

JOHN DEERE 100 K SERIES SYNCHRONOUS THINNER



JOHN DEERE

OPERATORS MANUAL JOHN DEERE 100 K SERIES SYNCHRONOUS THINNER

OMK40650 J8 English

OMK40650 J8

LITHO IN THE U.S.A.
ENGLISH





TO THE PURCHASER

Your 100K Series Synchronous Thinner was designed and manufactured to the traditionally high quality standards of all John Deere Farm Equipment. It has been thoroughly inspected and tested.

This manual has been carefully prepared and illustrated, so that you may make the necessary adjustments for adapting your thinner to work properly in practically all types of field conditions.



Study this manual carefully. Keep it handy, in a safe place, for future 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- and left-hand sides referred to in this manual are determined from a position at the rear of the thinner facing in the direction of travel.

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.

EXPLANATION OF MODEL NUMBERS

Thinner model numbers consist of numbers and letters which identify specific details of the thinner. For example, Model No. 124K-01 would identify the following details:

- 1 - 100 Series Thinner
- 2 - 2 Rows of Plants Per Bed
- 4 - 4 Rows of Plants - Total
- K - Killefer Machine
- 01 - Model Number

MODEL AND SERIAL NUMBERS

When ordering parts, always furnish the model number and complete serial numbers. By doing so, you will assist your John Deere dealer in giving you prompt, efficient service.

Record the model and serial numbers in the spaces provided below.

Model Number
(Located on switch support)

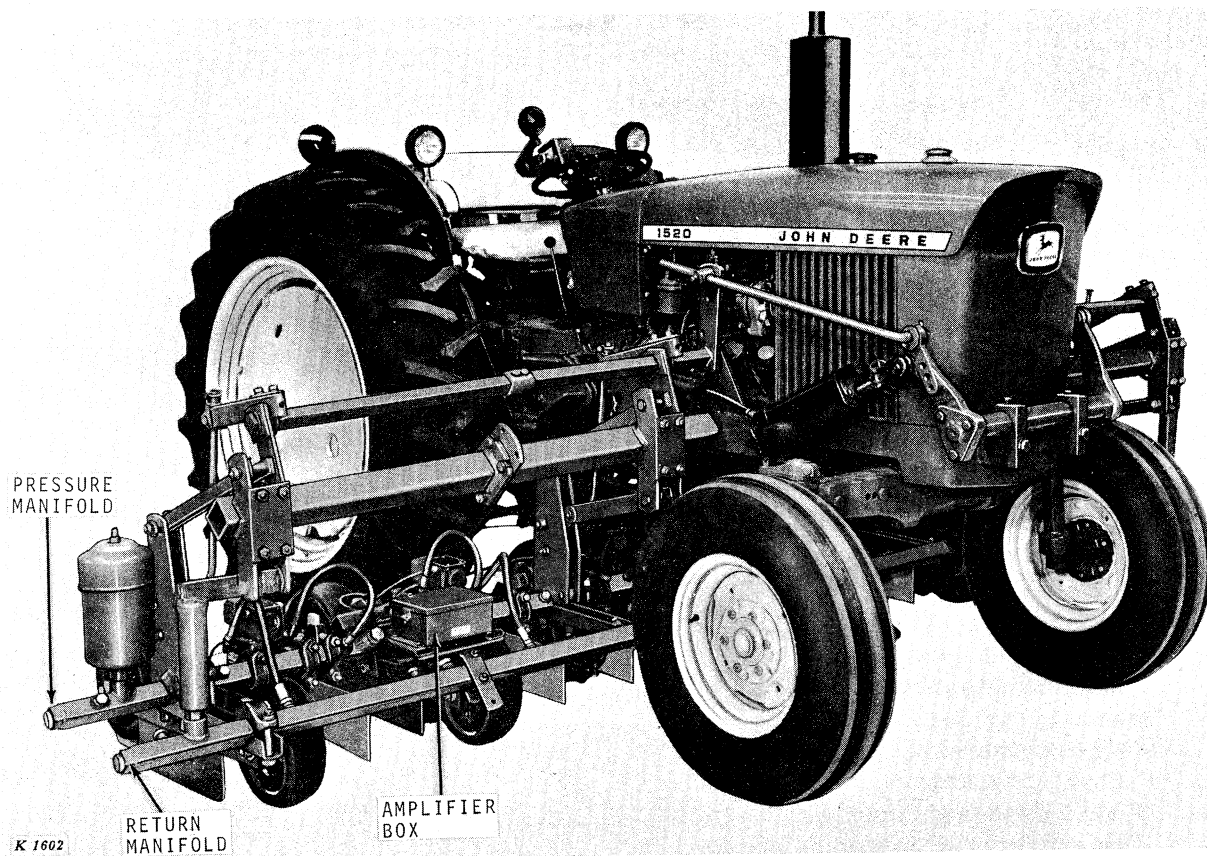
Actuator
(Located at rear of block in L.H. corner)

Amplifier
(Located on front side of box)

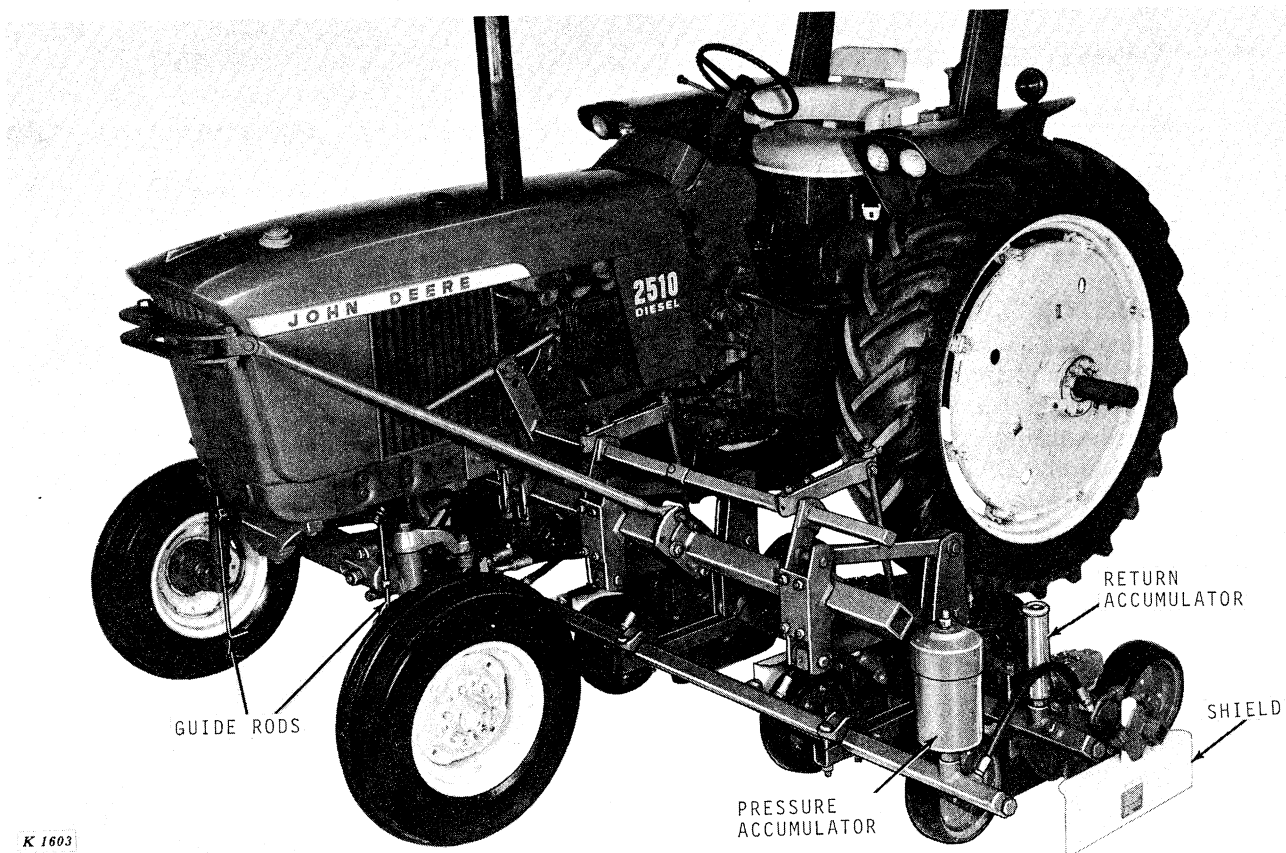


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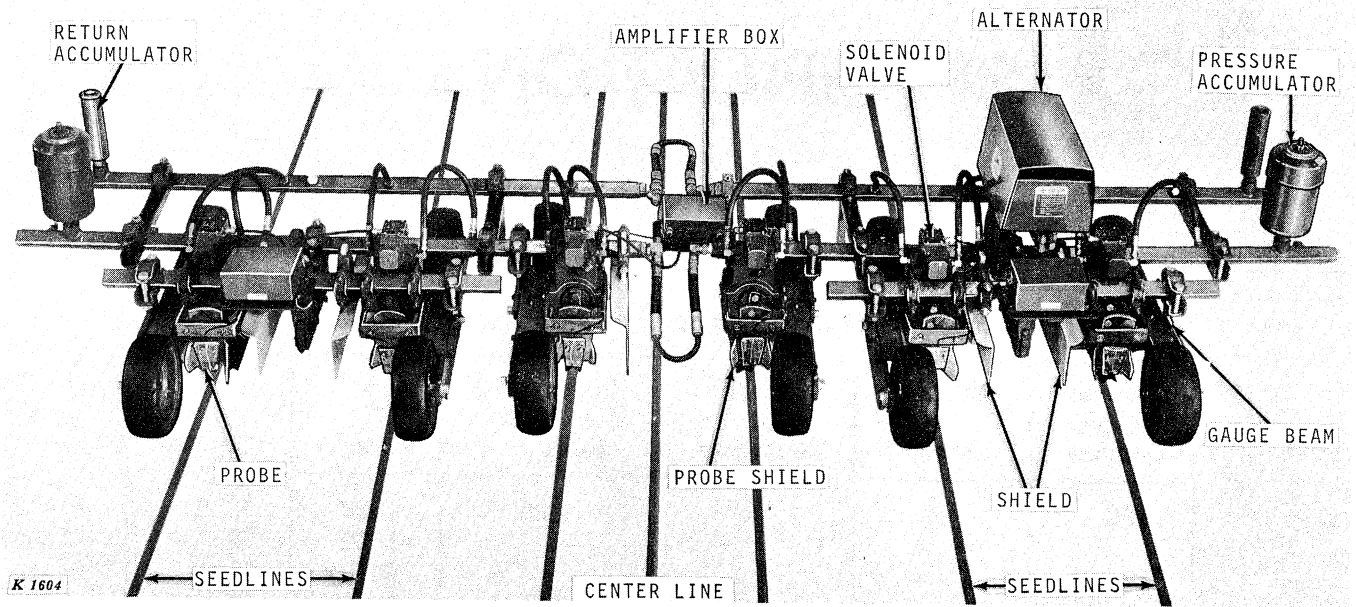
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John Deere 116K Thinner with 24-Inch Row Spacing and 53K1E Carrier on 1520 Tractor



John Deere 116K Thinner with 30-Inch Row Spacing and 54KBE Carrier on 2510 Tractor



John Deere 116K Thinner with 22-Inch Row Spacing



SPECIFICATIONS

MODELS

For Crops Planted on Flat Ground or One Seed Line Per Bed

Thinner Less Carrier	Number of Beds	Number of Seedlines	Spacing Between Beds	Tractor	Carrier
112K	2	2	14'' - 60''*	1020 1520 2020 2510 2520 3020 4020	53K1 53K1 53K2 54KB 54KB 54KB 54KB
114K-30	4	4	22'' - 30''*	1020 1520 2020 2510 2520 3020 4020	53K1 53K1 53K2 54KB 54KB 54KB 54KB
114K-40	4	4	32'' - 42''*	1020* 1520* 2020* 2510 2520 3020 4020	53K1 53K1 53K2 54KB 54KB 54KB 54KB
116K-30	6	6	22'' - 30''*	1020* 1520* 2020* 2510 2520 3020 4020	53K1E 53K1E 53K2E 54KBE 54KBE 54KBE 54KBE
118K-30	8	8	22'' - 30''*	2510 2520 3020 4020	54KBE 54KBE 54KBE 54KBE

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

For Crops Planted Two Seed Lines Per Bed

Thinner Less Carrier	Number of Beds	Number of Seedlines	Spacing Between Beds	Spacing Between Seedlines	Tractor	Carrier
124K	2	4	36'' - 46''	13'' - 15''	1020	53K1
					1520	53K1
					2020	53K2
					2510	54KB
					2520	54KB
					3020	54KB
128K	4	8	36'' - 46''	13'' - 15''	4020	54KB
					2510	54KBE
					2520	54KBE
					3020	54KBE
					4020	54KBE

TRACTOR REQUIREMENTS

Tractor must be equipped with:

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

13-gpm pump on 1020, 1520, or 2020 Tractor.

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

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

Adjustable-tread front axle, double wheels with or less Roll-O-Matic, or single front wheel.

NOTE: Use of the following front tires is not recommended:

2510 and 2520 Row-Crop

6.00 - 14, 4-ply

9.00 - 10, 8-ply single

4020 Row-Crop

7.50 - 16, 10-ply single

WEIGHT

MODEL	ESTIMATED WEIGHT
112K	700 lbs.
114K-30	1,000 lbs.
114K-40	1,000 lbs.
116K-30	1,500 lbs.
118K-30	2,000 lbs.
124K	1,000 lbs.
128K	2,000 lbs.

OPERATING SPEED

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

ALTERNATOR

Output - 110 - 130 volts, 1,800 watts.

KNIVES

8-inch knives regular equipment on all models.

9-inch knives regular equipment on 124K and 128K.

5-, 6-, 7-, 8-, 9-, 10-, 11-, and 12-inch knives optional equipment.

OPTIONAL EQUIPMENT

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

Rear gauge wheel - 6 inches wide.



DESCRIPTION

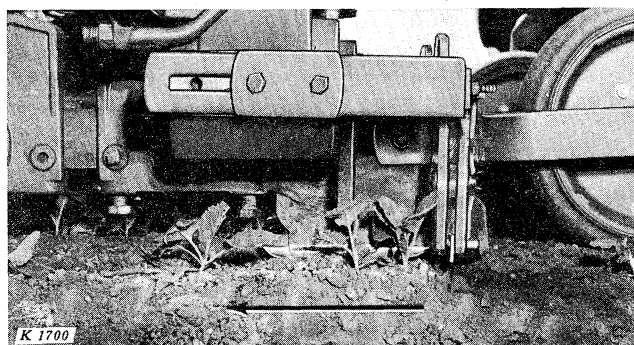
GENERAL

John Deere 100K Series Thinners are available in six 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.

