

100K SYNCHRONOUS THINNER



JOHN DEERE

OPERATORS MANUAL 100K SYNCHRONOUS THINNER

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To the Purchaser

This new thinner was carefully designed and manufactured to give years of dependable service. To keep it running efficiently, read the instructions in this operator's manual. Each section is clearly identified so you can easily find the information you need—whether it is advance planning, operation, lubrication, trouble shooting, service, removal and storage or installation. Read the Table of Contents to learn where each is located. Use the alphabetical index for fast reference.

Should your thinner require replacement parts go to your John Deere dealer where you can obtain Genuine John Deere Parts -- accept no substitutes. Genuine John Deere Parts fit properly and insure satisfactory service because they are made from the original patterns and from the same materials as used in new machines.

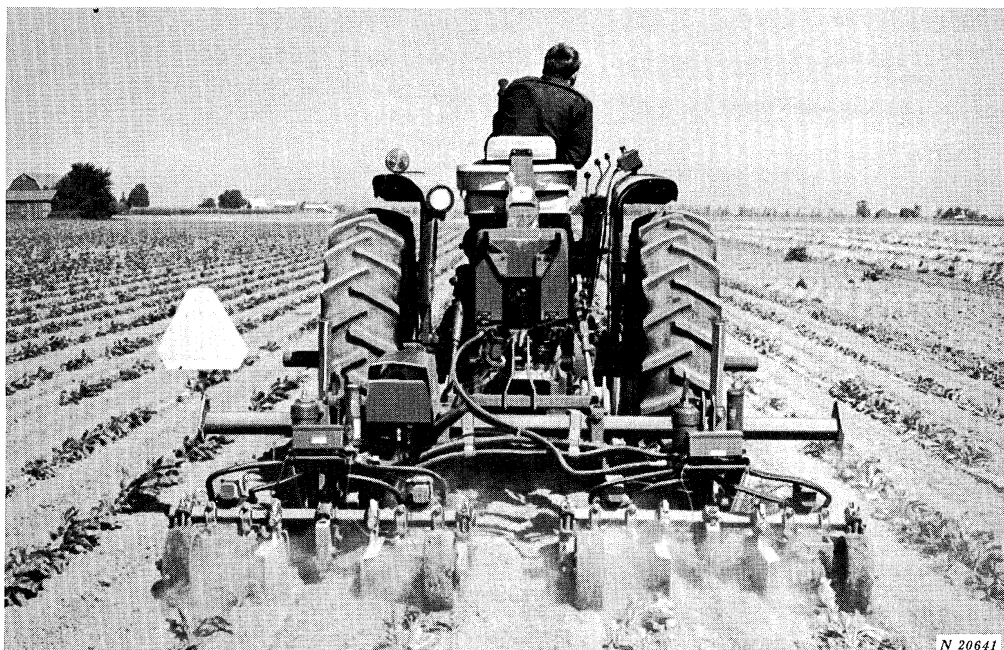
"Right-hand" and "left-hand" sides are determined by facing the direction the thinner will travel when in use.

Record your thinner serial numbers in the space provided on page 53. Your dealer needs this information to give you prompt, efficient service when you order parts or attachments.

The warranty on this thinner appears on your copy of the purchase order which you should have received from your dealer when you purchased the thinner.



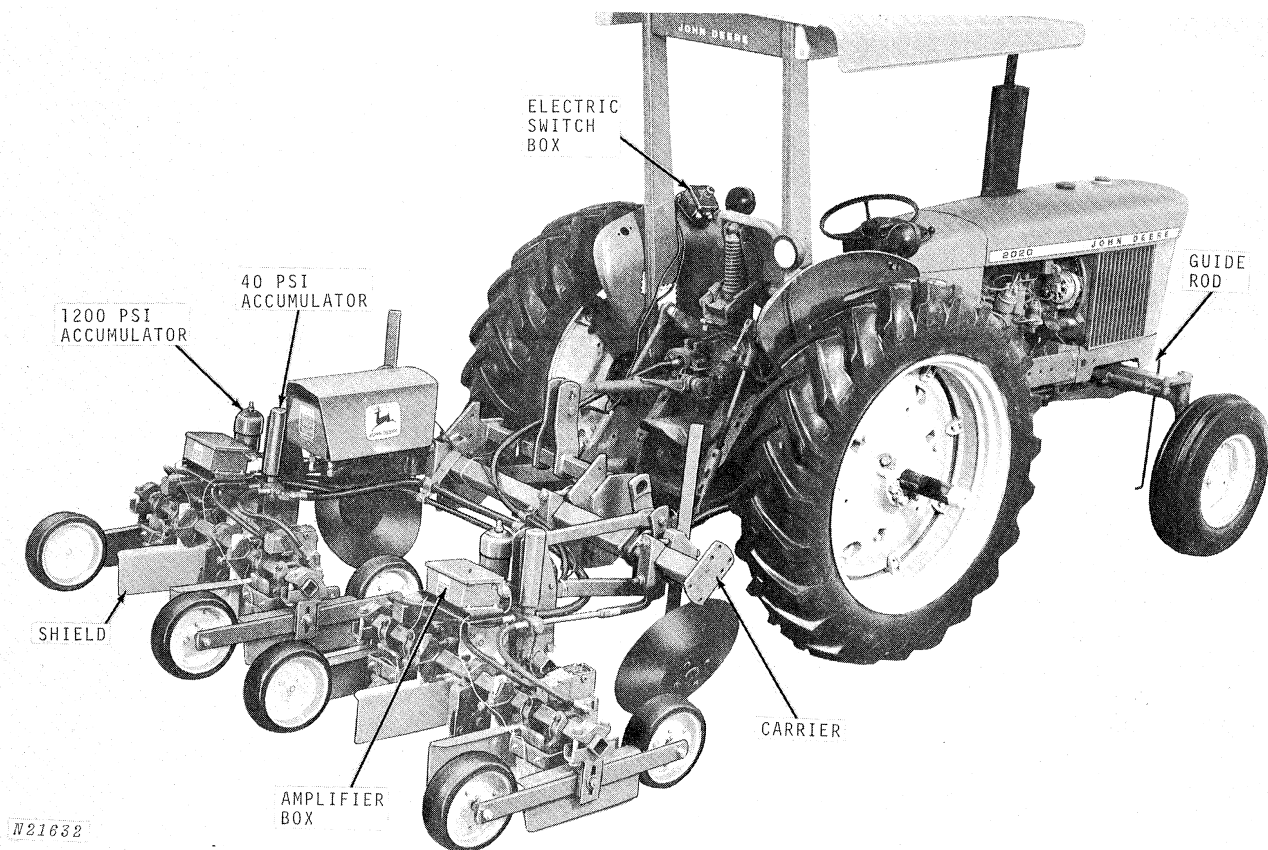
This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.



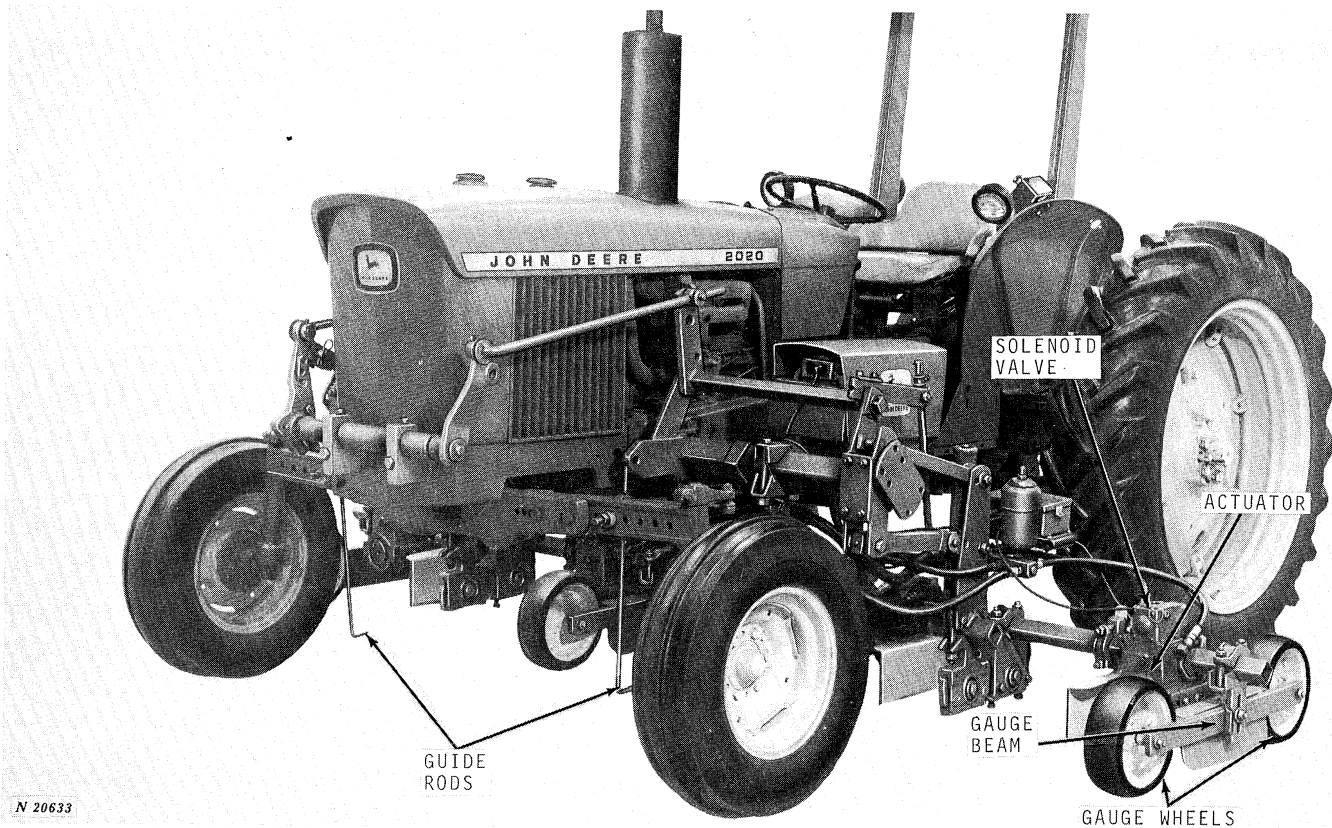


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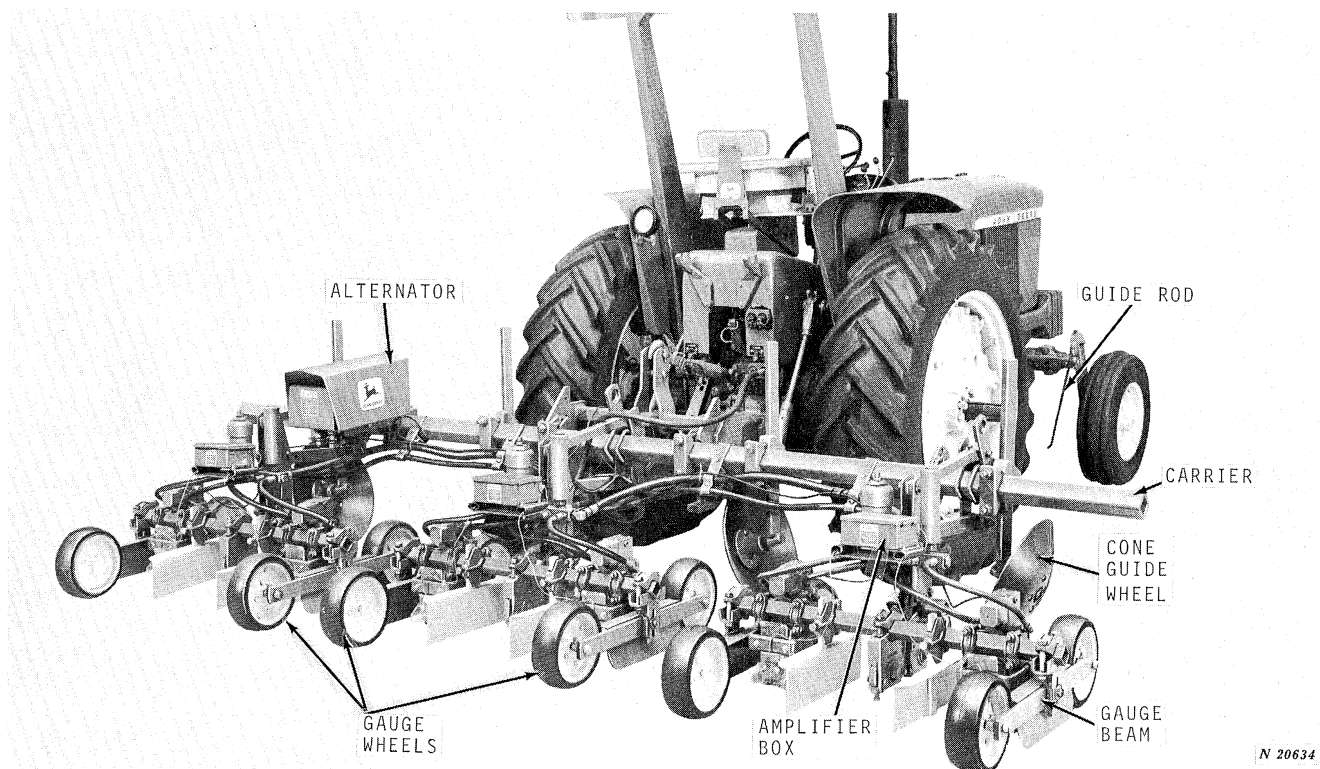
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John Deere 114K-30 Synchronous Thinner Mounted on 55KBG Carrier



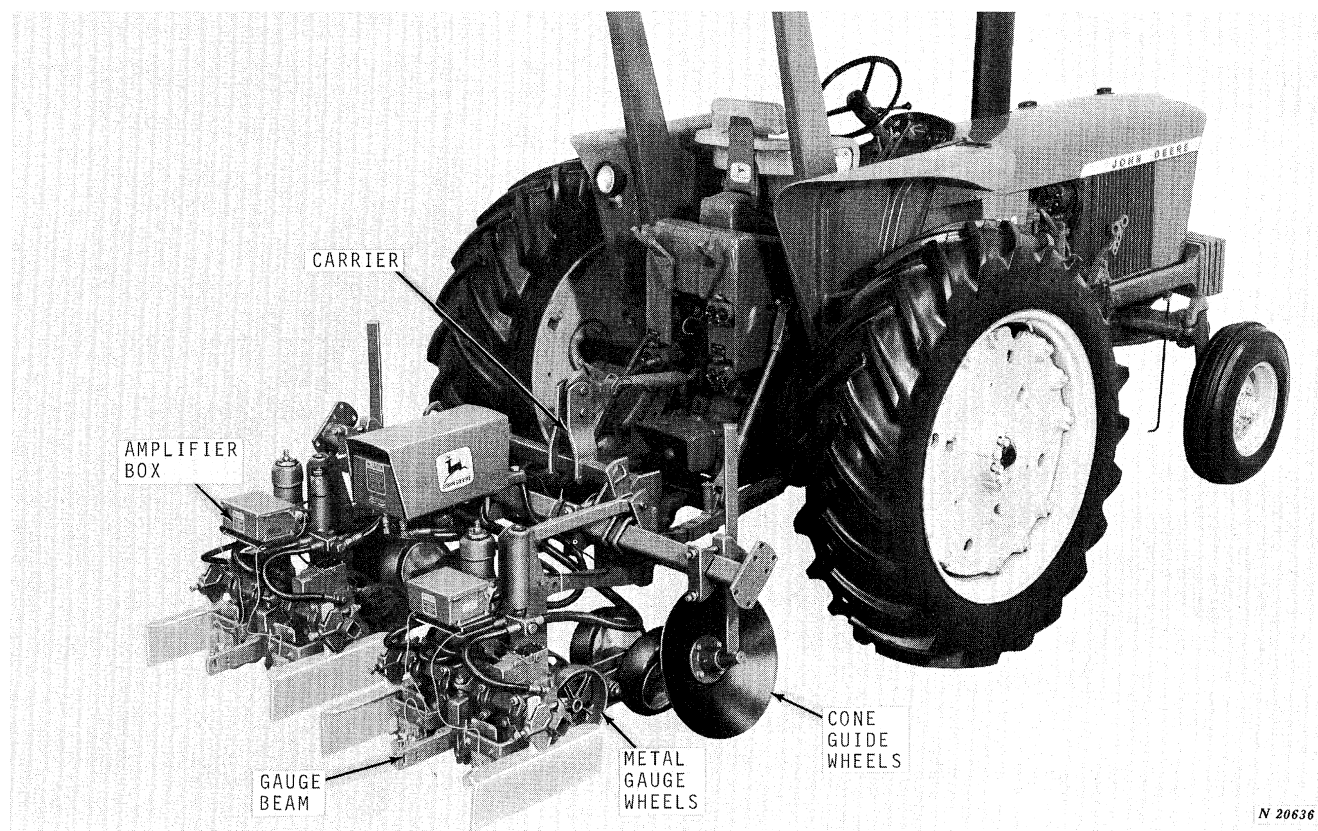
John Deere 114K-40 Synchronous Thinner Mounted on 53K2 Carrier



John Deere 116K Synchronous Thinner Mounted on 55KCGE Carrier

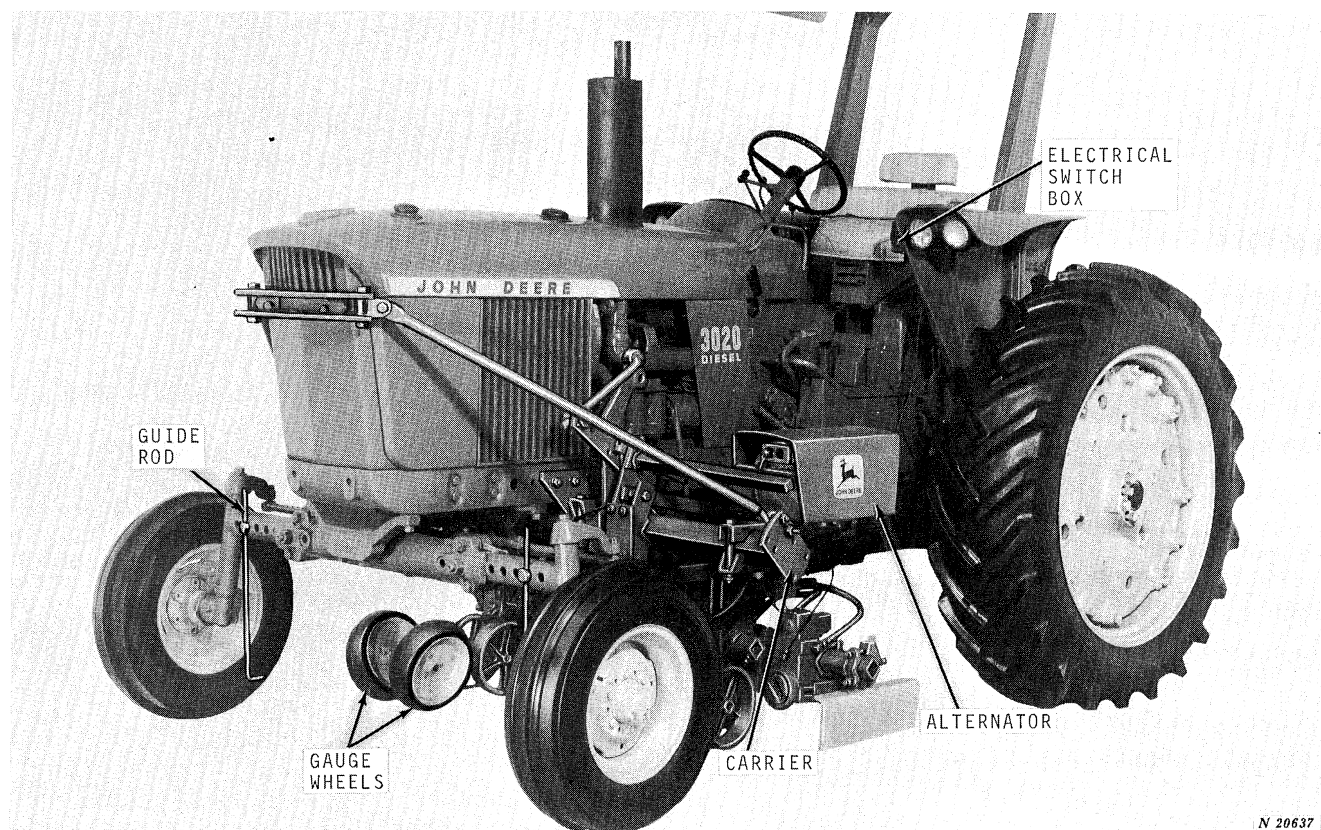


John Deere 116K Synchronous Thinner Mounted on 54KBE Carrier



N 20636

John Deere 124K Synchronous Thinner Mounted on 55KBG Carrier



N 20637

John Deere 124K Synchronous Thinner Mounted on 54KB Carrier



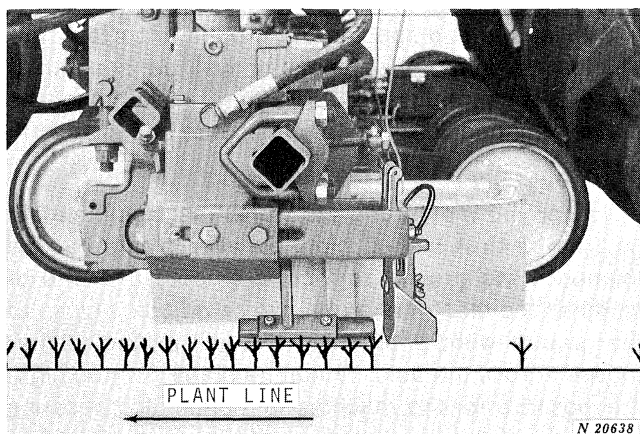
Description

GENERAL

John Deere 100K Synchronous Thinners are available in seven different models to thin various crops planted under various conditions. The operating principle of all models is the same. The distinctions concern the type of row units and the number of rows or seedlines each is designed to thin.

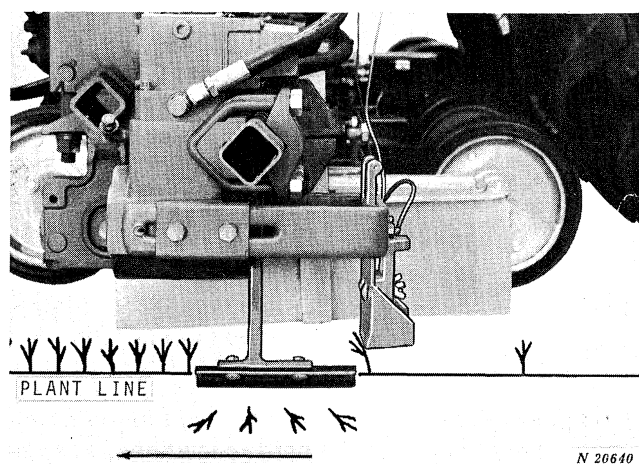
Row units are of two types, single-row units and double-row units. The single-row unit thinners are for crops, such as cotton, sugarbeets, etc., planted one seedline per bed. The single-row unit actuators are spaced from 22 to 40 inches apart. The double-row units are for crops, such as lettuce, broccoli, cabbage, etc., planted two seedlines per bed. The double-row unit actuators are spaced from 12 to 15 inches apart.

HOW IT WORKS



The thinner row unit (moving left in picture above) approaches the plant. The operation begins when the plastic shield on the probe touches the outer edge of the leaf. The shield folds the leaves forward until the probe is over the center of the plant. This is to prevent the leaves from contacting the electronic probe, which would activate the knife too soon.

As the unit continues to move along the row, and the shield folds the leaves forward, the electronic probe touches the plant near the plant's center. Contacting the plant completes an electric circuit, and generates a signal to a solenoid valve. The valve directs hydraulic oil to activate a piston in the actuator which, in turn, moves the knife.

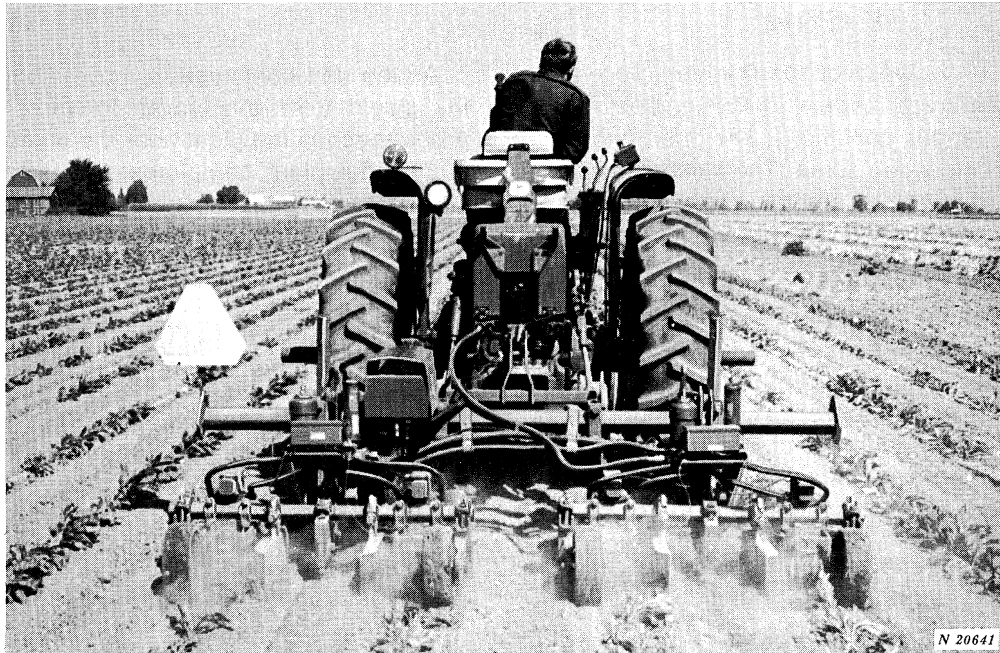


When activated by the signal from the probe, the knife swings across the row at an extremely high speed. (From the time the probe touches the plant until the knife completes its swing, time lapse is only 28/1,000 second.) This speed assures that the knife will pass close enough to the plant sensed to leave single plants and provides enough force to cut out excess plants, for a distance equal to the length of the knife.

At the end of the swing across the row in one direction, the knife and knife arm are stopped hydraulically. When the shield and probe contact the next plant, the same series of electrical and hydraulic actions take place; the knife swings back across the plant line, again clearing out excess plants. As the process is repeated down the row, a stand of young plants properly spaced for maximum growth, is left to mature.



Advance Planning



Advance planning and field work is required for efficient operation of the thinner. Follow these recommended steps:

1. Field surface should be firm and as smooth as possible. This is necessary for accurate gauging and maintaining uniform height of the electrical probe. An irregular surface could cause the gauge wheels to (1) raise the probe above the plants, resulting in no thinning or (2) permit the probe to touch the soil and activate the knife, taking out a plant that should be saved.

2. The plant line should be free of clods as a clod can complete the electrical circuit and activate the knife. In this case the clod would be saved and the plant in front would be removed. Cultivating before thinning is normally not recommended. If it is necessary to cultivate and if clods appear in the plant line, roll the field a day or two before thinning. **NOTE:** Be sure plants will tolerate rolling before doing so.

