lift wheel into position. Start feeding wheel onto rear rollers making sure 7/8" square rail is riding on rollers (see Figure 43). Continue feeding wheel on rollers toward front of machine making sure rail is aligned with front roller (see Figure 44). Rotate wheel as far forward as possible to allow the retainer to be mounted. Secure the wheel half in place.

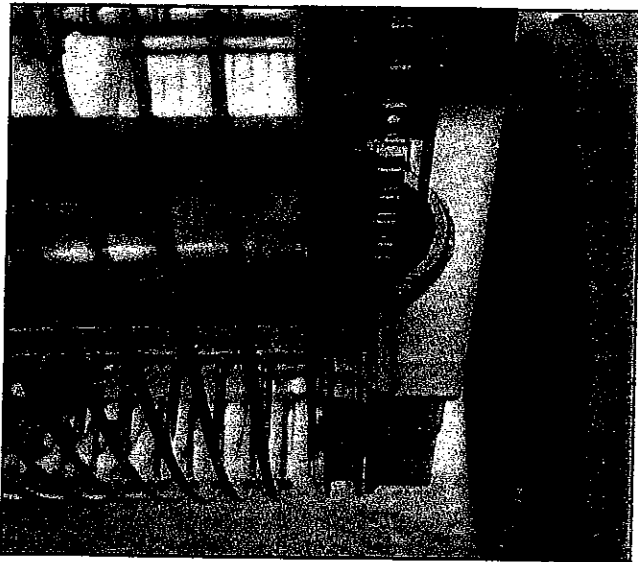


FIGURE 43 - REAR ELEVATOR WHEEL ROLLERS

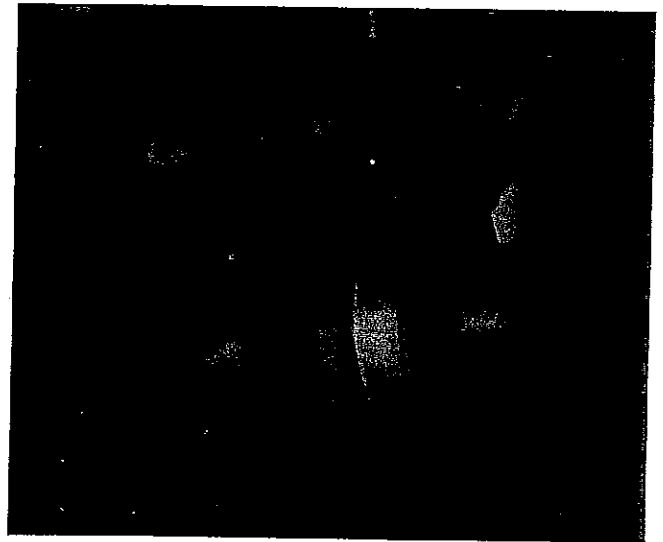


FIGURE 44 - FRONT ELEVATOR WHEEL ROLLER
(Shield removed for clarity)

ELEVATOR ASSEMBLY

Cut wires to free elevator side assemblies. Use eleven (11) 3/8" x 1" carriage bolts, eleven (11) 3/8" lock washers, and eleven (11) 3/8" nuts to secure elevator sides in place.

Attach elevator hood using six (6) 3/8" x 1-1/2" carriage bolts, six (6) 3/8" lock washers and six (6) 3/8" nuts.

Adjust the elevator height to the desired position by moving the rollers and brackets to the correct set of holes (A) (see Figure 45). The lower set of holes lowers the truck end of the elevator.



FIGURE 45 - ELEVATOR HEIGHT ADJUSTMENT

ASSEMBLY OF BEET HARVESTER



CAUTION: Support the elevator so it will not tip when repositioning elevator.

The elevator also has two possible angle positions to adjust for the truck side height. To change angle of the truck elevator, rotate center bracket (A) 180° to change height. With narrow end of bracket pointing up - the elevator is in the high position; down - low position (see Figure 46).

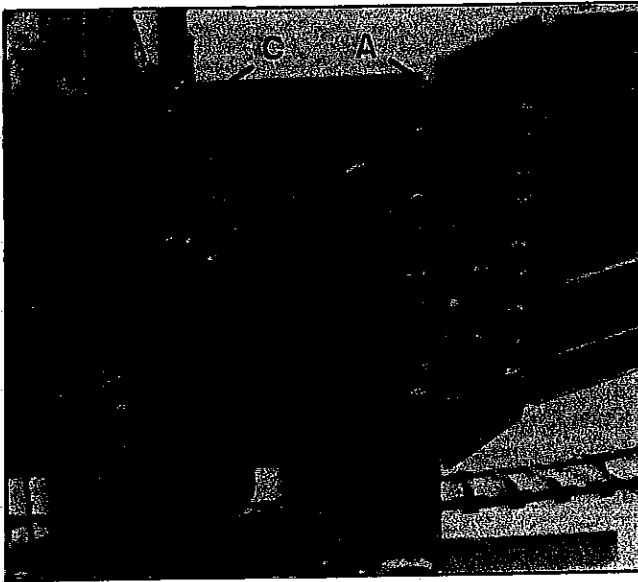


FIGURE 46 - TRUCK ELEVATOR ADJUSTMENT (LOW POSITION)

The elevator has two (2) stops available to adjust the truck end location of the elevator. When using the bolt-on stop (B) (see Figure 48, page 33), the filler plate (C) (see Figure 46) must be shifted to the left side of the retainer.

TANK ASSEMBLY



CAUTION: Tank and Elevator unit is top heavy - use care when handling.

Pick up tank assembly and set in place on frame (see Figure 47). For lifting, placing chain hooks in top tank tube ends works well. Use the six (6) 1/2" x 1-3/4" carriage bolts, six (6) 1/2" flat washers, six (6) 1/2" lock washers and six (6) 1/2" nuts provided to secure tank in place. *Slide tank as far right and forward as possible and square up to frame.* Tighten hardware.

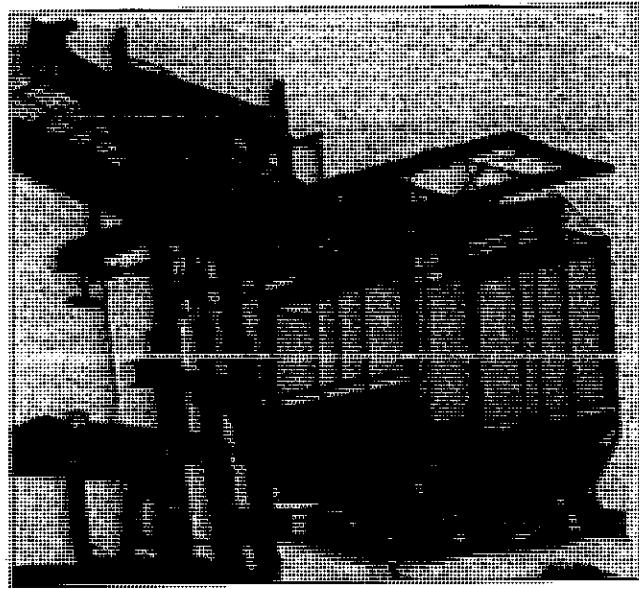


FIGURE 47 - LIFTING TANK ASSEMBLY

Use the 3/8" hardware from the tank mounting hardware bag to attach the two beet deflector plates (A) (see Figure 48, page 33) and one rubber flap to rear tank channel. Also, install the beet deflector plate to front tank channel if equipped with a reverse grab roll.

Attach two (2) 2" x 4" track support tubes to elevator track and frame (see Figure 48, page 33). Make sure to place the upper and lower end to the tank side of the 2" x 4" tube and the angle iron weldments respectively. Use the four (4) 1/2" x 4-3/4" hex bolts on top, four (4) 1/2" x 3-1/2" hex bolts on bottom, eight (8) 1/2" lock washers and eight (8) 1/2" nuts provided to secure tubes in place.

NOTE: *The track may have to be raised to insert hardware into mounting holes.*

Attach ladder and ladder extension to tank (see Figure 49, page 33). Use two (2) 3/8" x 2" carriage bolts and two (2) 3/8" flange lock nuts to loosely join ladder and ladder extension together. Put two (2) 3/8" x 1" carriage bolts and two (2) 3/8" flange lock nuts into ladder extension. Slide assembly onto ladder mounts and secure in place. Then pivot lower ladder support out and secure to ladder brackets using two (2) 3/8" x 1" carriage bolts and two (2) 3/8" flange lock nuts.

Use three (3) 1/2" x 1-1/2" hex bolts, six (6) 1/2" flat washers, three (3) 1/2" lock washers and three (3) 1/2" nuts to fasten diagonal chain bed flap to tank and frame. Also use two (2) 1/2" x 1-1/2" hex bolts, four

ASSEMBLY OF BEET HARVESTER

(4) 1/2" flat washers, two (2) 1/2" lock washers and two (2) 1/2" nuts to fasten grab roll flap brackets to tank.