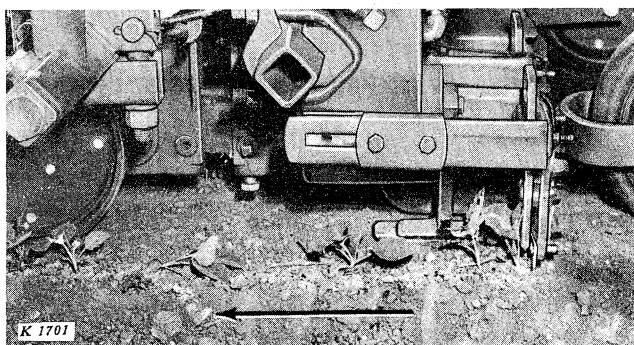
Row units are of two types. One type consists of two thinner heads and a common gauging system to thin crops planted two seedlines per bed . . . such vegetable crops as lettuce, broccoli, and cabbage.

The other type has a single head with separate gauging system for each row to thin crops such as cotton planted one seedline per row, on beds, or crops such as sugarbeets planted one seedline per row, planted flat.

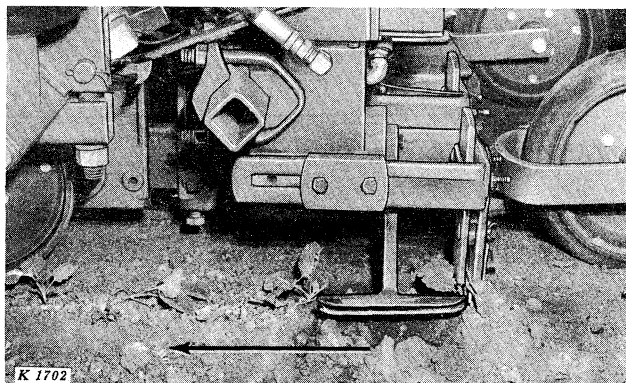
HOW IT WORKS



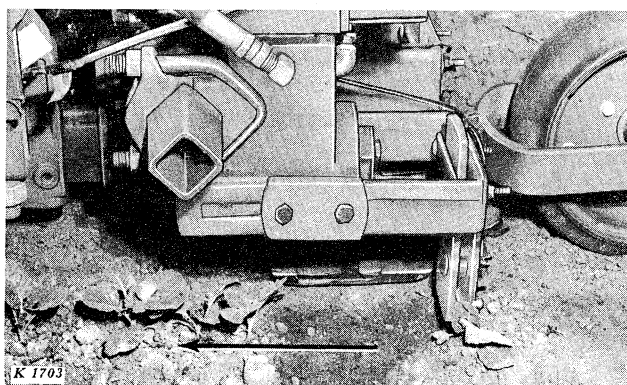
100K Series Thinner row unit (moving left in picture above) approaches the plant. The operating cycle begins when a plexiglass shield on the probe touches the outer edge of a leaf. The shield folds the leaves forward until the probe is over the center of the plant. This is to prevent the leaves from 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 which, in turn, moves the knife.



When activated by the signal from the probe, the knife swings across the row at 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 provides enough force to knock out excess plants and weeds, 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 stop. When the shield and probe contact the next plant, the same series of electrical and hydraulic actions take place; the knife swings back to the opposite side, again clearing out excess plants and weeds. 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 or sensor. 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 machine, 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 thinner. 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 machine will consider two plants as one and save both plants.

4. For the most accurate work, the plants should be from 1-1/2 to 4 inches high. Smaller plants can be thinned if the ground surface is smooth and free of clods so the electrical probe or sensor 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 machine 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.

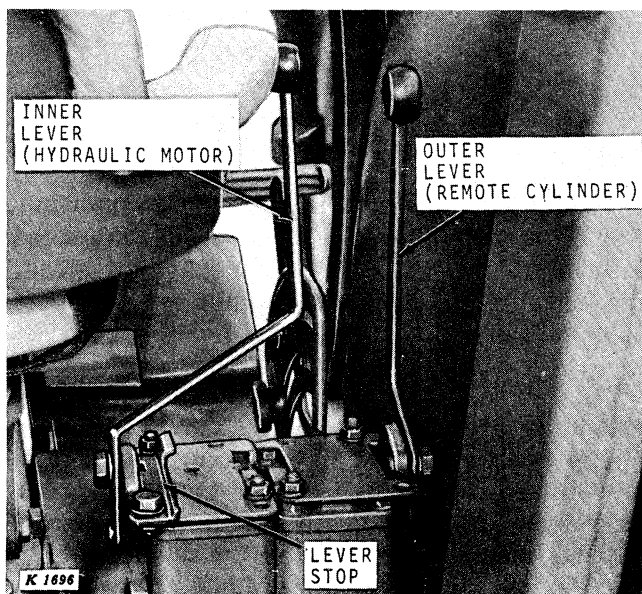
REMOTE CYLINDER OPERATING LEVERS

One remote cylinder operating lever raises and lowers the thinner.

The other lever provides constant hydraulic pressure to operate the alternator and the actuators. To provide constant hydraulic pressure, it is necessary to keep this lever in the operating position.

The lever stop is used to hold the lever in operating position as shown in the following illustrations.

1020, 1520, and 2020 Tractors



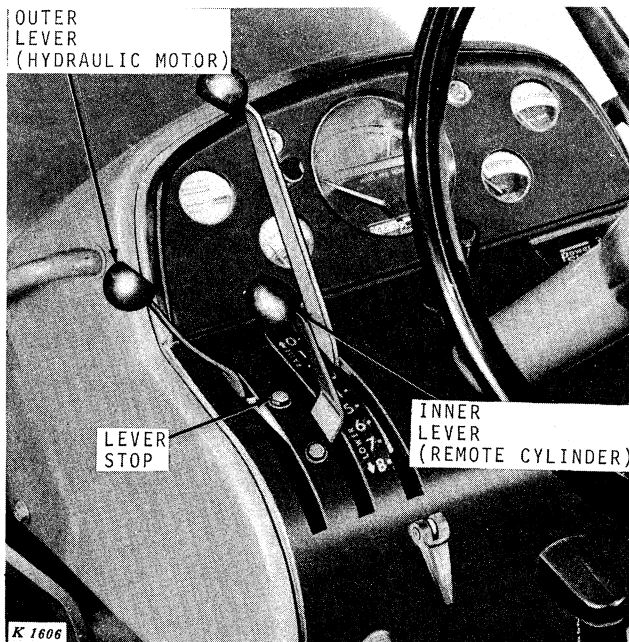
The lever stop is attached to hold the inner lever in the operating position.

To hold the lever in operating position, pull lever rearward, lift up on lever stop and pull lever stop into position to secure lever.

To release lever stop, lift up on lever stop and push away from lever.

Raise and lower the thinner with the outer 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.

To place lever in operating position, push lever up.

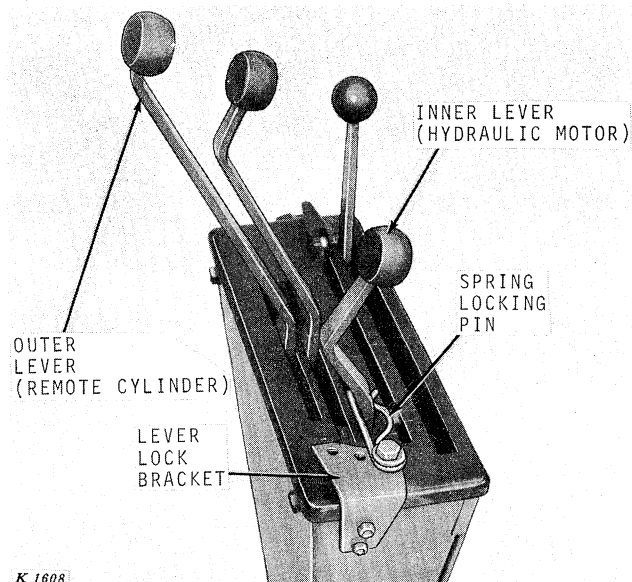
To release lever to neutral position, push lever to the left and return lever past the stop to neutral.

Raise and lower the thinner with the inner 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.

CONTROLS—Continued

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



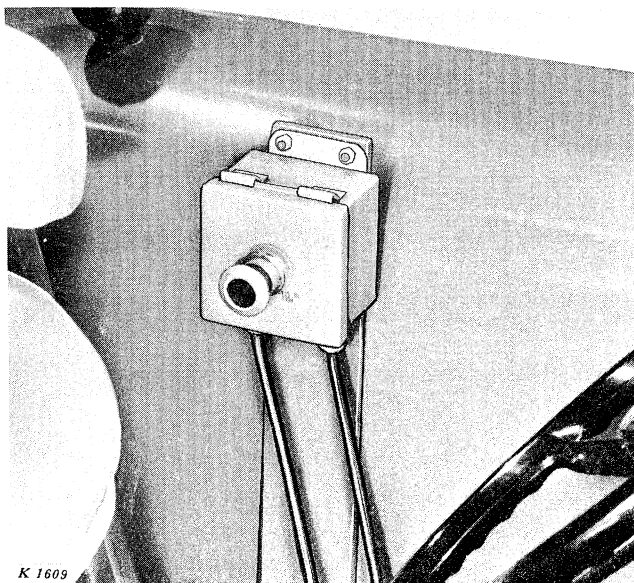
The lever stop is attached to hold the inner lever in the operating position.

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 thinner with the outer lever.

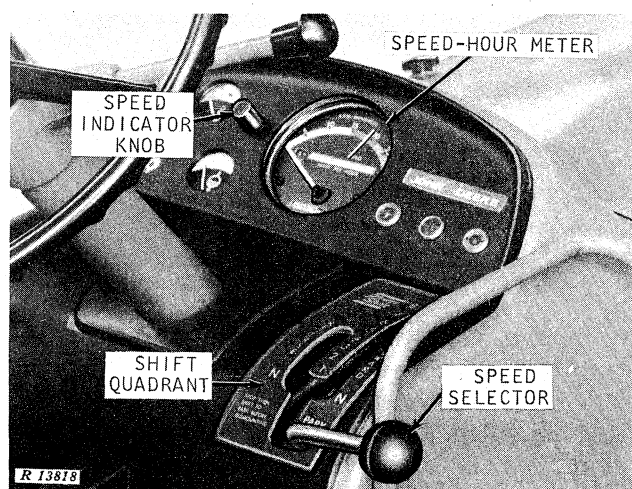
ELECTRIC SWITCH



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

When the machine is grounded by metal gauge wheels or metal shield and the probe touches a plant, the circuit is completed causing the solenoid to open a valve allowing the oil flow to actuate the knife.

SELECTING SPEED



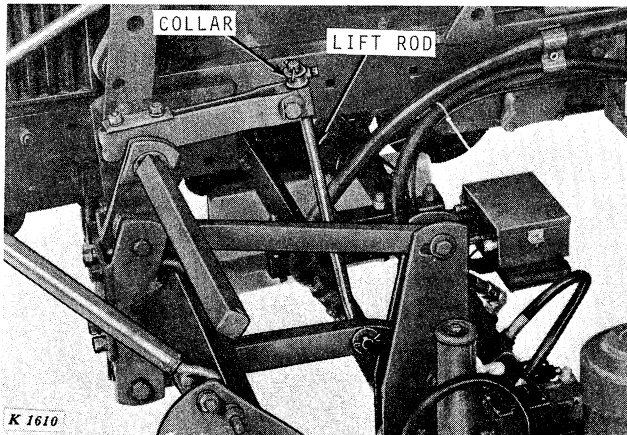
Speed Indicator Knob and Speed Selector

With engine running at required rpm (see "Field Operation," page 14) to supply enough hydraulic oil for your size machine, turn speed indicator knob to the gear which shows 1-1/2 miles per hour at the required rpm. Drive tractor in that gear.

ADJUSTMENTS

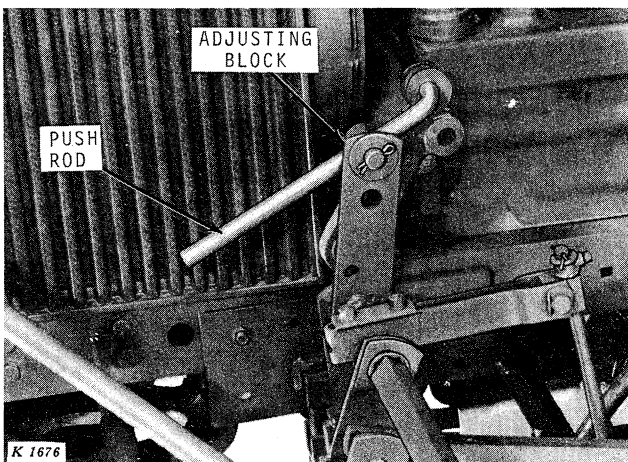
The length of service you receive from your thinner depends on correct operating adjustments to meet varying crop and field conditions, thorough lubrication, and regular service.

LIFT ROD



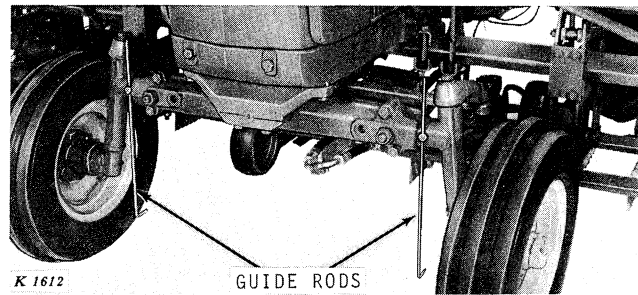
Adjust each lift rod for minimum lift by setting the set screw collar at the top of the rod. Lift thinner slowly, checking to see if it is level on both sides. Lower set screw collar on lift rod if thinner is lower on one side than the other. Adjust until thinner has equal transport clearance on both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

PUSH ROD



Lift the 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 just clears under the tractor.

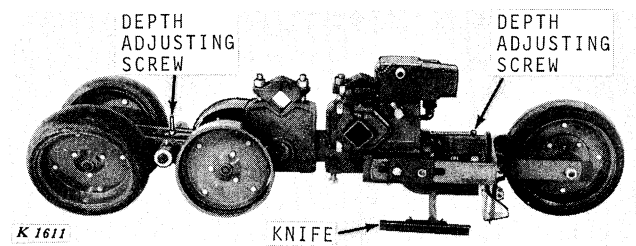
GUIDE RODS



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.

KNIFE ADJUSTMENTS

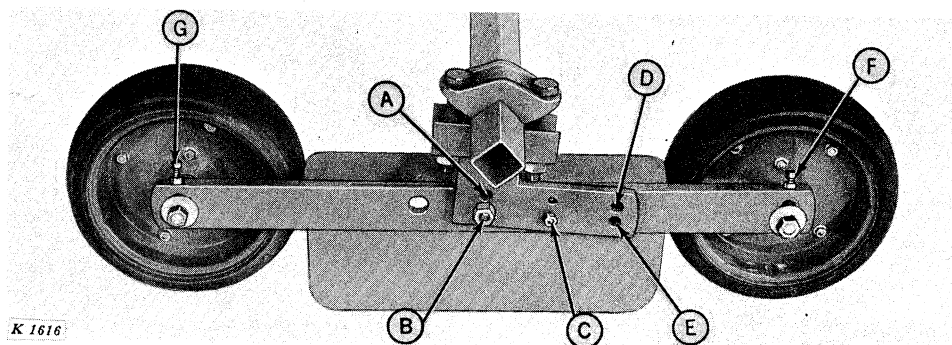
Knife Depth



Double-Row Gauge Wheel Illustrated

Knife depth is controlled by two adjustment screws located at each end of the gauge beam on double-row gauge wheels. Adjustment screws are located at each gauge wheel axle on the single-row gauge wheel. See page 11.