3. Planting and spacing the crop is important. For efficient thinning, the plants should be spaced at least 2 inches apart. If the plants are too close, the thinner will consider two plants as one and save both plants.

4. For the most accurate work, the plants should be from 1 to 4 inches high. Smaller plants can be thinned if the ground surface is smooth and free of clods so the electrical probe can be adjusted close to the ground without touching the soil as the thinner moves across the field. When the plants are too high, it is possible for the machine to malfunction because of trash or cutout plants accumulating and contacting the electrical probe.

5. There should not be any weeds in the plant line as a weed will activate the knife the same as the plants to be saved.



Operation

CONTROLS

Before attempting to operate your new thinner, acquaint yourself with the location and function of all controls.

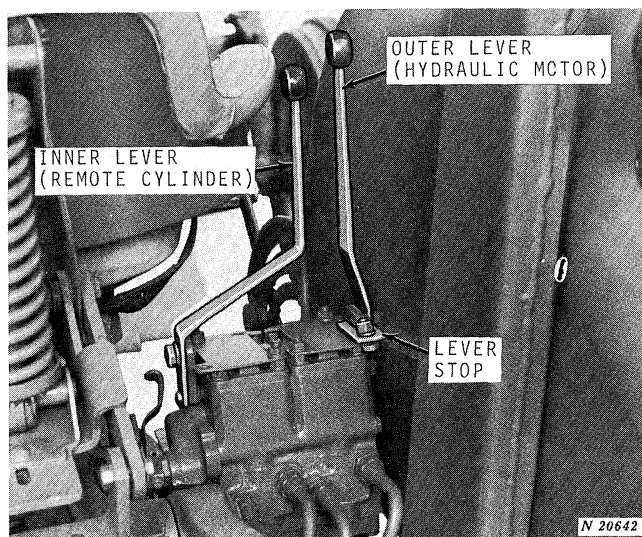
All controls are located within easy reach of the tractor seat. Refer to the illustrations for the location and name of the various controls.

Remote Cylinder Operating Levers

One remote cylinder operating lever raises and lowers the front-mounted thinner. The rockshaft control lever raises and lowers the rear-mounted thinner.

The other operating lever provides constant hydraulic pressure to operate the alternator and the actuators. *NOTE: It is necessary to keep this lever in the operating position to provide constant hydraulic pressure.*

1020, 1520, and 2020 Tractors



The lever stop is attached to hold the outer lever in the operating position. This lever will provide constant hydraulic pressure.

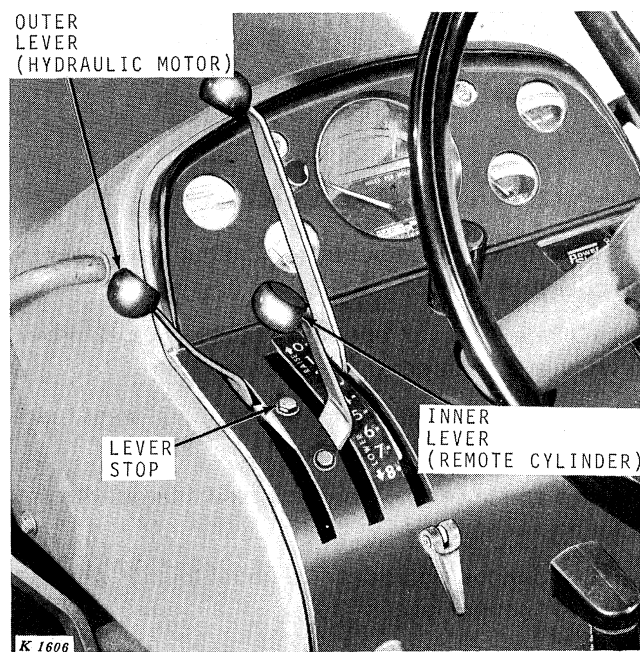
To hold the lever in operating position, push lever forward, and rotate lever stop into position to secure lever.

To release lever stop, rotate away from lever.

Raise and lower the front-mounted thinner with the inner operating lever.

Raise and lower the rear-mounted thinner with the rockshaft control lever.

3020 (Below Serial No. 123,000) and 4020 (Below Serial No. 201,000) Tractors



The lever stop is attached to hold the outer lever in the operating position..

CONTROLS—Continued

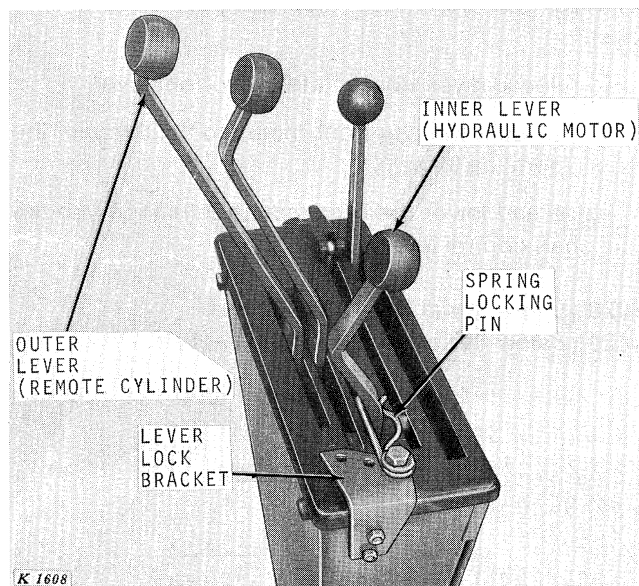
To place lever in operating position, push lever up.

To release lever to neutral position, push lever to the left and return lever past the stop to neutral.

Raise and lower the thinner with the inner operating lever.

NOTE: The lever stop must be removed when operating other implements which require regular detent action. To remove lever stop, remove tractor cowl and remove two bolts securing lever stop. Replace cowl.

**2520, 4000, 3020 (Serial No. 123,000 and Above),
4020 (Serial No. 201,000 and Above) and
4320 Tractors**



The lever stop is attached to hold the inner lever in the operating position.

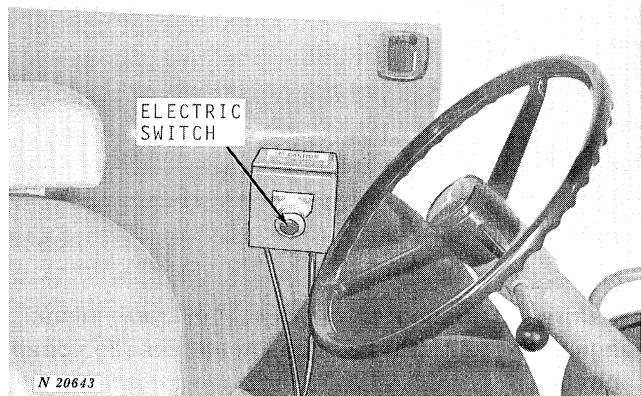
To place lever in operating position, push lever forward until secured by spring locking pin.

To release lever to neutral position, pull lever rearward from spring locking pin.

Raise and lower the front-mounted thinner with the outer operating lever.

Raise and lower the rear-mounted thinner with the rockshaft control lever.

Electric Switch



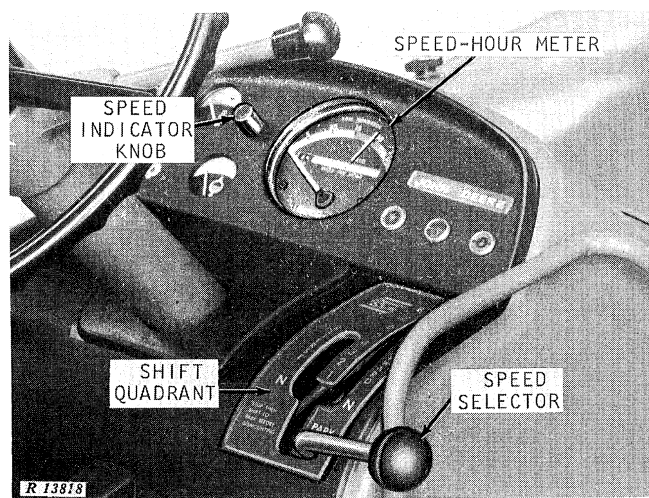
The electric switch is mounted on the left-hand tractor fender.

The alternator supplies 110 volts of electric current for operation of the solenoid valve and sensing circuit, through the amplifier. The electric switch controls the electrical power to the amplifier.

To turn switch on, pull switch out; to turn off, push switch in.

For storage, the switch box can be removed from the switch bracket by lifting box up and storing with thinner.

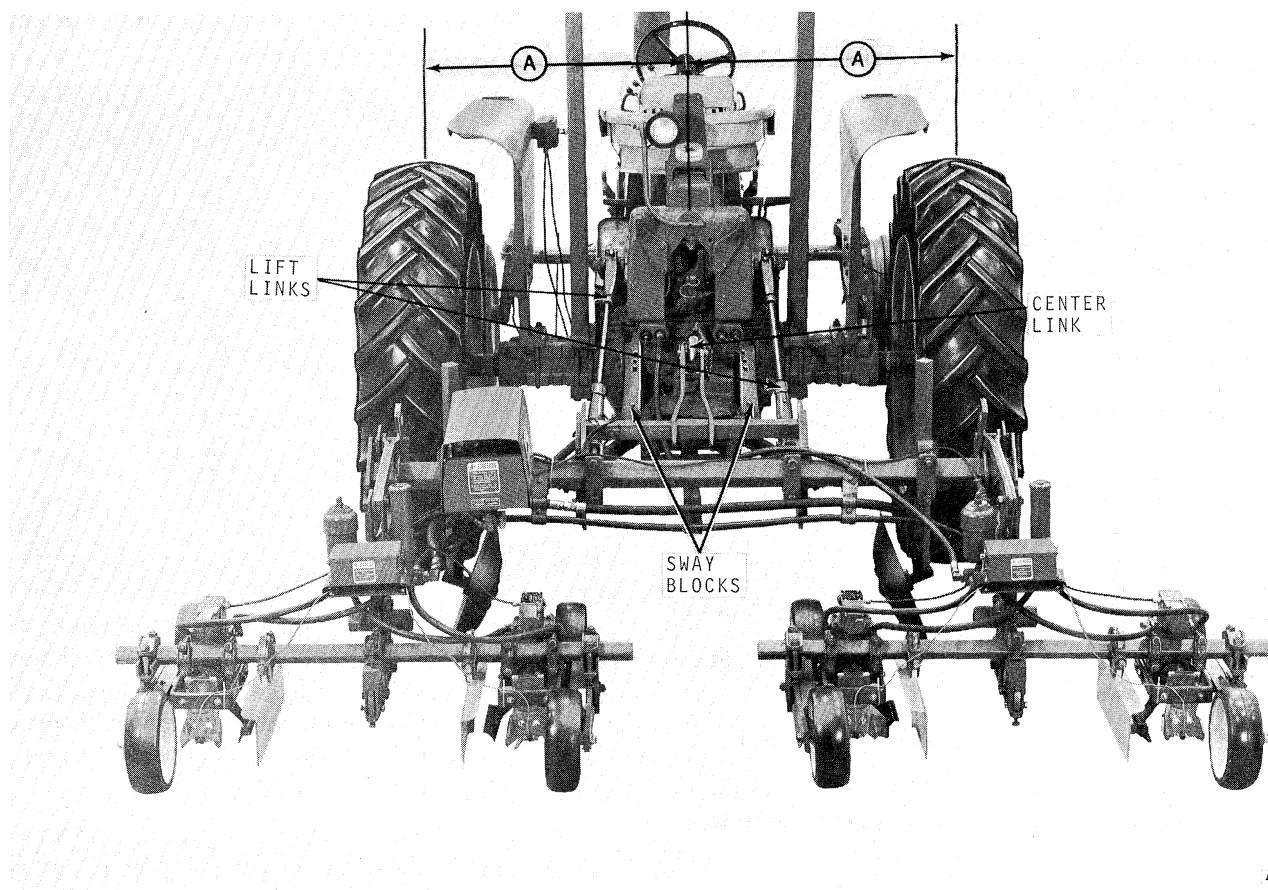
Selecting Speed



Speed Indicator Knob and Speed Selector

With engine running at required rpm (See "Field Operation," page 15) to supply enough hydraulic oil for your size thinner, turn speed indicator knob to the gear which shows 3 mph at the required rpm. Drive tractor in that gear.

PREPARING THE TRACTOR



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Wheel Spacing

Set tractor wheels to operate in the center of the rows or furrows. Measure from center-to-center of tires and be sure tractor wheels are spaced equidistance from the center of the tractor as at "A" above.

See your tractor operator's manual for correct tire inflation pressure and rear wheel ballast.

Sway Blocks (Rear-Mounted Thinners Only)

Place sway blocks in the upper position in category 2 or wide setting as shown above.

See your tractor operator's manual for installation.

Lift Links and Center Link (Rear-Mounted Thinners Only)

Adjust the lift links and center link to their normal operating length. See your tractor operator's manual for normal length.

Front End Weights (Rear-Mounted Thinners Only)

Front end weights may be necessary for increased stability and steering control. See your tractor operator's manual.

ADJUSTMENTS

The length and quality of service you receive from your new thinner depends on the correct operating adjustments to meet varying crop and field conditions, thorough lubrication, and regular service.

Shop Adjustments

Make the following step-by-step checks and adjustments before taking your thinner to the field.

IMPORTANT: Position your thinner on a level surface before adjusting.

1. Lubrication, Oil Level and Overall Checks

Lubricate thinner according to the lubrication instructions (see pages 20 and 21).

Check hydraulic oil level in tractor (see tractor operator's manual).

Check for damaged wires (bad insulation), and loose or broken wires.

Check all bolts for tightness, especially knife, knife arm, and clamp bolts.

Clean probe with file to remove any build-up of foreign material.



CAUTION: DO NOT touch probe while switch is on. Turn off electric switch and shut off tractor engine.

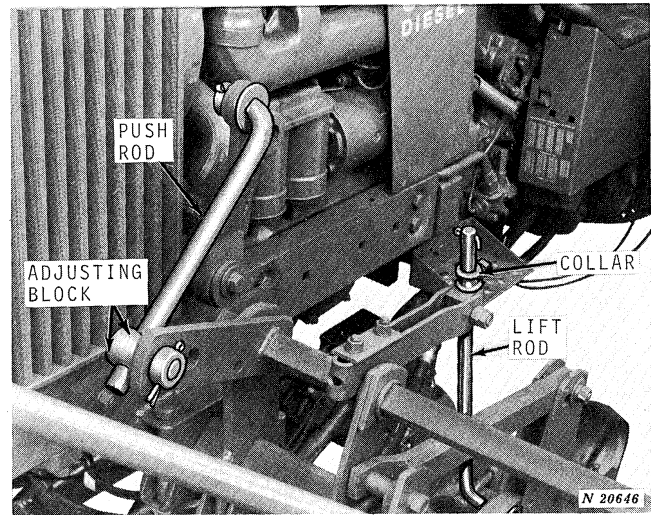
2. Dimensions

Check the following dimensions (see diagrams on pages 41 through 49).

- Actuator row spacing
- Gauge wheel row spacing
- Rig hanger location
- Shield location

Cone guide wheels or coulter location (rear-mounted thinners only). Set each one the same height.

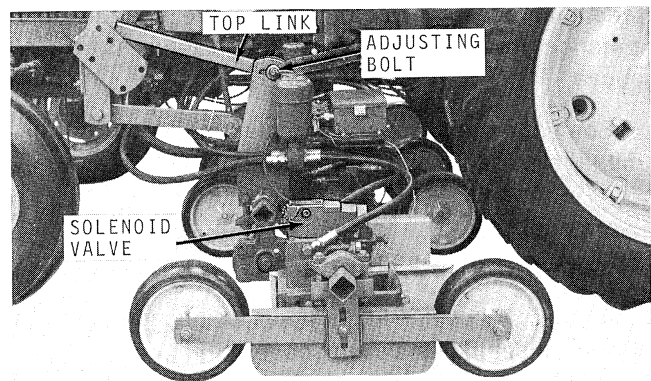
3. Lift Rod and Push Rod (Front-Mounted Thinners Only)



Adjust each lift rod for minimum lift by setting the set screw collar at the top of the rod. Lift thinner slowly, checking to see if it is level on both sides. Lower set screw collar on the lift rod if thinner is lower on one side than the other. Adjust until thinner has equal transport clearance on both sides.

Lift thinner slowly and check clearance under the tractor. Loosen set screw in adjusting block and adjust push rod length to allow a full stroke of the remote cylinder when the thinner clears under the tractor.

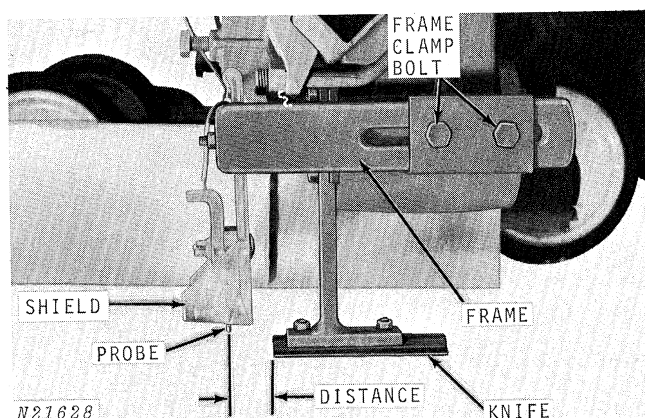
4. Leveling - Front-to-Rear



Sight across the top of the solenoid valves to check if they are level with each other and with the floor. If not, loosen the adjusting bolt on the rig hanger and adjust hanger until valves are level with each other and the floor. Tighten adjusting bolt.

On rear-mounted thinners check to see if they are level with the ground. If not, adjust center link until valves are level with the ground.

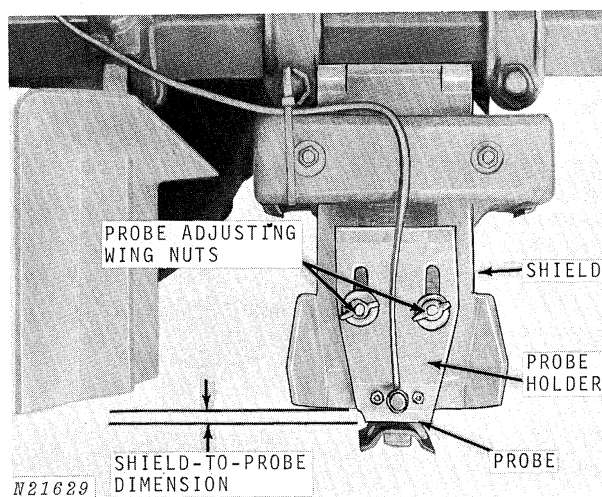
5. Knife-to-Probe Distance



The best starting point for knife-to-probe distance is 1-1/8-inch from the end of the knife to the face of the probe.

Adjust to this distance by loosening the frame clamp bolts (two on each side). Slide the frame forward or backward in slot to achieve this distance. Tighten clamp bolts.

6. Probe-to-Shield Distance

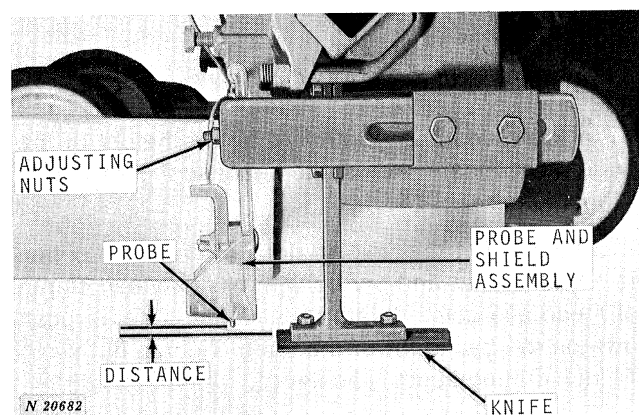


Adjust the probe in relation to shield, according to the crop being thinned.

Crop	Bottom Edge of Shield to Bottom Edge of Probe
Beets	1/8 to 1/2 inch
Lettuce	1/8 to 3/16 inch
Broccoli	1/2 to 1 inch
Cabbage	1/2 to 1 inch
Cotton	1/2 to 1 inch
Tomatoes	1/2 to 1 inch

To adjust the probe, loosen the wing nuts and move the probe holder up or down in relation to the shield to achieve the desired distance. Tighten wing nuts as tight as possible by hand.

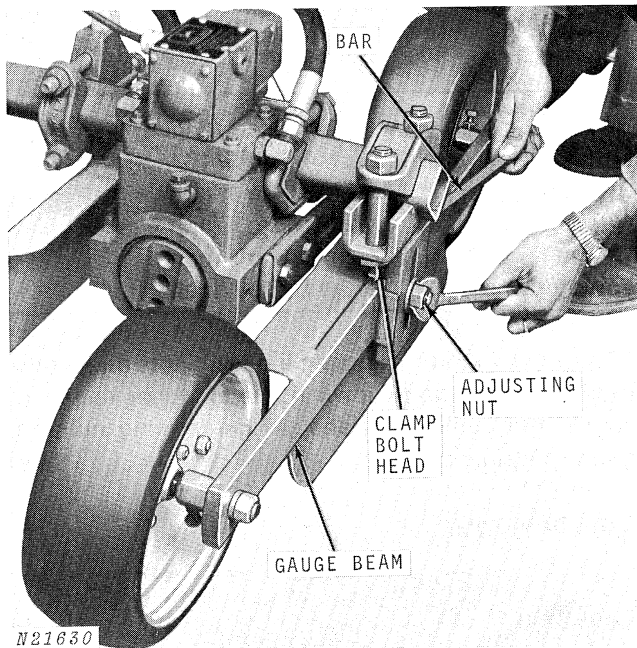
7. Probe Height



The best starting point for the probe height distance is 13/16 inch above the top edge of the knife.

To adjust, loosen the shield clamp adjusting nuts and lower or raise the probe 13/16 inch from top of knife. Tighten adjusting nuts.

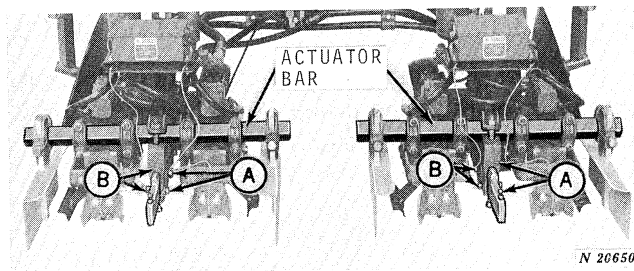
8. Knife Cutting Depth - Single-Row Thinner



The knife depth is controlled by the height of the gauge wheel beam. Adjust the beam so the knife cuts 1/4 inch deep.

To adjust, set the unit on floor or ground. Loosen the adjusting nut and pry up with bar between clamp bolt head and gauge beam to raise the knife, or push down on the bar to lower the knife. Tighten nut when 1/4 inch cutting depth is achieved.

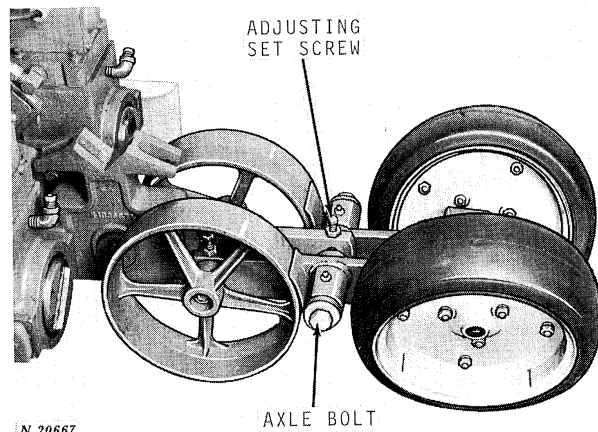
9. Knife Cutting Depth - Double-Row Thinner



Level the two actuators on each gauge beam to allow each actuator knife to work at the same depth.

Place the weight of the thinner on the gauge wheels on a flat surface.

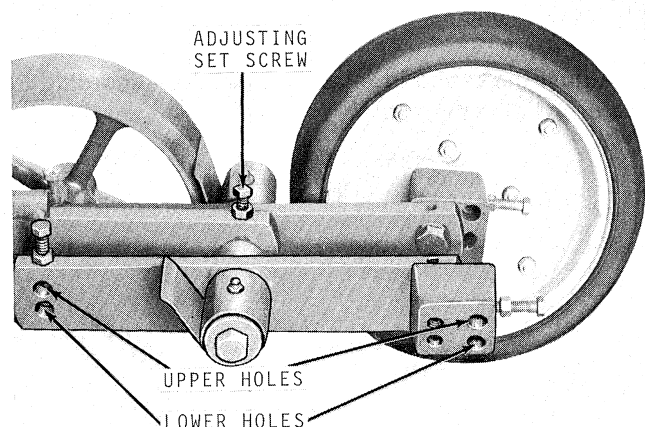
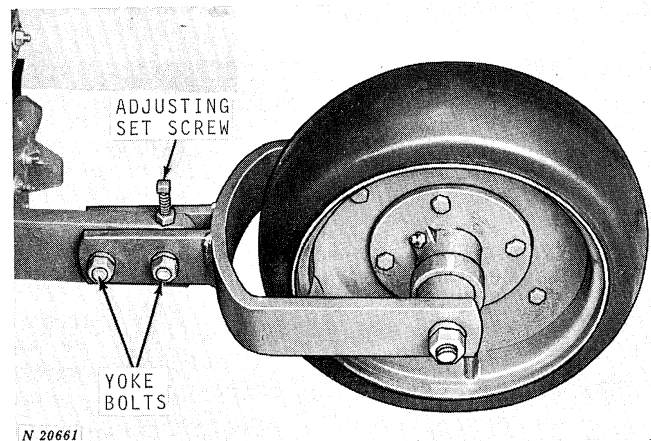
To level, loosen the cap screws, ("A" or "B") on the side that is high and tighten the opposite screws to locate the two actuators the same height above the floor or ground. Tighten all cap screws to hold the adjustment.



The knife depth of cut is controlled by the gauge wheels and center link of tractor and top link of hangers. Adjust top and center link until all actuators are level with the ground.

To adjust, loosen axle bolt and adjust set screw up or down to achieve depth of cut.

If thinner is equipped with rear gauge wheel, loosen yoke bolts and adjust set screw the same as the front gauge wheels.

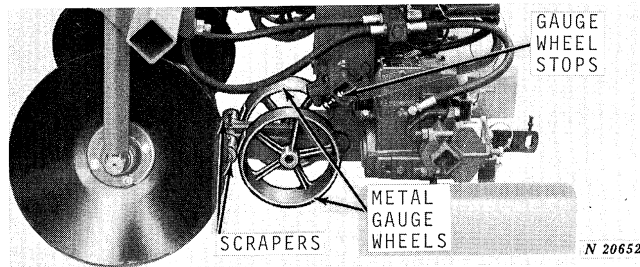


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If further adjustment is necessary to achieve the depth of cut (1/4 inch), reposition gauge wheels in the other set of holes (upper or lower). Adjust set screw to achieve desired knife depth.