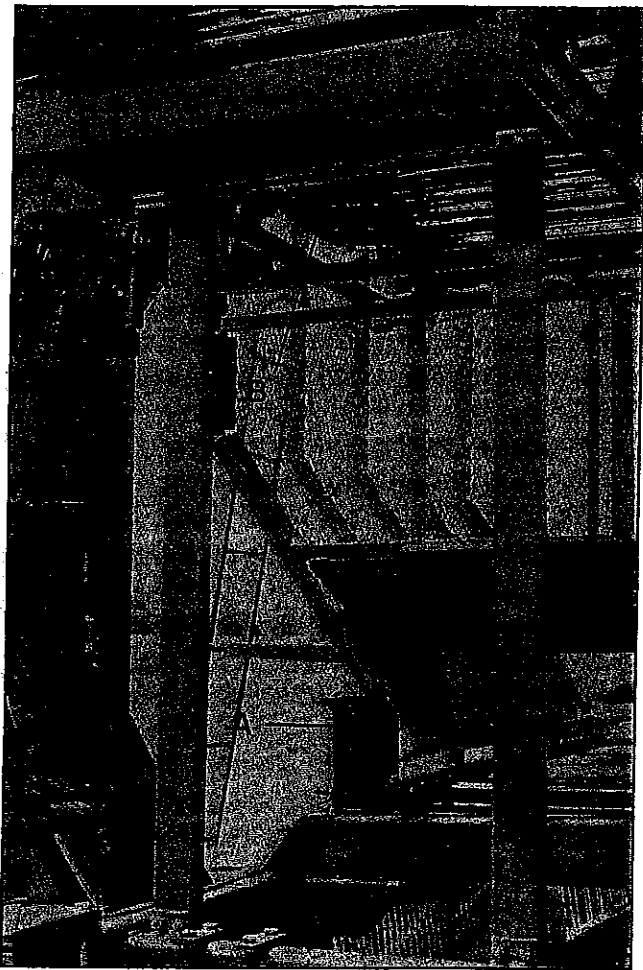


FIGURE 48 - TRACK SUPPORT TUBES

RETAINER ASSEMBLY

Install the bottom of the retainer first with four (4) 1/2" x 1-1/4" hex bolts, four (4) 1/2" lock washers, two (2) 1/2" flat washers and four (4) 1/2" nuts provided. Make sure the sides of the retainer are outside the attaching panels as shown (see Figure 50).

Insert two (2) 5/8" x 2-1/2" hex bolts and two (2) 5/8" flat washers through angle on track and the retainer attaching brackets. Push retainer as close to the unloading elevator as possible and secure with two (2) 5/8" nuts, two (2) 5/8" lock washers and two (2) 5/8" flat washers. The retainer will be adjusted later (see Figure 51, page 34).

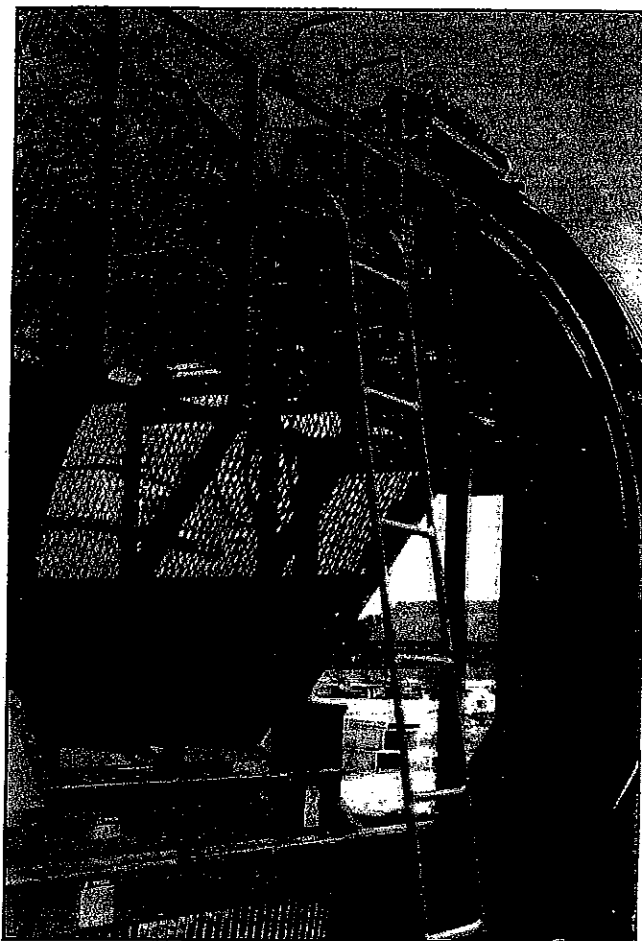


FIGURE 49 - LADDER ASSEMBLY

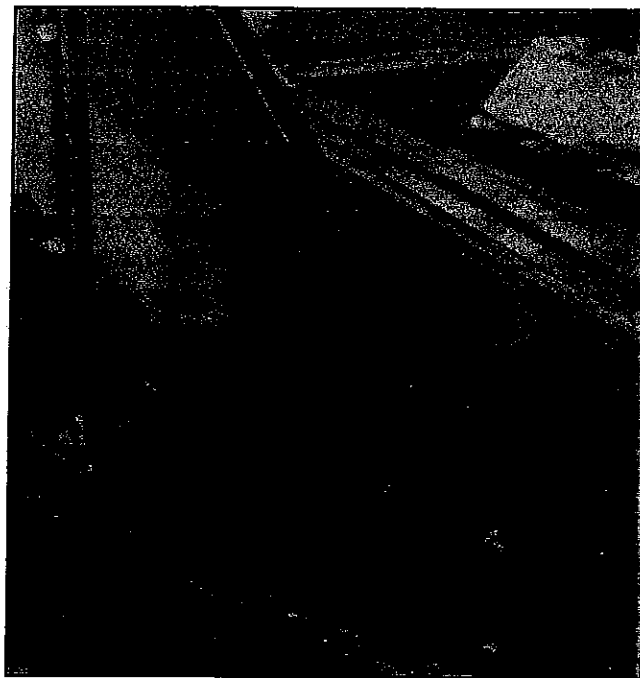


FIGURE 50 - LOWER RETAINER INSTALLATION

ASSEMBLY OF BEET HARVESTER

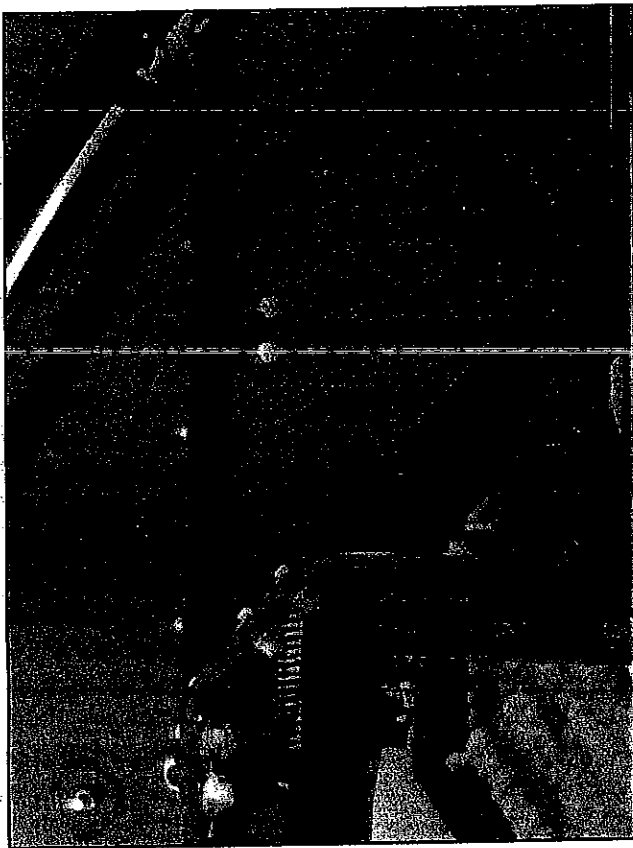


FIGURE 51 - UPPER RETAINER INSTALLATION

WHEEL ELEVATOR ASSEMBLY

Lift the second wheel half in preparation for installing. Position the chains around fourth crossbar for proper balance.

Loosen the right-hand rollers at the top of the machine, if necessary, so the wheel slides between them and the single left-hand roller.

Attach the two (2) wheel halves together with eight (8) 5/8" x 3 1/2" bolts and eight (8) rocker straps, **flat side towards nuts and bolt heads**. Make sure the side tabs interlock properly (four places) where the halves join (see Figure 52).

IMPORTANT: Make sure the rail that rides on the rollers is aligned end to end when bolting the halves together. Use C-clamps or similar device to align the rails (see Figure 52). It may be necessary to grind rail ends to insure alignment of halves.

NOTE: Use a punch to align the holes at one joint first, then loosely insert two (2) bolts, straps and jam

nuts. Then use a punch to align the other joint holes and insert hardware.

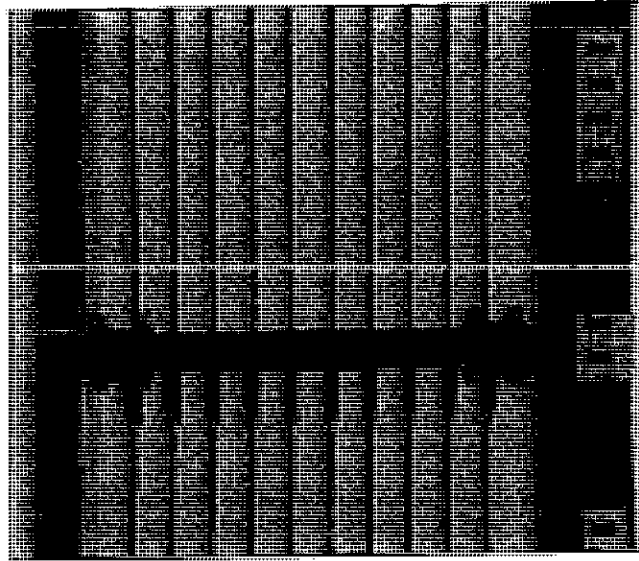


FIGURE 52 - WHEEL ELEVATOR JOINT

Tighten the first jam nut to 120 ft-lbs, then securely lock the second jam nut against the first one.

IMPORTANT: Do not over tighten the first jam nut.

Install the rod connectors between the two wheel halves as shown (see Figure 53). Free the wheel and turn the wheel manually through one or two revolutions to make sure nothing is interfering with it. Adjust the right-hand rollers so they are about 1/8" away from the drive band of the wheel elevator at its closest point. Install tabs in chain slots (see figure 52).