To adjust knife depth, drive tractor down the row. Set unit down on bed and turn on electric switch. Drive tractor down row to actuate knife. Turn off electric switch and tractor engine. Check the actual cutting depth. Make this adjustment as shown on page 11. Adjust knife to cut 1/4 inch deep.

Gauge Wheel (Single-Row)

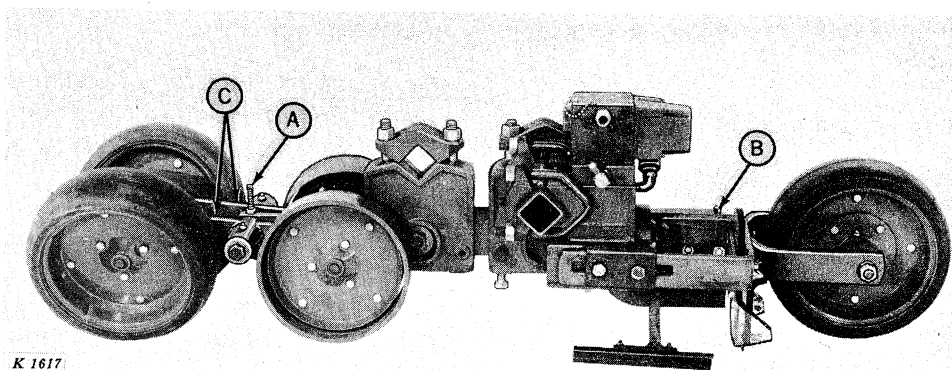
The gauge beam has two adjustments for raising or lowering the cutting knife working depth.

The gauge wheels can be raised or lowered $\frac{7}{8}$ inch on the attaching clamp bracket by using either hole "A" or "B." Move stop bolt "C" to the corresponding hole with setting "A" or "B."

The gauge beam clamp can be moved ahead $6\frac{1}{2}$ inches by using either hole "D" or "E"

to attach clamp to beam. This setting is used to place gauge wheels between tool bars for clearance on 6- and 8-row thinners.

When the knife depth requires a fine setting, adjust gauge wheels up or down using set screws "F" and "G." Loosen gauge wheel axle nut and raise or lower wheel through slot in beam.

Gauge Wheel (Double-Row)

The gauge beam has three adjustments for raising or lowering the cutting knife working depth.

The gauge wheels are raised or lowered at set screws "A" and "B" on each end of the main gauge beam. Loosen axle bolt at "A" and adjust axle up or down with set screw. Set screw "B"

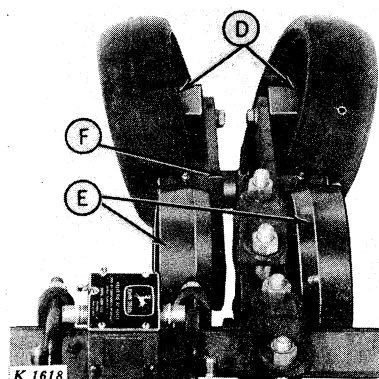
raises the rear gauge wheel yoke up or down through slot in main beam. Loosen both yoke bolts and adjust yoke up or down.

The front gauge wheel arms "C" can be rotated to raise or lower the front end of the main beam. When the grease fittings are up, they are in the raised position. To rotate, remove all four gauge wheels, rotate and replace gauge wheels.

12 Operation

KNIFE ADJUSTMENTS—Continued

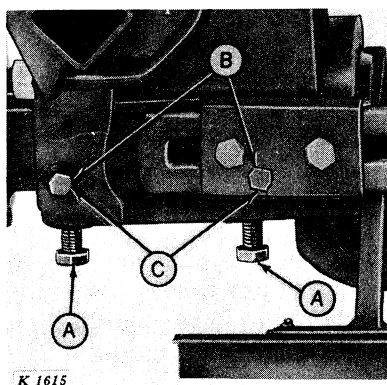
Gauge Wheel (Double-Row)—Continued



The front gauge wheel wedge blocks "D" are drilled for a high and low position of the gauge wheel axle. The rear gauge wheels "E" also can be raised or lowered by two sets of holes drilled in arms. Set in high or low position and lock with set screw.

The front four gauge wheels can be set in 1 inch narrower when thinning crops of extremely close rows by removing the two 1/2-inch spacers "F" and placing them on the outside position on the same axle bolt.

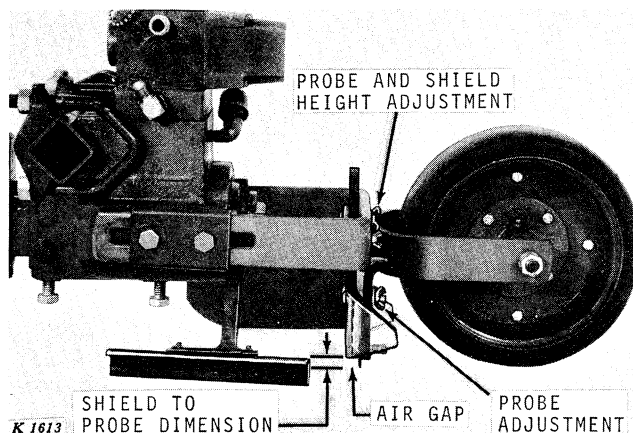
Leveling Actuators (Double-Row)



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

With the gauge beam holding the two actuators sitting on a level surface, loosen cap screws "A" and adjust cap screws "B" and "C" ("C" is on the other side) in or out to level the two actuators. Tighten all cap screws to hold the adjustment.

PROBE AND SHIELD SETTING



Adjust probe in relation to shield according to 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

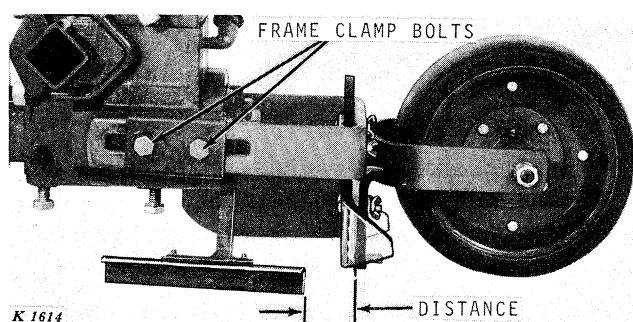
To adjust the probe, loosen the wing nuts and move the probe holder up or down in relation to the shield. Tighten the wing nuts as tight as possible by hand.

The probe height (probe-to-ground) is 1/2 to 3/4 inch on all crops. Adjust the probe height from ground by loosening the shield clamp bolts and lowering the shield and probe assembly so the probe clears the uncut ground by 1/2 to 3/4 inch. Check this height by moving down the row with the hydraulic pressure on but the electric circuit off. Observe the average height of the probe as it moves down the row. Readjust until probe clears by an average of 1/2 inch.

Keep the air gap free of foreign material build-up. When build-up occurs between shield and probe, the probe will short out.

KNIFE TO PROBE DISTANCE

The distance from the end of knife to probe is 3/4 to 1-1/4 inches. Adjust distance by loosening the frame clamp bolts (two on each side). Slide the frame forward or backward in relation to the actuator casting.

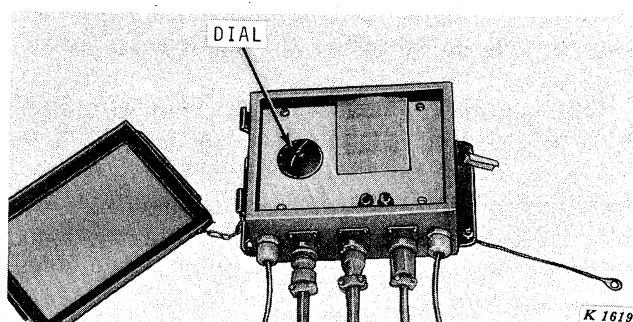


The distance from the knife to probe should be adjusted before the probe-to-shield, and probe-to-ground adjustments have been made.

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

When too many doubles are left, reduce this distance. If the knife is cutting too close to the plant, lengthen this distance.

AMPLIFIER BOX



The amplifier box is preset at the factory and requires NO adjustment before going to the field.

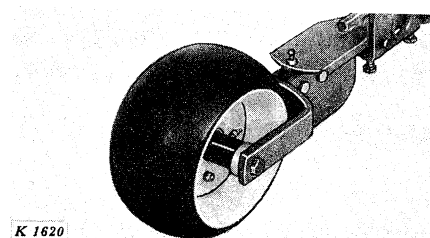
Inside each amplifier box is a delay dial with numbers 1 to 6. These dials are set at the factory on No. 2 which in most cases is the correct setting when traveling at 1-1/2 miles per hour. If traveling over 2 miles per hour, set at No. 1.

This delay dial regulates the dead time which is the 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 if the plant was large and you were traveling slow.

When using a 12-inch knife set dial on 4 or 5 as the tractor will have to travel twice the distance as when using 5-inch knife. The dead time eliminates the possibility of the probe triggering on debris or clods before touching the next plant. The smaller the number, the shorter the dead time; the larger the number, the longer the dead time. DO NOT use this adjustment to try to eliminate doubles. See "Knife to Probe Distance" above.

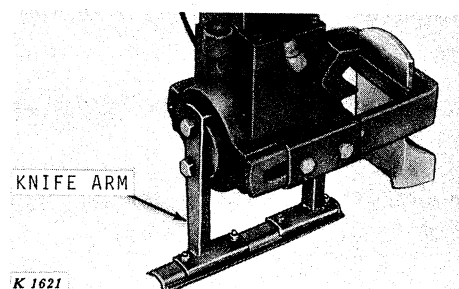
SPECIAL EQUIPMENT

REAR GAUGE WHEEL (Double-Row)



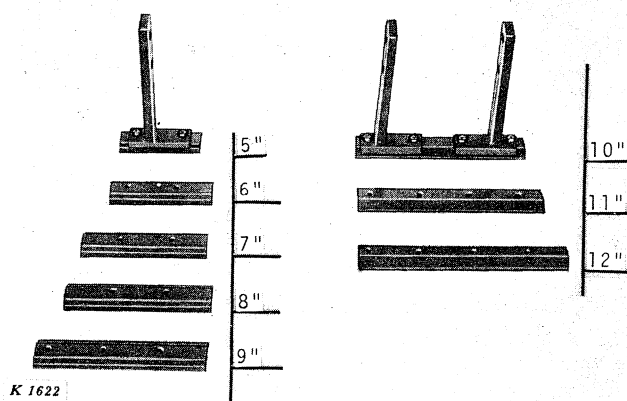
The 6-inch gauge wheel (AK40637) is used in place of the 4-inch gauge wheel in areas having salt peaks. The wide wheel straddles the peak with the center of the wheel inverting, allowing gauging on either side of peak.

KNIFE ARM



When using a knife length of 10, 11, or 12 inches, an additional knife arm (AK40670) 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 crop spacing.

FIELD OPERATION

ADVANCE PLANNING

Advance planning and field work is required for efficient operation of the thinner. See page 7.

BEFORE OPERATION CHECKS AND ADJUSTMENTS

Careful inspection and service of the thinner before starting work each day will prevent needless delays and possible breakdowns in the field.

1. Lubricate thinner according to lubrication chart (see page 17).

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

3. Check the oil level in each actuator (see page 17).

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

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

6. 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.**

7. Make sure probe cable does not touch or pass close by the solenoid. This may cause knife to trigger twice.

IN THE FIELD

The width of machine or number of rows to thin at one pass is determined by the number of rows planted at one pass. If your planter was set up to plant four rows on two beds, your thinner should be set up to thin four rows on two beds in one pass. The thinner should follow the same four rows that were planted on each pass leaving the guess row between each time. This procedure will allow all four actuators to stay centered over each row at all times. See "Row Spacing" pages 44-55.

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.

With all preliminary adjustments made, such as blade depth of cut, row spacing of actuators and tractor wheels, drive tractor on rows with the guide rods centered over the rows.

Lock the remote cylinder lever running the hydraulic motor in the forward position. The oil is now flowing through the 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 remote cylinder lever which operates the carrier.

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 a plant.

With engine running at the correct rpm (see chart below) and transmission in the gear that will give 1-1/2 miles per hour travel speed, start tractor down row. Drive 10 or 12 feet and stop. Carefully check work that has been done. Make any necessary adjustments and then continue down row.

Tractor rpm

Tractor	2-Row	4-Row	6-Row	8-Row
1020	1500	1500	2000	
2020	1500	1500	2000	
1520	1500	1500	2000	
2510	1500	1500	2000	2400
2520	1500	1500	1500	1500
3010	1500	1500	1500	1500
3020	1500	1500	1500	1500
4010	1500	1500	1500	1500
4020	1500	1500	1500	1500

STOPPING THINNER

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

Turn off electric switch (push in).

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

Raise thinner off ground with the remote cylinder lever which operates the carrier.

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

TRANSPORTING

Do not transport the thinner over 20 miles per hour on a smooth surface road. Reduce speed considerably when traveling 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 the 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

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.

CAUTION: Keep all shields in place. Disengage all engine and/or motor power before servicing or unclogging machine. 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 left-hand 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.

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, use accessory lights and devices for adequate warning to operators of other vehicles. In this regard, check local governmental regulations. Various lights and devices are available from your John Deere dealer.

In areas where flashing lights are prohibited by local regulations, be sure the flasher for the warning lamp is disconnected. See tractor manual.

END OF THE SEASON SERVICE

When the thinning season is completed, follow these suggestions to make sure your thinner will be ready when the next season begins:

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.

Lubricate the thinner completely. Add oil to each actuator if not filled to check hole.

Paint all parts from which paint has worn.

Store thinner inside, in a dry place.

Block up the thinner, taking load off gauge wheels. See "Removal and Storage" on pages 29 and 30.

List and order the 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 OF THE 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.

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. See "Installation" on pages 31 and 32.

Lubricate and check oil level in each actuator. If low, check for leaks and add oil as required.

Check for loose bolts and replace worn knives.

Check for damaged wires (bad insulation).

File probe clean and scrape probe wire contacts.

Check alternator voltage output; reset if necessary (see page 21).

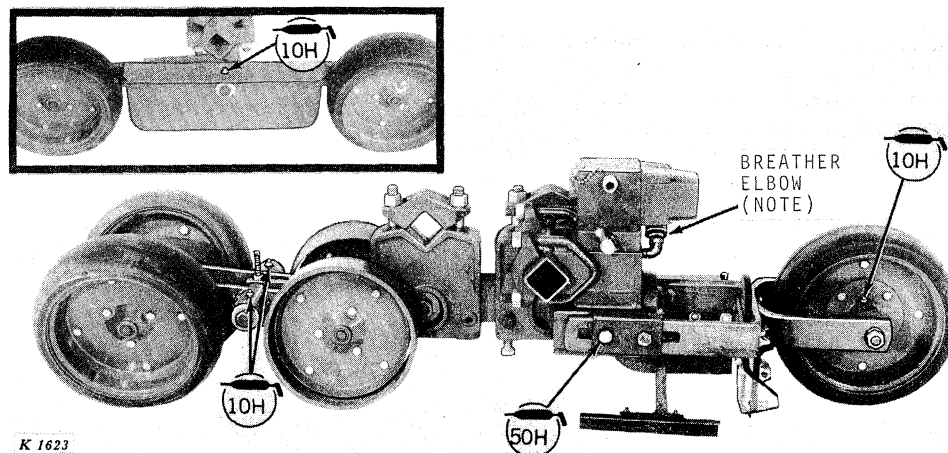
Remove each fuse and reinsert to insure good contact in socket.