If further adjustment is required remove gauge wheels and rotate gauge wheel beam 180°. The knife will be at its highest position when the beam is turned with the grease fitting on top.

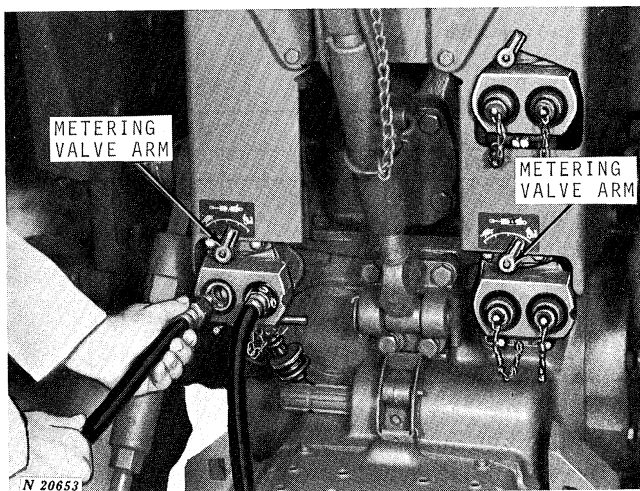
10. Gauge Wheel Stops and Scrapers - Double-Row Thinner



Check metal gauge wheels to make sure they turn easily against scrapers. If not, loosen scrapers with screw driver or pry bar.

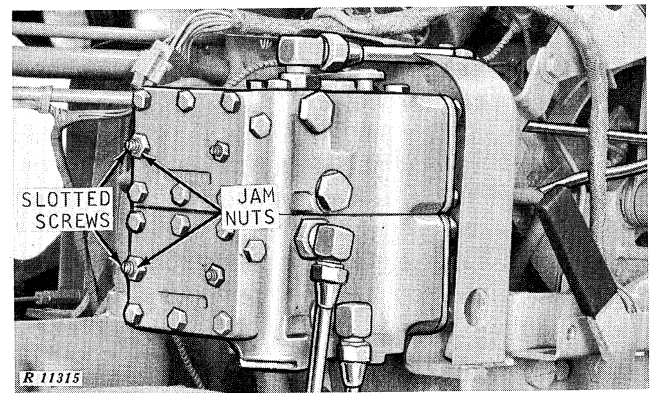
Adjust gauge wheel stops to make sure gauge wheels do not rotate over center when the thinner is raised.

11. Adjusting Tractor Hydraulic Flow to Maximum



If tractor is equipped with metering valve arm, located above breakaway couplers, adjust valve arm to increase the flow of oil.

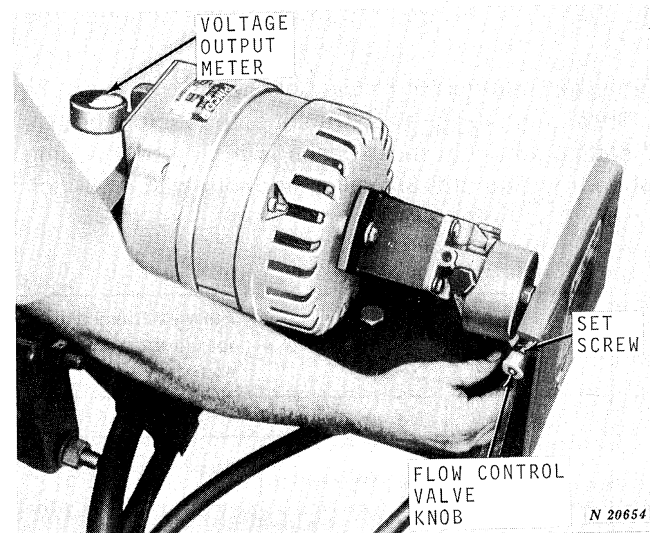
To adjust, loosen the lock nut and turn metering valve arm clockwise as far as it will go to achieve maximum flow of oil. Tighten lock nut.



If tractor is not equipped with metering valve arm, remove the left-hand side shield, reach up under the hood, loosen the jam nuts and turn the slotted screws on the selective control valve counter-clockwise to increase hydraulic oil flow to maximum. Tighten jam nuts.

NOTE: Flow should be adjusted to normal after removing thinner from tractor.

12. Alternator Voltage Output Check and Adjustment



CAUTION: Always stand in front of the carrier boom when checking voltage output of alternator.

The speed of the alternator is controlled by the flow control valve on the hydraulic motor. The higher the speed, the higher the voltage. The voltage output should be 125 volts.

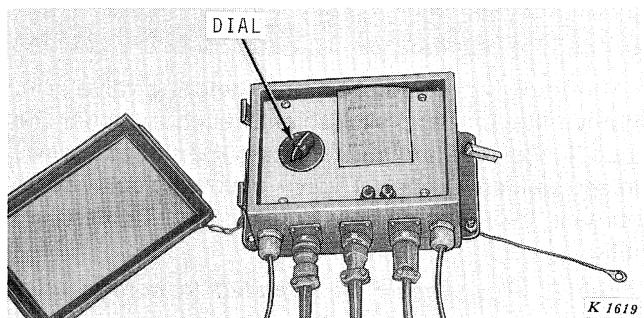
To check the voltage output, first warm up the hydraulic oil then remove the electrical connection from the alternator, **MAKE SURE ELECTRICAL SYSTEM IS OFF**, and insert voltage output meter in alternator. Let tractor engine run at 1500 rpm while checking. If the voltage output is not 125 volts, adjust by loosening locking set screw in knob and turn knob until meter reads 125 volts. Tighten set screw.

13. Amplifier Box

The thinner is equipped with amplifiers with either yellow covers or green covers.

The yellow cover amplifier is adjustable for travel speeds from 1-1/2 to 3 miles per hour.

The green cover amplifier is adjustable for travel speeds from 1-1/2 to 2-1/4 miles per hour.



Inside each amplifier box is a time delay dial with numbers 1 to 6. This time delay dial regulates the

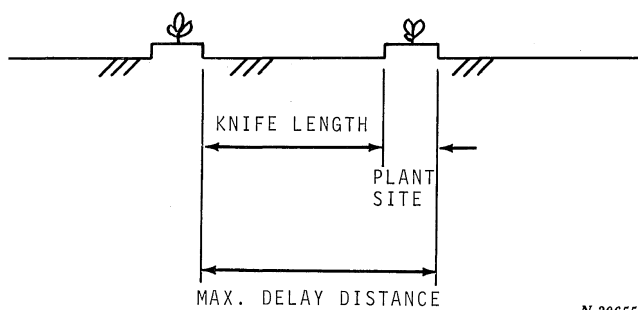
Amplifier Settings for Yellow Cover Box

These time delay dials are set at the factory on No. 2 setting which in most cases is the correct setting when traveling at 2-3/4 miles per hour with an 8-inch knife.

length of time, after the knife has worked until it can be triggered again. This prevents the probe from triggering twice on the same plant.

The smaller the dial number, the shorter the delay distance; the larger the number, the longer the delay distance.

The maximum delay distance is equal to the knife length plus the plant block site.



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If traveling at 3 miles per hour set the dial at No. 1. See chart below for recommended speed and time delay dial setting.

Forward travel distance (delay distance) in inches for different amplifier dial settings and travel speeds.							
Dial Setting	Travel Speed - Miles Per Hour						
	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	3
1	4"	5"	5-1/2"	6-1/2"	7"	7-1/2"	8-1/2"
2	5"	6"	6-1/2"	7-1/2"	8-1/2"	9"	10"
3	6"	7"	8"	9"	10"	11"	12"
4	6-1/2"	8"	9"	10"	11"	12-1/2"	13-1/2"
5	7-1/2"	8-1/2"	10"	11"	12-1/2"	13-1/2"	15"
6	9-1/2"	11"	12-1/2"	14"	16"	17-1/2"	19"

Adjust amplifier dial setting and forward travel speed so that the corresponding delay distance does not exceed the length of the knife by more than 1-1/2-inches.

EXAMPLE: For knife length of 7 inches and a plant site block of 1-1/2 inch the maximum delay distance would be 8-1/2 inches. Referring to the chart above this results in a travel speed of 3 miles per hour and an amplifier dial setting on No. 1.

Amplifier Settings for Green Cover Box

These dials are set at the factory on No. 2 which in most cases is the correct setting when traveling at 1-1/2 miles per hour with an 8-inch knife. If traveling at 2 miles per hour, set the dial at No. 1. See chart below for recommended speed and delay dial setting.

Forward travel distance (delay distance) in inches for different amplifier dial settings and travel speeds.				
Dial No.	Travel Speed - Miles Per Hour			
	1-1/2	1-3/4	2	2-1/4
1	6-1/8"	7-1/8"	8-1/8"	9-1/8"
2	7-1/2"	8-3/4"	10"	11-1/4"
3	8-3/4"	10-1/8"	11-3/4"	13-1/8"
4	10-1/4"	12"	13-1/2"	15-1/4"
5	12-1/4"	14-1/4"	16-1/4"	18-1/4"
6	14-1/2"	16-3/4"	19-1/4"	21-1/2"

Adjust amplifier dial setting and forward travel speed so that the corresponding delay distance does not exceed the length of the knife by more than 1-1/2-inches.

Example: for a knife length of 6 inches and a plant site block of 1-1/8 inches the maximum delay distance would be 7-1/8 inches. Referring to the chart above this results in a travel speed of 1-3/4 miles per hour and an amplifier dial setting on No. 1.

Field Operation and Adjustment

For the thinner to do the most satisfactory job, plants should be from 1-1/2 to 4 inches high. This means that in a large acreage field, thinning should be started when the plants are 1-1/2 inches high.

With the "Shop Adjustments" made, drive thinner to the field and position on rows to be thinned. The thinner should follow the same rows that were planted leaving the guess row between each time.

Starting Thinner

Lock the remote cylinder lever, running the hydraulic motor, in the forward position. The oil is now flowing through the hydraulic motor, running the alternator, that creates the electric current. The oil pressure will swing the knife arms out to the right or left, ready for actuating.

Lower the thinner onto the rows with the operating lever which operates the carrier.

Select correct operating gear with engine running at correct rpm (see chart below) that will give desired travel speed. (See chart on page 14 or chart in left-hand column.)

Pull out on the electric switch to turn it on. The red light indicates switch is on. If the probe is touching a plant, the knife will actuate when the switch is turned on. The knife will keep actuating as long as the probe is touching the plant.

Engage tractor clutch.

MINIMUM TRACTOR RPM				
Tractor	2-Row	4-Row	6-Row	8-Row
1020	1500	1500		
1520	1500	1500	2000	
2020	1500	1500	2000	
2520	1500	1500	1800	2000
3020	1500	1500	1800	2000
4000	1500	1500	1800	2000
4020	1500	1500	1800	2000
4320	1500	1500	1800	2000

Stopping Thinner

Stop forward travel by depressing tractor clutch. Put shift lever in "PARK" position.

Turn electric switch off (push in).

Unlock remote cylinder operating lever which operates hydraulic pressure to alternator; put in neutral position.

Raise thinner off ground with operating lever which operates the carrier.

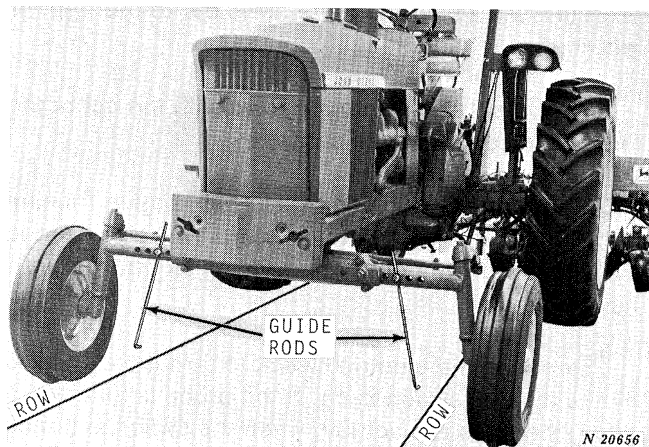


CAUTION: Always turn electric switch off (push in) before dismounting from tractor.

Field Adjustments

Make the following step-by-step checks and adjustments before starting to thin.

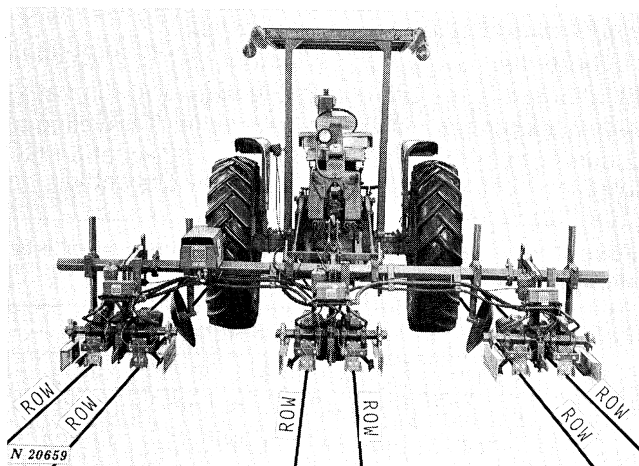
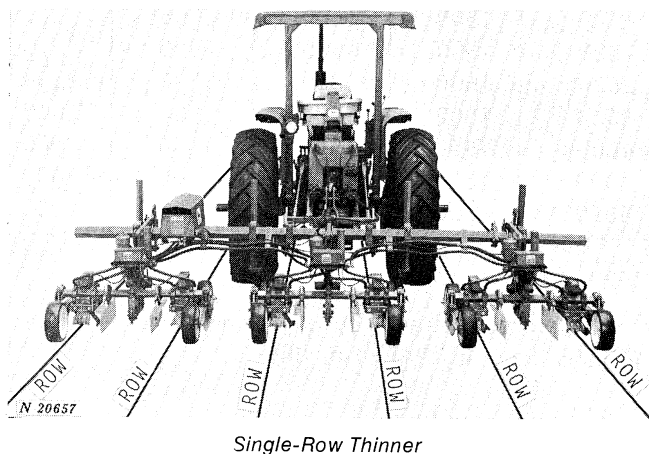
1. Guide Rods



Center each guide rod over the plant row on both sides of the tractor. Lower the rods to the top of the plants. Use the rows that can be seen from the tractor seat.

2. Aligning Thinner

Align thinner on the rows and check the exact gauge wheel and actuator alignment.



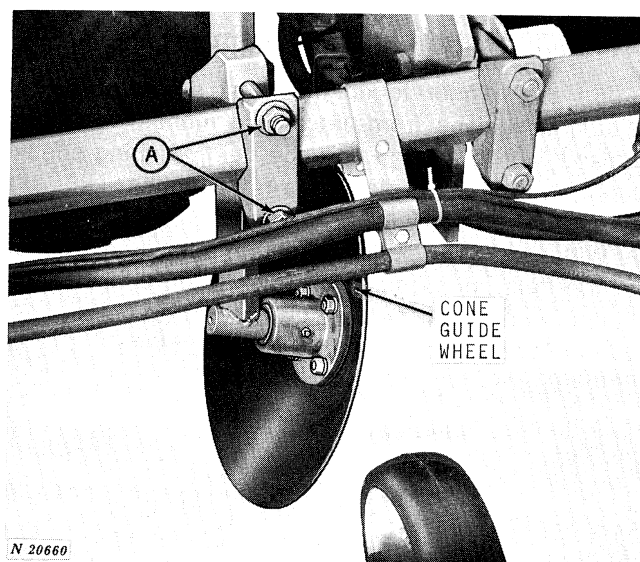
Double-Row Thinner

IMPORTANT: On double-row thinners gauge wheels must be centered between the two rows. Adjust rig hangers on carrier to center gauge beams over row.

If actuators are not centered over the row, reposition actuator on beam to center over the row.

IMPORTANT: When adjusting individual actuators, make sure shields clear knife.

3. Cone Guide Wheels - Rear-Mounted Thinner Only



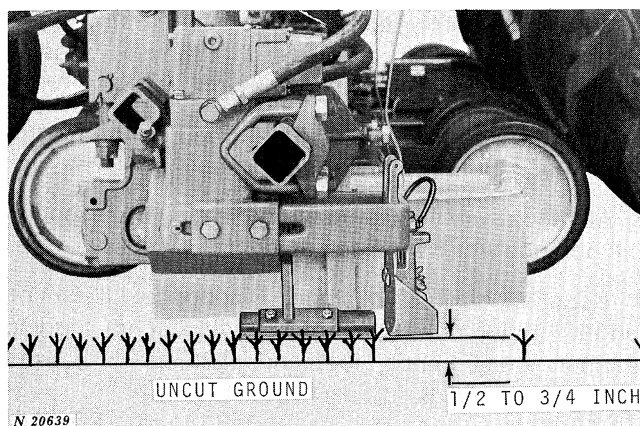
All cone guide wheels must be the same distance from the center of the beds or furrows.

Check the alignment of the cone guide wheels with the furrows. If not aligned, loosen nuts "A" and align. Tighten nuts "A".

4. Knife Cutting Depth

With the tractor and thinner operating, drive down the row a few feet, stop thinner, SHUT-OFF ELECTRICAL SYSTEM, and check knife cutting depth. If knife is cutting into ground more or less than 1/4 inch, adjust the gauge wheels as outlined in steps 8 and 9 in "SHOP ADJUSTMENTS" page 12.

5. Probe-to-Ground Distance



Check probe-to-ground distance by turning electrical switch off (hydraulic pressure still on) and drive forward and observe probe height over uncut ground.

On rear-mounted thinners observe probe height while under forward motion because thinner will tip forward slightly because of slack in tractor hitch balls. The amount of height change should be observed and the probe adjusted to compensate for the change.

The probe-to-ground distance is 1/2 to 3/4 inch on all crops. Adjust the height by loosening the shield clamp nuts and moving assembly up or down until probe clears ground by an average of 3/4 inch.



CAUTION: Never attempt to adjust probes while the tractor is running or the switch is on.

6. Eliminating Doubles

With thinner operating, drive thinner down the row; if thinner is leaving doubles make the following adjustments to eliminate doubles.

Probe-to-Knife Distance, page 11

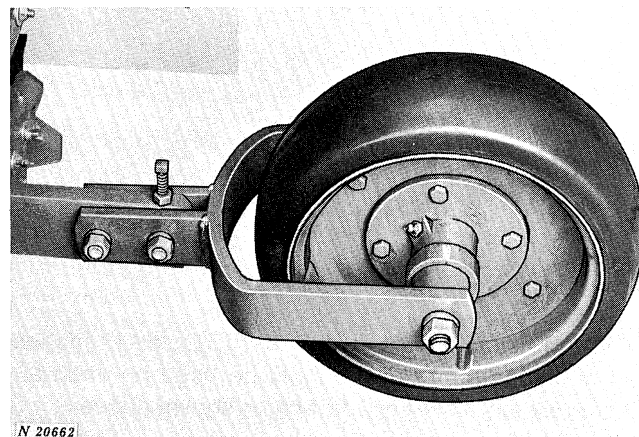
Probe-to-Shield Distance, page 11

Probe-to-Ground Distance, page 17

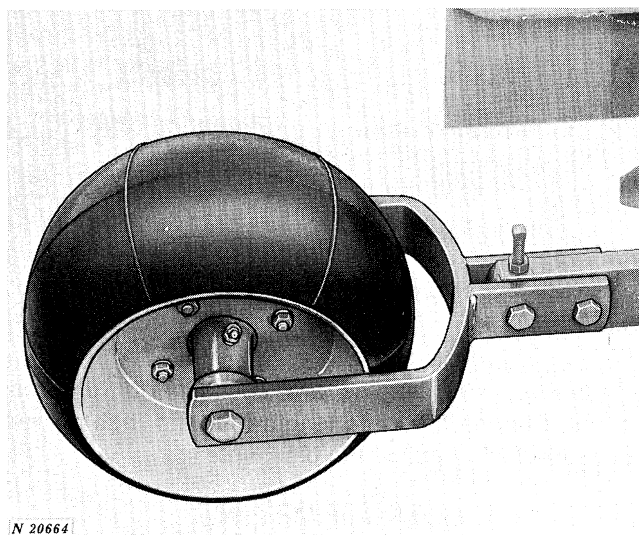
Maintain speed as outlined on pages 14 and 15

SPECIAL EQUIPMENT

Rear Gauge Wheel - Double-Row Thinner



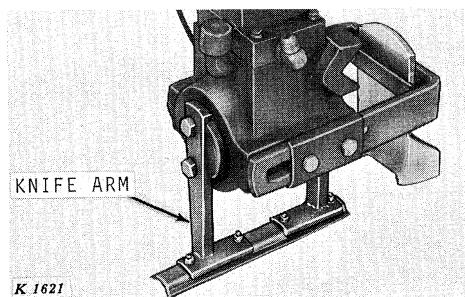
The 4-inch gauge wheel is available when a higher degree of gauging is necessary and in areas not having salt peaks.



The 6-inch gauge wheel is available for areas having salt peaks. The wide wheel straddles the peak with the center of the wheel inverting, allowing gauging on either side.

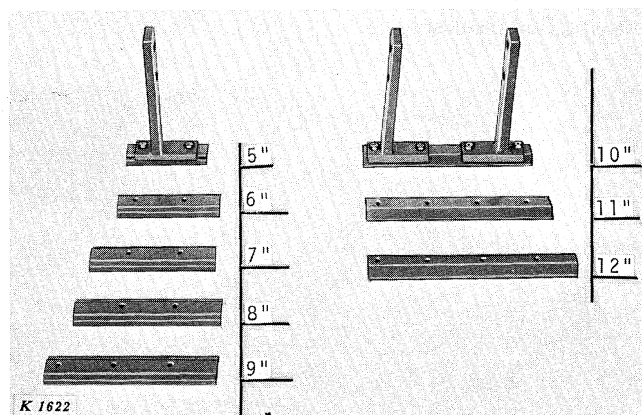
SPECIAL EQUIPMENT—Continued

Knife Arm



When using a knife length of 10, 11, or 12 inches, an additional knife arm should be used on each actuator for extra support. Attach as shown above.

Knives



Various knife lengths are available for different crops. Choose the knife length that is 1 inch shorter than the desired minimum plant spacing.

TRANSPORTING

Do not exceed 10 miles per hour when transporting thinner. Reduce speed when transporting over rough ground.

IMPORTANT: Never transport thinner across ditches or extremely rough terrain causing a jarring action on the thinner.

CAUTION: When driving the thinner on a road or highway at night or during the day, use warning lights and devices for adequate warning to operators of other vehicles. In this regard, check local governmental regulations. In areas where flashing lights are prohibited by local regulations, be sure that flasher for warning lamp is disconnected. (See tractor manual).

SAFETY SUGGESTIONS

! The safety of the operator was one of the prime considerations in the minds of John Deere engineers when this thinner was designed. Shielding, simple adjustments, and other safety features were built into the thinner wherever possible.

However, investigation of thousands of farm accidents show that careless use of farm machinery causes nearly 1/3 of all farm accidents. You can make your farm a safer place to live and work if you observe the safety suggestions given. Study these suggestions carefully and insist that they be followed by those working with you and for you.

Only the operator should be allowed on the tractor when the thinner is in operation.

All machinery should be operated only by responsible persons who have been delegated to do so.

Keep all shields in place. Disengage all engine and/or motor power before servicing or unclogging thinner. Keep hands, feet and clothing away from power-driven parts.

In rocky soil caution any observer to stand back at a safe distance.

Do not leave thinner unattended with actuators raised. Always lower them to the ground.

Before dismounting from tractor, always push the thinner electric switch off. Unlock and place the remote cylinder lever in neutral position. Place the shift lever in park position.

Escaping hydraulic oil under pressure can cause personal injury; therefore, be sure all connections are tight and that lines and hoses are not damaged. Before disconnecting lines in the thinner hydraulic system, be sure to relieve all hydraulic pressure.

Replace damaged or leaky hydraulic hoses before they break. Prevent hydraulic hoses from rubbing together or against sharp edges.

Never clean, oil, or adjust the thinner when it is running.

When driving the thinner on a road or highway at night or during the day, follow safety instructions outlined under "Transporting" in the left-hand column.

END OF SEASON SERVICE

When the thinning season is completed, follow these steps to make sure your thinner will be ready for next season.

1. Wash the outside thoroughly. Use diesel fuel and a stiff brush on the actuators.

NOTE: If water is used, dry the unit with air pressure.

2. Lubricate the thinner completely. Add oil to each actuator if not filled to check hole. See "Lubrication" pages 20 and 21.

3. Paint all parts from which paint was worn.

4. Store thinner inside, in a dry place. Block up thinner removing load from gauge wheels. See "Removal and Storage" on pages 34-37.

5. List and order all replacement parts that will be needed before the next season. Your John Deere dealer can give better service during the off season, and parts can be installed in spare time, avoiding delay at thinning time

BEGINNING SEASON SERVICE

Check the thinner carefully before starting the season. By making sure your thinner is in tip-top shape, you can avoid costly breakdowns during the season.

Make following checks and adjustments before starting the season.

1. Remove desiccant bag from each amplifier box. Reactivate per instructions on bag, which reads as follows: Reactivation temperature in bag, 245-260°F. Reactivation time is 12 hours. Place in oven for the time and temperature specified. After reactivation, replace in amplifier box and seal tight.

2. Lubricate and check oil level in each actuator. If low, check for leaks and add oil as required. See "Lubrication" pages 20 and 21.

3. Check for loose bolts and replace worn knives.

4. Check for damaged wires (bad insulation).

5. File probe clean and scrape probe wire contacts.

6. Check alternator voltage output; reset control valve if necessary, see page 13.

7. Check precharge of pressure and return line accumulators. See your John Deere dealer.

8. Check each actuator for operation while in a raised position as follows:

- a. Pull each probe wire out of binding post.
- b. Start tractor engine.
- c. Lock the remote cylinder lever which operates alternator in the forward position.
- d. Turn on the electric switch.
- e. Tap probe wire on grounded metal surface to actuate knife.

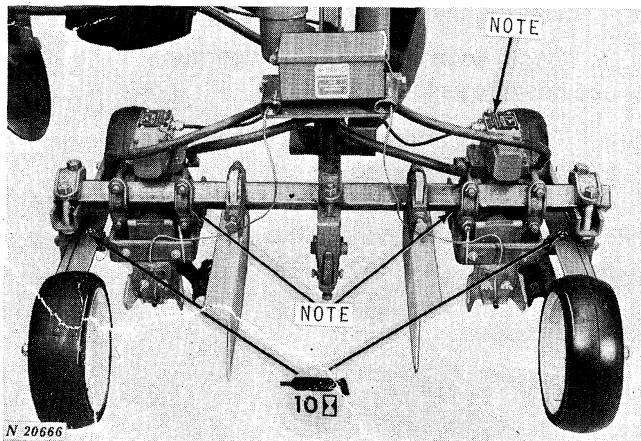


Lubrication

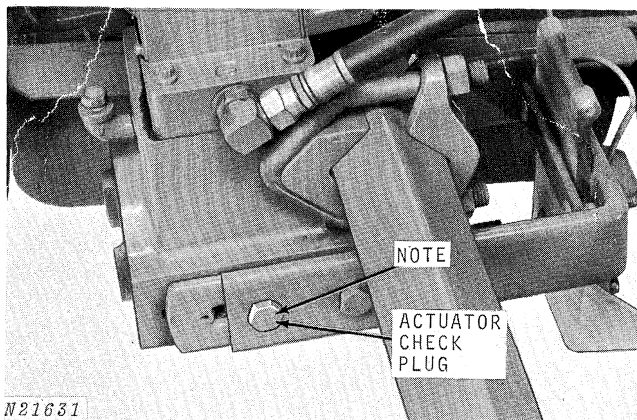
Lubricate all parts provided with grease fittings with John Deere Multi-Purpose lubricant or its equivalent.