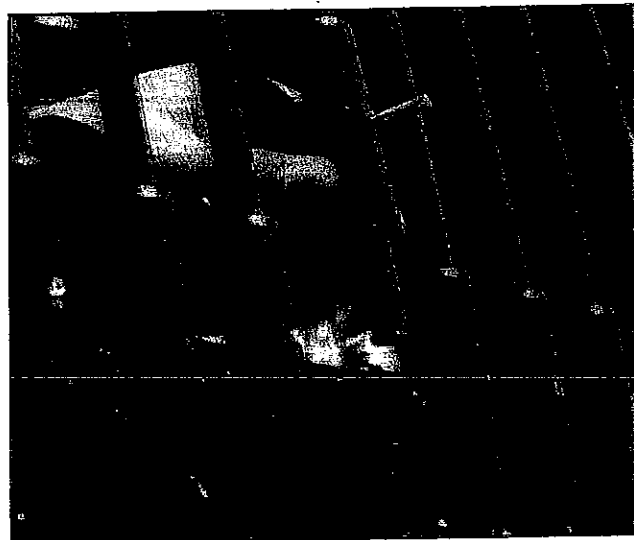


FIGURE 53 - ROD CONNECTOR INSTALLATION

ASSEMBLY OF BEET HARVESTER

RETAINER ADJUSTMENT

Center the retainer both right-and-left and front to back with the wheel. The distance between the outside edge of the retainer and the inside edge of the wheel must be the same at the top as it is at the bottom.

First loosen the two attaching bolts at the top. Move the retainer with a chain and a bar to position it correctly, then tighten the two (2) bolts. Make sure the retainer does not make contact with the truck elevator.

NOTE: It may be necessary to reposition the tank assembly so the elevator clears the retainer and maintains an equal gap with the wheel.

STRIPPER ASSEMBLY

Install mounting angles 2-1/2" from rear edge of support frame. Lift the stripper into its position and attach with four (4) 1/2" U-bolts bolts (A), eight (8) 1/2" flat washers and eight (8) 1/2" hex nuts as shown (see Figure 54).

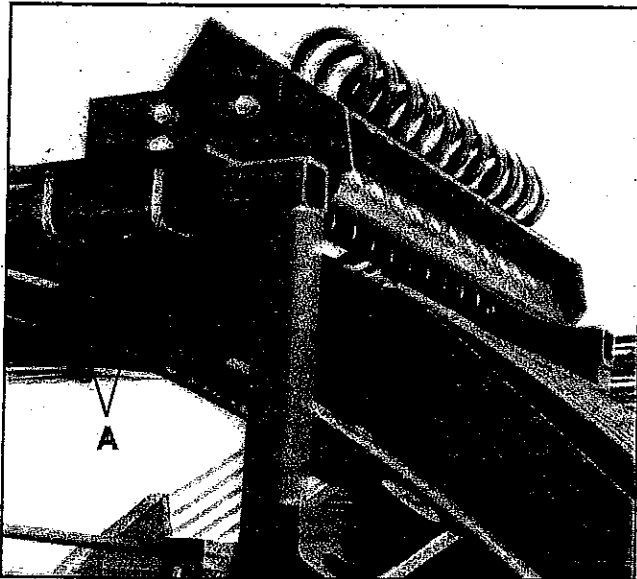


FIGURE 54 - STRIPPER INSTALLATION

Set coil spring rods in at an angle that best deflects beets in your field condition. make sure rod tips *do not* strike against square cross tube weldments, or tear the rubber flaps when installed.

Turn the wheel elevator through one or two complete revolutions and slide stripper supports right or left to eliminate interference (see Figure 54).

Bend the wheel elevator rods, if necessary, *only after* adjusting stripper support. Pay particular attention to the wheel elevator joints.

WHEEL ELEVATOR CHAIN ASSEMBLY

Remove one of the square wear plates on the wheel. Use that hole to wire the wheel elevator chain to the wheel. Make sure to reinstall the wear plate after the chain is installed. Turn the wheel manually to install the chain. Wrap around the drive and tightener sprockets as shown and install the connector link (see Figure 55). Tighten the chain by loosening jam nut (A) and turning adjusting nut (B). Check this adjustment by pulling the chain *away from* the rear of the wheel elevator. A 1/2" to 1-1/2" distance indicates proper tension (see Figure 56, page 36).

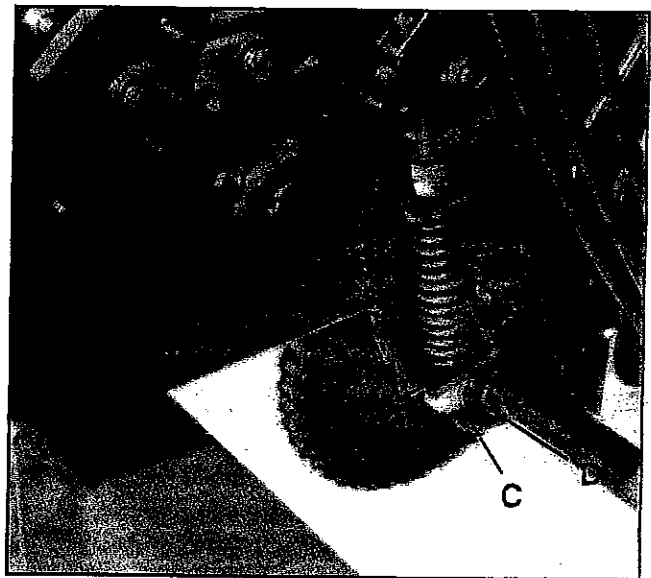


FIGURE 55 - WHEEL ELEVATOR DRIVE
(Shield removed for clarity)

The tightener sprocket must be aligned with the chain. Use washers if necessary at the forward end of the tightener sprocket pivot arm (where the grease fitting is located).

Set dampener spring length to 6-3/4" (see arrows in Figure 55). Adjust if necessary by loosening jam nut (C) and turning adjusting nut (D) (see Figure 55).

ASSEMBLY OF BEET HARVESTER

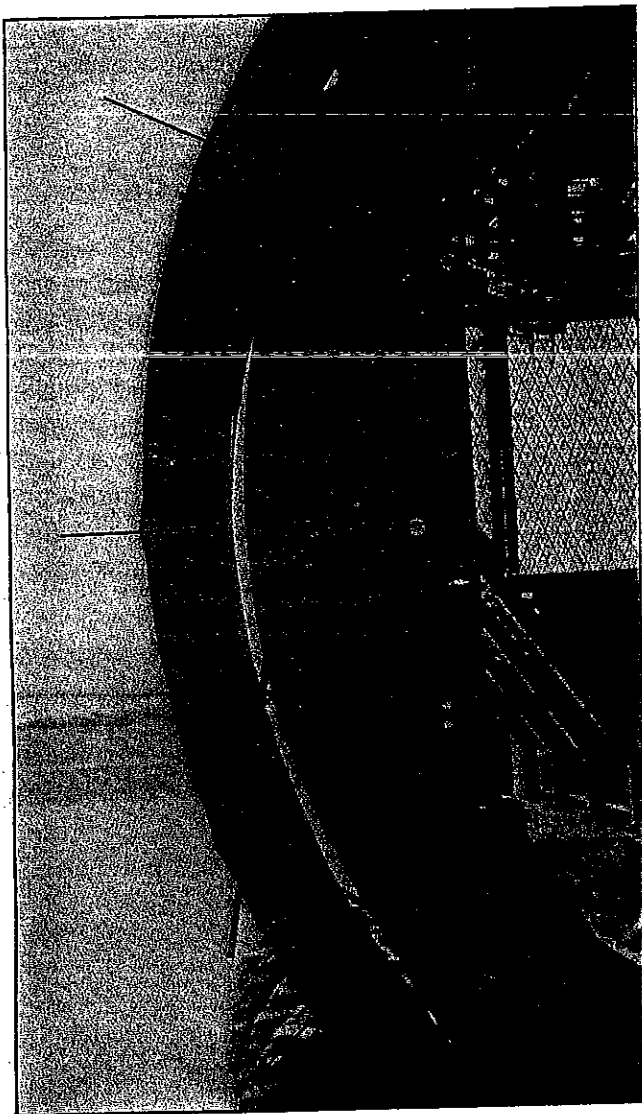


FIGURE 56 - WHEEL CHAIN TENSIONING

HITCH ASSEMBLY

Attach hitch assembly to pivot point on main frame using pivot pin, slotted nut and cotter pin (see Figure 57).

JACKSHAFT EXTENSION SUPPORT

Install single U-joint to jackshaft extension and main driveshaft. Use two (2) 3/8" woodruff keys, two (2) 3/8" x 3-1/4" hex bolts, two (2) 3/8" lock nuts and two (2) 3/8" x 1/2" set screws. Install jackshaft extension

support with four (4) 1/2" x 1-1/2" hex bolts, four (4) 1/2" lock washers and four (4) 1/2" hex nuts. Slide bearing onto shaft and install with (2) 1/2" x 3/4" carriage bolts, two (2) 1/2" lock washers and two (2) 1/2" hex nuts. Install left and right extension shields with six (6) 1/4" x 1" hex bolts, six (6) 1/4" lock washer and six (6) 1/4" hex nuts. Right shield closes over left shield.

PTO ATTACHMENT

Attach the PTO to the jackshaft extension using a 3/8" woodruff key, a 1/2" set screw and a 3/8" x 3-1/4" hex bolt and a 3/8" lock nut. Install two (2) hose carriers (loops toward hitch centerline) to the hitch assembly with two (2) 3/8" x 1-1/2" hex bolts, two (2) 3/8" lock washers and two (2) 3/8" nuts.

Mount a 5" diameter x 8" stroke or 5" diameter x 10" stroke hydraulic lift cylinder (maximum closed length 22-1/4") and 4" diameter x 8" stroke hydraulic row finder cylinder and hoses (not included).