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

1. Pull each probe wire out of binding post.
2. Start tractor engine.
3. Lock the remote cylinder lever which operates alternator in the forward position.
4. Turn on the electric switch.
5. Tap probe wire on grounded metal surface to actuate knife.



LUBRICATION



K 1623

Lubricate all parts provided with grease fittings with SAE multipurpose-type grease.

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.

BE SURE to check hydraulic oil in tractor every day. Check tractor hydraulic system when thinner is not running. Keep to full mark at all times.

Symbols

-  Lubricate every 10 hours of operation or once daily.
-  Lubricate every 50 hours of operation.

NOTE: Check every 50 hours of operation and add oil if needed. Use John Deere type 303 special-purpose oil or its equivalent. Add oil through breather elbow.

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



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	Probable Cause	Remedy	Page Reference
Doubles	Probe and shield assembly set too high.	Adjust probe and shield height to 3/4 inch from top of undisturbed bed.	12
	Probe set too far behind knife.	Set probe so the metal plate is between 3/4 and 1-1/4 inches behind knife.	12
	Probe plate dirty.	Clean with file.	14
	Ground speed too fast in relation to knife length and amplifier dead time adjustment.	Set dead time to position number 1. Reduce speed to reduce doubles, 1-1/2 mph should be optimum speed. 2 mph is maximum speed possible with 7-inch knife.	13 9
	Ground too uneven to allow uniform contact of plant.	Roll beds, use better seedbed preparation.	7
	Hydraulic volume too low.	Open the adjusting screw to the selective control valve to maximum flow of oil.	Tractor Manual
Skips (extra plant taken out by knife)	Clods or trash in plant row.	Roll plant row with smooth roller.	7
	Probe too low in relation to shield for crop.	Set probe height as recommended for kind of crop.	12
	Probe too low.	Move probe up so it will clear ground approximately 3/4 inch from ground.	12
	Probe too high.	Lower probe and shield to 3/4 inch from bed.	12
	Probe too close to knife.	Normal probe plate to knife is 3/4 to 1-1/4 inches.	12
	Knife cutting too deep.	Raise knife to cut 1/4 inch deep.	10
	Probe shorted to shield.	Clean air gap between shield and probe.	12
	Plants too large.	Thin earlier.	7

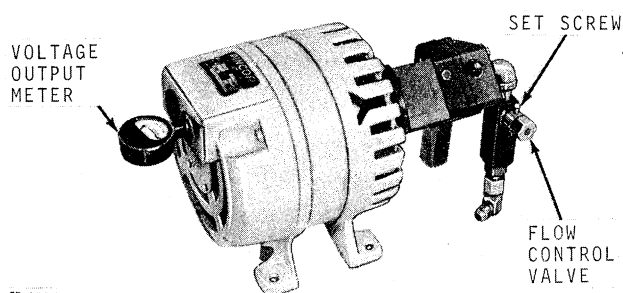
Problem	Probable Cause	Remedy	Page Reference
Knife oscillates continuously	Plant or dirt shorting from probe to frame or ground.	Clean probe and remove any foreign material.	12, 14
	Probe wire insulation cut allowing shorting from center wire to shielding.	Replace probe wire. Clean off amplifier box lid before removing it.	27
	Moisture in amplifier box.	Reactivate desiccant bag. IMPORTANT: Failures caused by dirt entering box are not covered under warranty.	16
Thinning erratic	Probe and/or actuator not aligned with row.	Align probe and actuator to row.	14
	Probe dirty.	Clean probe.	14
	Gauge wheels too far from plant row.	Move gauge wheels closer to row.	12
	Probe too high.	Lower probe to 3/4 inch.	12
	Hydraulic oil volume too low.	Open the adjusting screw to the selective control valve to maximum flow of oil.	Tractor Manual
	Ground wire from amplifier to support broken.	Install new wire.	22
	Machine not grounding because of insufficient metal to ground contact.	Check to see that shields are contacting ground. In extreme dry conditions a narrow chisel point mounted on frame will ground it.	9
	Broken electrical wire or loose connection.	Check and replace defective wire.	22
Knife makes two strokes for each plant	Probe cable passing too close to solenoid.	Reroute probe cable away from solenoid.	14
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.	14
Two knives actuate as a result of one probe contacting plant	Loose power supply wire.	Tighten fittings and check wires.	14
	Loose or broken amplifier to solenoid wire on unit not contacted.	Tighten fittings and check for broken wires.	14
	Fuse not tight in socket.	Tighten fuse in socket.	16

Problem	Probable Cause	Remedy	Page Reference
Three or more units operate when one probe is contacted	Electrical power source is being interrupted.	Check wires and switch for loose connections.	16
	Alternator voltage in excess of 150 volts.	Adjust voltage to 110 volts.	21
No electrical power	Brushes worn out.	Install new brushes.	21
	Brushes not contacting slip rings because of misalignment and wear.	Change brushes and check alignment of brushes to slip rings and adjust if necessary.	21
	Armature of alternator not turning.	Check hydraulic pressure and motor.	23
	Switch inoperative.	Repair or replace as necessary.	21
Hydraulic motor leaks	Shaft seal worn out.	Replace seal.	23
	Drive block worn or bearings failed.	Replace drive block and/or bearings as required.	23
Solenoid valve fails to operate	Coil burned out.	Replace coil and check spool operation.	23
	Wires broken or disconnected.	Repair or reconnect.	23
	Spool locked or stiff due to over-tightened bolts or foreign material.	Loosen bolts and recheck spool operation. Clean valve and remove any burrs caused by foreign material.	23
Solenoid valve leaks oil	O-rings on drive pins leaking.	Replace with correct part (K41001). DO NOT substitute standard O-ring for correct part.	23
	O-ring around guide leaking.	Replace with correct part (K41041).	23



SERVICE

ALTERNATOR

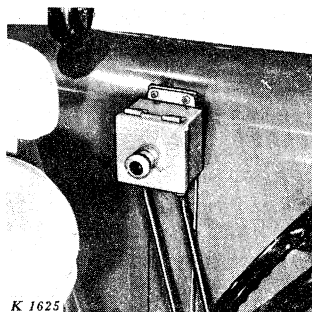


K 1624

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 110 volts $\pm$ 10 volts. Check the voltage only after oil has warmed up and with engine running at 1500 rpm. To adjust voltage, loosen locking set-screw on knob and turn knob until voltage meter reads 110 volts. Tighten set screw to hold setting.

If the alternator fails to show an output on voltage meter, check the brushes in 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.

SWITCH

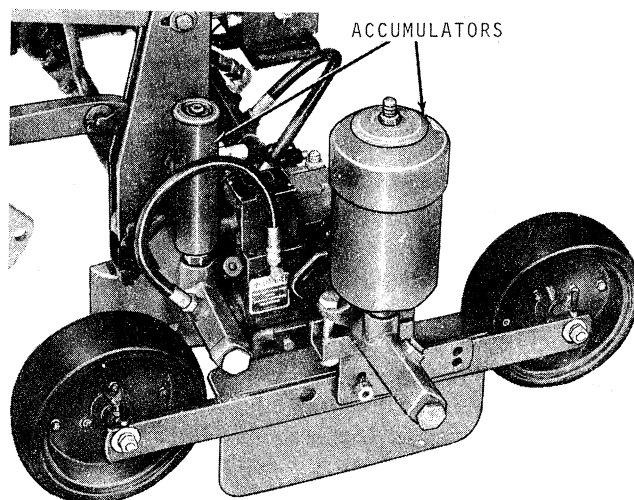


K 1625

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 25.

ACCUMULATORS



K 1626

Attached to the manifold are two accumulators; one on the pressure side and one on the return side (6- and 8-row thinners have four). 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 25 psi nitrogen gas pressure.

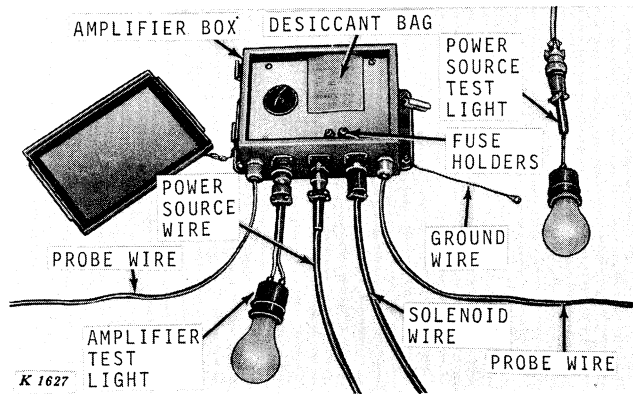
The oil pressure compresses the nitrogen and when all actuators work at once beyond the pump capacity, the accumulator gives the added oil pressure needed to carry through this peak work load.

If the accumulators are 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 the tractor engine and, if the alternator stops almost immediately, the accumulator is not working properly. The alternator should run approximately 5 or 6 seconds after the engine is stopped.

Have your John Deere dealer check the nitrogen pressure and recharge the pressure accumulator to 1200 psi $\pm$ 50 psi. Recharge the return accumulator to 25 psi $\pm$ 5 psi. If the bladder is leaking, the gauge will show zero pressure.

CAUTION: NEVER USE compressed air or oxygen as the combination of oxygen and oil are highly combustible.

AMPLIFIER CONTROL UNIT



The amplifier box contains two complete circuits, one for each solenoid valve it operates. The amplifier receives 110 volts from the alternator through the switch and is coupled to the amplifier box at the center terminal. The wire to the right of center terminal controls the right solenoid valve. The wire to the left of center terminal controls the left solenoid valve. The two outside wires are the probe wires that sense the plants causing the actuators to work on each of their rows.

When the thinner fails, look for the following possible causes at the amplifier box in the order as listed:

1. Probe wire plate insulated by dirt or wax from plants.

File the probe plate clean to remove dirt.

2. Probe wire broke or shorting out by dirt or moisture.

Replace probe wire by releasing the connection at the box outlet. Pull wire out 1 inch and uncouple the connector, insert new probe wire. Check to be certain that the connector makes a good contact between the outer shield contacts. Install neoprene grommet over outer (female) probe plug. Place washer and nut over wire and insert assembled plug into the fitting and tighten nut. **IMPORTANT: DO NOT** leave probe wires disconnected from box as dirt and moisture can enter when the probe wire is not in place.

3. No current coming to the amplifier box.

Uncouple the center power source wire and plug in test light. With switch on and alternator running, the light should light up. If it fails

to light up, check wire connections and check alternator with voltage meter. See page 21.

4. Bad wire connection at solenoid or at the amplifier box.

Remove valve housing plate and check wire connections inside housing. Uncouple wire at the amplifier box, clean connecting prongs and recouple.

5. Ground wire broken or not grounding amplifier box to frame.

If broken, replace. Clean the contacting surfaces of the ground wire.

6. Fuse blown out.

Insert a test light in the outlet to the solenoid valve on the actuator that is not working. With switch on and alternator running, the light should go on and off when the probe wire is touched to the amplifier box. If it doesn't, replace amplifier fuse (K40629) on that side or exchange fuse with the side working for a check.

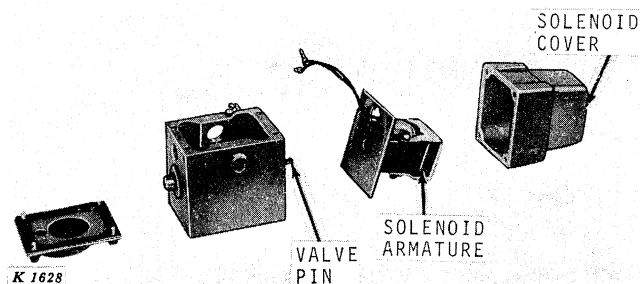
7. Amplifier box is shorted out by moisture or dirt entering box.

Remove any dust or dirt from the amplifier box cover and then remove the amplifier box cover. (If it is a dry day, leave lid off for 10 minutes) remove the desiccant bag and reactivate per instructions on bag. See "Beginning of the Season Service," page 16. If the amplifier box is shorted out by dirt, the amplifier box will have to be exchanged.

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.

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 a magnet that works the spool valve back and forth closing and opening the oil ports. An electrical current energizes the magnet shifting the valve 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.

Take a small punch and manually work the solenoid and valve back and forth. The solenoid cover has a pin in the center. With a small punch or nail, push in at this point. This pin should go in about 7/16 inch and return when releasing the tension. If sticking, check solenoid armature and valve spool for obstructions. If the solenoid armature is sticking, replace solenoid coil.

Check the valve by pushing on the valve pin. The pin should return when releasing finger tension. If the valve is sticking, return to your dealer for repair.

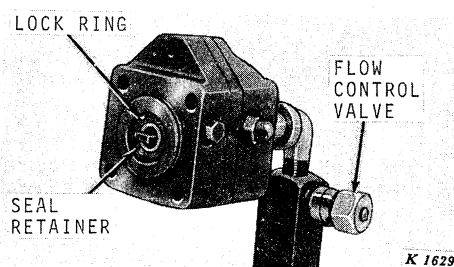
2. The electrical current is not coming through to the solenoid valve.

Use the amplifier test light to determine if the amplifier is putting out to the solenoid valve (see step 6 under "Amplifier Control Unit," page 22). If the amplifier is working, check the solenoid wire and connections.

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 guide start to leak, they should be replaced before an excessive amount of oil is lost.

HYDRAULIC MOTOR

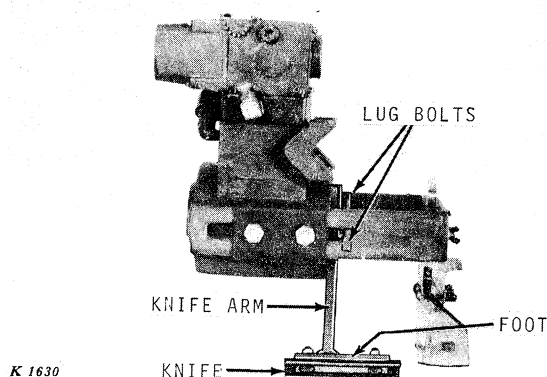


The hydraulic motor runs the alternator. The speed of the motor is controlled at the flow control valve. Increase or decrease the flow of oil entering the motor to allow the alternator to put out 110 volts. See "Alternator," page 21.

Should the hydraulic motor leak oil around the shaft, replace the quad ring shaft seal. Remove the lock ring and seal retainer. Remove the quad ring from the seal retainer and replace quad ring (B29375). Reassemble and lock with lock ring.

Note: Check bearings in the drive block. If they have failed, this will shorten the life of the quad ring.