Fill actuator crankcase through breather elbow. Check crankcase by removing cap screw indicated on either side of actuator. Oil should be up to hole and run out when crankcase is full. Use John Deere type 303 Special-Purpose oil or its equivalent.

NOTE: A small amount of oil splash from the breather is normal, especially after unit has been parked overnight. Only if a continuous leakage occurs should there be any concern. If continuous leakage occurs, replace piston seals.



Double-Row Unit - Gauge Beam



Actuator Check Plug

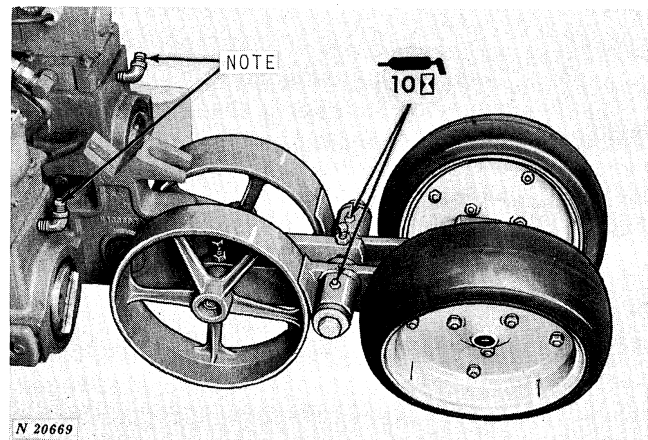
IMPORTANT: Check hydraulic oil in tractor every day. Check tractor hydraulic system when thinner is not running. Keep at full mark at all times.

The period recommended is based on normal conditions; severe or unusual conditions may require more frequent lubrication.

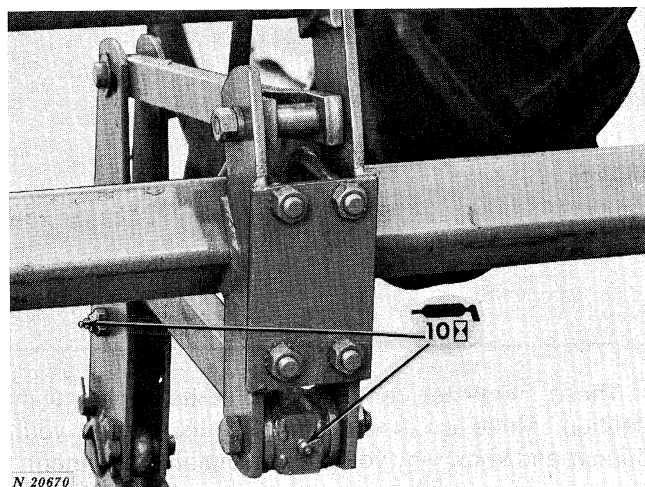
SYMBOLS

10H Lubricate every 10 hours of operation or once daily with John Deere Multi-Purpose lubricant or an equivalent SAE multipurpose-type grease.

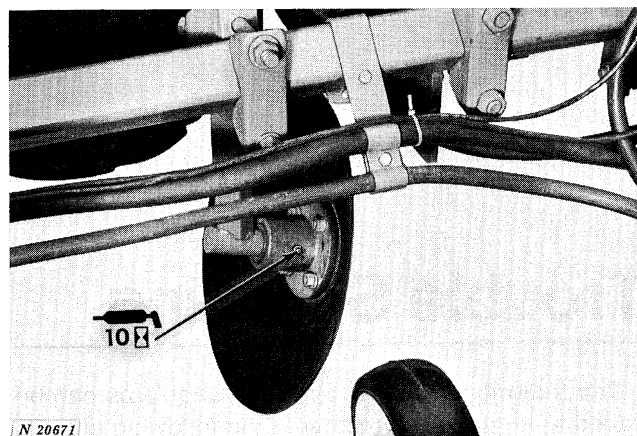
NOTE: Check every 10 hours of operation and add or drain oil to level or check plug. Use John Deere type 303 Special-Purpose oil or its equivalent. Add oil through breather elbow. Flush crankcase annually.



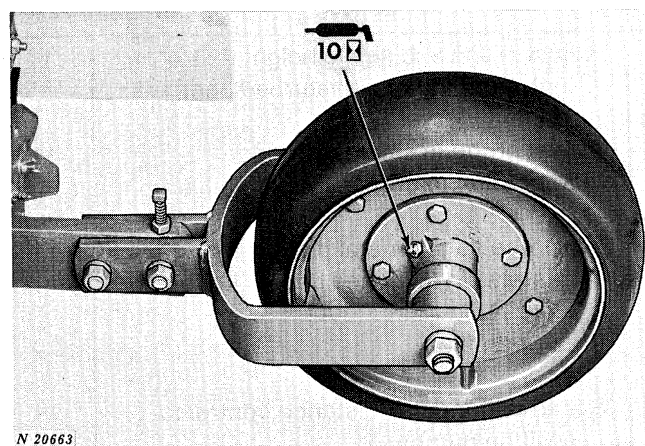
Single-Row Unit - Gauge Beam



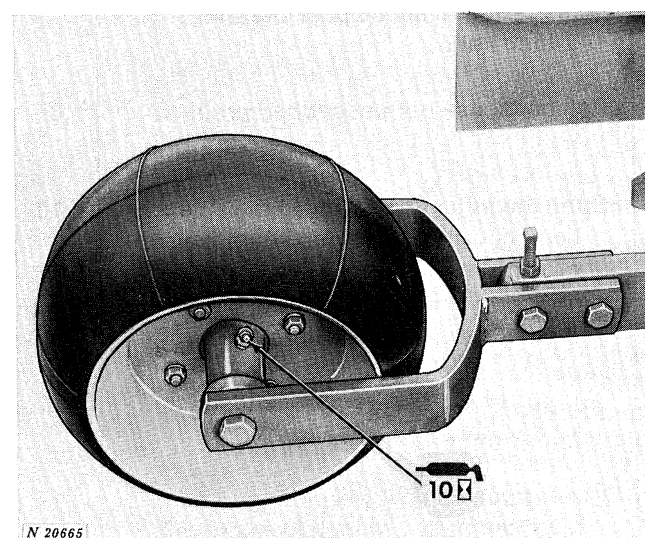
Rig Hanger



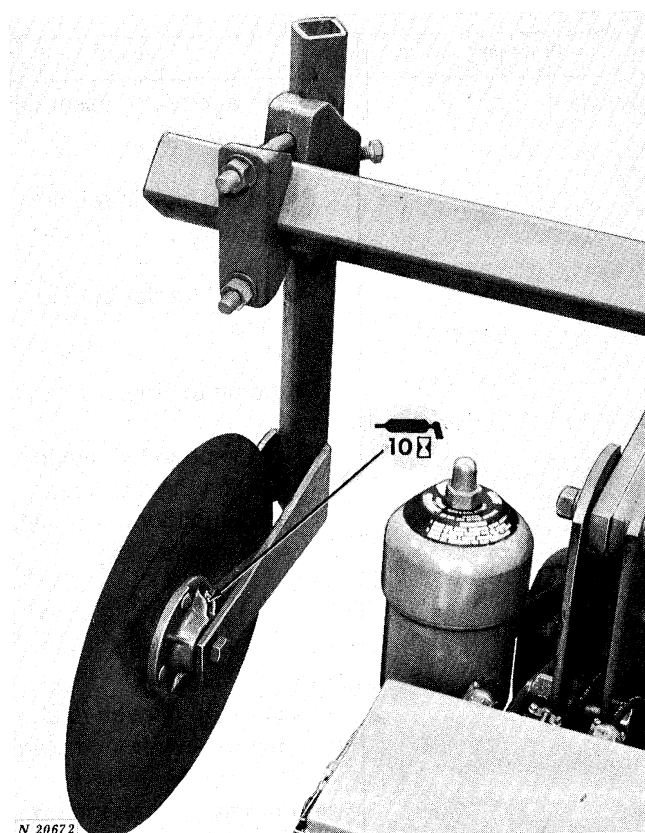
Cone Guide Wheel



Double-Row Unit - Rear Gauge For Flat Top Beds
(Attachment)



Double-Row Unit - Rear Gauge Wheel For Salt Ridge
(Attachment)



Rolling Coulter



Trouble Shooting

The majority of thinner operating problems can be traced to improper adjustment. The following chart is designed to help you when such a problem develops by suggesting a probable cause and the recommended solution.

These suggested remedies should be applied with caution. Make a sincere effort to understand your thinner and know why you are making an adjustment.

If you are unable to remedy the trouble, have your John Deere dealer check for worn or damaged parts.

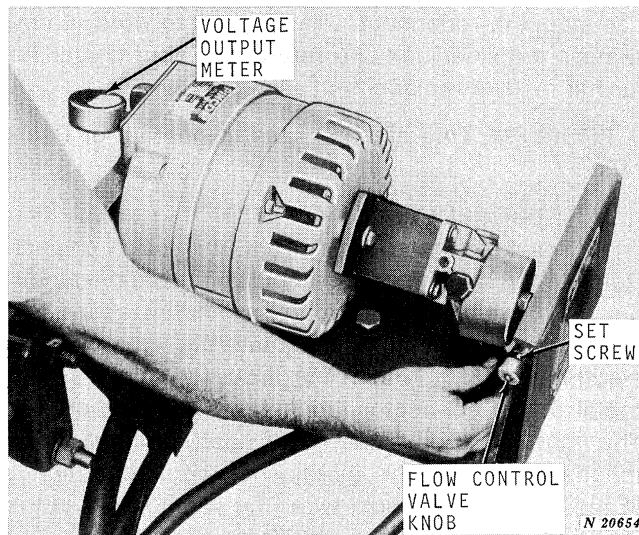
Problem	Cause	Remedy	Page
Doubles	Probe and shield assembly set too high.	Adjust probe and shield height to 3/4 inch from top of undisturbed bed.	17
	Probe too high in relation to shield.	Adjust probe to shield distance according to crop.	11
	Probe set too far behind knife.	Set probe so the metal plate is approximately 1-1/8 inches behind knife.	11
	Probe plate dirty.	Clean with file.	10
	Ground speed too fast in relation to knife length and amplifier delay distance adjustment.	Set amplifier delay distance control to position number 1.	14 15
		Reduce speed to reduce doubles, 1-1/2 mph should be optimum speed. 3 mph is maximum speed possible with 7-inch knife.	14 15
	Ground too uneven to allow uniform contact of plant.	Roll beds, use better seedbed preparation.	6
	Hydraulic volume too low.	Open the adjusting screw to the selective control valve to maximum flow of oil.	13
Skips (extra plant taken out by knife)	Clods or trash in plant row.	Roll plant row with smooth roller.	6
	Probe too low in relation to shield.	Set probe height as recommended for kind of crop.	11
	Probe too low.	Move probe up so it will clear ground approximately 3/4 inch from ground.	17
	Probe too high.	Lower probe and shield to 3/4 inch from bed. (On rear mounted units the probe will raise approximately 1/2" when tractor moves forward)	17

Problem	Cause	Remedy	Page
Skips (extra plant taken out by knife) continued	Probe too close to knife.	Normal probe plate to knife is approximately 1-1/8 inches.	11
	Knife cutting too deep.	Raise knife to cut 1-4 inch deep	12-13-17
	Probe shorted to shield.	Clean air gap between shield and probe.	10
	Plants too large	Move shields away from actuator as far as possible without creating safety hazard.	6
	Plant or dirt shorting from probe to frame or ground.	Clean probe and remove any foreign material.	10
	Probe wire insulation cut allowing shorting from center wire to shielding.	Replace probe wire.	26
	Probe wire socket shorting	Remove and dry socket or replace probe wire.	26
Knife oscillates continuously	Moisture in amplifier box.	Reactivate desiccant bag. IMPORTANT: Failures caused by dirt entering box are not covered under warranty.	19
Thinning erratic	Probe and/or actuator not aligned with row.	Align probe and actuator to row.	16
	Probe dirty.	Clean probe with file or knife.	10
	Gauge wheels too far from plant row.	Move gauge wheels closer to row.	..
	Probe too high.	Lower probe to 3/4 inch.	17
	Hydraulic oil volume too low.	Open the adjusting screw to the selective control valve to maximum flow of oil.	13
	Ground wire from amplifier to support broken.	Install new wire.	26
	Machine not grounding because of insufficient metal to ground contact.	In extreme dry conditions a narrow chisel point mounted on frame will ground it.	..
	Broken electrical wire or loose connection.	Check and replace defective wire.	26
Knife makes two strokes for each plant	Probe cable passing too close to solenoid.	Reroute probe cable away from solenoid.	..
Knife of one row chatters instead of making full stroke	Wire from amplifier to solenoid coil has loose connection or is broken.	Check all connections and replace wire if necessary.	10

Problem	Cause	Remedy	Page
Two knives actuate as a result of one probe contacting plant	Loose power supply wire.	Tighten fittings and check wires.	10
	Broken supply wire.	Replace supply wire.	
	Loose or broken amplifier to solenoid wire on unit not contacted.	Tighten fittings and check for broken wires.	10
	Fuse not tight in socket.	Tighten fuse in socket.	26
Three or more units operate when one probe is contacted	Electrical power source is being interrupted.	Check wires and switch for loose connections.	25-26
	Alternator voltage in excess of 150 volts.	Adjust voltage to 120 volts.	25
No electrical power	Brushes worn out.	Install new brushes.	25
	Brushes not contacting slip rings because of misalignment and wear.	Change brushes and check alignment of brushes to slip rings and adjust if necessary.	25
	Armature of alternator not turning.	Check hydraulic pressure and motor.	28
	Hydraulic motor inoperative	Check for correct connection of hoses to hydraulic motor.	39
		Check for correct hose hookup and be sure hydraulic valve is not assembled backwards	29
	Switch inoperative	Repair or replace as necessary.	25, 33
Hydraulic motor leaks	Shaft seal worn out.	Replace seal.	28
	Drive block worn or bearings failed	Replace drive block and/or bearings as required.	28
Solenoid valve fails to operate	Coil burned out.	Replace coil and check spool operation.	27
	Wires broken or disconnected.	Repair or reconnect.	27
	Spool locked or stiff due to over-tightened bolts	Loosen bolts and recheck spool operation. Clean valve and remove any burrs caused by foreign material.	27
Solenoid valve leaks oil	O-rings on drive pins leaking.	Replace with correct part. DO NOT substitute standard O-ring for correct part. See your John Deere dealer.	27
	O-ring around guide leaking.	Replace with correct part. See your John Deere dealer.	27

Service

ALTERNATOR

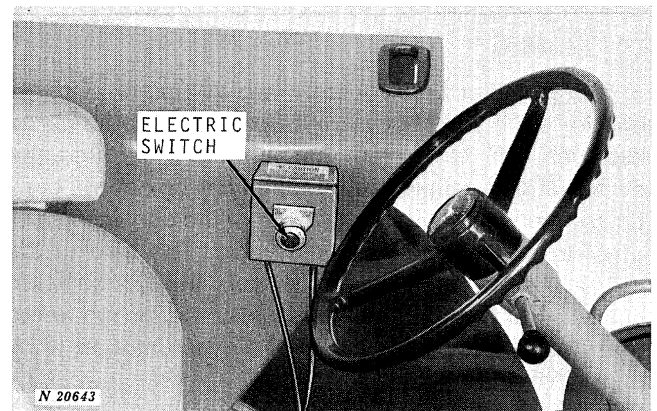


CAUTION: Always stand in front of the carrier boom when checking voltage output of the alternator.

The speed of the alternator is controlled by the flow control valve. The higher the speed, the higher the voltage. The voltage output should be 125 volts. Before checking voltage, warm up hydraulic oil, disconnect electric wire from alternator, and let tractor engine run at 1500 rpm while checking. Install voltage output meter and check. If output is not 125 volts adjust by loosening locking set screw and turning knob until voltage output reads 125 volts. Tighten set screw to hold setting.

If alternator fails to show an output on voltage meter, check the brushes in the alternator. The brushes must be aligned to allow each brush to fully contact its copper slip ring. If out of alignment, add shims to move the brush holder out or remove shims to move in. The brushes should be inspected every 1000 hours of operation, and when worn to approximately 1/4 inch, they should be replaced. Replace brushes in sets only - never singly.

ELECTRIC SWITCH

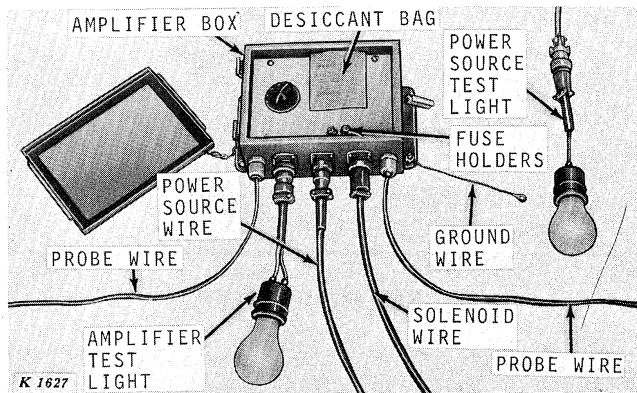


When the switch is on (pulled out) a red light indicates the switch is on. Should the light burn out, the switch will still operate, however, the light should be replaced as a safety measure.

Should the wires going to or from the switch box become frayed or broken, be sure to rewire switch as shown on page 34.

Route wires away from lift linkage to prevent pinching or damage to wires.

AMPLIFIER CONTROL BOX



The amplifier box contains two complete circuits, one for each solenoid valve it operates. The amplifier receives 125 volts from the alternator through the switch and is coupled to the amplifier box at the center terminal. The wire to the right of the center terminal controls the right solenoid valve. The wire to the left of the center terminal controls the left solenoid valve. The two outside wires are the probe wires that sense the plants causing the actuator to work on each of their rows.

When the thinner fails to operate satisfactory, refer to the problems listed in the "Trouble Shooting" section on pages 22, 23, and 24.

When the problems indicate failures within the amplifier, testing procedures of the amplifier will be determined by the problem. The problem and testing procedures are as follows.

PROBLEM: Knife oscillates continuously.

This problem is usually caused by some portion of the probe circuit being shorted to the amplifier ground. It can also be caused by signals picked up from high voltage circuits when the shield of the probe wire is not properly grounded.

TEST PROCEDURE

1. Disconnect probe wires from binding post. Install test light in circuit being checked. Start tractor and engage hydraulic lever. Lift thinner to clear ground. Turn on electrical system; if recycling has stopped, the shorting is between the probe, shield and actuator. Clean the probe, shield and frame thoroughly to eliminate problem.

2. Loosen connector nut, pull wire out approximately 1 inch and disconnect probe wire at connector. Start tractor and activate hydraulic and electrical

systems. If recycling stops, the short is in the probe wire and it should be replaced, along with its grommet. If recycling is not stopped re-install the probe wire.

NOTE: When re-installing the probe wire tighten connector nut only finger tight. Probe wires must never be left out of the box because of dirt or moisture entry.

3. If test 1 and 2 have not corrected the problem open the amplifier (carefully to prevent dirt entry) and allow it to dry. Regenerate the desicator bag or install new dry bag and close box and seal it. If recycling has stopped, reconnect wires and go to work; if not, remove amplifier box and return it to your dealer for further tests or replacement as necessary.

PROBLEM: One actuator fails to operate or is erratic.

TEST PROCEDURE

1. Remove probe wire from the binding post. Remove the amplifier to solenoid wire from the amplifier outlet which is not functioning and install the test light. Start the tractor and actuate the hydraulic and electrical system. Touch the probe wire to the bare metal of the connector fittings on the amplifier box. The light should flash on or off each time the probe touches the box. If the light flashes the malfunction is in the amplifier solenoid wire, the solenoid, or in the ground wire between the amplifier and support.

2. Follow the steps outlined in test (1) then open box and replace the fuse (if another fuse is not handy, switch the fuse from the circuit which is functioning properly). If the circuit does not function after this check, return the amplifier to your John Deere dealer for inspection, repair or replacement.

PROBLEM: Two actuators operated by the same amplifier fail to operate.

TEST PROCEDURE

1. Remove power supply wire from center connector of amplifier box and install test light in wire. Start tractor and actuate hydraulic and electrical circuits. If light comes on continue checking as in 1 and 2 of above. If not, replace power supply wire.

PROBLEM: Actuator chatters and/or will not hold in full-on position.

TEST PROCEDURE

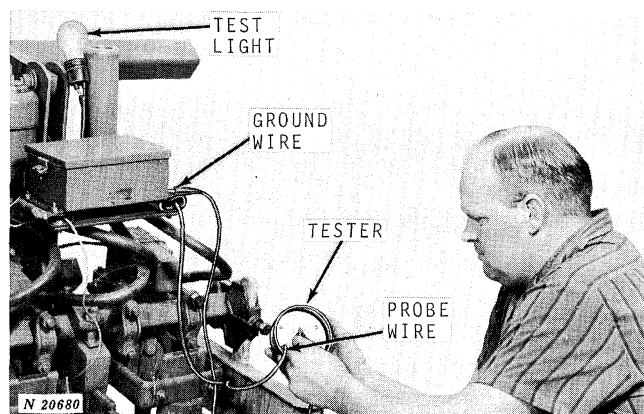
1. Check all wires and connections as indicated in trouble shooting chart on page 23.

2. Remove wire to solenoid and install test light on amplifier. Trigger the circuit to turn the light on. Observe the light closely for evidence of flickering. If the light flickers when testing one output circuit but not when testing the other return the box to your John Deere dealer for replacement. If the light flickers on both circuits, install a test light in the power supply wire to check the input to the amplifier. If light flickers when attached to the power source check the alternator and wiring for causes of power fluctuation. If power source is constant the problem is within the amplifier and it must be returned to your John Deere dealer for exchange.

PROBLEM: Amplifier does not seem to be sensitive enough, the probe touches plants but does not actuate the knife.

TEST PROCEDURE

1. Make all checks shown in the trouble shooting chart under headings of skips and thinning erratic. If the amplifier is grounded, the machine grounded, the probe wire properly connected and the probe plate clean, the amplifier sensitivity should be checked.



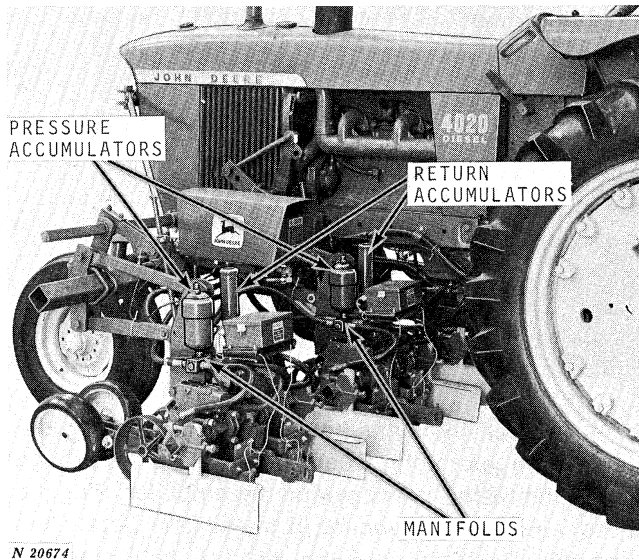
2. A sensitivity tester (tool no. TN908) can be obtained from your John Deere dealer. Clip the ground wire of the tester to a screw on the amplifier. Plug the probe wire into the socket in the tester. Rotate the knob counter clockwise until the test light starts to flash then rotate the knob counter clockwise until the light stops flashing. The point at which it stops should be between 4.5 and 6.5 megohms. (The tester must be kept sealed and checked with an ohmmeter occasionally for accuracy.)

Readings above those recommended do not necessarily indicate that the amplifier is out of adjustment. Damaged or dirty probe wires can cause the sensitivity to become greater.

See your John Deere dealer for replacement amplifier control units. Remove the amplifier box by first uncoupling the solenoid wires and center power line at the box. Remove the lower end of the probe wires at the probe binding post. The probe wires remain with the box. Unbolt the box from the shock mount.

IMPORTANT: The amplifier is extremely sensitive to moisture and dirt, therefore, care must be taken to prevent dirt or moisture from entering the amplifier box. For this reason the probe wires should remain attached to the amplifier box at all times.

ACCUMULATORS



Attached to each manifold are two accumulators; one on the pressure side and one on the return side. There is one manifold for each two rows. Should these accumulators get damaged from contaminated oil causing the bladder to become perforated, replace at once.

The accumulators were precharged at the factory. The pressure accumulator (large) was charged with 1200 psi nitrogen gas pressure. The return accumulator (small) was charged with 40 psi nitrogen gas pressure.

The oil pressure from the tractor pump compresses the nitrogen and stores a volume of oil under pressure. The accumulator supplies the added oil pressure needed to carry through this peak work load. It also minimizes hydraulic shock in the lines.

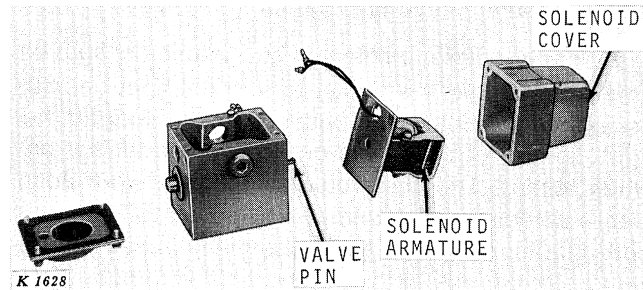
If the pressure accumulator is damaged, the actuator knives will work sluggish and slow. To check the accumulator, run the thinner for a minute to obtain full hydraulic system pressure. Stop tractor. The alternator should continue to run for approximate 10 to 30 seconds, then stop abruptly.

If the alternator slows down gradually the precharge is low and should be recharged. If the alternator stops immediately, either the accumulators have failed, the precharge is too high, or the tractor volume and pressure is not great enough to fully charge the accumulators. Have the accumulators checked for precharge at your John Deere dealers.

The return accumulator receives the oil exhausted from the actuators and then exhausts it to the tractor at a more uniform rate. Loss of accumulator pre-

charge or precharges in excess of recommendations will cause shock loadings on hoses and thinner components.

SOLENOID VALVE



The solenoid and valve in combination, controls the flow of hydraulic oil to the actuator causing the knife to work back and forth. The solenoid is an electromagnet that works the spool valve back and forth closing and opening the oil ports. An electrical current energizes the magnet, shifting the spool in one direction. When the current is turned off, a spring returns the valve to its original position.

When failure occurs, check solenoid and valve for these possible causes:

1. Valve or solenoid sticking.

Check the valve by pushing on the valve pin in the end of the solenoid cover with a punch or similar object. The pin should return when releasing finger tension. If the valve is sticking, return to your dealer for repair.

2. The electrical current is not coming through to the solenoid.

Use the amplifier test light to determine if the amplifier is supplying power to the solenoid valve (see "Amplifier Control Unit" page 26). If the amplifier is working, check the solenoid wire and connections.