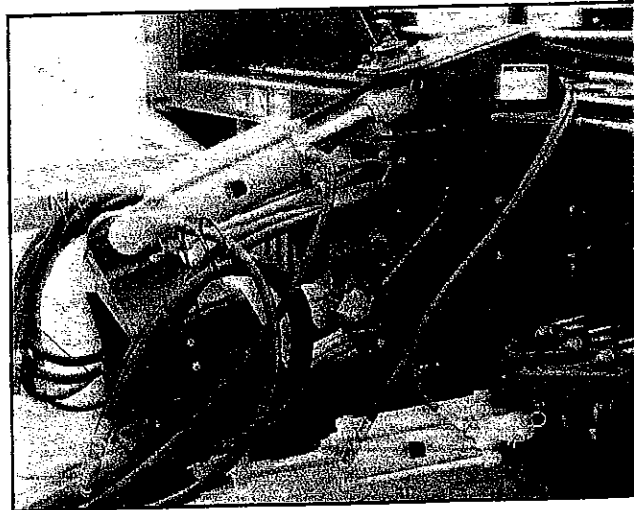


FIGURE 57 - HITCH INSTALLATION

NOTE: Upper mounting for lift cylinder is to be turned with hole closest to the front. Cylinder to have rod end mounted to the machine. Adjust the steering cylinder to the center of its stroke. Position the hitch straight forward (except when harvesting 28" rows - it is recommended to be 4" off center. Tighten U-bolts on the steering cylinder bracket.

ASSEMBLY OF BEET HARVESTER

ROW FINDER ASSEMBLY

Loosen upper lifter wheel strut mounting bolts on the first strut to the right of the hitch and install mounting bracket. Tighten bolts.

NOTE: If row finder is mounted on second or third strut to the right, interference can result with rear tractor tires.

Use four (4) 1/2" x 1-3/4" hex bolts (A), four (4) 1/2" lock washers and four (4) 1/2" nuts to mount row finder assembly to mounting bracket on first strut to right-hand side of hitch (see figure 58).

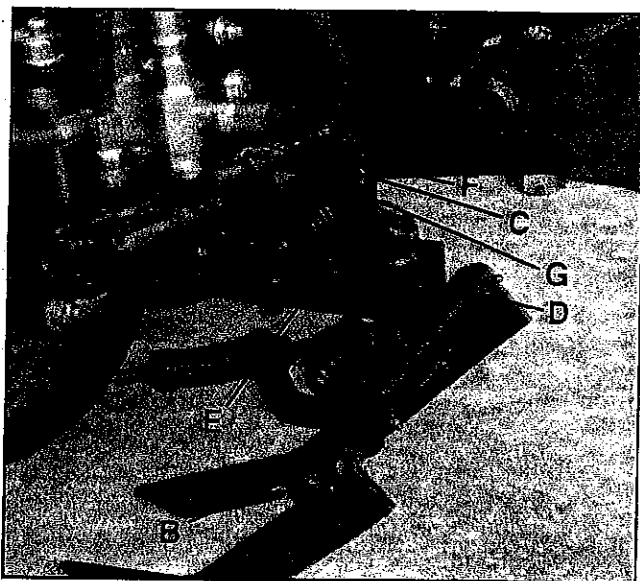


FIGURE 58 - ROW FINDER MOUNTING/CONTROL VALVE CENTERING

FEELER ARM CENTERING

(Refers to Figure 58) The horizontal shaft (B) in row finder must be parallel with the front of the harvester frame to function accurately. Remove pin (C) and loosen nuts (D) slide plate (E) until shaft is parallel with frame. Tighten nuts.

The hydraulic control valve must be centered each time the shaft is adjusted. Loosen nut (F) adjust nut (G) until pin (C) can be inserted freely through nut (G) and valve spool. Tighten the lock nut (F) and check to be sure the link pin is still free.

The feeler arms must be centered with the gap between the lifter wheels to function accurately. Do

this by loosening bolts (A) and sliding the entire assembly in the mounting slots until centered. Tighten bolts (see figure 59).

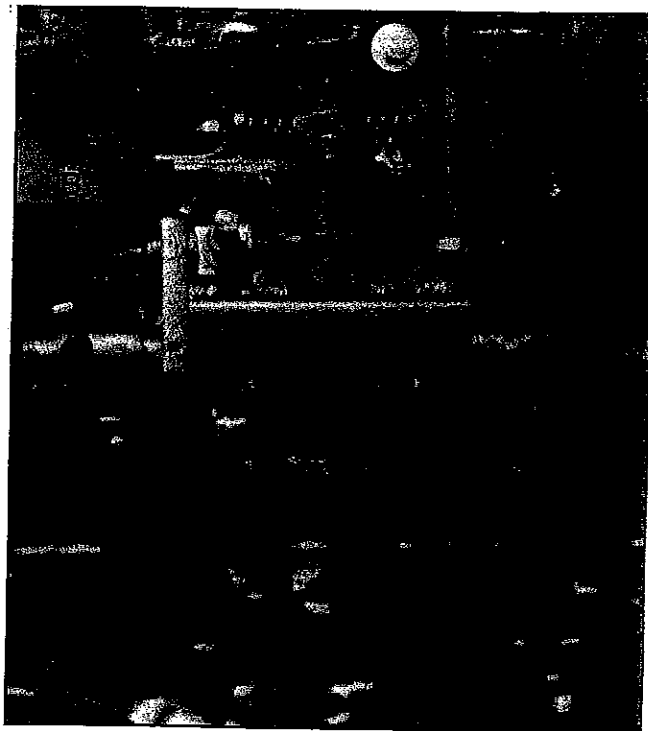


FIGURE 59 - ROW FINDER HEIGHT ADJUSTMENT

ROW FINDER HEIGHT

Set row finder height in correct relationship to the lifter wheel working depth to assure proper function. *Example:* If lifter wheels will work at a depth of 3", the bottom edges of the feeler arms should be about 3" above the rims of the lifter wheels when operating in the row. The feeler arms should ride along the surface of the ground, or just slightly penetrating the surface (see Figure 60, page 38).

To change the height of the row finder more than 1", remove the four (4) hex bolts (A) (see Figure 58) attaching the row finder assembly to the support plate. Bolt the row finder to the holes which provide the desired operating height.

NOTE: For less than 1" height adjustments, raise or lower the feeler arm by adjusting nuts (B) (see Figure 59).

ASSEMBLY OF BEET HARVESTER

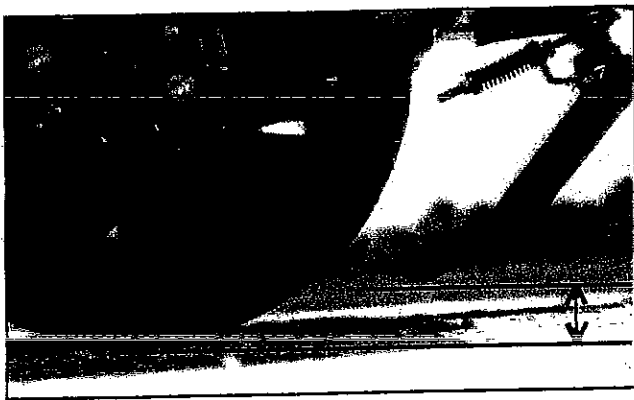


FIGURE 60 - ROW FINDER HEIGHT

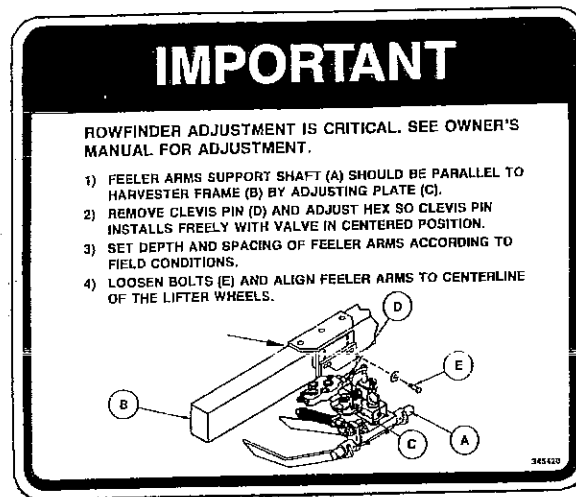


FIGURE 61 - ROW FINDER HEIGHT ADJUSTMENT (DECAL)

ASSEMBLY OF BEET HARVESTER

HYDRAULIC SYSTEMS: GENERAL INFORMATION

Hose Installation

Install elbows to flow control valve (H) and attach to frame hitch support. Install 26" hydraulic hose from flow control valve to "IN" port on row finder valve. (see Figure 63, page 41).

Install two (2) hose assemblies (96" and 120") from the valve assembly on the tank to the out ports on row finder and flow control valve as shown (see Figure 62).

Install hydraulic hoses (120" and 146") in row finder valve and flow control valve as shown and route through hose carrier on hitch to tractor.

Install hydraulic hose ends to match the tractor. Install hydraulic hoses (79") in row finder valve to steering cylinder as shown.

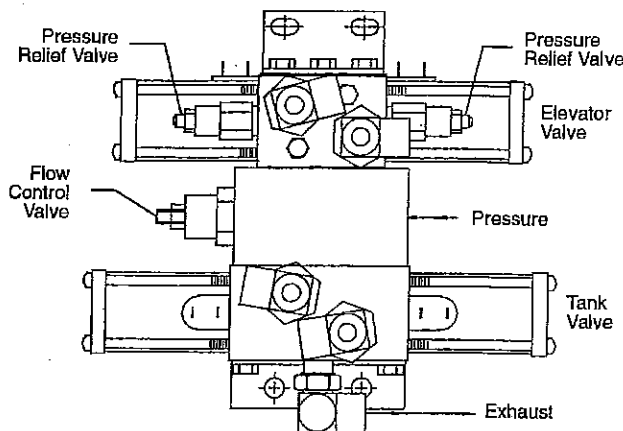


FIGURE 62 - VALVE LOCATION

Flow Control

The valve assembly for the 690 model harvester features a flow control for the elevator drive motor. The flow is factory pre-set and should **NOT** be changed unless special circumstances make it necessary. This setting allows the elevator belt to run at approximately 120 rpm which is sufficient to deal with normal beet flow and tank unloading flow. The flow range can be set from a low of 10 gpm to a high of 16 gpm.