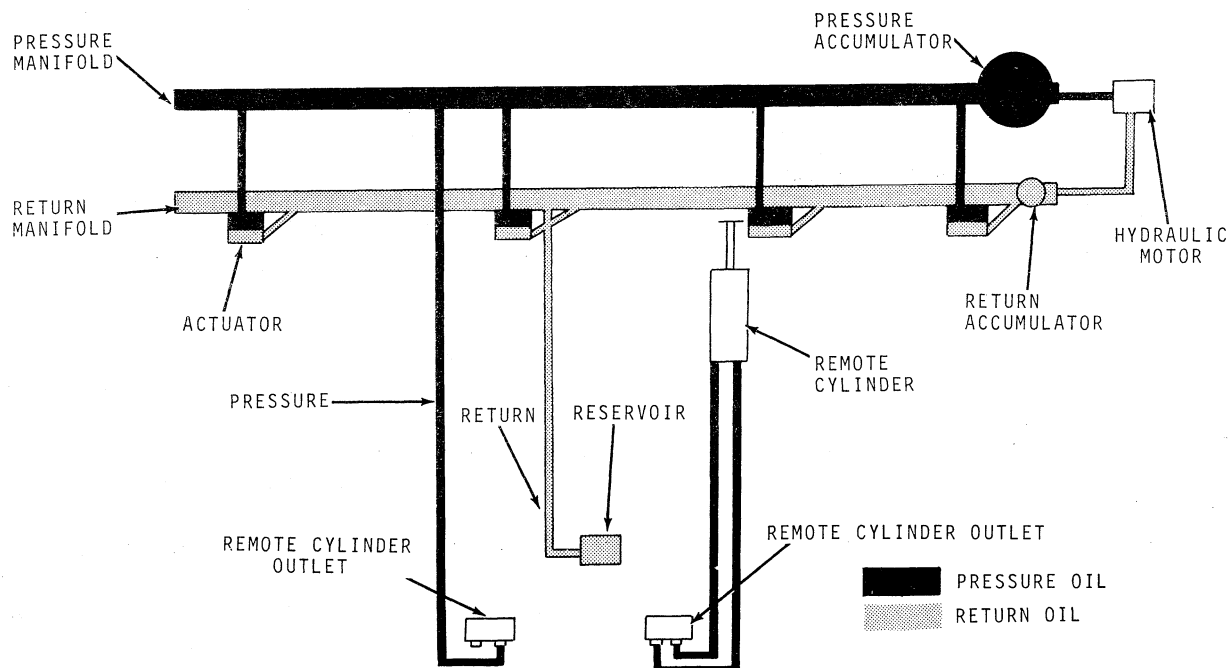
REPLACING KNIFE ARM AND KNIVES



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 should be used. Keep the knife arm lug bolts tight to hold arm snugly in groove.

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

HYDRAULIC SYSTEM



K 1631

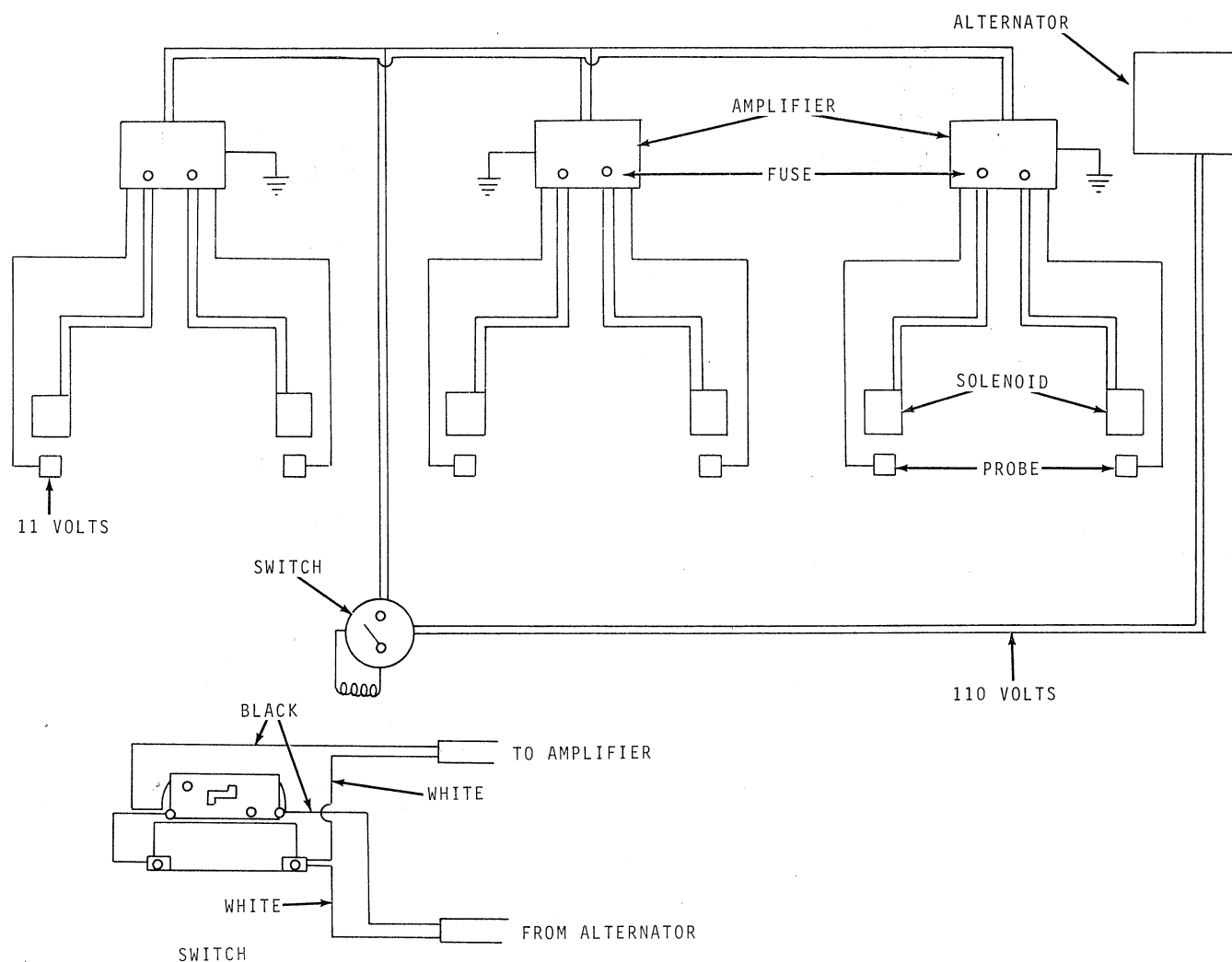
The John Deere Hydraulic System used on the Synchronous Thinner consists of a pump (tractor), reservoir (tractor), manifolds, actuators, accumulators, hydraulic motor, and remote cylinder. These individual components are connected with steel bar manifolds and reinforced neoprene hose.

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

Each day check the reservoir for proper oil level and visually inspect all hoses and actuators for leaks or damage. When an oil leak occurs at an O-ring, disassemble and inspect O-ring for damage. Replace the O-ring that is damaged. The O-rings must be seated in the recesses provided to position them. When reassembling manifold to cylinder block, tighten bolts to 25 ft-lbs torque. Tighten valve bolts to 8 ft-lbs torque to prevent seal leakage or valve warpage.

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

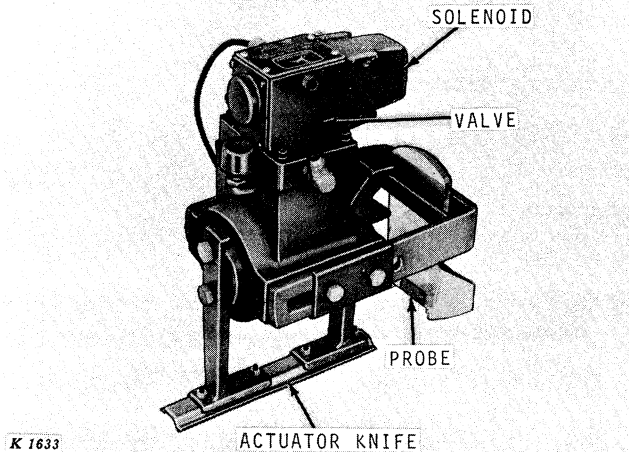
Shown above is the schematic wiring diagram of the 110-volt electrical system.

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

This text does not cover the servicing of the amplifier box because this is an exchange item only. However, the fuses (K40629) 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.

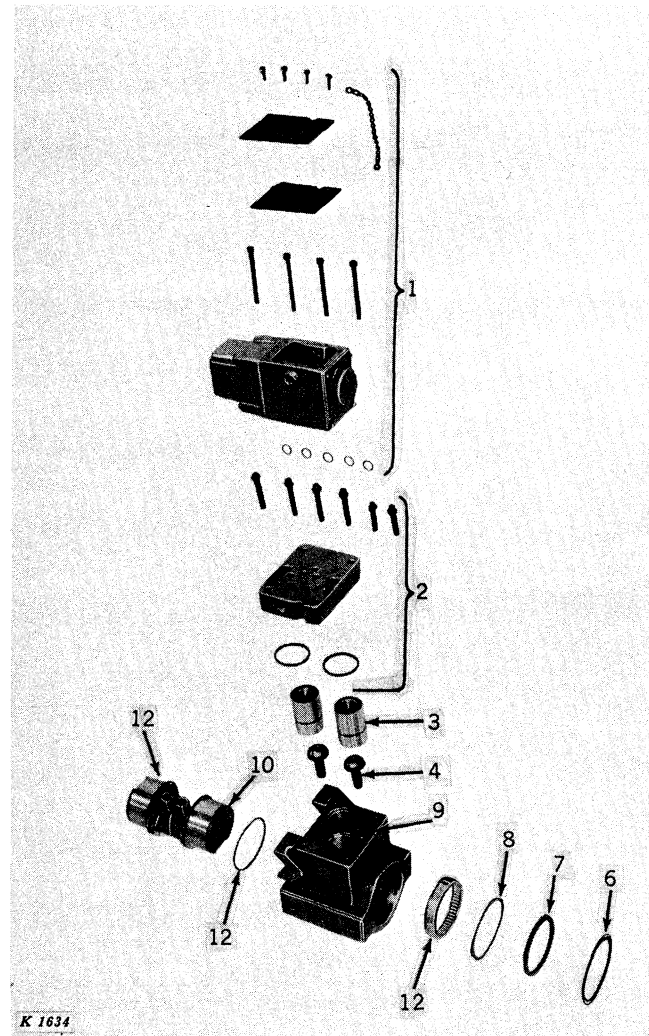
ACTUATOR



The actuator action is started by a signal from the probe circuit when a plant is touched. This signal controls 110 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.

1. Remove valve by removing nameplate and four socket head mounting screws.
2. Remove manifold plate, held by six count-erbore 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 $1/4 \times 2-3/4$ -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 vertically 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.

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

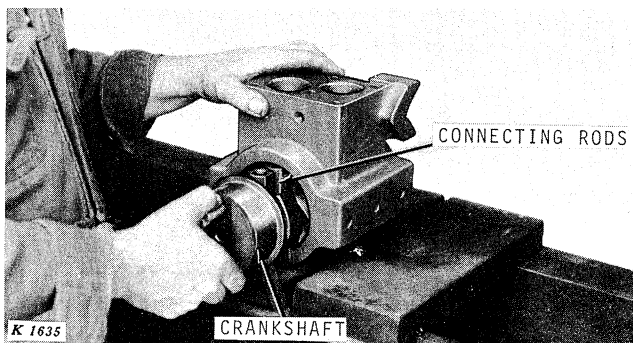
Inspect cylinder block for scuffing or extreme wear at the bottom of the cylinder bore.

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.

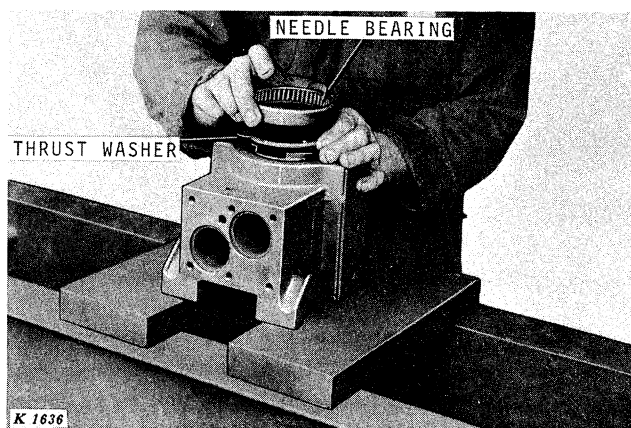
1. Thoroughly clean cylinder block and lubricate cylinder bores.

2. Install one needle bearing in cylinder block with the numbered side to the center of the cylinder block (flat side down). 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.

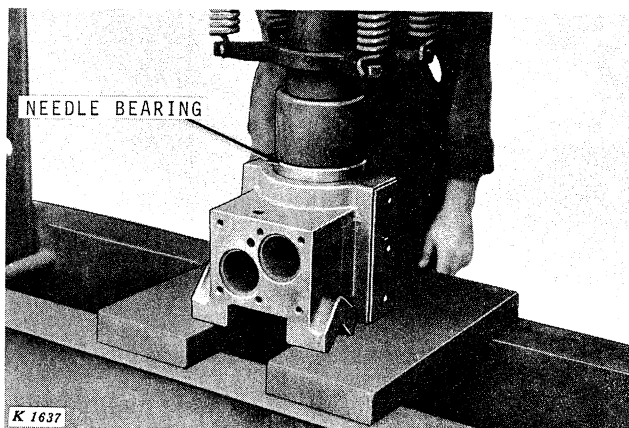


3. Apply wheel bearing grease to the center journal of the crankshaft and place the connecting rods on the center journal so that the chamfered edge of the bearing surface of each connecting rod is toward the outer end of the crankshaft.

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.

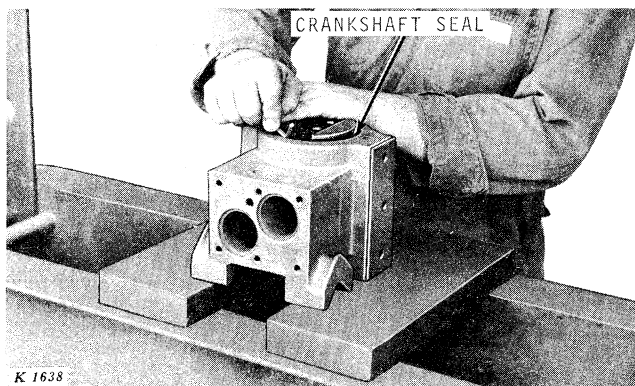


Press the needle bearing with the numbered side toward the center of the cylinder block (flat side down). Press the bearing in far enough to allow the snap ring to be installed in the inner snap ring groove.

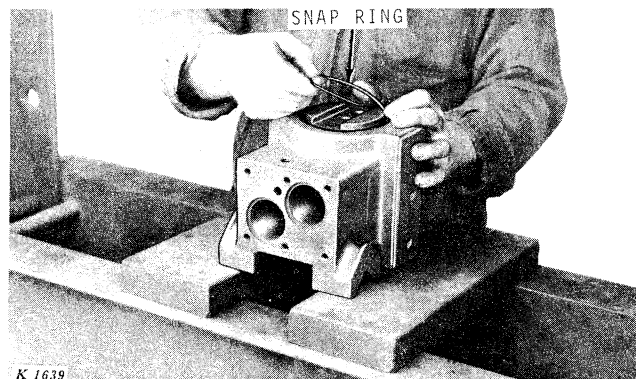
IMPORTANT: Do not apply excessive pressure to the needle bearing or push it beyond the located snap ring groove. Damage to the needle bearing will occur, resulting in premature failure if this is done.