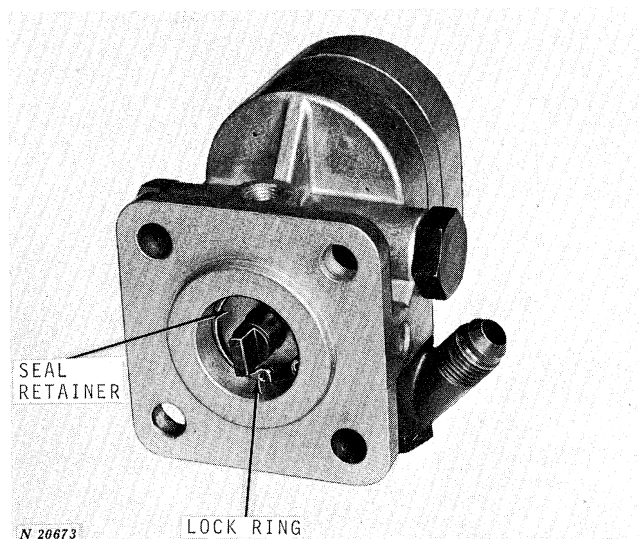
If the coil has failed, replacement coils are available.

3. Valve leaks oil.

The leaking of a small amount of oil in the solenoid will not cause a failure of the solenoid; however, when the O-rings on drive pin and/or guide start to leak, they should be replaced before an excessive amount of oil is lost.

A seal kit is available which contains all of the gaskets and O-rings needed to repair the valve.

HYDRAULIC MOTOR



The hydraulic motor runs the alternator. The speed of the motor is controlled at the flow control valve. Increase or decrease the flow of oil entering the motor to allow the alternator to deliver 125 volts. See "Alternator" page 13.

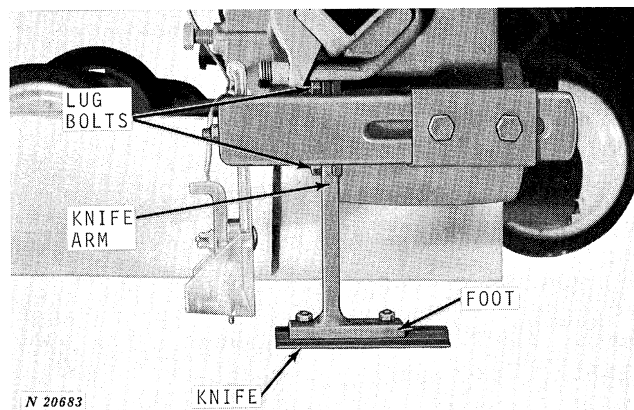
The motor is equipped internally with an over run check valve which allows the motor to coast to a stop if the control valve is returned to neutral, blocking returning hydraulic oil.

An external check valve allows flow out of the return port but stops flow into the return port if lines are accidentally crossed. The arrow on the check valve always points away from the motor.

Should the hydraulic motor leak oil around the shaft, replace the shaft seal. Remove the lock ring and seal. Install new seal and lock ring.

NOTE: Check bearings on the alternator drive block. If they have failed, this will shorten the life of the shaft seal.

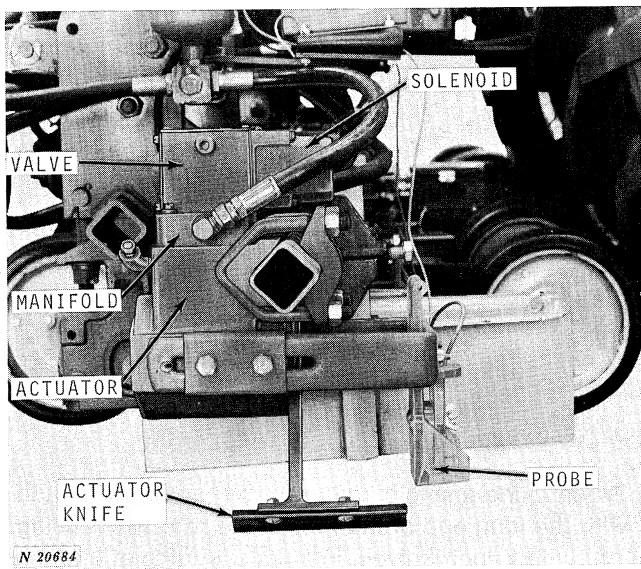
REPLACING KNIFE ARM AND KNIVES



When using a single knife arm per actuator, attach it with the long end of the foot to the rear when using 5-, 6-, and 7-inch knives. For knife lengths of 8 and 9 inches, turn the long end of the foot forward. When using knife lengths of 10, 11, and 12 inches, two knife arms are required. Keep the knife arm lug bolts tightened to 100-120-ft-lbs torque to hold arm snugly in groove.

Attach the knife using the clamp strap on the bottom side with carriage bolts going through the strap, knife, and foot of arm. Keep bolts tight.

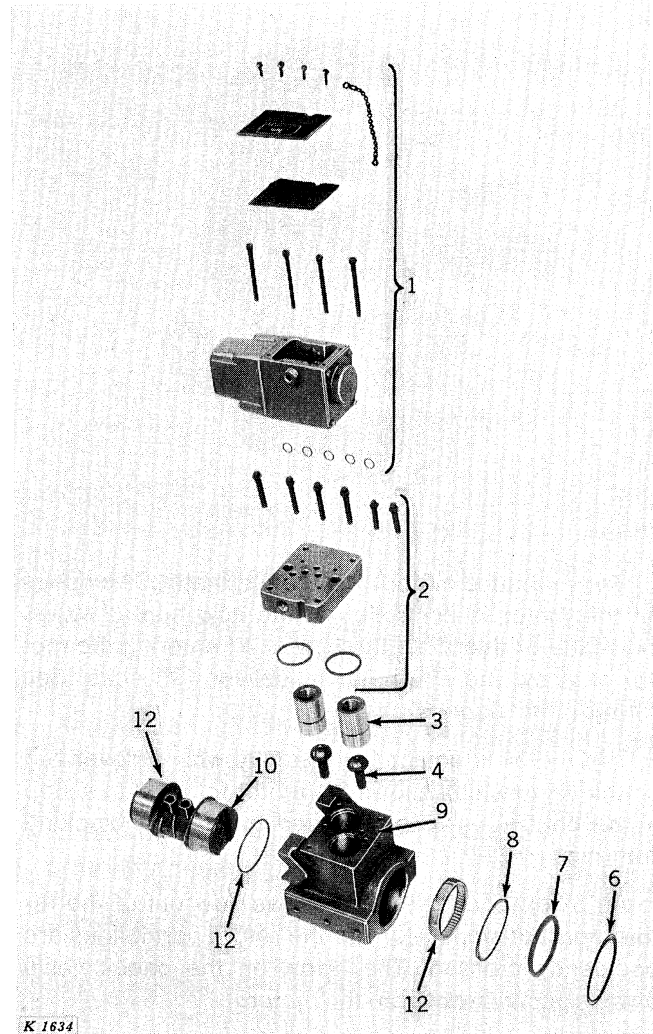
ACTUATOR



The actuator action is started by a signal from the probe circuit when a plant is touched. This signal controls 125 volts of power to the solenoid valve. Each time a plant is touched, the position of the control valve spool is shifted and oil is directed to the opposite piston to cause the knife to pass through the row.

Disassemble the actuator in the following steps to repair damaged parts or to replace leaky O-rings or seals. Clean all dirt and oil from the actuator. Position knife arm in bottom dead center position.

1. Remove valve by removing name plate and four socket head mounting screws.
2. Remove manifold plate, held by six counterbore screws.
3. Remove pistons. The groove in the hole in the center of the piston is provided as a gripping point for pulling the piston out.
4. Remove connecting rod balls. Use 1/4 x 2-3/4-inch bolt to screw into the ball to pull it out through the cylinder bore.
5. Remove knife arm (not shown).
6. Remove snap rings from each end of crankshaft.
7. Remove seals from each end of crankshaft. Screw a sheet metal screw into seal and pull out.



8. Remove bearing retaining snap ring from each end of crankshaft.

9. Locate cylinder block in press with crankshaft vertical under arbor.

10. Locate the crankshaft with the knife arm slot vertical in relation to cylinder bores.

11. Position the connecting rods straight up so the top end is located at top dead center in relation to the crankshaft.

IMPORTANT: Failure to properly position the connecting rods may result in damage to cylinder block, crankshaft, and connecting rods.

12. Press crankshaft out. Do not drop parts.

Carefully inspect the various parts for wear and defects. Inspect crankshaft bearing journals for pits or scoring in the needle bearing area and seal area.

Check connecting rods for breakdown of the bearing surface and stem mushrooming at the point of contact of the ball.

Inspect needle bearing for damage due to removal or wear.

Always replace crankshaft seals when servicing actuator assembly. An actuator seal kit is available which includes all actuator seals.

Inspect pistons on skirt and ball socket for extreme wear or scoring. Always replace piston backup and glide rings when repairing assembly.

Inspect cylinder block for scuffing or extreme wear at the bottom of the cylinder bore or in the seal area.

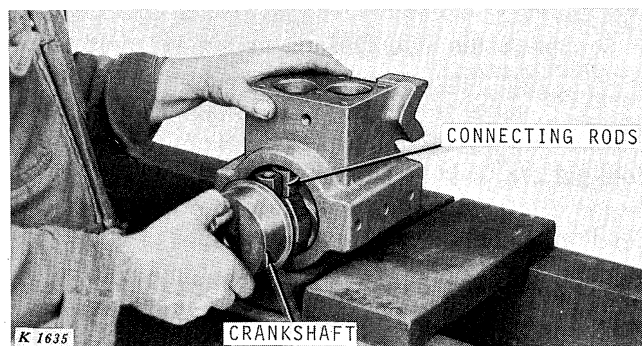
Completely clean all components during and after inspection.

Assemble the actuator in the following steps being particularly careful when pressing needle bearings in place.

NOTE: Crankshaft assembly illustrations start after the first needle bearing has been pressed in.

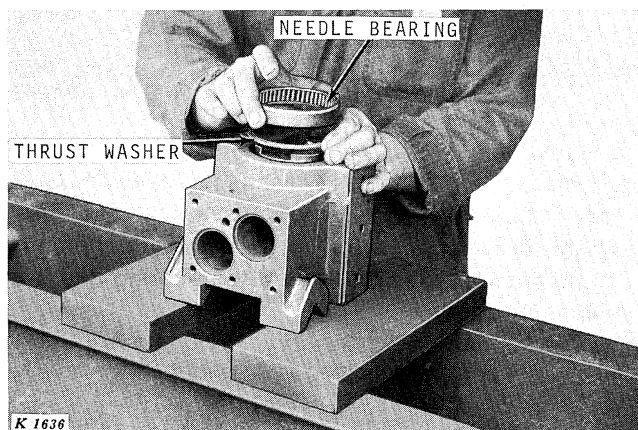
1. Thoroughly clean cylinder block and lubricate cylinder bores.

2. Install one needle bearing in cylinder block with the numbered side to the center of the cylinder block (flat side down) using special tool aid AK41097. It is best to install the first bearing on the clamp end of the casting. The bearing must be pressed in just far enough to allow the snap ring to be installed in the inner snap ring groove. (The crankshaft in the bore will assist in aligning the bearing to the bore when installing the bearings).

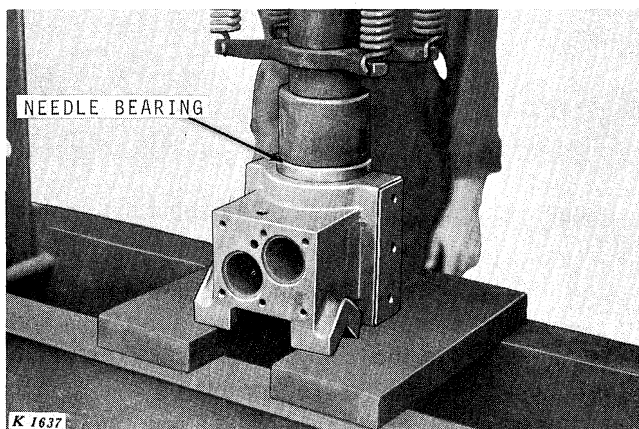


3. Apply wheel bearing grease to the center journal of the crankshaft and place the connecting rods on the center journal so that the chamfered edge of the bearing surface of each connecting rod is toward the outer end of the crankshaft.

Install thrust washer on end of the crankshaft. Slide crankshaft and connecting rods into cylinder block bore until it is properly located in the needle bearing previously installed.



4. With cylinder block on end and crankshaft vertical, install thrust washer.

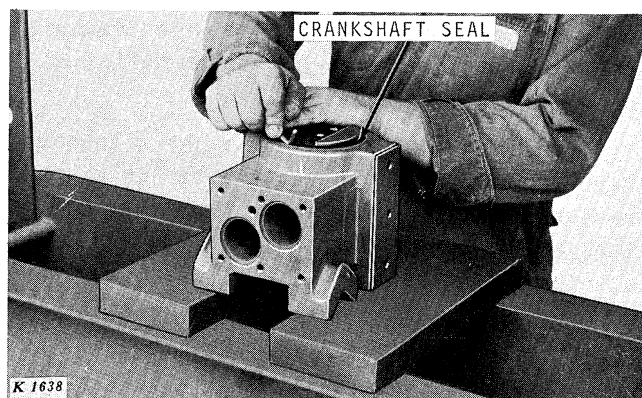


Press the needle bearing with the numbered side toward the center of the cylinder block (flat side down). Press the bearing in far enough to allow the snap ring to be installed in the inner snap ring groove.

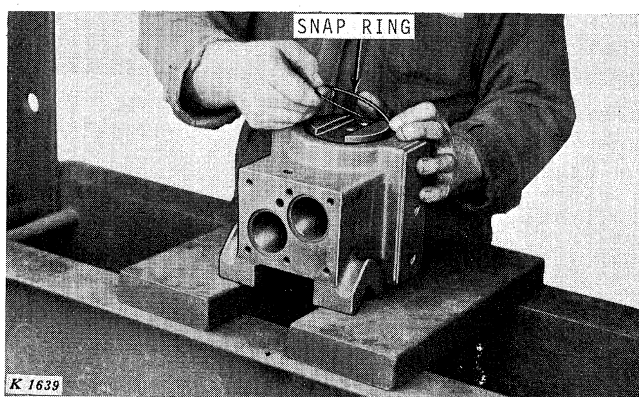
IMPORTANT: Do not apply excessive pressure to the needle bearing or push it beyond the snap ring groove. Damage to the needle bearing will occur, resulting in premature failure if this is done.

Install snap ring in the snap ring groove.

ACTUATOR - Continued

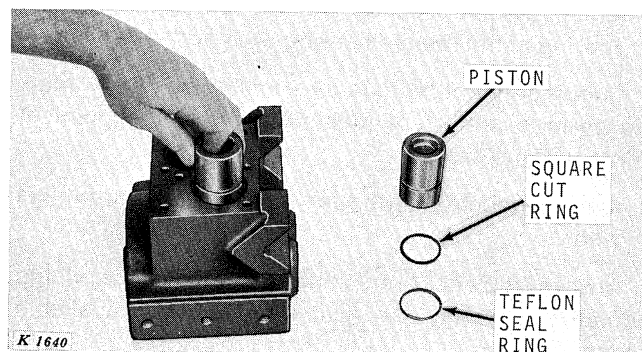


5. Grease the inside diameter of the crankshaft seals thoroughly. Install the crankshaft seals into the cylinder block bore on each side using a blunt instrument to work it into place. The seal goes into the bore with the rounded surface toward the bearing and the thin lip to the outside.



Install a snap ring on each side behind the seal to hold it in position.

6. Screw a 1/4 x 2-3/4-inch socket head cap screw into the center of the connecting rod balls and install the balls in the connecting rods. (The valve hold-down screws can be used for this.)



7. Install new seals on the piston by first installing a square cut ring in the piston groove. Over the square ring, place the teflon seal ring. The teflon ring gets stretched when installing it over the piston. Hold your fingers around the teflon ring for a few seconds to compress the teflon ring back into position groove. A seal installation tool No. K41098 is available to assist in seal installation.

Coat the rings with oil and gently work piston and rings into the bore.

DO NOT force piston rings into bore as this will damage the edges of the teflon seal ring resulting in oil leakage.

8. Install cylinder seals in recess and bolt manifold to casting using six counterbore screws. The two short screws (1-1/2 inches long) are used in the center holes.

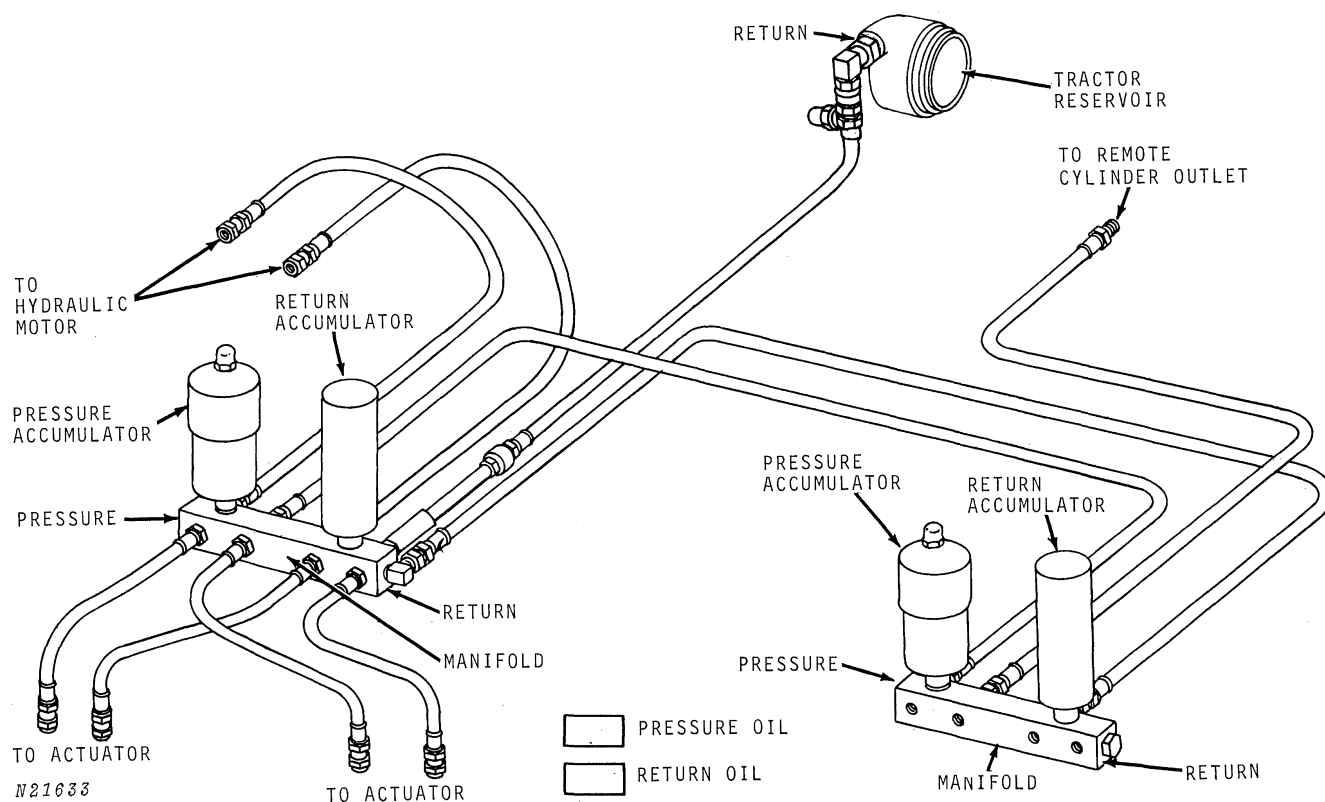
NOTE: Use only the seal number specified to prevent premature failures.

NOTE: Manifold can be installed turned either direction. Install in the direction you wish the solenoid valve to face with the oil ports lined up. Tighten counter bore screws to 35-40 ft-lbs torque.

9. Check the five O-rings in the solenoid valve making sure they are seated in their recess. Bolt the solenoid valve to the manifold plate using care to assure that the valve hole pattern matches the manifold pattern. Tighten valve hold-down bolts to 9-12 ft-lb torque. Reconnect the electrical wires to the solenoid. Reinstall name plate with gasket.

Fill to the oil check plug level with John Deere type 303 special-purpose oil or its equivalent.

HYDRAULIC SYSTEM



The John Deere Hydraulic System used on the Synchronous Thinner consists of a pump (tractor), reservoir (tractor), manifolds, actuators, accumulators, hydraulic motor, and remote cylinder. These individual components are connected with steel bar manifolds and reinforced neoprene hose.

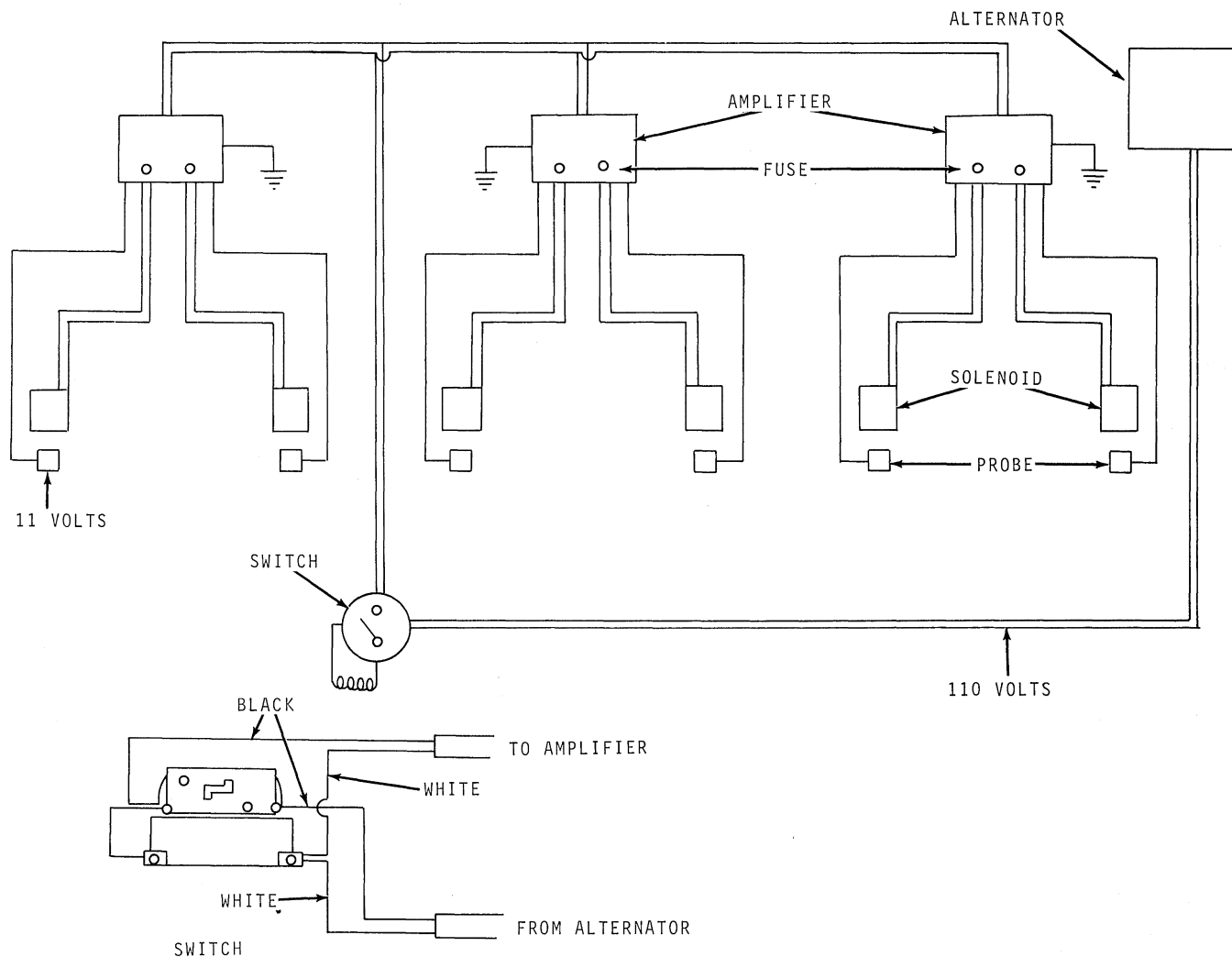
The tractor hydraulic system must be a closed-center, constant-pressure system requiring 2200 to 2300 psi maintained in the system.

Each day check the reservoir for the proper oil level and visually inspect all hoses and actuators for leaks or damage.

Check the oil level in each actuator daily.

CAUTION: Escaping hydraulic oil under pressure can cause personal injury. Therefore, be sure all connections are tight and that lines, pipes, and hoses are not damaged. Before disconnecting lines or hoses in the hydraulic system, be sure to relieve all hydraulic pressure.

ELECTRICAL SYSTEM



K 1632

Shown above is the schematic wiring diagram of the 125 volt electrical system.

Use this diagram in trouble shooting on electrical components. Also shown is a detail of the wiring diagram of the switch.

The text for the amplifier (page 26) only covers the testing of the amplifier box because this is an exchange item only. However, the fuses and probe wires can be replaced. Servicing of the alternator and solenoid valve are under separate headings.