To set full flow of the elevator drive system, use your tractor valve outlet flow control, and check elevator speed with an rpm meter. The elevator belt runs at

approximately 120 rpm when the motor is using 14 gpm.

IMPORTANT: If the tractor control is set for higher than required flow, it will shift to high pressure on PFC hydraulic systems.

Pressure Relief Valve

To reduce the chance of damage to the elevator belt chain, a pressure relief valve is also built in, and factory pre-set, for 1500 psi. Under normal conditions this setting should not be changed. The possible pressure range can be set from a low of 175 psi to a high of 3000 psi.

Tank Bottom Chain

The valve which provides flow to the tank bottom chain is of an open center design and can only be activated while the elevator chain is also running. The elevator belt chain drive can be switched to load into the truck or into the harvester tank. When switching from truck loading to tank loading or vice versa, a time delay switch will pause the chain momentarily before it engages in the other flow direction.

Row Finder

The elevator and tank chain valve will have no oil flow when the system is plumbed according to figure 68, page 43. The row finder will allow a 3-5 gpm flow if the tractor is running and the remote is engaged. If a closed plug was installed in the row finder, the tractor pressure system would kick into high and no flow would be available to the elevator and tank chain valve block.

Reverse Flow Divider

If for any reason the auxiliary flow divider gets plumbed backwards (ie. control flow [CF] to the elevator and tank chain valve block and exhaust [EX] to the row finder, the row finder function will be interrupted while the time delay switch is being activated.

No Row Finder

If no row finder is used, plug the elevator and chain valve block directly into the tractor remote. No flow divider is required. (See Figure 64, page 41).

NOTE: Use 5/8" hydraulic lines on "elevator and tank circuit" to reduce friction heat buildup.

ASSEMBLY OF BEET HARVESTER

PLUMBING HYDRAULICS

Art's-Way Manufacturing Co. Inc. recommends the following hydraulic plumbing instructions which have been tested at the factory. Refer to the hydraulic schematics on pages 41, 43 & 44 which illustrate the various systems described below.

PRESSURE AND FLOW COMPENSATED (PFC) HYDRAULIC SYSTEMS

An "open center plug" should be installed in the row finder.

NOTE: New Art's-Way row finders are shipped with the open center plug installed.

Tractors with Five (5) Remotes (See Figure 64)

- a) **#1 Remote** – A priority outlet. Plug in harvester hitch lift cylinder or the steering cylinder. For flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in whichever cylinder is not plugged into #1 outlet. For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in elevator chain and tank chain valve block. For flow adjustment, use tractor outlet control.
- d) **#4 Remote** – Plug in row finder. Do NOT use auxiliary flow divider; go directly into the row finder and return directly to the tractor remote. For flow adjustment, use tractor outlet controls.
- e) **#5 Remote** – Plug in steerable wheels. For flow adjustment, use tractor outlet controls.

Option: If auxiliary flow divider is used, c and d can be operated out of one remote (Figure 63).

Tractors with Four (4) Remotes (See Figure 64)

- a) **#1 Remote** – A priority outlet. Plug in the harvester hitch lift cylinder or the steering cylinder. For flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in whichever cylinder is not plugged into #1 outlet. For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in elevator chain and tank chain valve block. For flow adjustment, use tractor outlet control.
- d) **#4 Remote** – Plug in row finder. Make sure an "open center" plug is installed. Do NOT use auxiliary flow divider; go directly into row finder and return directly to the tractor remote. For flow adjustment, use tractor outlet control.

Option: If steerable wheels are used, c and d can be operated out of one (#3) remote if auxiliary flow divider is used. Plumbing has to be according to Figure 63 (PFC system).

Tractors with Three (3) Remotes (See Figure 63)

- a) **#1 Remote** – A priority outlet. Plug in the harvester hitch lift cylinder or steering cylinder. For flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in whichever cylinder is not plugged into #1 outlet. For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in combined systems of elevator and tank chain valve block with row finder. Use auxiliary flow divider.

NOTE: Steering wheels can NOT be used with only 3 Remotes.

ASSEMBLY OF BEET HARVESTER

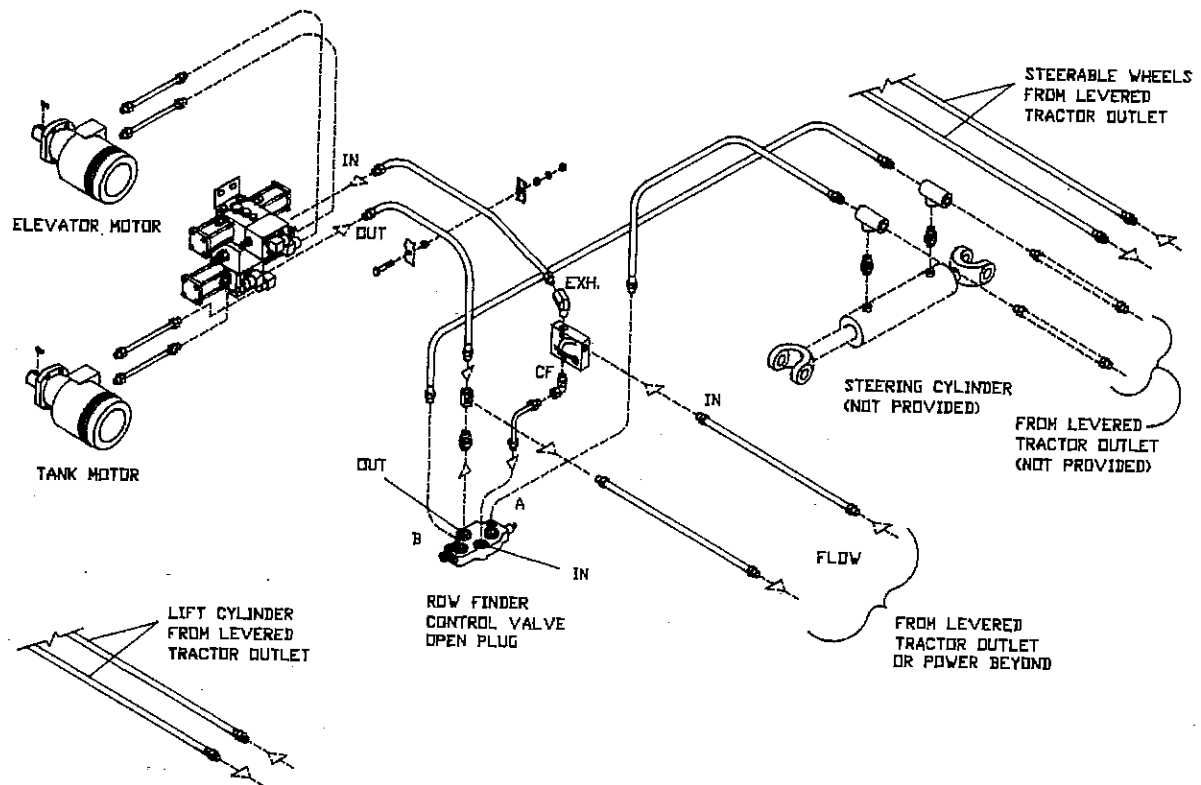


FIGURE 63 - PFC SYSTEM

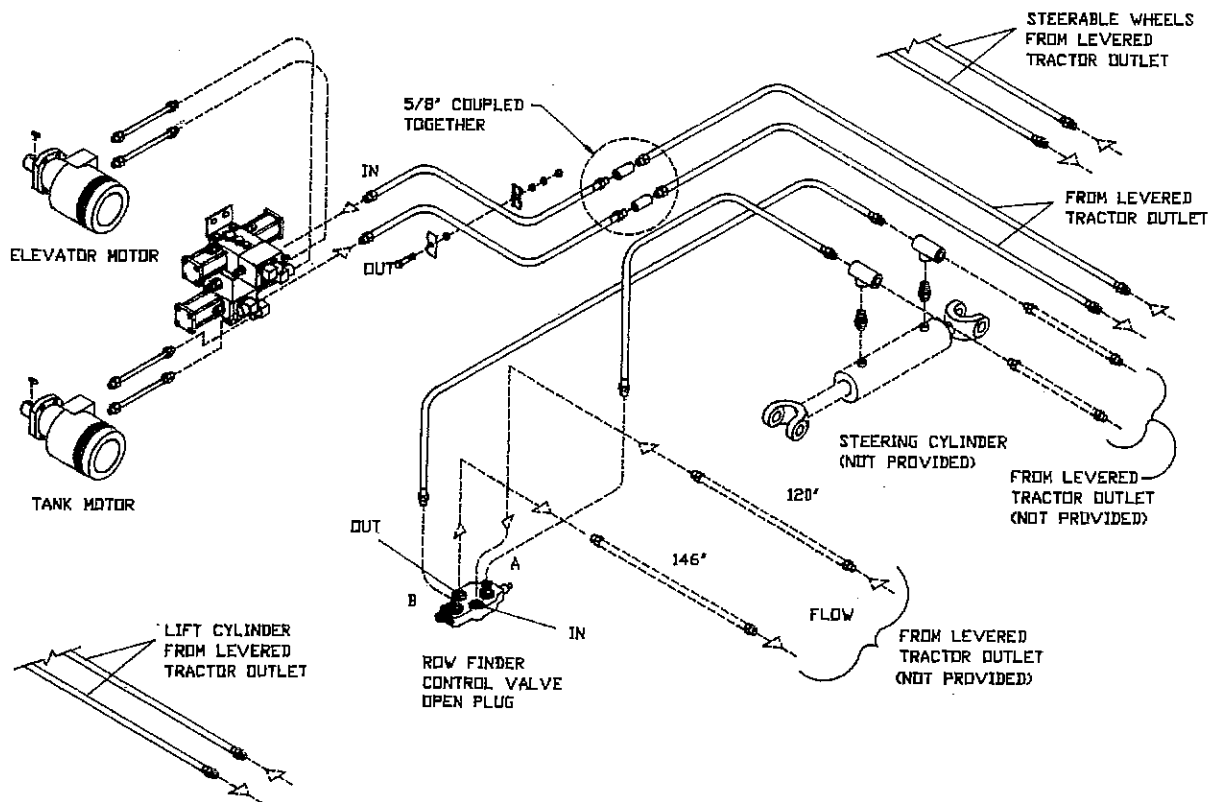


FIGURE 64 - PFC SYSTEM

ASSEMBLY OF BEET HARVESTER

CLOSED CENTER HYDRAULIC SYSTEMS

A "closed center plug" should be installed in the row finder whenever it is separated from the elevator and tank circuit.