Install snap ring in the inner snap ring groove.

ACTUATOR—Continued

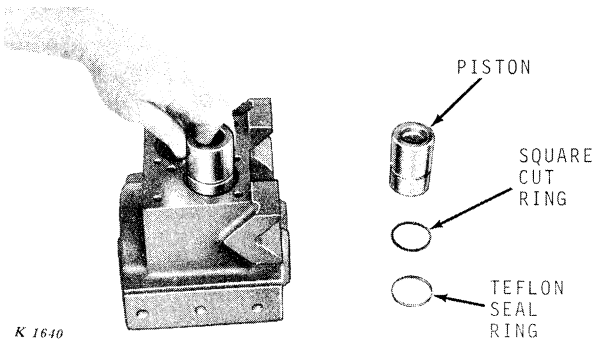


5. Grease crankshaft seals thoroughly. Install the crankshaft seals (Part No. K40406), into the cylinder block bore on each side. The seal goes into the bore with the rounded surface toward the bearing and the thin lip to the outside.



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 cap screw into the center of the connecting rod balls and install the balls in the connecting rods.



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 the piston groove.

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

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

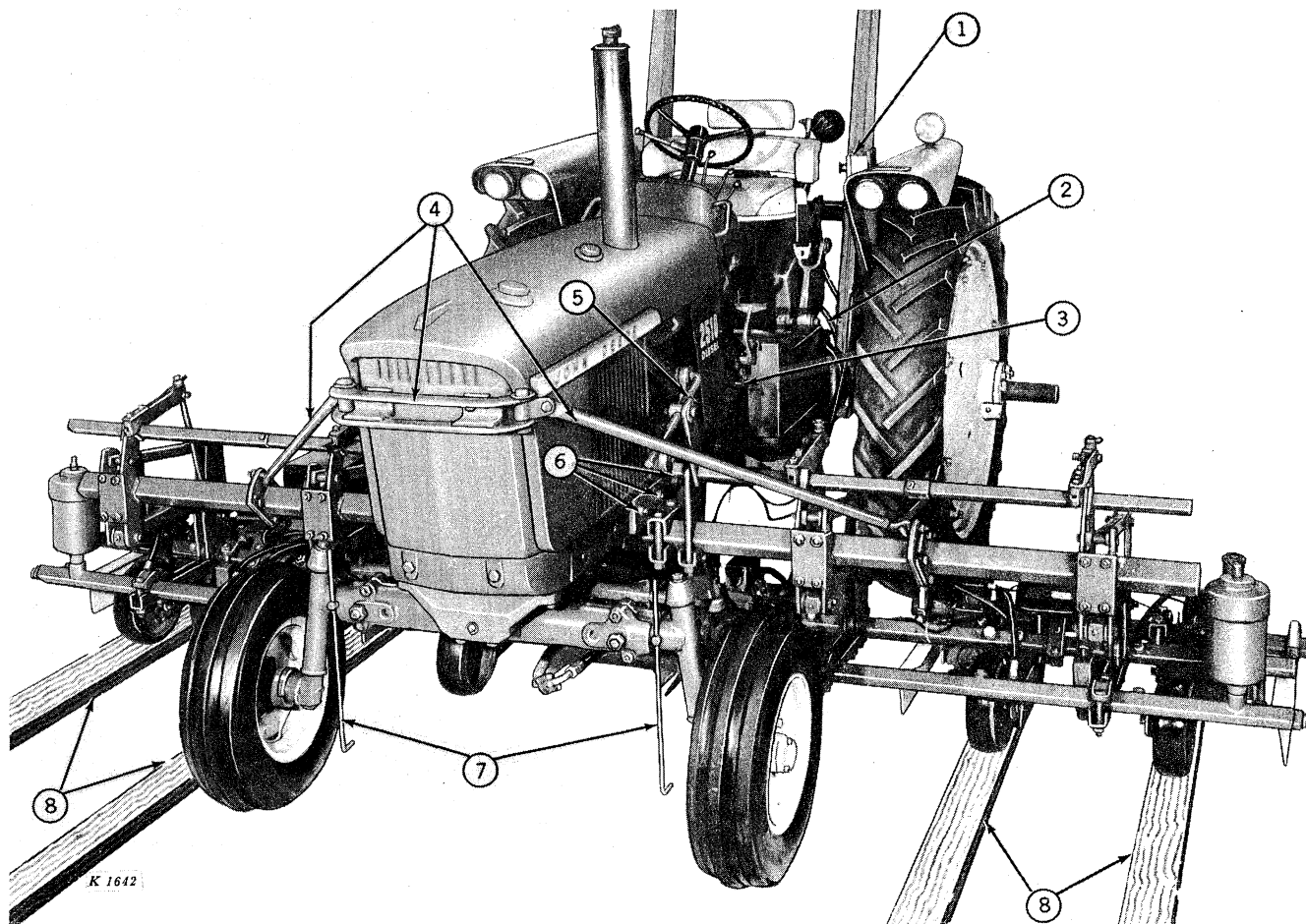
8. Install cylinder seals in recess and bolt manifold to casting using six counterbore screws. Note: Manifold can be installed turned either direction. Install in the direction you wish the solenoid valve to face with the oil ports lined up.

9. Check the five O-rings, 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. Reconnect the electrical wires to the solenoid. Reinstall name plate with gasket.



REMOVAL AND STORAGE

2520, 3020, OR 4020 TRACTORS



1. Remove electric switch from tractor fender and wrap wires around switch support. Lay switch across manifold.

2. Unplug pressure hose from the remote cylinder outlet.

3. Remove the return hose at the tractor reservoir. Cap opening with plug.

4. Remove truss rods and bracket.

5. Uncouple push rods from tractor rockshaft.

6. Unbolt booms from tractor.

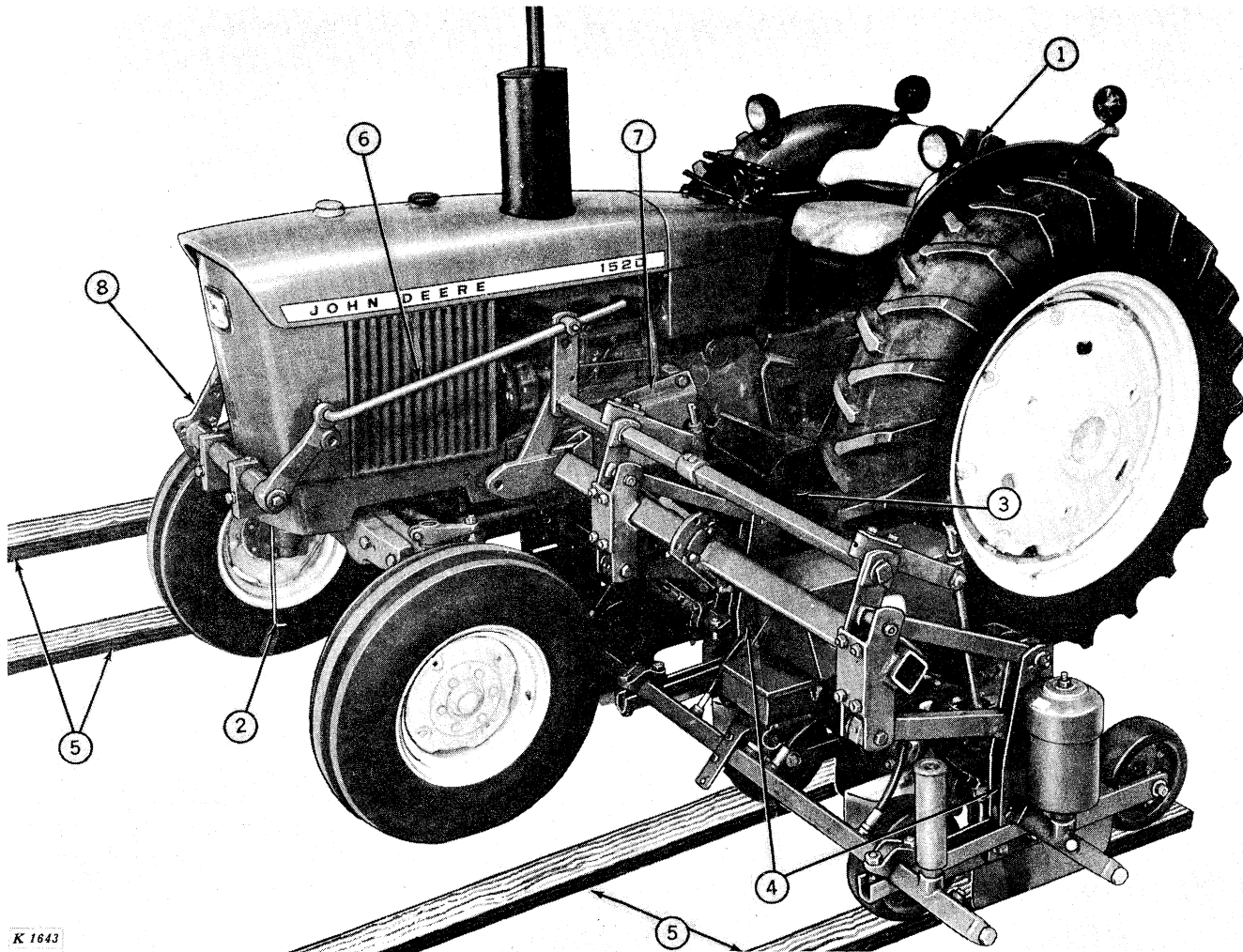
7. Remove guide rods.

8. With a spreader sling on hoist, lift front end of tractor up enough to allow the thinner and carrier to be rolled out from under tractor. Place a 2 x 4 under thinner gauge wheels so the shield fins will clear floor when rolling forward.

Store the thinner in a dry place with the load off of the gauge wheels. Remove dirt and trash which would hold moisture and cause rusting.

Paint all parts which require painting. Your thinner will indicate a pride of ownership and will be given better treatment when used by another person. See "End of the Season Service" on page 16.

1020, 1520, OR 2020 TRACTORS



1. Remove switch front fender and wrap wires around switch support. Lay switch across manifold.

2. Remove guide rods.

3. Remove pressure hose from remote cylinder outlet. Uncouple return hose from the filter cap and insert plug.

4. Unbolt hangers from manifold.

5. With a spreader sling on hoist, lift the front end of tractor up enough to allow the thinner to be rolled out from under tractor. Place a 2 x 4 under thinner gauge wheels so shield fins will clear floor when rolling forward.

6. Remove push rods.

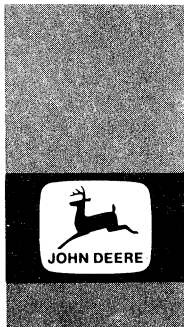
7. Unbolt booms from tractor.

8. Remove rockshaft from front of tractor.

Store the thinner in a dry place with the load off of the gauge wheels. Remove dirt and trash which would hold moisture and cause rusting.

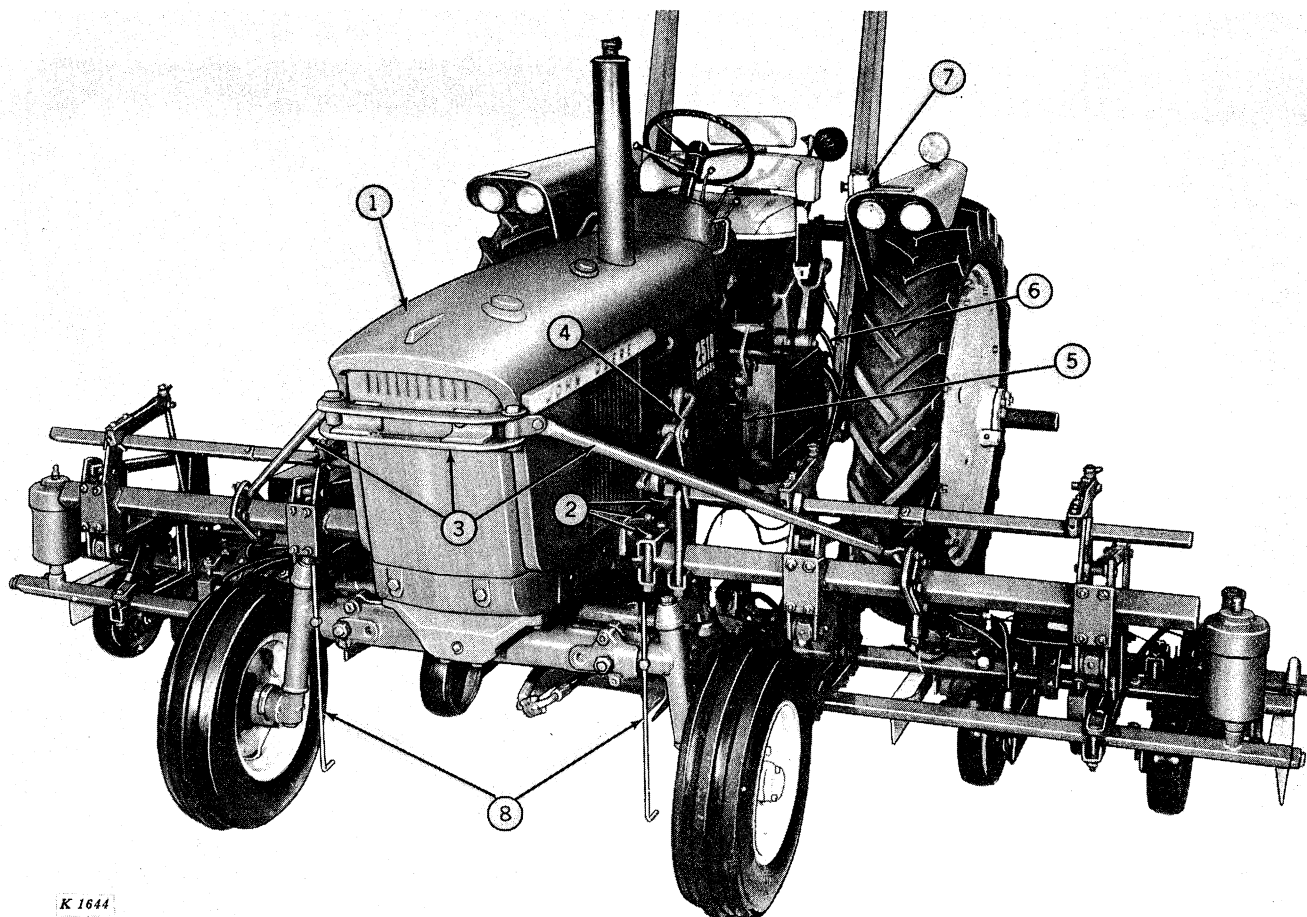
Paint all parts which require painting. Your thinner will indicate a pride of ownership and will be given better treatment when used by another person.

On no other occasion will you have a clearer picture of the operation of the thinner as when it makes its last trip out of the field before storage. Any part which is badly worn or broken should be given proper attention at this time before the details are forgotten. See "End of the Season Service" on page 16.