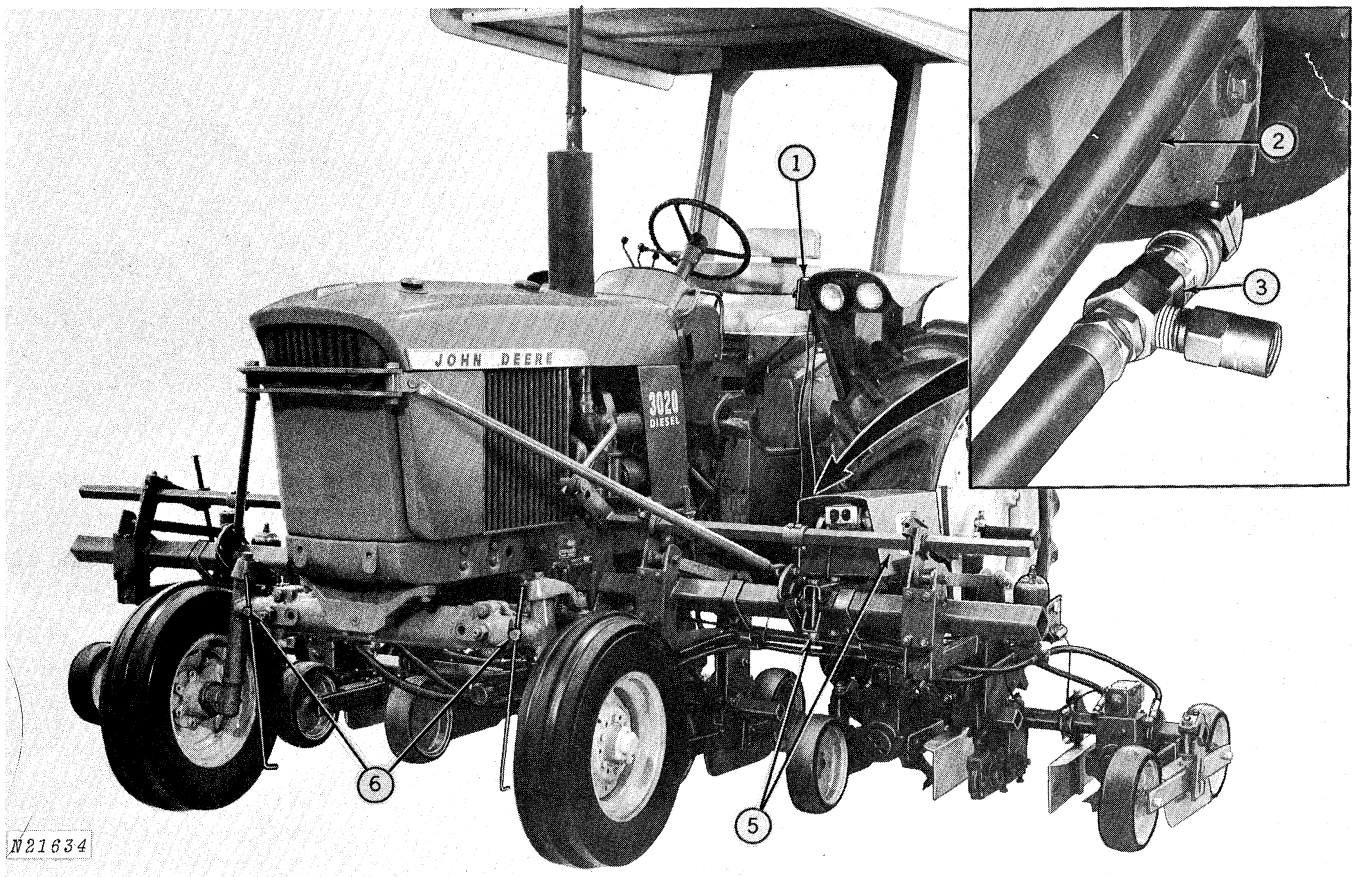
IMPORTANT: Be sure to determine the cause of fuse blow-out and correct it before installing new fuse.



Removal and Storage

FRONT-MOUNTED THINNERS

Thinner



1. Remove switch box from tractor fender and place with alternator.

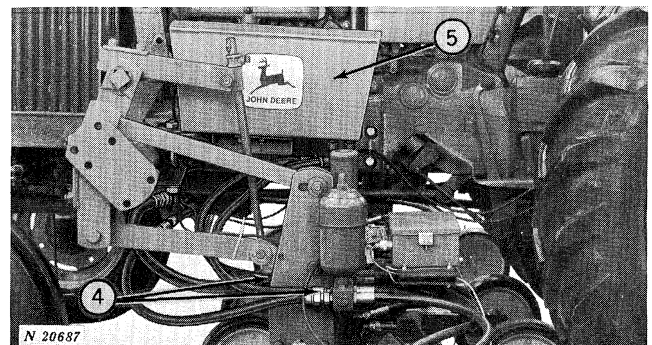
2. Unplug pressure hose from the remote cylinder outlet.

3. Disconnect the breakaway coupler from the tractor reservoir. Cap openings with plugs.

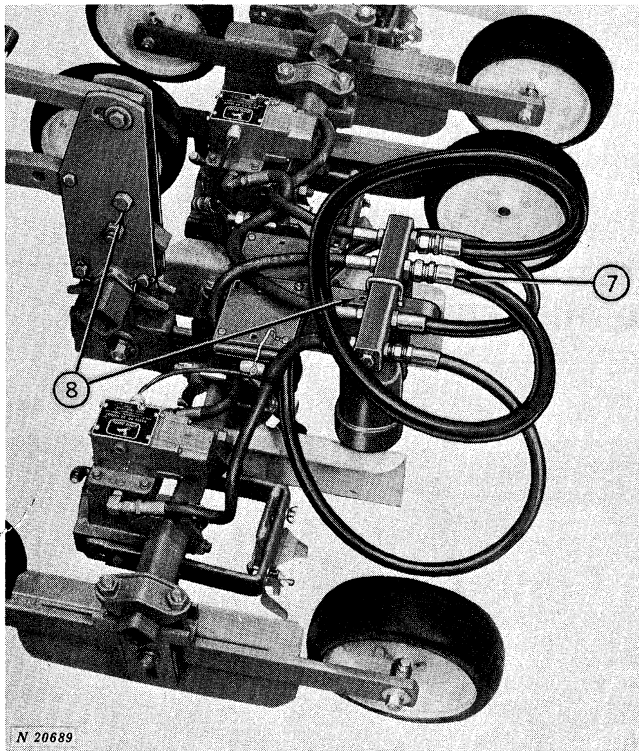
4. Remove the hydraulic motor pressure and return hoses from the manifold.

5. Remove alternator with switch box from carrier beam and store in dry place.

6. Remove guide rods.

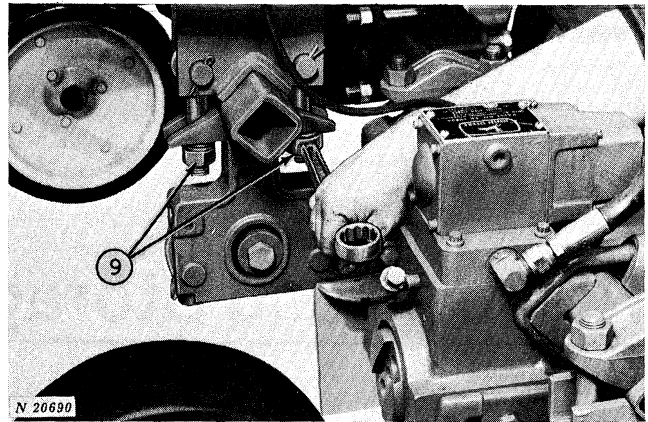


Thinner—Continued

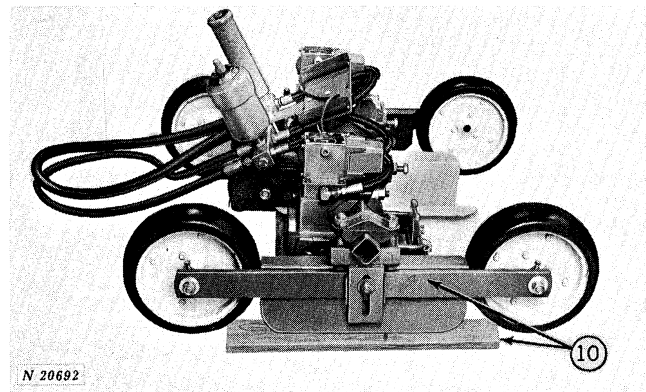


7. Disconnect hydraulic hoses from brackets along carrier beam and install in outlets in manifold.

8. Remove amplifier and manifold bracket from hanger. Remove as one unit and place on row unit. Install bolt with spacer in hanger.

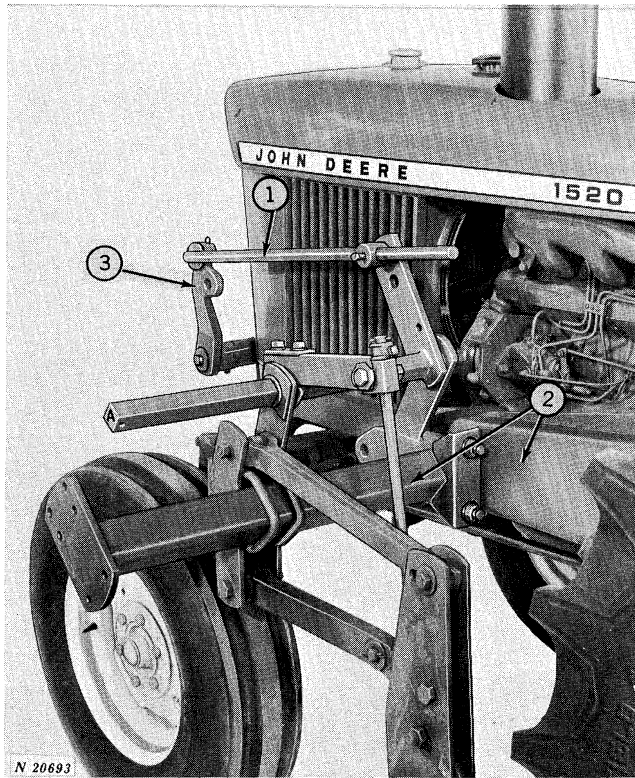


9. To remove row unit from carrier, remove hanger nuts as shown above using 1-5/16"-12 point box end wrench.



10. Slide row unit out from tractor and store on blocks with gauge wheels off of ground.

Paint all parts which require painting. See "End of Season Service" page 19.

Carrier (53K)

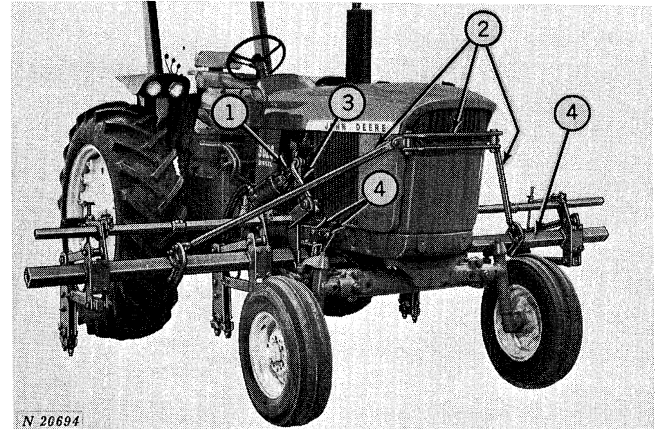
Disconnect and remove remote hydraulic cylinder and hoses.

1. Remove push rods from both sides.
2. Unbolt and remove booms with hangers from tractor.
3. Remove rockshaft from front of tractor.

Paint all parts that require painting. See "End of Season Service" page 19.

Carrier (54K)

2520, 3020, 4000, and 4020 Tractors



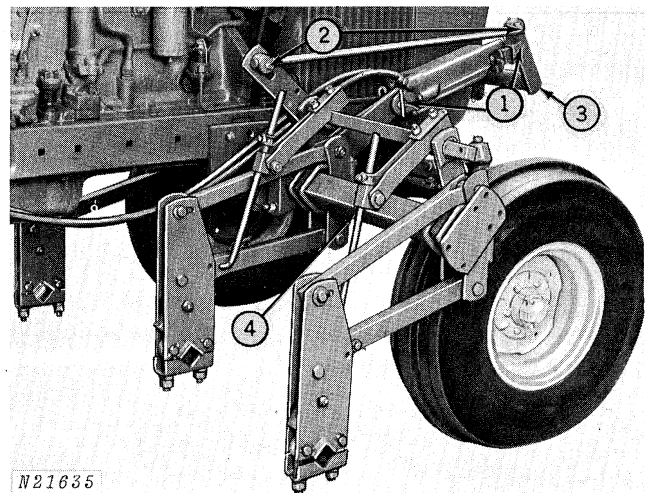
1. Disconnect and remove remote hydraulic cylinder and hoses.

2. Remove truss rods and bracket.

3. Uncouple push rods from tractor rockshaft.

4. Unbolt and lower booms with hangers from tractor. Slide carrier out from under tractor and store.

Paint all parts that need painting. See "End of Season Service" page 19.

4320 Tractor

1. Disconnect and remove remote hydraulic cylinder and hoses.

2. Uncouple push rods from rockshaft.

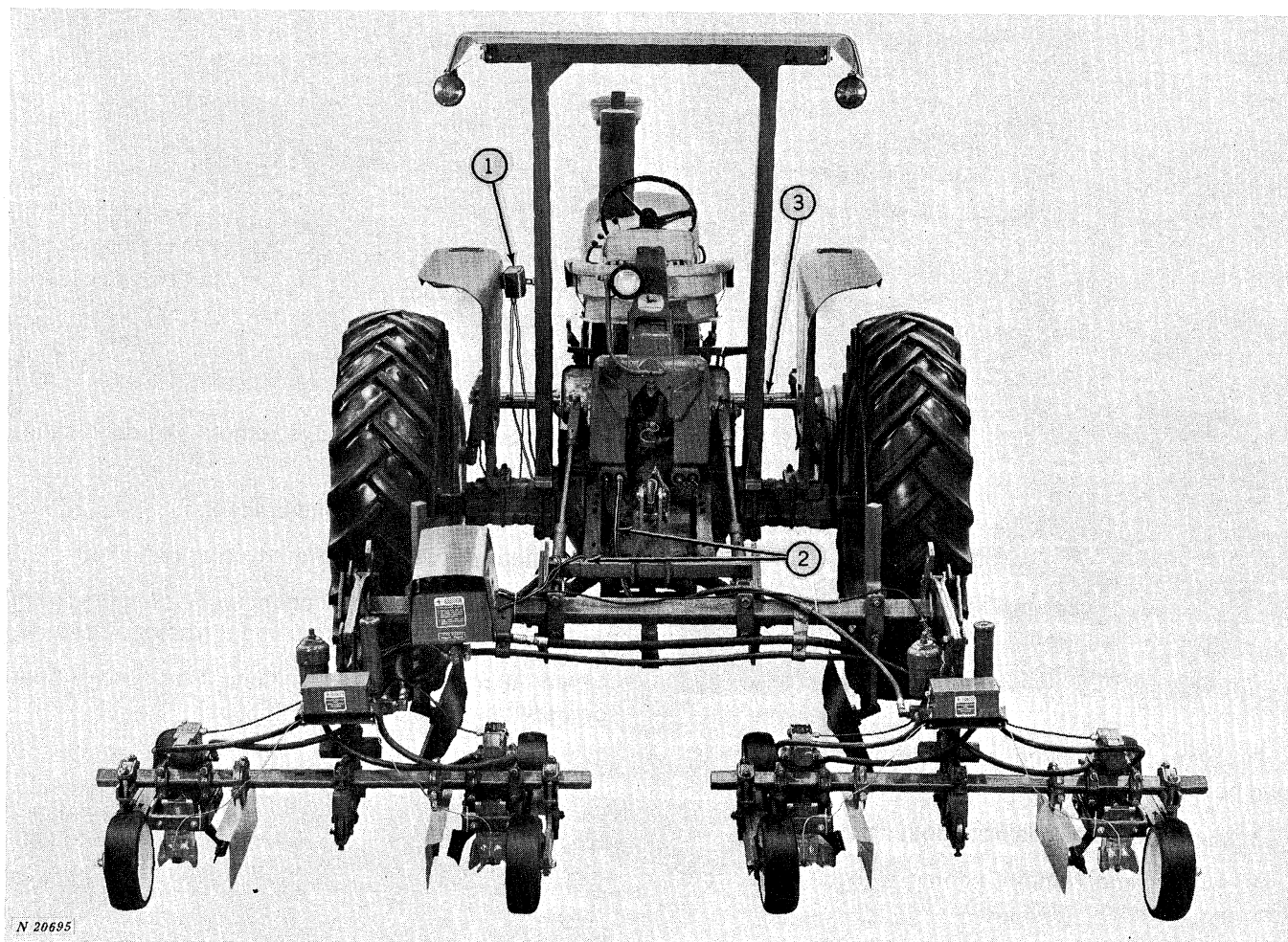
3. Remove rockshaft.

4. Unbolt and lower booms with hangers from tractor. Slide carrier out from under tractor and store.

Paint all parts that need painting. See "End of Season Service" page 19.

REAR-MOUNTED THINNERS

If using carrier for other operations, follow steps 1 through 10 of "Front-Mounted Thinners" pages 35 and 36 for removal of thinner from carrier.



1. Remove switch box from tractor fender and store on amplifier.

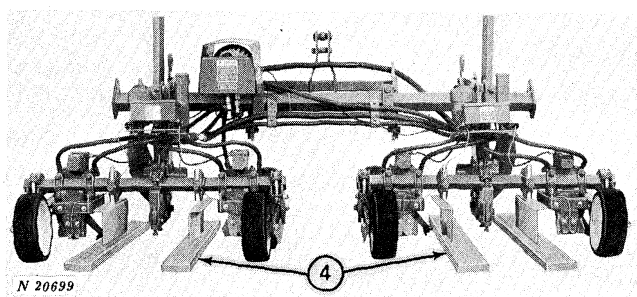
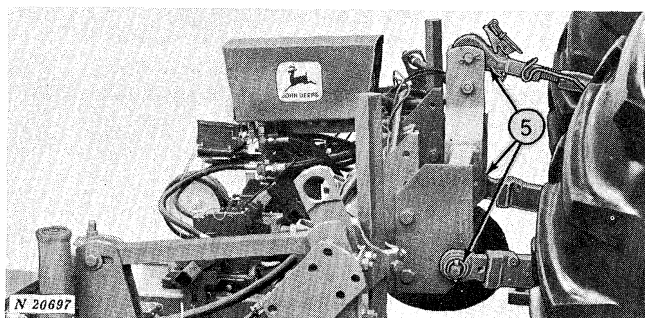
2. Remove pressure hose from remote cylinder outlet. Uncoupler return hose from the filter cap and insert plug. Cap end of hose.

3. Remove guide rods.

4. Lower thinner on blocks for storage. Keep gauge wheels off of ground.

5. Disconnect top link and lift links or Quick-Coupler from carrier.

Paint all unpainted surfaces. See "End of Season Service" page 19.

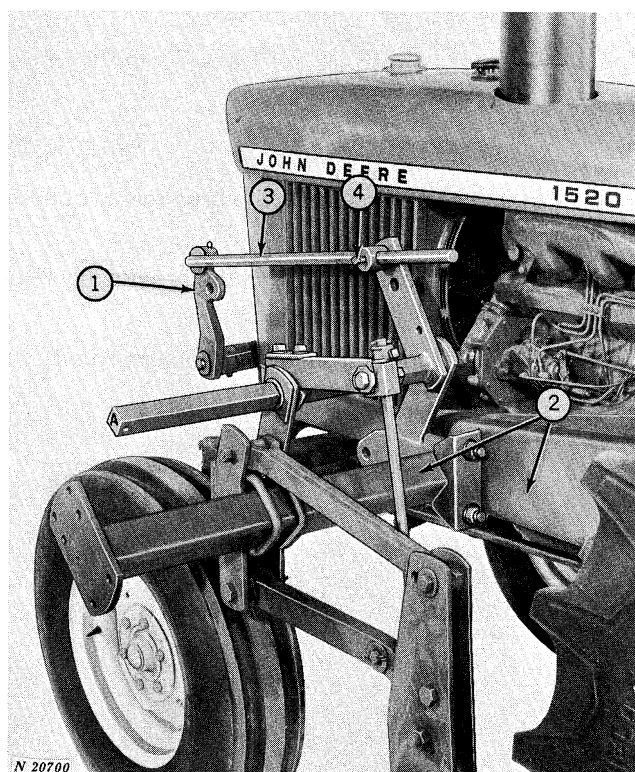




Installation

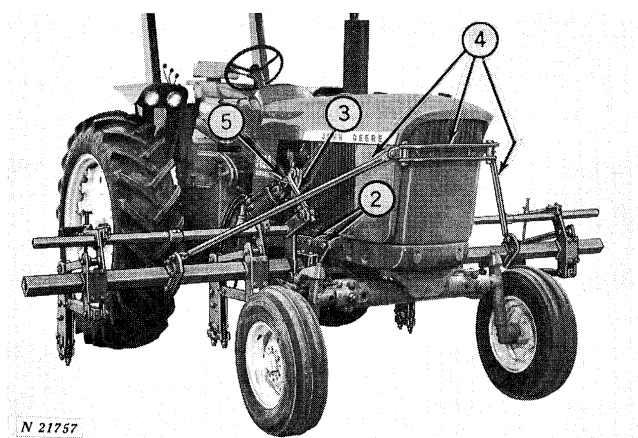
FRONT-MOUNTED THINNER

Carrier (53K)

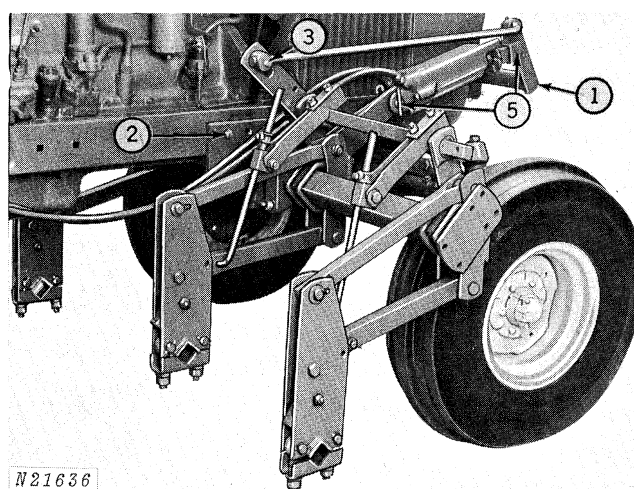


1. Bolt rockshaft to front of tractor.
 2. Bolt booms with hangers to tractor with five bolts each side.
 3. Attach push rods to rockshaft and lift bar.
- Install remote hydraulic cylinder on rockshaft. Install remote cylinder hoses in breakaway couplers.
4. Set the adjusting block on the push rod to give the correct lift and drop after the thinner has been attached to the hanger clamps.

Carrier (54K)



2520, 3020, 4000, and 4020 Tractors

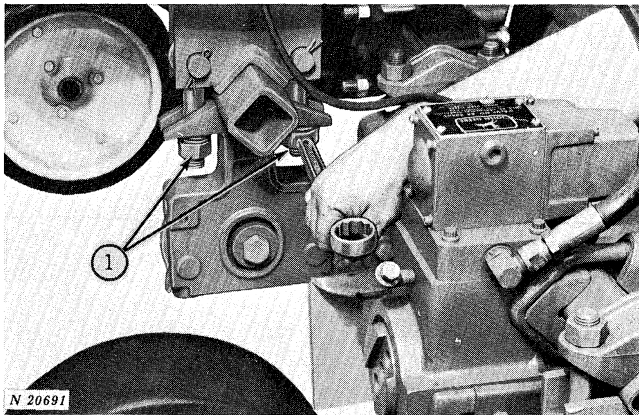


4320 Tractor

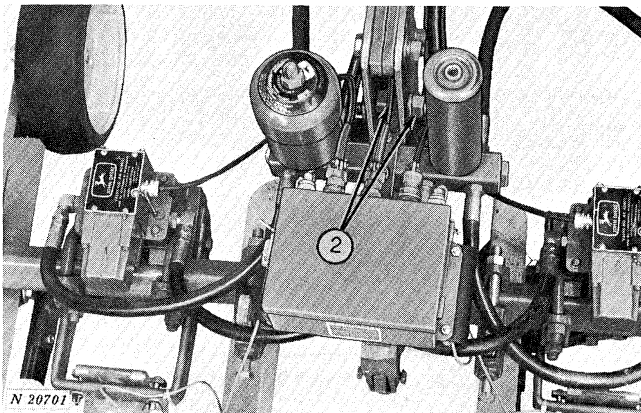
1. 4320 Tractor only. Attach rockshaft to front of tractor.
 2. Slide boom with hangers under tractor. Raise carrier and bolt to tractor using bushings supplied.
 3. Install push rods in rockshaft.
 4. Attach front bracket and truss rods.
- NOTE:** Truss rods are not used on 4320 Tractor.
5. Install remote hydraulic cylinder on rockshaft. Install hydraulic hoses in breakaway couplers.

Thinner

Set tractor wheels for row spacing of crop.



1. Slide row unit in position under rig hanger. Position bolts in tee casting and tighten nuts.



2. Disconnect hydraulic hoses from manifold and position manifold and amplifier bracket around spacer in rig hanger. Tighten bolt.

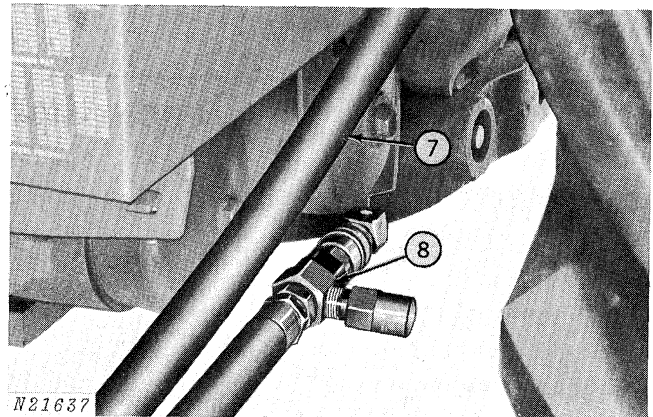


3. Bolt the alternator bracket with alternator to the carrier boom.

4. Install the hydraulic motor pressure and return lines in the manifold.

5. Connect hydraulic lines and place in hose brackets.

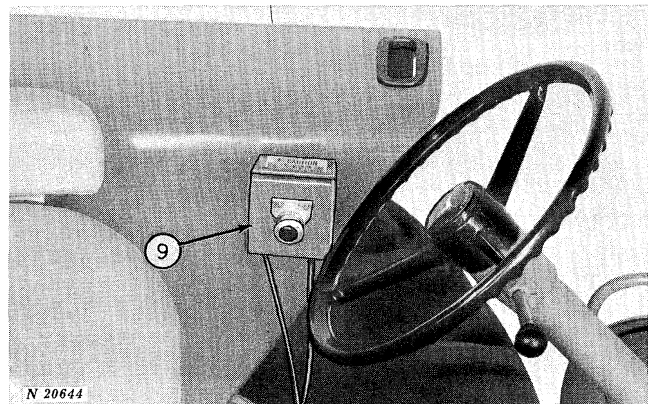
NOTE: Be sure hoses do not rub against the frame or each other.



6. Install the return hose in the breakaway coupler at filter cap.

7. Install the pressure hose in the breakaway coupler.

8. Bolt guide rods in front axle. (Not illustrated)



9. Install switch box in tractor fender switch box bracket.

Start tractor engine and check for oil leaks and any other malfunctions of the thinner. See "Beginning of Season Service," page 19.