NOTE: New Art's-Way row finders are shipped with the open center plug installed.

Tractors with Four (4) Remotes and Power Beyond (See Figure 65)

- a) **#1 Remote** – Plug in hitch lift cylinder. For flow adjustment, use tractor outlet controls.
- b) **#2 Remote** – Plug in hitch steering cylinder (override). For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in elevator and tank chain valve block. For flow adjustment, use tractor outlet control.
- d) **#4 Remote** – Plug in steerable wheels. For flow adjustment, use tractor outlet control.
- e) **Power Beyond** – Plug in row finder and use flow divider to set function speed.

Tractors with Four (4) Remotes (See Figure 65)

- a) **#1 Remote** – Plug in hitch lift cylinder. For flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in hitch steering cylinder (override). For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in combined system of elevator and tank chain valve block with row finder. For flow adjustment, use tractor outlet control and flow divider.
- d) **#4 Remote** – Plug in steerable wheels.

NOTE: If steerable wheels are not being used, the #4 Remote can be used for the row finder, while a separate pair of hoses is used for the elevator and tank chain valve block. (see Figure 65)

Tractors with Three (3) Remotes and Power Beyond (See Figure 65)

- a) **#1 Remote** – Plug in hitch lift cylinder. For flow adjustment, use tractor outlet control.

- b) **#2 Remote** – Plug in hitch steering cylinder. For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in steerable wheels. For flow adjustment, use tractor outlet control.
- d) **Power Beyond** – Plug in combined system of elevator and tank chain valve block with row finder. For flow adjustment, use tractor outlet control and flow divider.

NOTE: If steerable wheels are not being used, the #3 Remote can be used to plug in the elevator and tank chain valve block, while Power Beyond is used for the row finder. Adjust flow with the flow divider (see Figure 65)

Tractors with Three (3) Remotes (See Figure 65)

- a) **#1 Remote** – Plug in hitch lift cylinder. For flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in hitch steering cylinder (override). For flow adjustment, use tractor outlet control.
- c) **#3 Remote** – Plug in combined system of elevator and tank chain valve block with row finder. For flow adjustment, use tractor outlet control and flow divider.

Tractors with Two (2) Remotes and Power Beyond (See Figure 65)

- a) **#1 Remote** – Plug in hitch lift cylinder. Flow adjustment, use tractor outlet control.
- b) **#2 Remote** – Plug in hitch steering cylinder (override). For flow adjustment, use tractor outlet control.
- c) **Power Beyond** – Plug in combined system of elevator and tank chain valve block with row finder. For flow adjustment, use flow divider.

OPTION: Tractors with low flow volume can use a different plumbing circuit for activating the row finder, elevator and tank chain valve block. (See Figure 66) This system of plumbing will make more oil flow available to the hydraulic motors during operation. When the circuit is interrupted by a two second pause while switching the elevator from truck to tar' loading, the row finder will momentarily n. function.

ASSEMBLY OF BEET HARVESTER

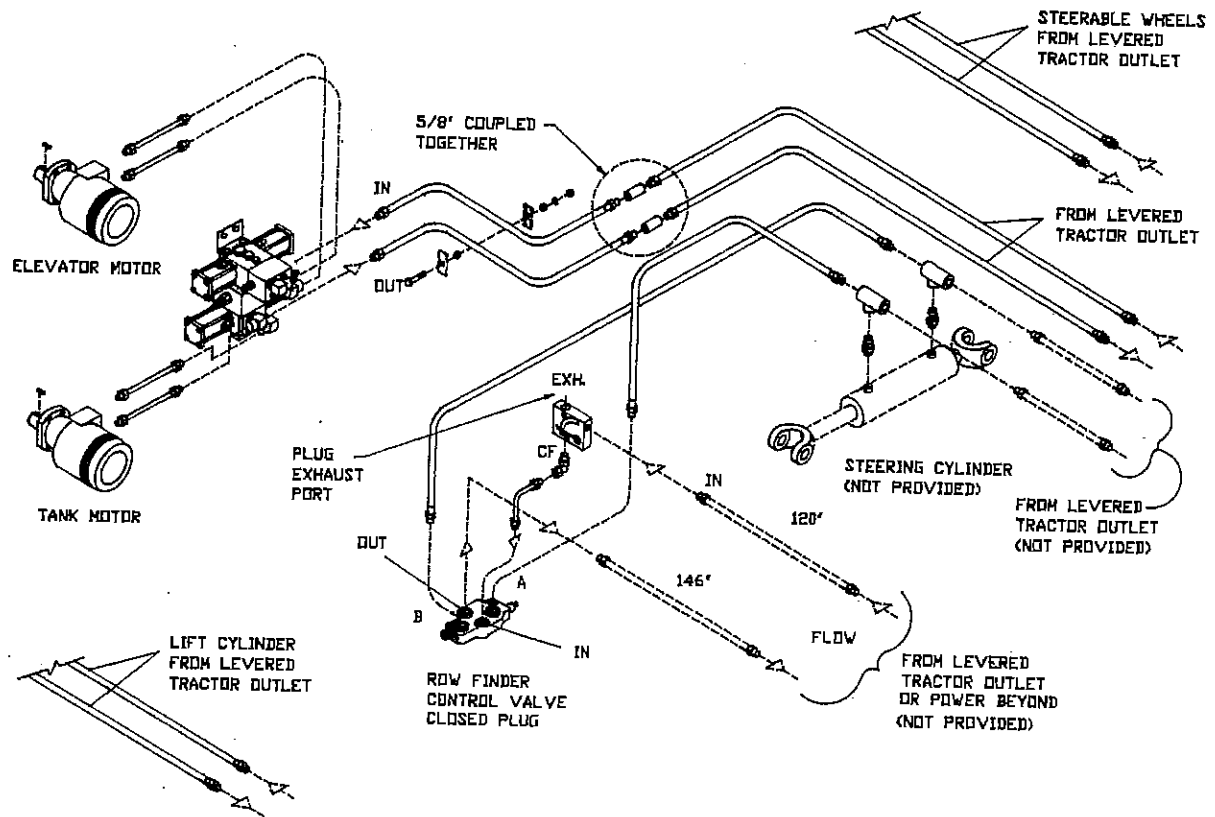


FIGURE 65 - CLOSED CENTER HYDRAULIC SYSTEMS

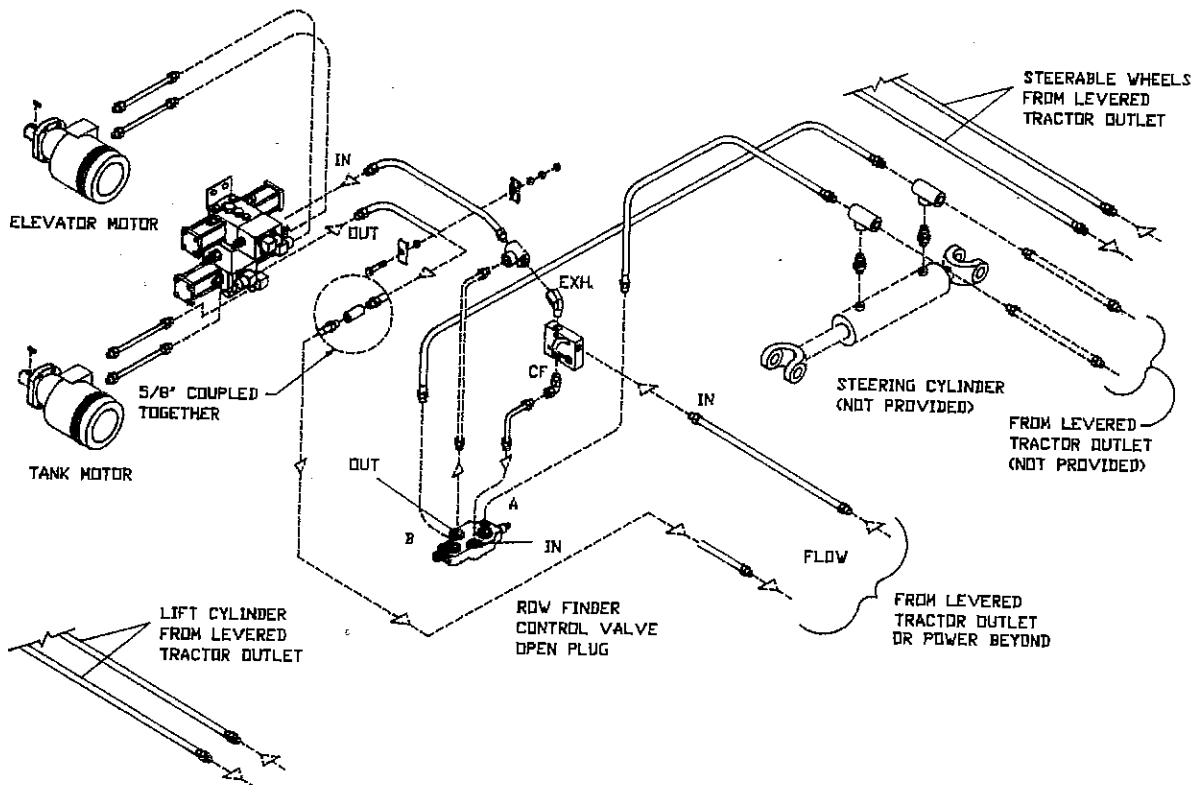


FIGURE 66 - CLOSED CENTER HYDRAULIC SYSTEMS

ASSEMBLY OF BEET HARVESTER

OPEN CENTER HYDRAULIC SYSTEMS

The open center hydraulic systems found on Ford and some foreign tractors and on older International Harvester models are not able to properly operate the 692 Art's-Way harvester valve for the elevator and tank chain.