INSTALLATION

2520, 3020, AND 4020 TRACTORS



K 1644

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

Set tractor wheels to match row spacing of crop.

1. Lift front end of tractor with hoist and roll thinner into position under tractor. Lower tractor.

2. Attach booms to tractor.

3. Attach front bracket and truss rods.

4. Connect push rods with tractor rockshaft.

5. Attach oil return hose to tractor reservoir. See pages 57 and 58.

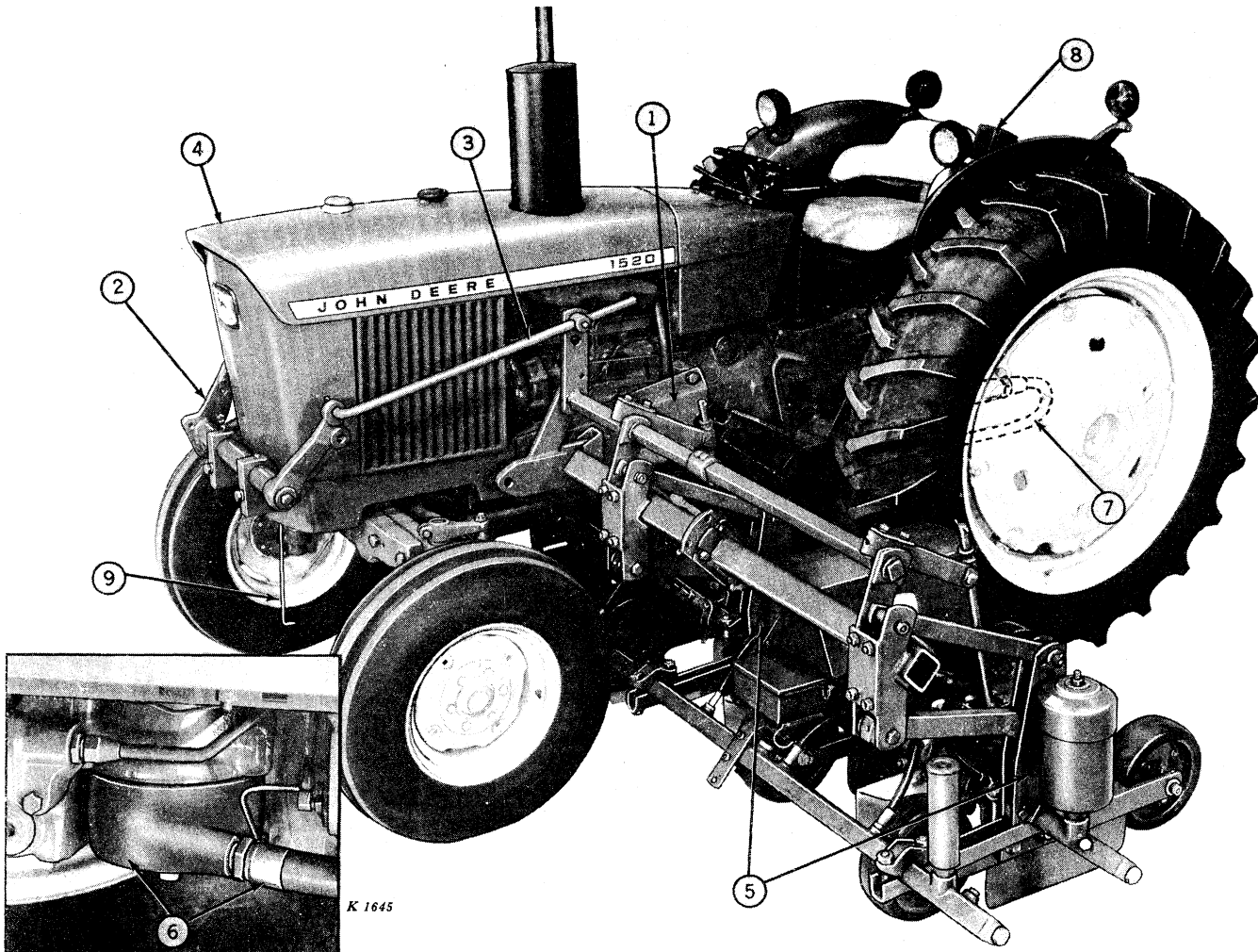
6. Plug in pressure hose to remote cylinder outlet.

7. Mount electrical switch on tractor fender and hold electrical wires in position with plastic keeper straps.

8. Attach guide rods.

Start tractor engine and check for oil leaks and any other malfunction of thinner. See "Beginning of the Season Service" on page 16.

1020, 1520, AND 2020 TRACTORS



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

Set tractor wheels to match row spacing of crop.

1. Attach booms with hangers to tractor.
2. Mount front rockshaft.
3. Attach push rods to rockshaft and lift bar.
4. Lift front end of tractor with hoist and roll thinner under tractor into position. Lower tractor.

5. Attach hangers to rear manifold bar.
6. Attach oil return hose to oil filter cap.
7. Plug in pressure hose to remote cylinder outlet.
8. Mount electrical switch to tractor fender and hold electrical wires in position with plastic keeper straps.
9. Attach guide rods.

Start tractor engine and check for oil leaks and any other malfunction of thinner. See "Beginning of the Season Service," page 16.



ASSEMBLY

100K SERIES THINNER

SHIPPING BUNDLES

Bundle No.	Description	112K	114K-30	114K-40	116K-30	118K	124K	128K
AK 40543	Accumulator, Pressure	1	1	1	2	2	1	2
AK 40544	Accumulator, Return	1	1	1	2	2	1	2
BK 40471	Actuator Box	1	2	2	3	4	2	4
BK 40497	Alternator	1	1	1	1	1	1	1
BK 40508	Manifolds and Spacers	1	.	.	.	.	1	2
BK 40773	Manifolds and Spacers	.	1	1	.	2	.	.
BK 40801	Manifolds and Spacers	.	.	.	2	.	.	.
BK 40523	Hydraulic Hose (For 2510, 2520, 3020, 4020 Tractors)	1	1	.	.	.	1	.
BK 40799	Hydraulic Hose (For 2510, 2520, 3020, 4020 Tractors)	.	.	1	.	.	.	.
BK 40809	Hydraulic Hose (For 2510, 2520, 3020, 4020 Tractors)	.	.	.	1	1	.	1
BK 41034	Hydraulic Hose (For 1020, 1520, 2020 Tractors)	1	1	.	.	.	1	.
BK 41035	Hydraulic Hose (For 1020, 1520, 2020 Tractors)	.	.	.	1	.	.	.
BK 41036	Hydraulic Hose (For 1020, 1520, 2020 Tractors)	.	.	1	.	.	.	.
BK 40882	Electrical Wires	1	.	.	.	.	.	.
BK 40780	Electrical Wires	.	1	.	.	.	.	.
BK 40800	Electrical Wires	.	.	1	.	.	.	.
BK 40808	Electrical Wires	.	.	1	.	.	.	.
BK 40522	Electrical Wires	.	.	.	.	.	1	.
BK 40883	Electrical Wires	.	.	.	.	.	.	1
BK 40814	Gauge Wheel	1	.	.	.	.	.	.
BK 40774	Gauge Wheel	.	2	2	2	4	.	.
BK 40814	Gauge Wheel	.	.	.	1	.	.	.
BK 40500	Gauge Wheel	.	.	.	.	.	2	4
AK 40636	Gauge Wheel, Rear, 4-Inch.	.	.	.	.	.	2	4
K 40408	Knife, 8-Inch	2	4	4	6	8	4	8
K 40793	Bar, Support, 48-Inch	.	2	.	2	4	.	.
K 40797	Bar, Support, 64-Inch	.	.	2	.	.	.	.

OPTIONAL EQUIPMENT

K 40415	Knife, 5-Inch	2	4	4	6	8	4	8
K 40416	Knife, 6-Inch	2	4	4	6	8	4	8
K 40407	Knife, 7-Inch	2	4	4	6	8	4	8
K 40409	Knife, 9-Inch	2	4	4	6	8	4	8
K 40410	Knife, 10-Inch	2	4	4	6	8	4	8
K 40411	Knife, 11-Inch	2	4	4	6	8	4	8
K 40412	Knife, 12-Inch	2	4	4	6	8	4	8
AK 40670	Arm, Knife	2	4	4	6	8	4	8
AK 40637	Gauge Wheel, Rear, 6-Inch.	.	.	.	.	.	2	4

53K AND 54K SERIES CARRIER

SHIPPING BUNDLES

Bundle No.	Description	53K1	53K1E	53K2	53K2E	54KB	54KBE
BK 40847	Lift Parts	1	1	1	1	.	.
BK 40854	Lift Bar.	1	1	1	1	1	1
BK 40856	Boom, R.H.	1	1	.	.	.	.
BK 40857	Boom, L.H.	1	1	.	.	.	.
BK 40850	Boom, R.H.	.	.	1	1	.	.
BK 40855	Boom, L.H.	.	.	1	1	.	.
BK 40858	Hanger, R.H. and L.H.	1	2	1	2	1	2
BK 40875	Mounting Parts	.	.	.	.	1	1
BK 40877	Boom, 86-Inch	.	.	.	.	1	1
4394 K	Truss Pipes (2).	.	.	.	.	1	1
BK 40871	Boom Extension	.	1	.	1	.	1

53K1 For John Deere 1020 and 1520 Tractors

53K2 For John Deere 2020 Tractor

54KB For John Deere 2510, 2520, 3020, and 4020 Tractors

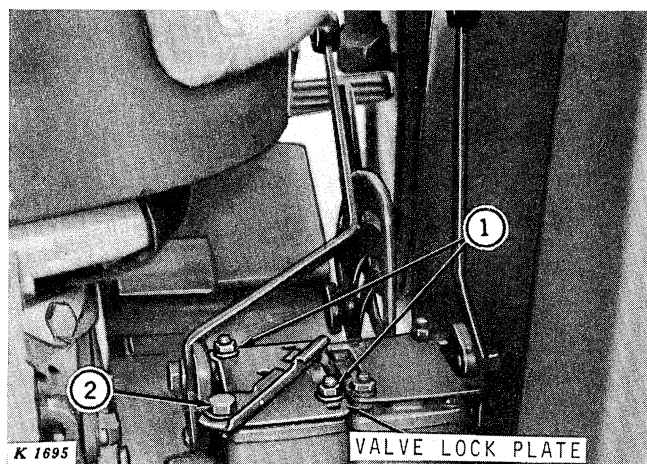
PREPARING THE TRACTOR

ROW SPACING

Set the tractor wheels to match the crop row spacing. See the tractor operator's manual for instructions on adjusting wheel tread.

LEVER STOP

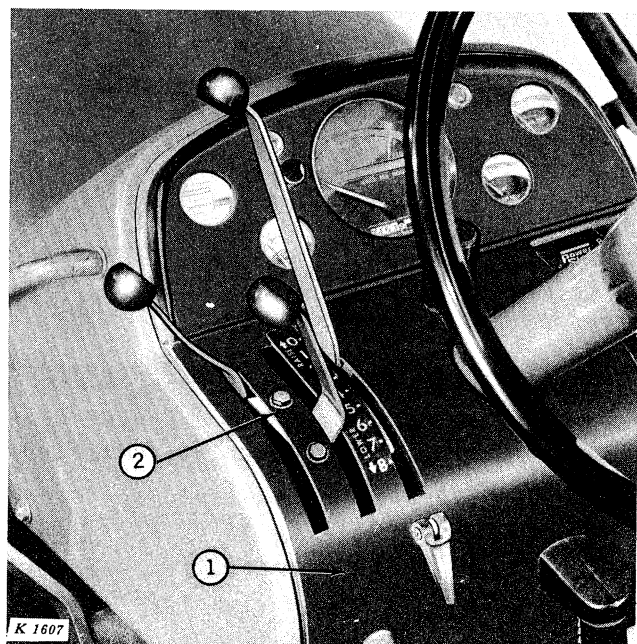
1020, 1520, AND 2020 TRACTORS



1. Remove lever stop plate from left-hand remote cylinder operating lever and replace with plate furnished with lock.

2. Attach lock lever to lever stop plate with cap screw, washer, spring washer, and nut provided.

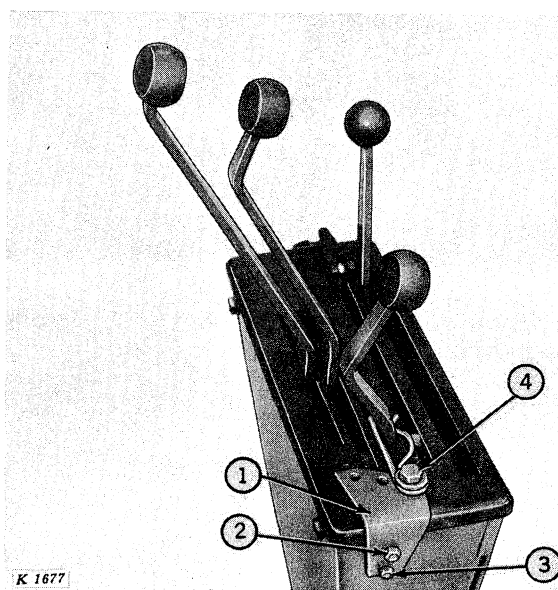
3020 (BELOW SERIAL NO. 123,000) AND 4020 (BELOW SERIAL NO. 201,000) TRACTORS



1. Remove tractor cowl. Using the template (Dir. 540) provided with your operator's manual, locate the lever stop holes and drill two 1/4-inch holes in the tractor dash.

2. Install the lever stop as shown below at left. Replace cowl.

2520, 3020 (SERIAL NO. 123,000 AND ABOVE), AND 4020 (SERIAL NO. 201,000 AND ABOVE) TRACTORS



1. Place bracket over front edge of control panel housing with approximately 1/8 inch clearance between bracket and stop control panel. Position bracket so adjusting holes on top side of bracket are in alignment with the selective control valve levers and mark location for drilling holes.

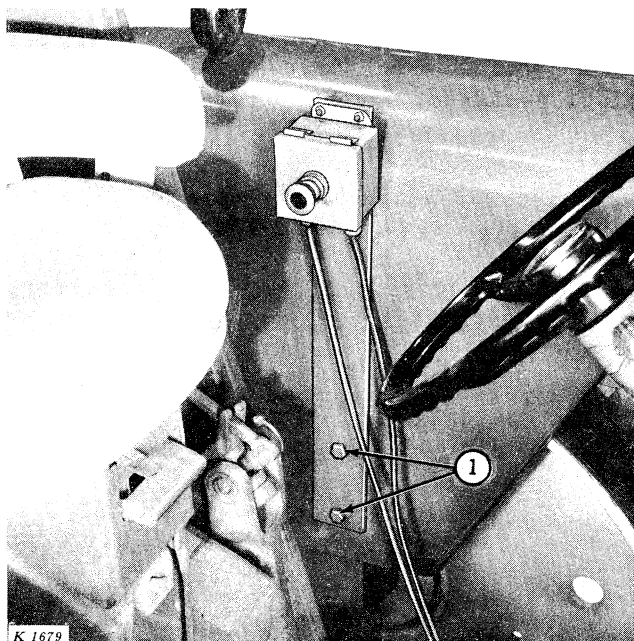
Drill two 7/32-inch holes in housing front.