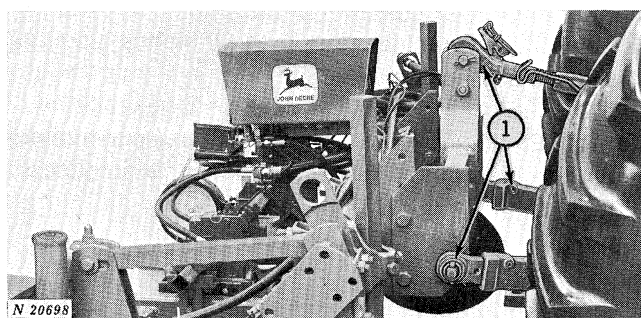
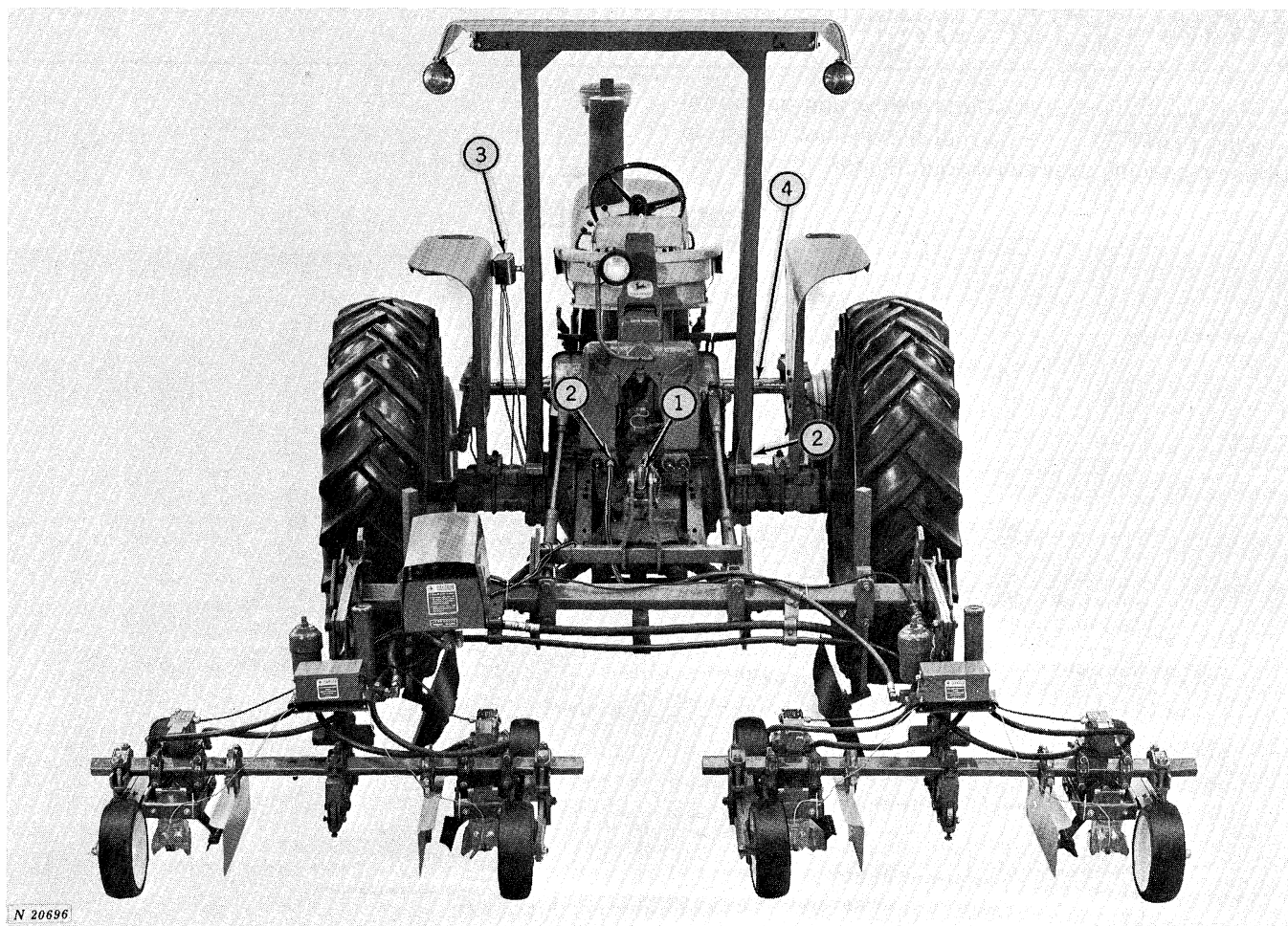
CAUTION: To avoid possible burst in the thinner hydraulic system, never substitute a quick-coupler for the standard threaded fitting in the thinner return line without also installing a safety relief valve. The safety valve should be located in the return line between the coupler and the thinner. See your John Deere dealer for optional quick-coupler with safety relief valve (part number AN132221).

REAR-MOUNTED THINNERS

For complete tractor operating and adjusting instructions, refer to your tractor operator's manual.

Set tractor wheels to match row spacing of the crop.

If using carrier for other operations, follow steps 1 through 9 of "Front-Mounted Thinners," page 40 for installation of row units on carrier.



1. Back tractor to thinner and connect top link and lift links or quick coupler.

2. Install pressure hose in remote cylinder outlet. Install return hose in the filter cap.

3. Insert switch box in bracket on tractor fender.

4. Bolt guide rods to front tractor axle.

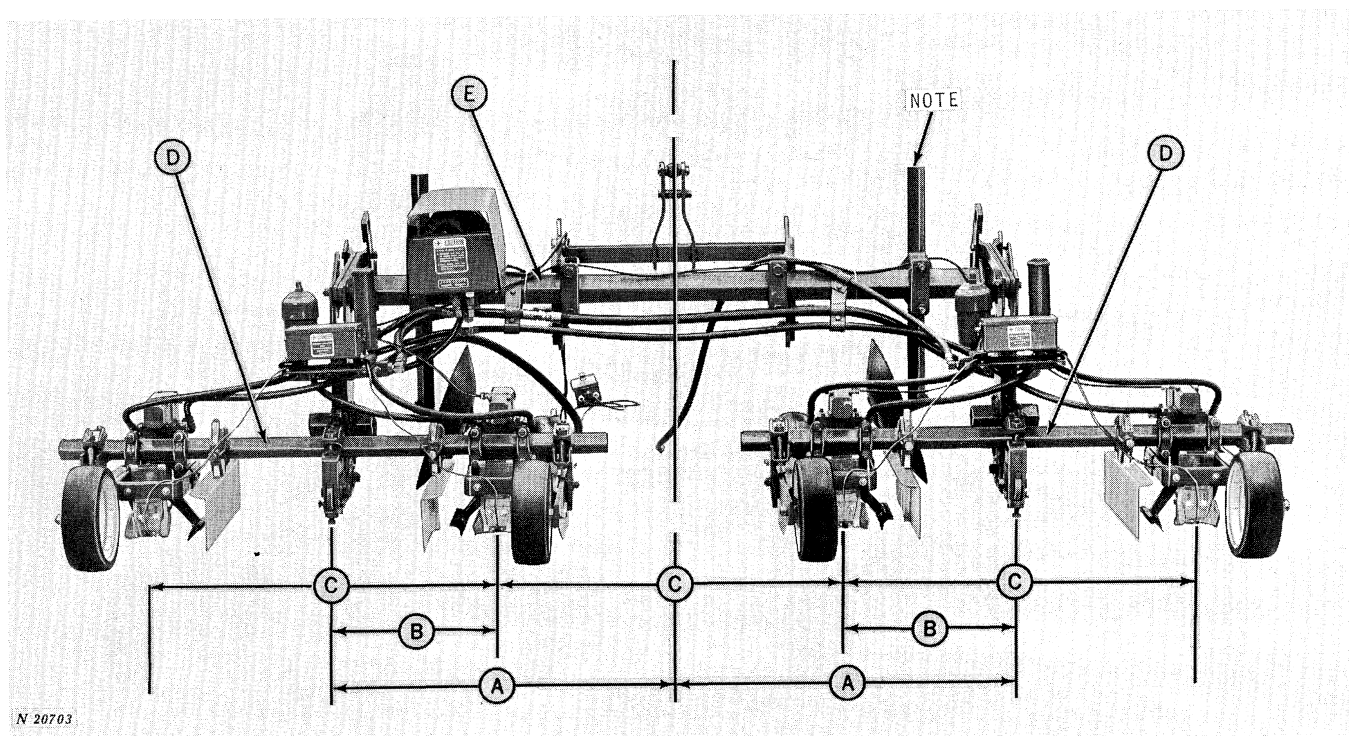
Start tractor engine and check for oil leaks and any other malfunctions of the thinner. See "Beginning of Season Service" page 19.



Row Spacing

The illustrations and charts below and on the following pages give the correct dimensions to use for the row spacing desired for your thinner.

114K THINNER



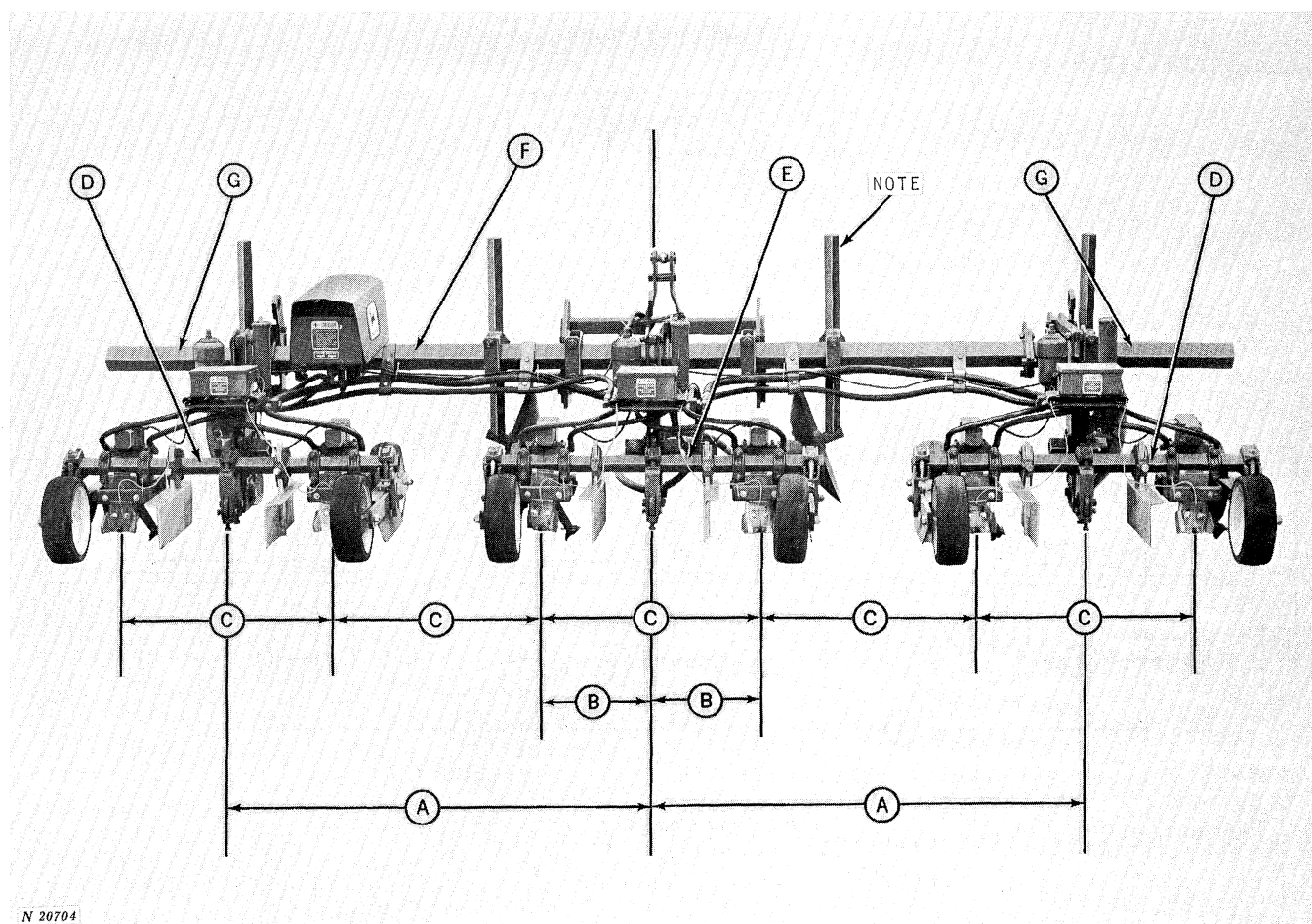
114K Thinner (Rear-Mounted Illustrated)

Description	Symbol	Row Spacing (Inches)				
		22	24	30	32*	40*
Hanger Centerline	A	22"	24"	30"	32"	40"
Actuator Spacing	B	11"	12"	15"	16"	20"
Row Centerline	C	22"	24"	30"	32"	40"
Actuator Bar Length	D	48"	48"	48"	64"	64"
Boom Length	E	86"	86"	86"	86"	86"

* For row spacing wider than 30 inches, use longer hoses and actuator bar.

NOTE: Locate cone guide wheels (rear-mounted only) on the sides of the bed or for furrow guidance.

116K REAR-MOUNTED THINNER

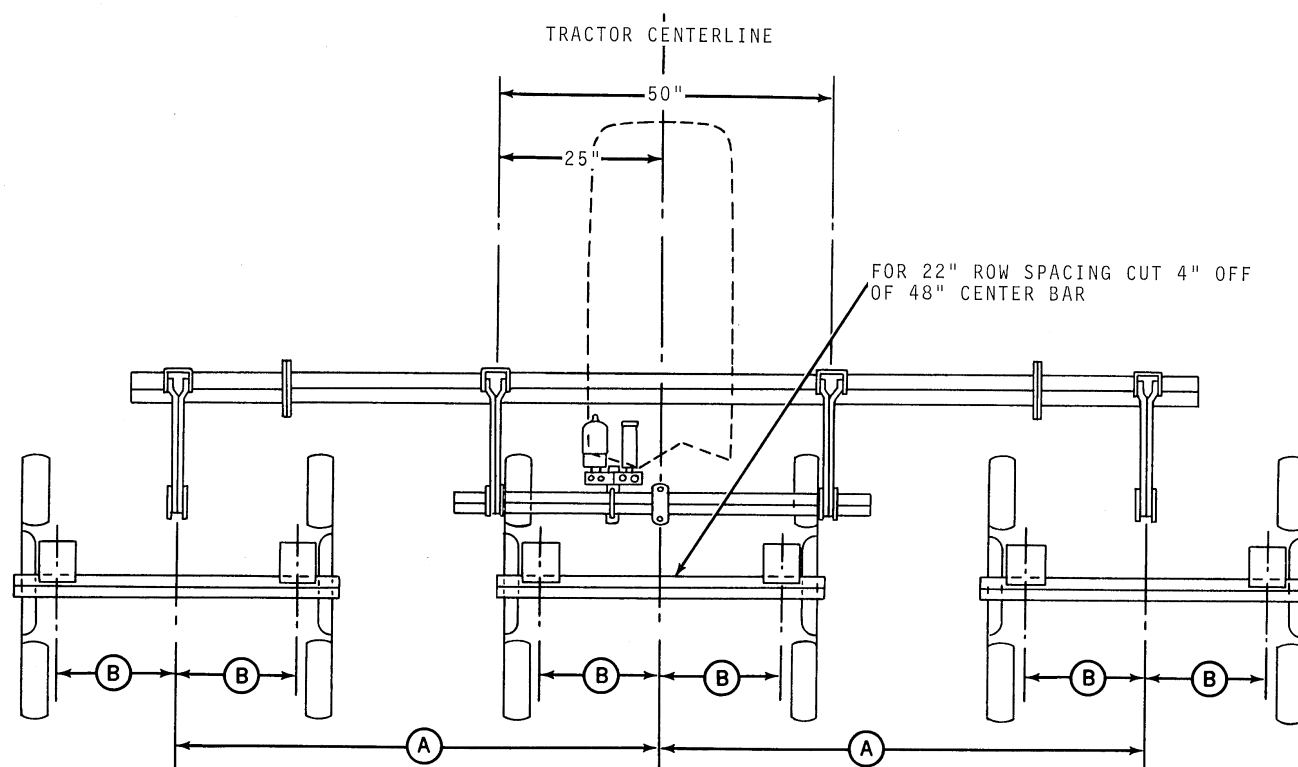


116K Rear-Mounted Thinner

Description	Symbol	Row Spacing (Inches)		
		22	24	30
Hanger Spacing	A	44"	48"	60"
Actuator Spacing	B	11"	12"	15"
Row Spacing	C	22"	24"	30"
Actuator Bar Length (End)	D	48"	48"	48"
Actuator Bar Length (Middle)	E	48"	48"	48"
Boom Length	F	110"	110"	110"
Boom Extension No. Required	G	0	0	2

NOTE: Locate the cone guide wheels on the sides of the bed or for furrow guidance.

116K FRONT-MOUNTED THINNER

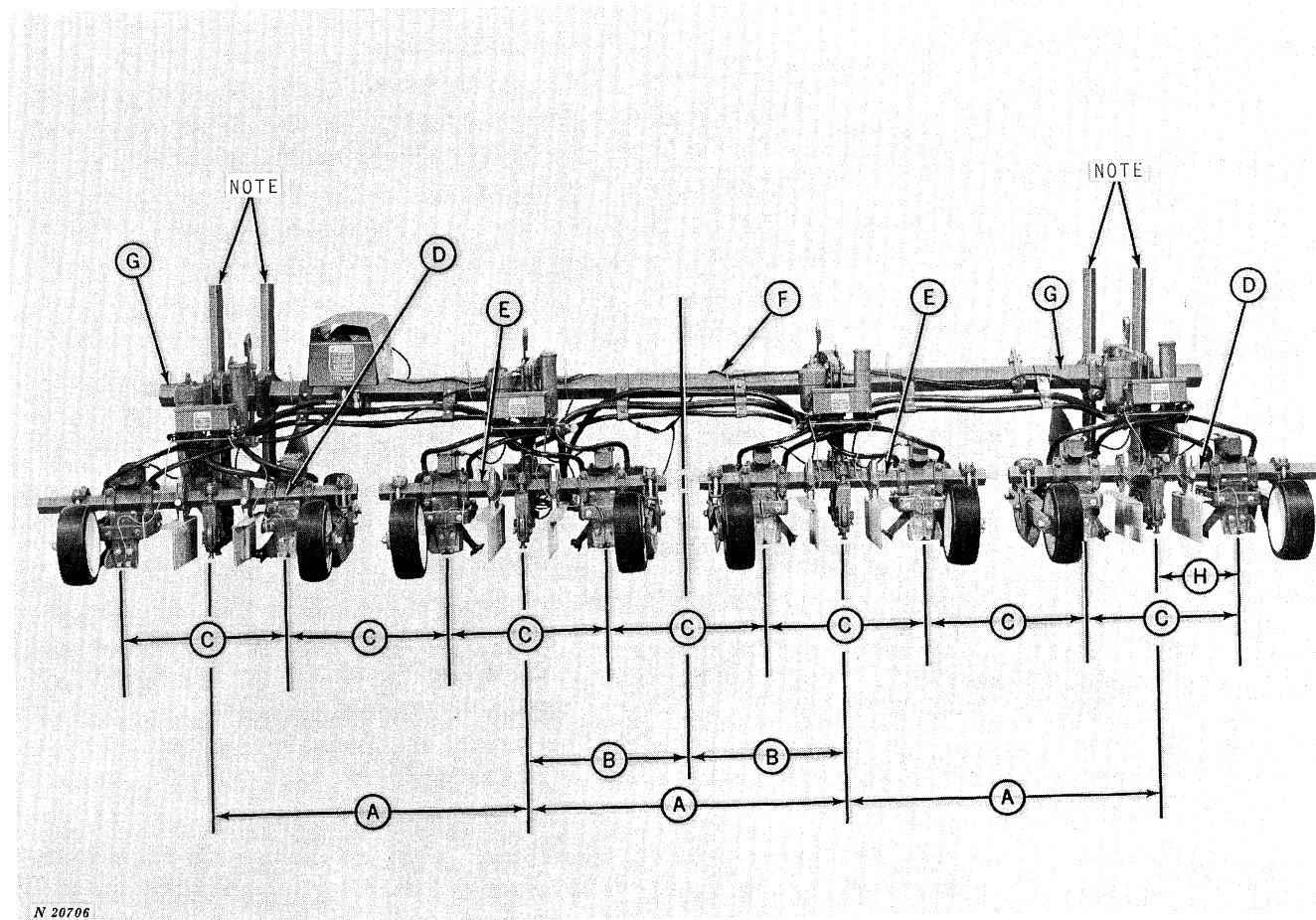


N 20705

116K Front-Mounted Thinner

Symbol	Row Spacing (Inches)				
	22	24	26	28	30
A	44"	48"	52"	56"	60"
B	11"	12"	13"	14"	15"

118K THINNER

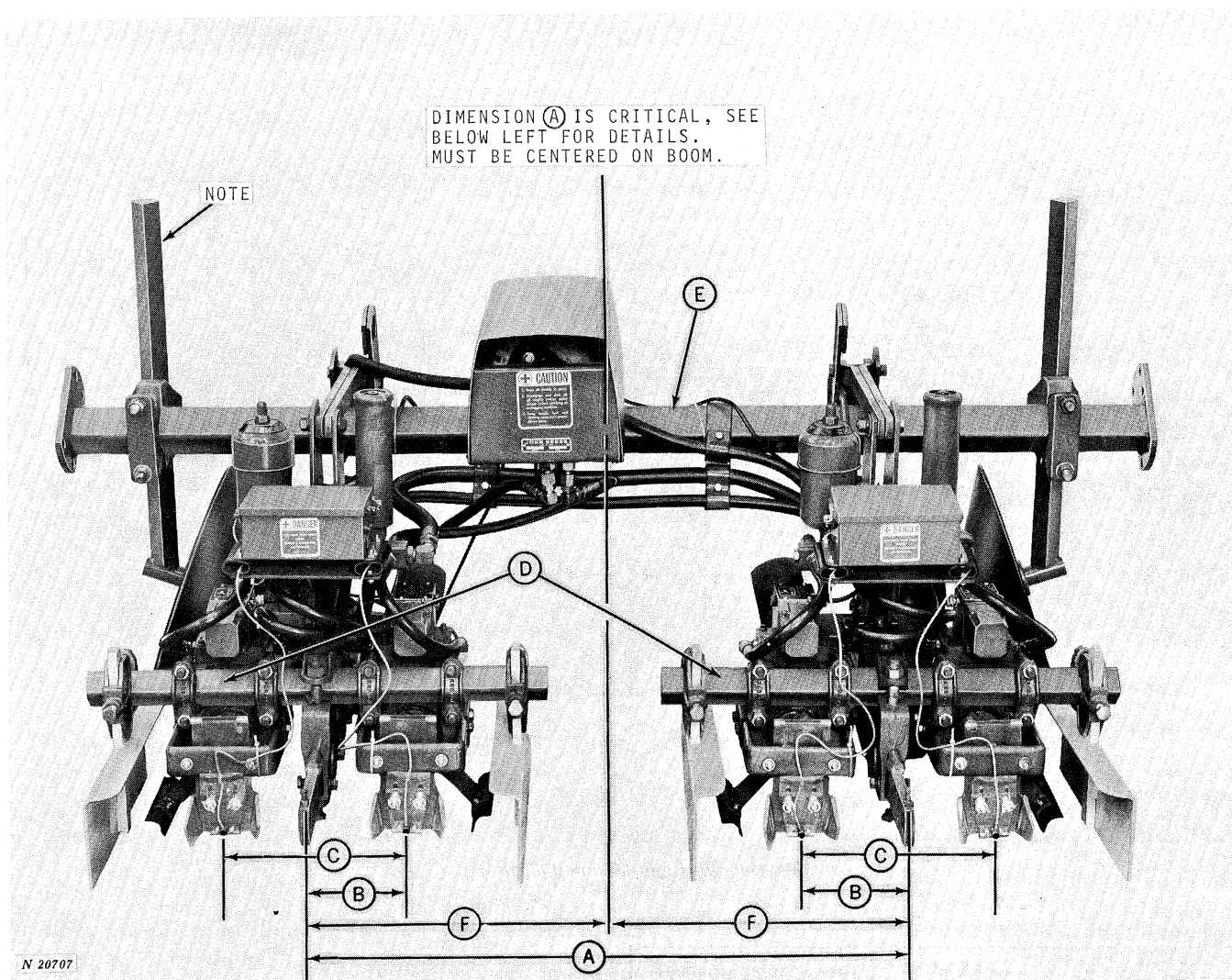


118K Thinner (Front-Mounted Illustrated)

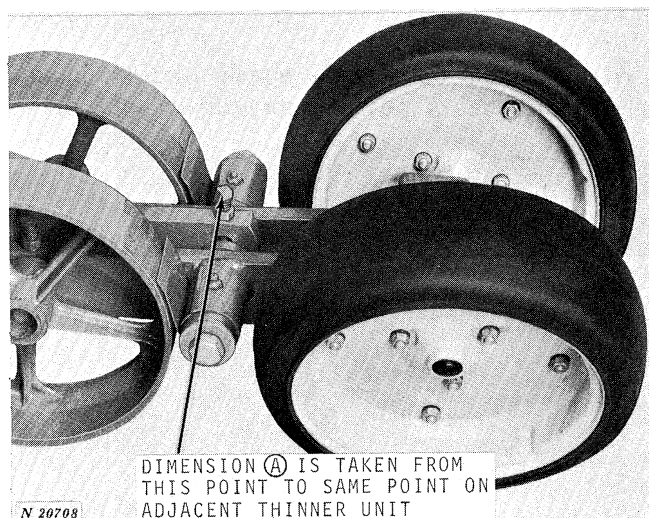
Description	Symbol	Row Spacing (Inches)	
		22	24
Hanger Spacing	A	44"	48"
Centering Dimension	B	22"	24"
Row Spacing	C	22"	24"
Actuator Bar Length (End)	D	48"	48"
Actuator Bar Length (Middle)	E	44"	44"
Boom Length	F	110"	110"
Boom Extensions - No. Required	G	2	2
Actuator Spacing	H	11"	12"

NOTE: Locate cone guide wheels (rear-mounted only) on the sides of the bed or for furrow guidance.