The closed center valve which is installed poses no problem if a bypass is created. (See Figure 67).

Art's-Way offers an electric hydraulic valve kit (Part Number 384660) which *must be* installed on the harvester prior to operation, on open center tractor hydraulics.

For plumbing instructions relating to the number of "Remotes" your particular tractor has, refer to the Pressure and Flow Compensated (PFC) pages for details.

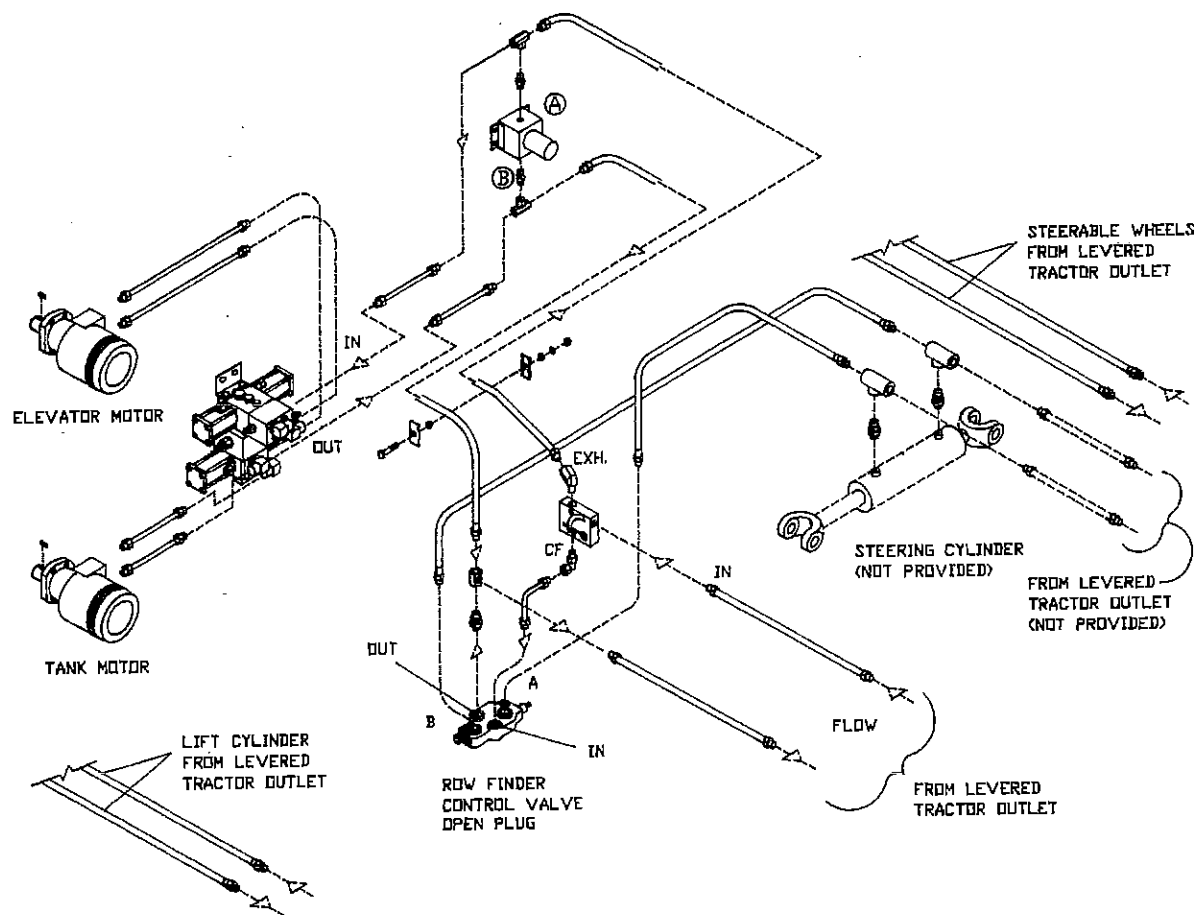


FIGURE 67 - OPEN CENTER HYDRAULIC SYSTEMS

ASSEMBLY OF BEET HARVESTER

INSTALLING CONTROL BOX ON TRACTOR

Place the control box in a location that is convenient to the operators seat on the tractor.

NOTE: Control box may be permanently installed if so desired.

Route cable to battery, fastening it securely in all areas where it could create a hazard. Connect the white wire to the "HOT" side of battery. Connect black wire from cable to electrical ground on tractor (see Figure 68).

IMPORTANT: The control box is rated for use with a 12 VOLT DC SYSTEM ONLY. A battery charger will not work for testing. Follow the illustration below for correct wiring.

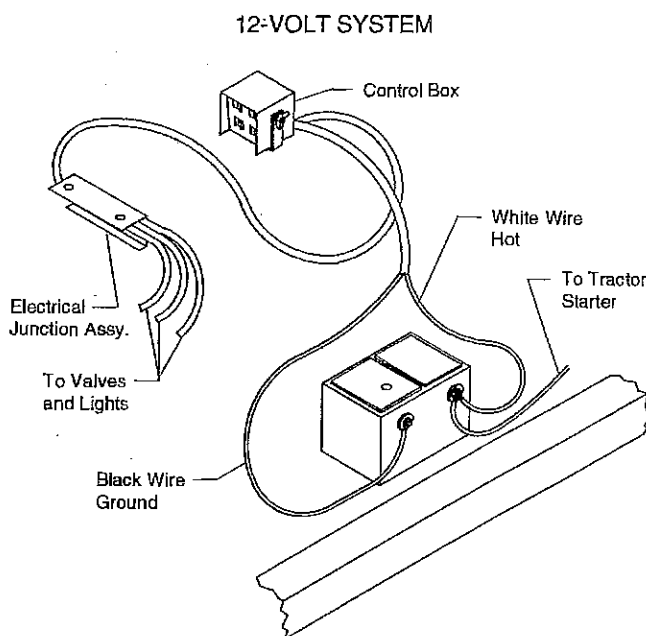


FIGURE 68 - CONTROL BOX POWER CONNECTION

With main power switch in off position, connect wire from harvester as indicated on the back panel of control box (see Figure 69). Mount quick attach plug on tractor to a convenient location that will still allow wire to reach junction box on harvester. Secure all loose sections of wire.

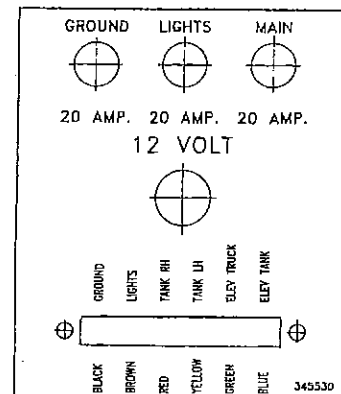


FIGURE 69 - CONTROL BOX DECAL

INSTALLING ELECTRICAL JUNCTION SHIELD ON HARVESTER

Attach valve assembly wire to junction box as shown (see Figure 70). Attach the black and brown wires to the ground on shield using the 1/4" machine screw. Attach light wires if equipped. Strap wires to electrical shield with nylon straps and attach junction box to main gearbox shield as shown (see Figure 71).

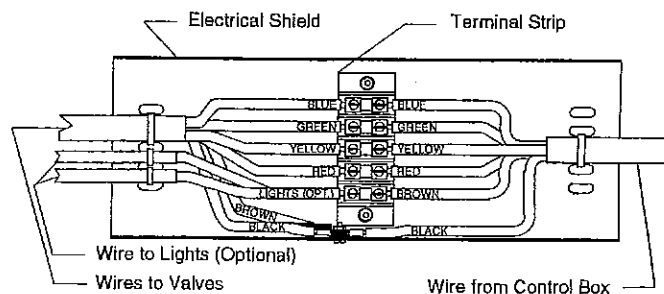


FIGURE 70 - JUNCTION BOX

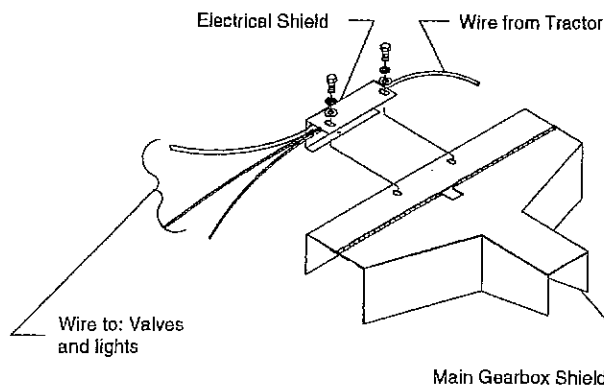


FIGURE 71 - ELECTRICAL JUNCTION ASSEMBLY

Route valve wire from junction box to valve assembly. Connect as shown (see Figure 72, page 48). Secure all loose sections of wire.