124K THINNER



124K Thinner



Measuring Point for Dimension A

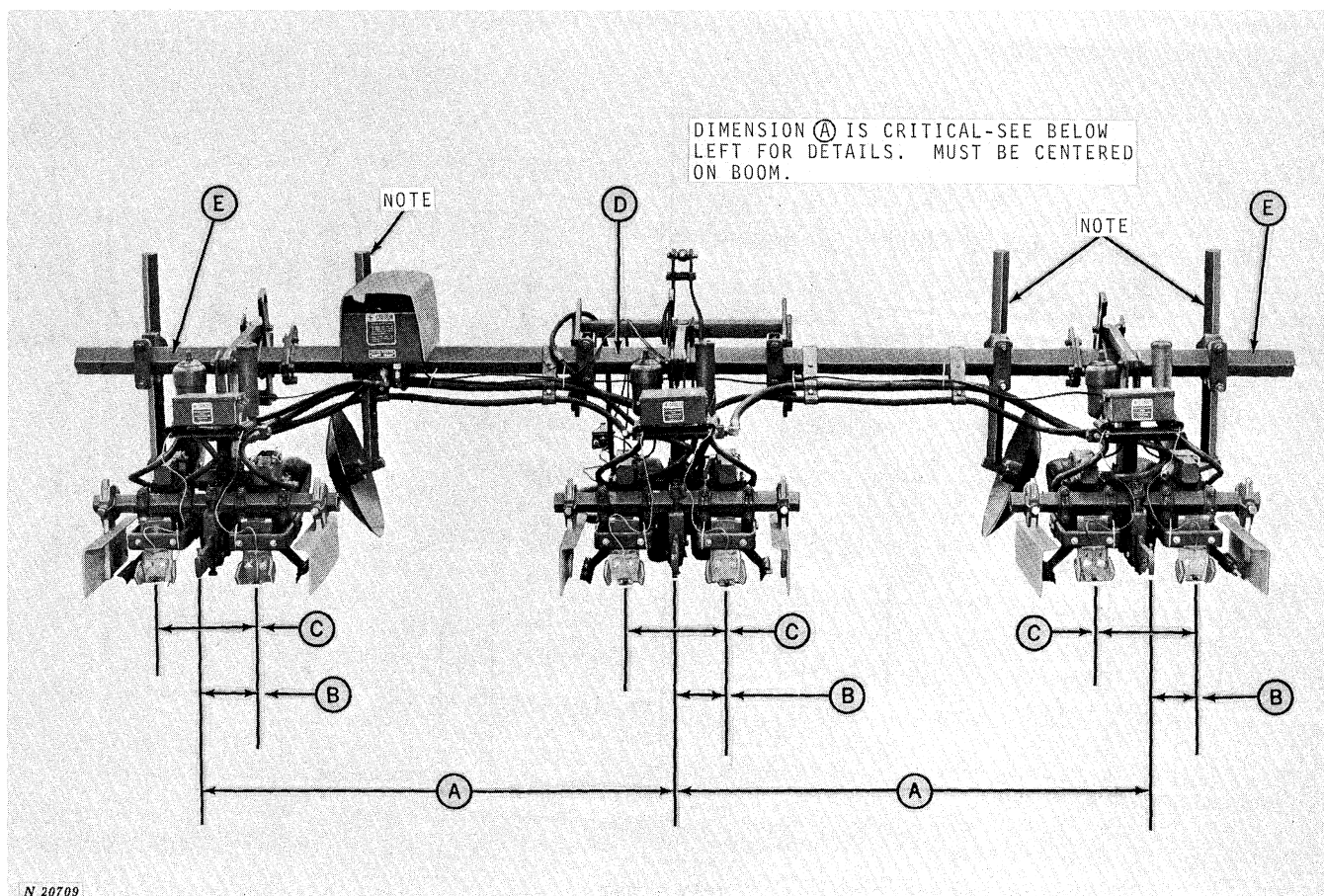
Description	Symbol	Seedline Spacing			
		12"* *	13"* *	14"	15"
Bed Centerline*	A	40"	40"	40"	40"
Reference Dimension	B	6"	6-1/2"	7"	7-1/2"
Seedline Spacing	C	12"	13"	14"	15"
Actuator Bar Length	D	32"	32"	32"	32"
Boom Length	E	86"	86"	86"	86"
Centering Dimension	F	20"	20"	20"	20"

* Variable for 38", 42" and 44" bed centerlines; 40" beds most common.

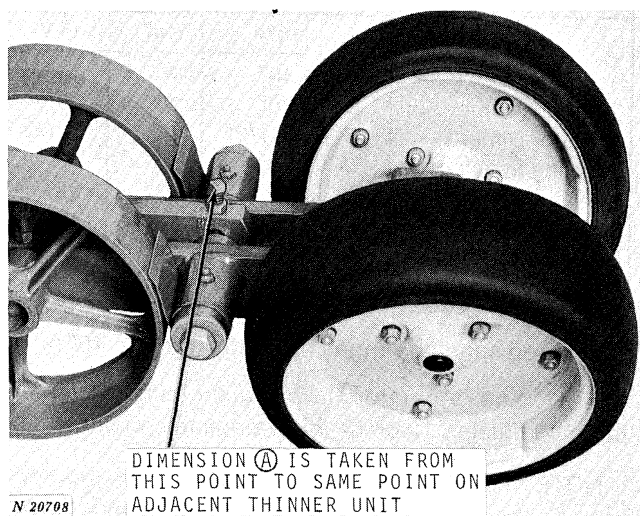
* * See "Actuator Row Spacing" instructions on pages 49 and 50 if using 12 or 13-inch seedline spacing.

NOTE: Locate cone guide wheels (rear-mounted only) on the sides of the bed or for furrow guidance.

126K THINNER



126K Thinner



Measuring Point for Dimension A

Description	Symbol	Seedline Spacing		
		13" * * *	14"	15"
Bed Centerline*	A	60"	60"	60"
Reference Dimension	B	6-1/2"	7"	7-1/2"
Seedline Spacing	C	13"	14"	15"
Boom Length	D	110"	110"	110"
Boom Extension* * (No. Required)	E	2	2	2

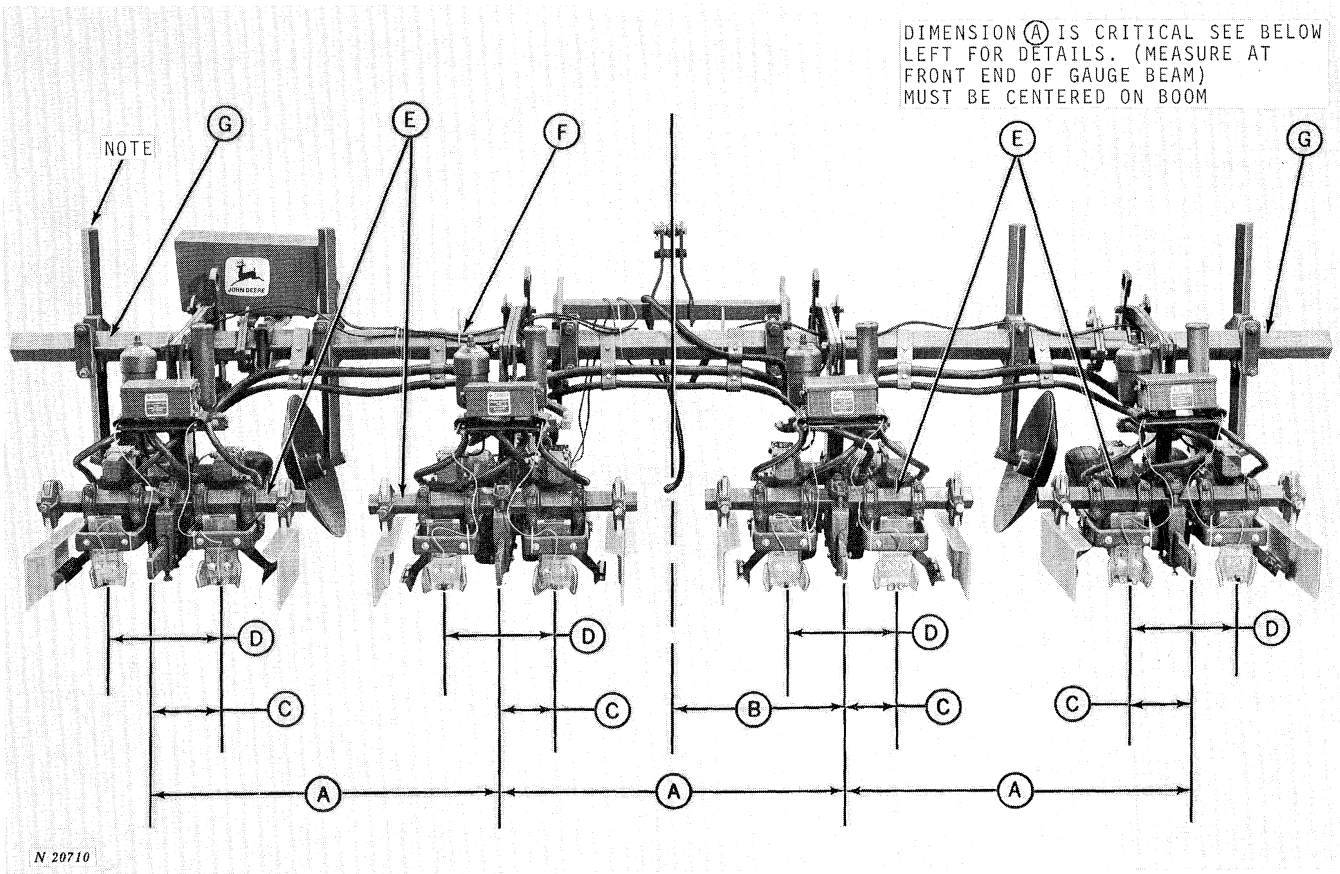
* Variable for 26" through 60".

* * Extensions not required for 26-44 inch bed centerlines.

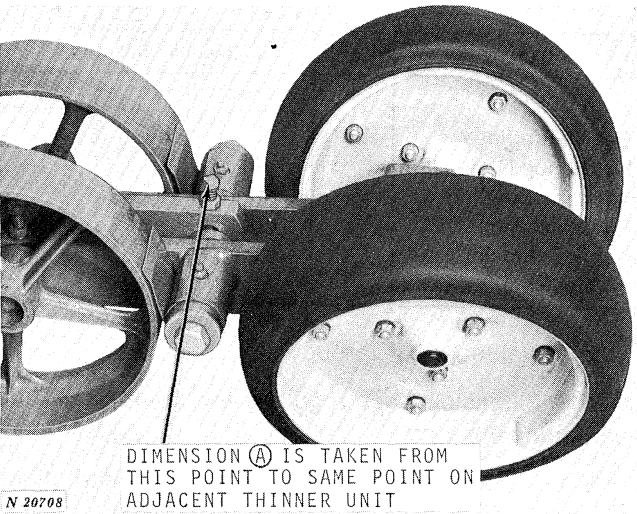
* * * See "Actuator Row Spacing" instructions on pages 49 and 50 if using 12 or 13-inch seedline spacing.

NOTE: Locate cone guide wheels (rear-mounted only) on the sides of the bed or for furrow guidance.

128K THINNER



128K Thinner



Measuring Point for Dimension A

Description	Symbol	Seedline Spacing		
		13"* *	14"	15"
Bed Spacing*	A	40"	40"	40"
Centering Dimension	B	20"	20"	20"
Actuator Dimension	C	6-1/2"	7"	7-1/2"
Seedline Spacing	D	13"	14"	15"
Actuator Bar Length	E	32"	32"	32"
Boom Length	F	110"	110"	110"
Boom Extensions— (No. required)	G	2	2	2

* Bed spacing ranges from 26" through 40".

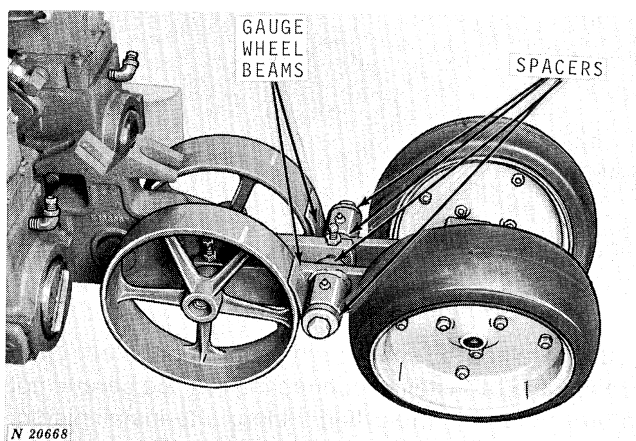
* * See "Actuator Row Spacing" instructions on page 49 if using 12 or 13-inch seedline spacing.

NOTE: Locate cone guide wheels (rear-mounted only) on the sides of the bed or for furrow guidance.

ACTUATOR SPACING - DOUBLE-ROW UNIT

12 or 13-Inch Actuator Spacing

Installing gauge beam spacers

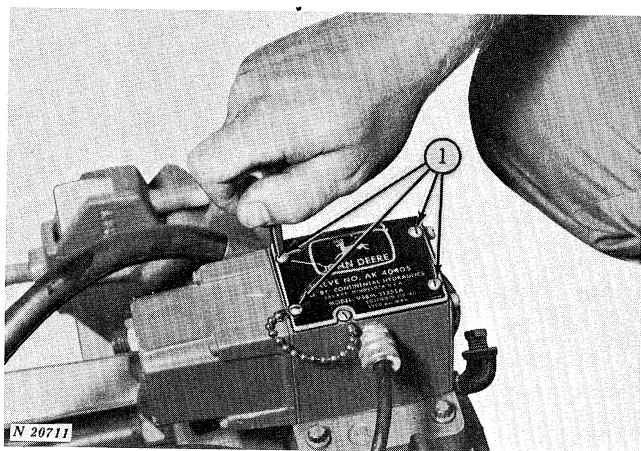


If actuators are spaced on actuator beam 12 or 13 inches apart, the spacers between the gauge beams must be installed as shown above.

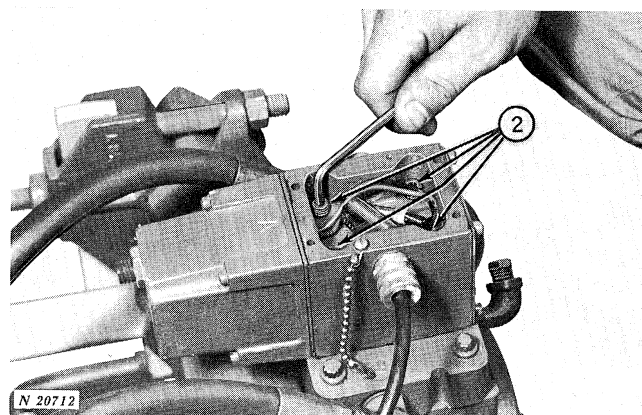
12-Inch Actuator Spacing Only

Installing connecting rod spacers

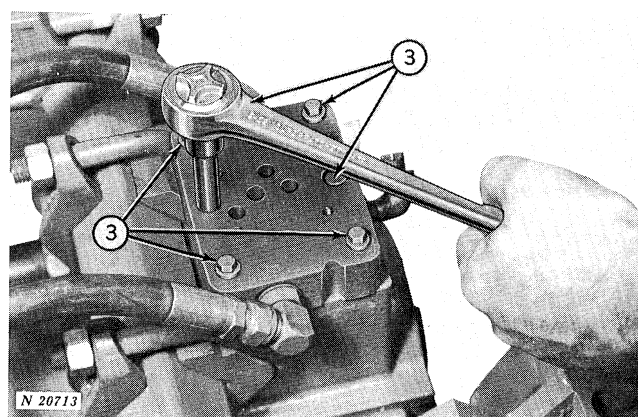
For 12-inch spacings the knife stroke must be reduced. Connecting rod spacers are provided with each unit and the installation procedure is outlined as follows.



1. Remove the solenoid valve cover by removing the four screws.

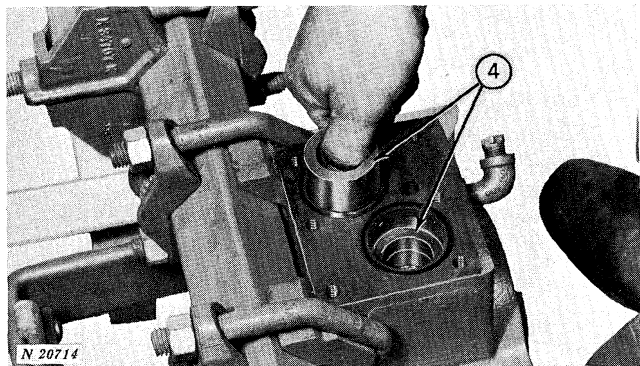


2. Remove the solenoid valve by removing the four socket head mounting screws.

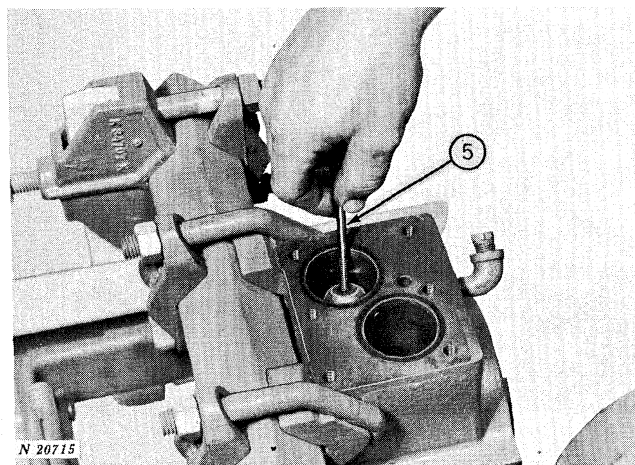


3. Remove the manifold plate by removing the six counterbore bolts.

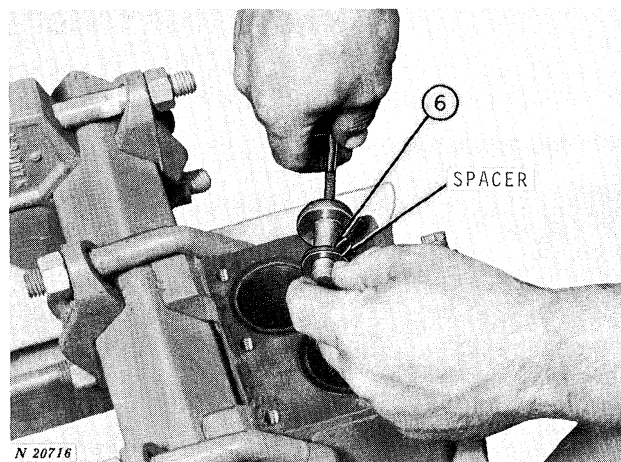
12-Inch Actuator Spacing Only - Continued



4. Remove the pistons as shown above. The groove in the center of the piston is provided as a gripping point for pulling the piston out.



5. Remove the connecting rod balls. Use 1/4 x 2-3/4-inch bolt to screw into rod to pull it out through the cylinder bore. Be sure to position the knife arm at bottom dead center before removing connecting rod balls to prevent the connecting rod from rotating out of position.



6. Install one spacer on each ball stem with grease and re-install in connecting rod. Be careful not to drop spacer in the cylinder block. Re-install piston. Be careful not to damage piston seal.

Replace cylinder head O-rings and install manifold block on the cylinder block with 6 counterbore screws using the two short (1-1/2 inch) screws in the center holes. Tighten screws in to 35-40 ft-lbs torque working from the center bolts out.

Position O-rings in the solenoid valve and assemble it to the manifold block. Tighten bolts to 9-12 ft-lbs torque to prevent seal leakage or valve warpage.

Connect solenoid wires and replace valve cover and gasket.



Specifications

MODELS

Carrier Models	THINNER -- CARRIER COMBINATIONS							
	Thinner Models							
	114K-30	114K-40	116K		118K-24	124K	126K	128K
			24"	30"				
53K1	yes	yes	no	no	no	yes	no	no
53K1E	yes	yes	yes	yes	no	yes	no	no
53K2	yes	yes	no	no	no	yes	no	no
53K2E	yes	yes	yes	yes	no	yes	no	no
54KB	yes	yes	no	no	no	yes	no	no
54KBE	yes	yes	yes	yes	no	yes	no	yes
54KC	yes	yes	no	no	no	yes	no	no
54KCE	yes	yes	yes	yes	yes	yes	no	yes
54KCS	yes	yes	yes	no	no	yes	no	no
54KBH	yes	yes	no	no	no	yes	no	no
54KCH	yes	yes	no	no	no	yes	no	no
54KBEH	yes	yes	yes	yes	no	yes	no	no
54KCEH	yes	yes	yes	yes	yes	yes	yes	yes
54KCSH	yes	yes	yes	no	no	yes	no	no
55KB	yes	yes	no	no	no	yes	no	no
55KBG	yes	yes	no	no	no	yes	no	no
55KC	yes	yes	yes	no	no	yes	no	no
55KCG	yes	yes	yes	no	no	yes	no	no
55KCE	yes	yes	yes	yes	no	yes	yes	no
55KCGES	yes	yes	yes	yes	yes	yes	yes	yes

For Crops Planted on Flat Ground or One Seedline Per Bed

Thinner	No. of Beds	No. of Seedlines	Spacings Between Beds
114K-30	4	4	22" - 30"* *
114K-40	4	4	32" - 40"* *
116K	6	6	22" - 30"* *
118K-24	8	8	22" - 24"* *

* * Minimum bed width of 5 inches beside the seedline is necessary for gauge wheel to properly gauge thinning knife.

For Crops Planted Two Seedlines Per Bed

Thinner	No. of Beds	No. of Seedlines	Spacing Between Beds	Spacing Between Seedlines
124K	2	4	36" - 46"	* 13" - 15"
126K	3	6	36" - 60"	* 13" - 15"
128K	4	8	36" - 46"	* 13" - 15"

* Spacing between seedlines can be reduced to 12 inches if spacers are installed in actuators. See pages 49 and 50.

TRACTOR REQUIRED

Rear-Mounted

John Deere 1020* , 1520* , 2020* , 2520, 3020, 4000, 4020, 4320 Tractors are recommended for use with 114K-30, and 114K-40 Thinners.

John Deere 1520* (without Quik-Coupler), and 2020* Tractors are recommended for use with 126K Thinner.

John Deere 2520, 3020, 4000, 4020 and 4320 Tractors are recommended for use with 116K, 118K-24, and 128K Thinners.

Front-Mounted

John Deere 1020* , 1520* , 2020* , 2520, 3020, 4000, 4020, and 4320 Tractors are recommended for use with 114K-30, 114K-40, and 116K Thinners.

John Deere 2520, 3020, 4000, 4020 4320 are recommended for use with 118K-24 and 128K Thinners.

* 1020, 1520 and 2020 Tractors must be equipped with 13-gpm pump.

TRACTOR REQUIREMENTS

Tractor must be equipped with the following:

Closed-center hydraulic system (minimum of 2,000 psi and maximum of 2,300 psi).

Constant pressure in return line (minimum of 50 psi and a maximum of 100 psi).

Dual remote cylinder outlets (one raises and lowers the front-mounted thinner, the other controls flow of hydraulic fluid which operates thinner row units).

TRACTOR TIRE RESTRICTIONS AND FRONT BALLAST

See your tractor operator's manual for tire restrictions and front end weight.

ACTUATOR

Oil capacity - 4 fluid ounces
Type of oil - JDM 303
Type - Two piston
Solenoid voltage - 110 volts
Stroke time - .028 seconds

(Specifications and design subject to change without notice.)

ACCUMULATORS

For each two rows there is a high and low pressure accumulator.

The high pressure accumulator has a preset nitrogen pressure of 1200 psi.

The low pressure accumulator has a preset nitrogen pressure of 40 psi.

OPERATING SPEEDS

Down-the-row - approximately 1-1/2 to 3 miles per hour.

Transport - 10 miles per hour.

ALTERNATOR

Output - 125 volts, 1,800 watts.

KNIVES

6-inch knives regular equipment on all single-row thinners.

8-inch knives regular equipment on all double-row thinners.

5-, 7-, 9-, 10-, 11-, and 12-inch knives are optional equipment.

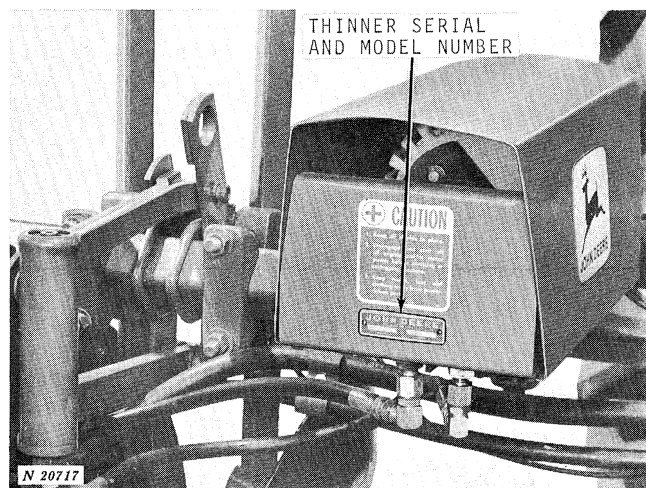
OPTIONAL EQUIPMENT

Additional knife arm for use with 10-, 11- and 12-inch knives.

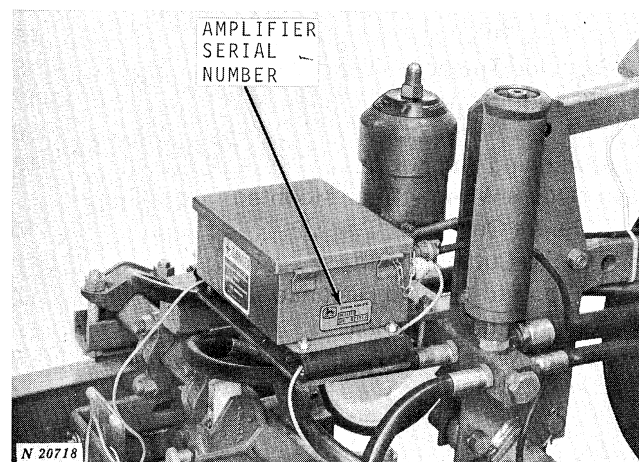
Rear gauge wheels for double-row thinner:

1. Standard flat gauge wheel
2. High crown gauge wheel for salt peaks

SERIAL NUMBERS



The thinner serial and model numbers are on a plate located on the alternator shield.



The amplifier serial number is on a plate located on the side of each amplifier.

When ordering parts, always bring with you the model and serial number. By doing so, you will assist your John Deere dealer in giving you prompt, efficient service. For your convenience, a space is provided below for recording this information.

THINNER MODEL NUMBER

THINNER SERIAL NUMBER

AMPLIFIER SERIAL NUMBER



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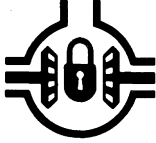
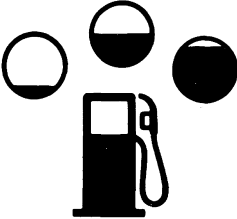
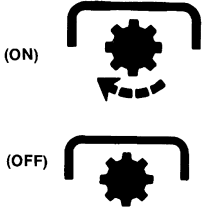
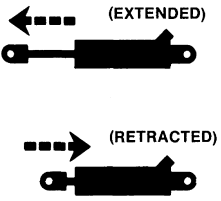
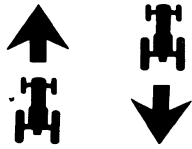
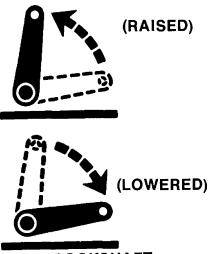
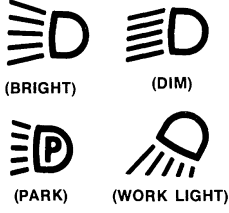
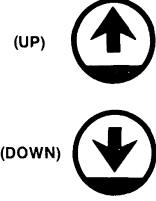
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MEMORANDA

WORLDWIDE SYMBOLS FOR OPERATOR CONTROLS

Symbols instead of words; that's what John Deere is using to promote worldwide identification of operator controls. Once standardized, they give a quick, positive message anywhere in the world — without translation. Study the symbols below and learn to recognize them at a glance.

				
TRANSMISSION OIL PRESSURE	TRANSMISSION OIL TEMPERATURE	TRANSMISSION OIL FILTER	ENGINE OIL PRESSURE	ENGINE R P M
				
DIFFERENTIAL LOCK	WATER TEMPERATURE	PRESSURIZED — OPEN SLOWLY	AIR FILTER	CHOKE
				
AMMETER OR GENERATOR LIGHT	FUEL	FUEL SHUTOFF	POWER TAKE-OFF	REMOTE CYLINDER
				
SPEED RANGE	VEHICLE FORWARD VEHICLE REVERSE	NEUTRAL	PARK	ROCKSHAFT
				
LIGHTS	WINDSHIELD WIPER	WINDSHIELD DEFROSTER	IMPLEMENT MOVEMENT	CIGAR LIGHTER
				
HORN	ROCKSHAFT LOAD AND DEPTH CONTROL		GREASE FREQUENCY	OIL TYPE AND FREQUENCY