ASSEMBLY OF BEET HARVESTER

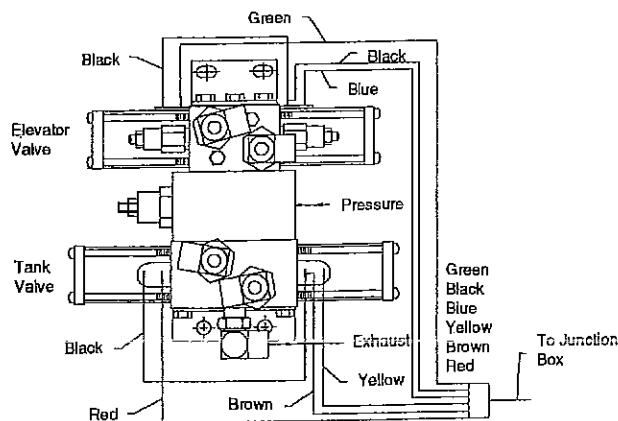


FIGURE 72 - VALVE ELECTRICAL CONNECTION

INSTALLING LIGHT PACKAGE

Choose locations where light is desired during operation after dark. Position brackets to mount lights in chosen locations.

NOTE: Bar is provided for support when mounting to mesh on tank.

Drill 13/32" (.406) dia. holes where necessary and attach brackets (holes are provided for bracket on front and back of truck elevator). Install lights through 17/32" (.531) dia. holes in brackets and secure in position. Crimp 3/8" ring terminals for 18 ga. wire on one wire of each light. Ground all ring terminals to frame bolts on light brackets.

Connect black wires between lights using wire cap nuts (no more than two lights per wire run). Attach the lead end of the light wires to the brown wire on the terminal strip located behind main gearbox shield (see Figure 68).

NOTE: Light wires must be attached to brown wire from tractor.

NOTE: Four lights maximum - 200 watts maximum.

Secure all loose sections of wire.

REVIEW THE MACHINE

Generally review the machine for:

- Any loose bolts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation (see figure 2, page 8).
- Hydraulic cylinders and hoses are properly installed.
- Electric wires being adequately secured to prevent damage.
- Oil level in gear box up to fill plug.
- All shields and guards are in place.
- Proper installation of any options.
- Check tire pressure. Inflate implement tires to 45 psi and traction tires to 25 psi.

TEST RUN HARVESTER



CAUTION: Before test running harvester keep all children and bystanders away from the machine.

Run tractor at low RPM, slowly engage PTO. Check operation of machine at low RPM. Slowly increase RPMs to proper operating speed of 1000 RPM.

Check operation, alignment and clearances of all moving parts. Make any necessary adjustments.



CAUTION: Keep well clear of moving parts. Be sure to shut off tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

Cycle tank and elevator drives and continue to run machine for 10 to 15 minutes. After running is complete and movement has stopped, re-check machine for any loose hardware and re-check drives.

SPECIFICATIONS

690 BEET HARVESTER GENERAL DESCRIPTION

MODEL

4 or 6 Row Tank Type Harvester

OVERALL DIMENSIONS

Transport 14'H x 21'6"W x 18'L
Operating 15'3"H x 27'W x 18'L
Machine Weight 15,000 lbs

TIRES

Tread Width Adjustable to row spacing
Tires Implement 11.00-16 12 Ply
Traction 13.50 x 16.1 6 Ply
Operating pressure 45 psi (Implement)
25 psi (Traction)

TANK

Construction Welded Steel
Capacity 9,000 pounds
Unloading Chain type conveyor, actuated by electro-hydraulic valve and hydraulic motor

ROW SPACING

4 rows 28" to 30"
6 rows 22" to 24"
Operating Speed 4.5
Lift and depth control* hydraulic
Steering hitch control** hydraulic

*Requires 5" x 8" remote cylinder (not furnished)

**Requires 4" x 8" remote hydraulic cylinder (not furnished)

LIFTER WHEELS

(2 per row) 28" solid rim heavy duty cast steel

LIFTER STRUTS

Heavy duty tapered bearings

LIFTER WHEEL SCRAPERS

To prevent mud buildup on lifter wheels

PADDLE SHAFT AND DRIVE

Type Three steel per row
Drive Heavy #80 roller chain with heavy duty slip clutch

CENTER GEARBOX

Heavy, 1-3/4" Diameter Shafts
Capacity - 5 Qts. 90W Gear Oil

BED CHAIN AND DRIVE

Size 25 sq. ft.
Type Three 42-inch wide draper chain
Drive #60H roller chain with friction clutch protection

GRAB ROLLS AND DRIVE

Size 35 sq. ft.
Type Three 6-5/8-inch grab rolls with 3/4" spiral rods and three 5-inch smooth grab rolls adjustable spring loading and spacing
Drive Belt drives with spring loaded idlers

TRUCK TO TANK LOADING ELEVATOR

Size Width, 40-inch 56mm pitch belt-ed chain
Type Electro-hydraulic valve and hydraulic motor driven belted chain, reversible for tank or truck loading, retractable for transport.

TIGHTENING TORQUE GUIDE SAE GRADE 5 - COARSE THREAD

SIZE	CLAMP LOAD	PLAIN	PLATED
1/4 - 20(.250)	2,025	8 ft. lbs.	76 in. lbs.
5/16 - 18(.3125)	3,338	17 ft. lbs.	13 ft. lbs.
3/8 - 16(.375)	4,950	31 ft. lbs.	23 ft. lbs.
7/16 - 14(.4375)	6,788	50 ft. lbs.	37 ft. lbs.
1/2 - 13(.500)	9,075	76 ft. lbs.	57 ft. lbs.
9/16 - 12(.5625)	11,625	109 ft. lbs.	82 ft. lbs.
5/8 - 11(.625)	14,400	150 ft. lbs.	112 ft. lbs.
3/4 - 10(.750)	21,300	266 ft. lbs.	200 ft. lbs.
7/8 - 9(.875)	29,475	430 ft. lbs.	322 ft. lbs.
1 - 8(1.00)	38,625	644 ft. lbs.	483 ft. lbs.
1-1/8 - 7(1.125)	42,375	794 ft. lbs.	596 ft. lbs.

IDENTIFICATION OF SAE BOLT GRADES; HEAD MARKINGS

Grades 0, 1, and 2 no markings



Grade 5: 3 radial dashes 120° apart



Grade 8: 6 radial dashes 60° apart



SPECIFICATIONS

TRACTOR REQUIREMENTS

RECOMMENDED HORSEPOWER RATING

4, 6 row 150 PTO HP (minimum)

REMOTE CYLINDERS: (NOT FURNISHED)

(1) 4" x 8" and (1) 5" x 8"

HYDRAULICS REQUIREMENTS

Tractor must be equipped with three remote hydraulic outlets, four remotes if equipped with steerable wheels. The tractor must be capable of supplying 22 gpm flow. If using the "Power Beyond" connect to the row finder, tank and elevator drives.

PTO SHAFT

Tractors must have 1-3/8" or 1-3/4" diameter 1000 rpm PTO shaft. (Do Not use and adapter shaft.)

FRONT BALLAST

Maximum tractor front ballast is required.

DRAWBAR SUPPORT (RECOMMENDED)

ELECTRICAL SYSTEM

12-Volt

ATTACHMENTS

ROW FINDER

To keep the harvester on the row.

LIFTER WHEEL CLOSE-UPS

To prevent loss of small beets through lifter wheels

LIFTER WHEEL SPACERS

To increase lifter wheel opening by 1/4" increments

LIFTER WHEEL CUSHIONS

To protect lifter wheels in rocky soil conditions (standard on flex struts).

CONSTANT VELOCITY PTO

Allows turning without disengaging PTO

FLASHING WARNING LIGHT KIT

Recommended where regulations allow when towing harvester. Order JTY15263

LIGHT PACKAGE

To light machine for night use (3 sealed beam halogen lights)

FIXED OR STEERABLE WHEELS

EXTRA FIXED OR STEERABLE CARRIER STRUT

Helps flotation in very wet conditions.

601
602
603
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605
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607



Quality Manufacturers of:

- **Portable Mixer-Processor**

105 bu. or 150 bu. tank sizes with optional Hopper, HammerMill (20" & 26") or RollerMill (20", 30", 20" 2-High & 20" Ear Corn).

- **GRIXXER - Mixer-Processor**

Economical portable 105 bu. Grinder Mixer with a 20" HammerMill - other options available.

- **Stationary Feed Systems for All Feed Grains**

1 Ton, 2 Ton or 3 Ton vertical mixing tank. Micro Ingredient, multiple scale, and full automation options available.

- **HammerMills**

6", 20" or 26" electrically driven mills.
20" or 26" PTO driven mills.

- **RollerMills**

10", 20", 30" or 36" PTO or electrically driven mills.

- **UltRaMix - Mixing/Feed Wagon**

175 bu. or 250 bu. box capacity.

- **Ag Scale**

Indicators - from basic weighing to a computerized system that will manage the most complex operation imaginable.

Platform Scales.

Universal Scales.

Small Animal Scales.

- **Flail Shredders**

144", 180" & 240" cutting widths.

- **Finishing Mowers and Rotary Cutters**

60" or 72" Rear Mount and Mid-Mount Mowers.

60", 72" or 84" Cutters.

- **Eversman PreSeeder**

15' to 30' tillage tool that prepares the ideal seed bed, incorporates chemicals and plants in one pass.

- **Eversman Ditchers**

43" to 84" ditch width.

20" to 33" ditch depth.

- **Eversman Land Levelers**

9'3" to 14' cutting blade width.

19" to 30" cutting blade depth.

- **Eversman Land Planes**

12', 16', 20' & 24' blade widths.

- **Eversman Scrapers**

78" cutting width.

6 to 16'6" struck capacity.

7'6" to 21' heaped capacity.

- **Sugar Beet Defoliators**

4 to 8 row defoliators with different row spacings. Optional hydraulic or mechanical scalpers.

- **Sugar Beet Harvesters**

4 to 8 row harvesters with different row spacings.

- **Mega Tater**

4-row potato harvester.

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