2. Insert self-tapping screw through upper hole in bracket, place washer on screw, and attach to control panel housing.

3. Insert remaining self-tapping screw through lower hole in bracket and attach to control panel housing.

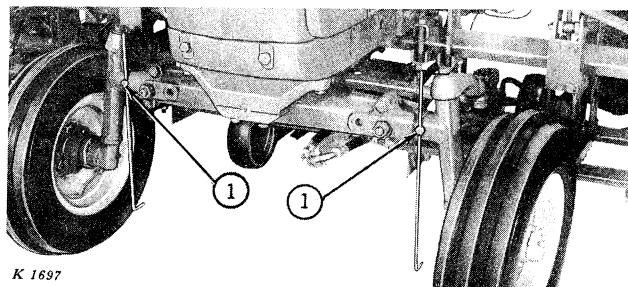
4. Attach spring locking pin in desired location with cap screw and washer provided.

ELECTRIC SWITCH



1. Mount electric switch on tractor fender with two bolts.

GUIDE RODS



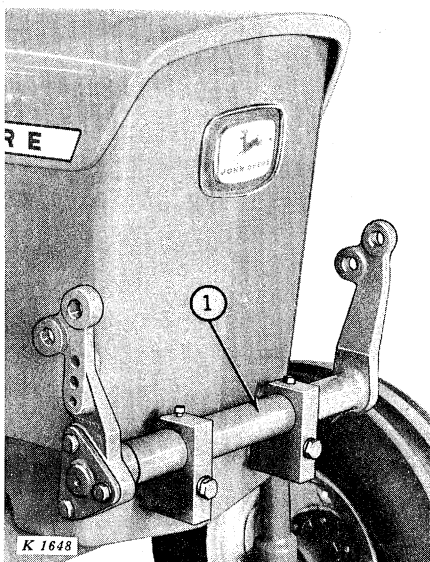
1. Attach guide rods to front axle.

ATTACHING CARRIER TO TRACTOR

53K1 AND 53K2 CARRIERS

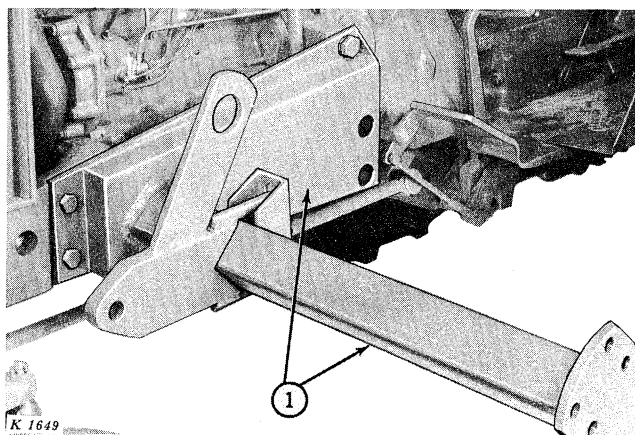
LIFT BARS, LIFT ARMS, AND PUSH RODS

ROCKSHAFT

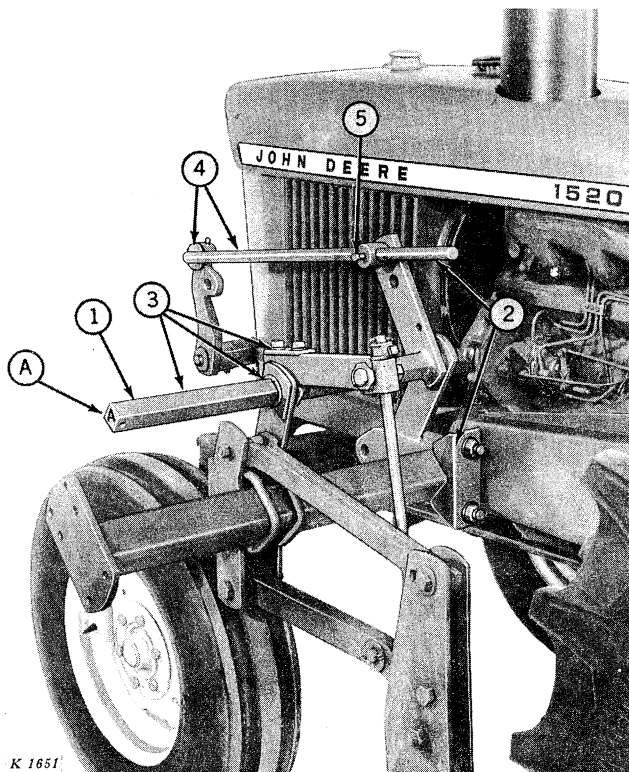


1. Attach rockshaft to tractor.

BOOMS



1. Attach booms directly to tractor side mount using five bolts on each side.



1. Lift bars are stamped "A" or "B" on the end. Place lift bar stamped "A" on the left-hand side and "B" on the right-hand side of tractor.

2. Locate the lift bar inside bearing support to allow the push rods to be in a straight line when attached to rockshaft and lift bar.

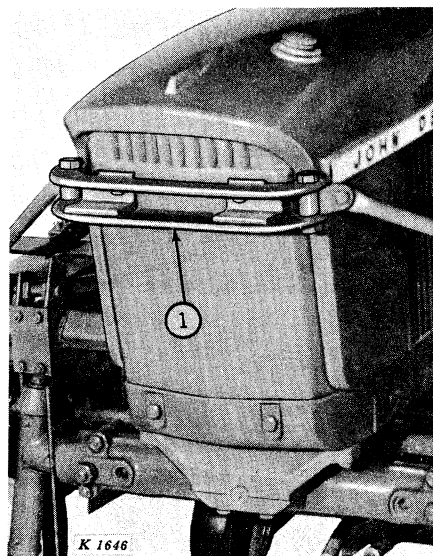
3. Attach hanger lift arm with V-bolt after sliding the lift bar cast bearings in place in such a manner that they will be held in place when the hanger lift arm is attached.

4. Attach push rod to the rockshaft and lift bar, using the top hole in the lift bar arm.

5. 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.

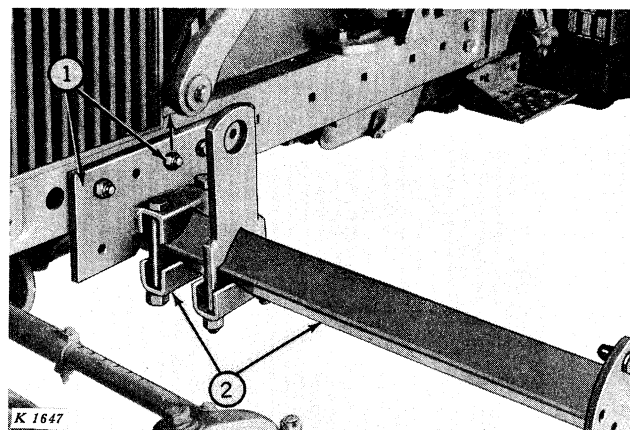
54KB CARRIER

FRONT BRACKET



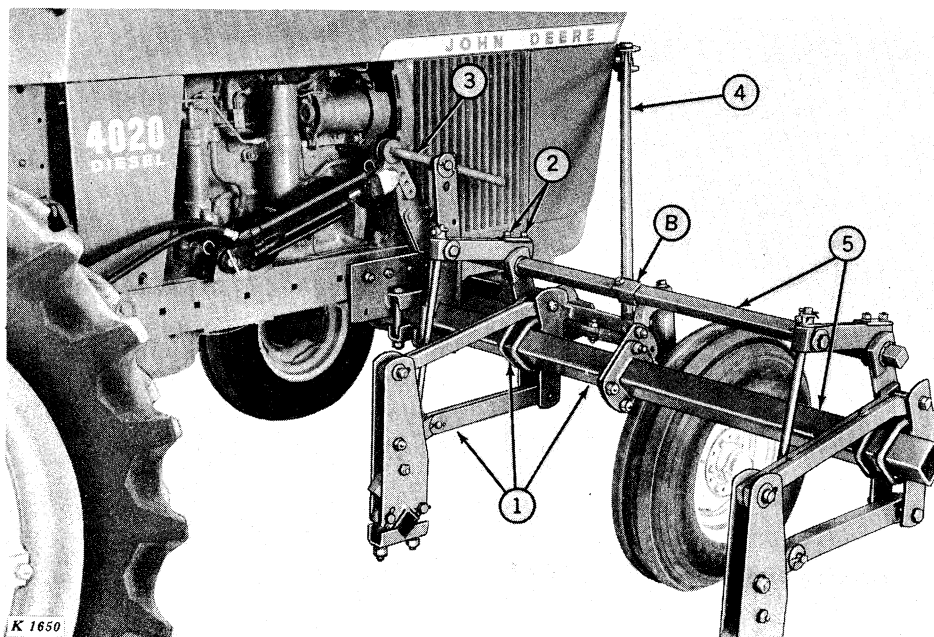
1. Attach front bracket to tractor.

BOOMS



1. Attach boom brackets to tractor side mount with the third hole from front of bracket directly below rockshaft pivot point.
2. Secure boom to brackets after centering.

HANGERS, LIFT BARS, LIFT ARMS, AND PUSH RODS



1. Remove V-bolts from hanger and position over boom before attaching truss rod. NOTE: insert lift bar through hanger bearing before mounting hanger with V-bolts. See stamped end "A" or "B." Place "A" on left-hand side and "B" on right-hand side of tractor. Attach hanger with V-bolts, leave loose.
2. Attach lift arm to lift bar with V-bolt.
3. Attach cylinder push rod as shown.

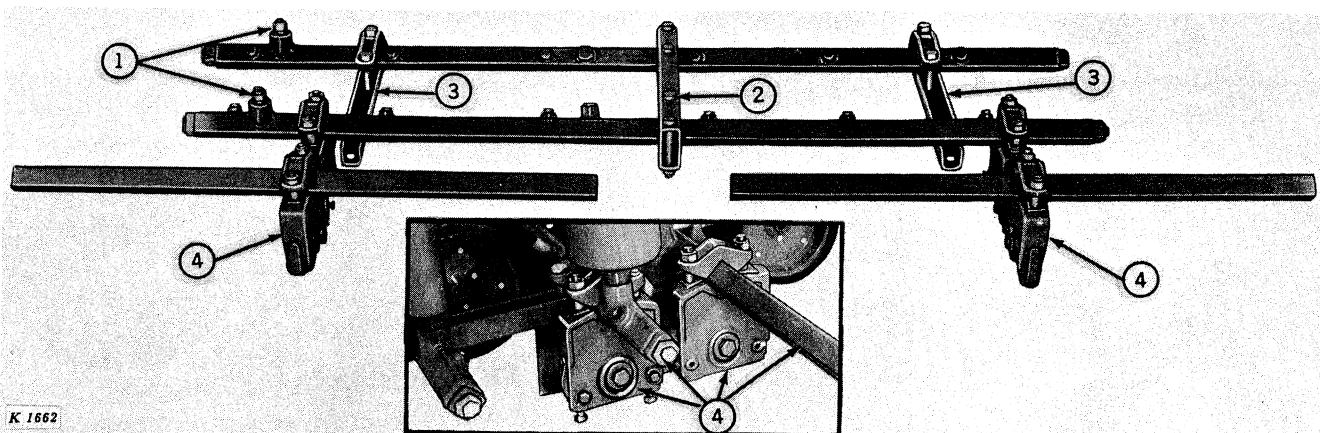
4. Attach truss rods to front bracket and boom end plate.

5. When four hangers are used, boom extensions are required. Attach as shown for 116K, 118K, and 128K thinners.

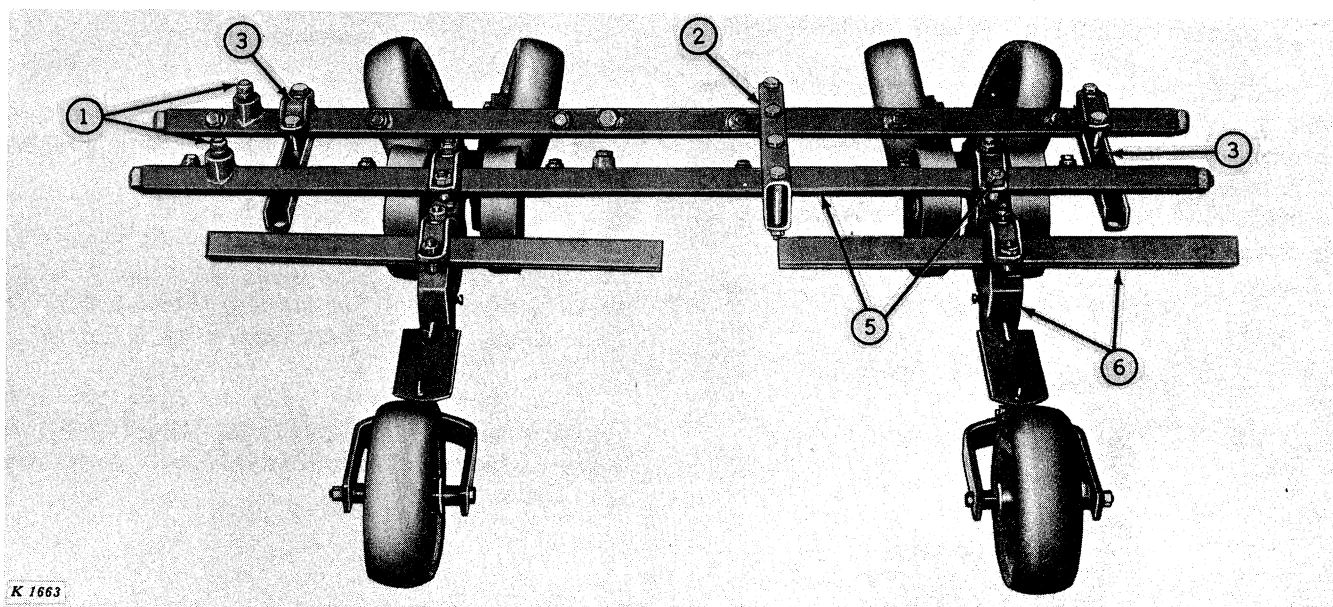
ASSEMBLING THINNER

NOTE: Pages 39 through 41 show assembly instructions for the MANIFOLDS, ACTUATOR, KNIFE ARM AND KNIFE, PROBE AND SHIELD, ALTERNATOR, AMPLIFIER, SHIELD AND GAUGE WHEEL. Before assembling them, refer to the row spacing illustrations on pages 44 through 55. Those illustrations show the dimensions to use and the location of the components on the various models.

MANIFOLDS (PRESSURE AND RETURN)



Single-Row Thinner (Models 112K, 114K, 116K, and 118K)



Double-Row Thinner (Models 124K and 128K)

1. Line up the two manifold bars with accumulator bosses (openings) to the left when standing at the rear. The openings or bosses for the hoses going to the actuators must both face the center or toward each other.

NOTE: Pressure and return manifold is determined by the location of the pressure and return accumulators. See line drawing and illustration of the model you are setting-up to determine their location.

2. Attach manifold spacers to manifolds using the dimensions given for the model you are assembling.

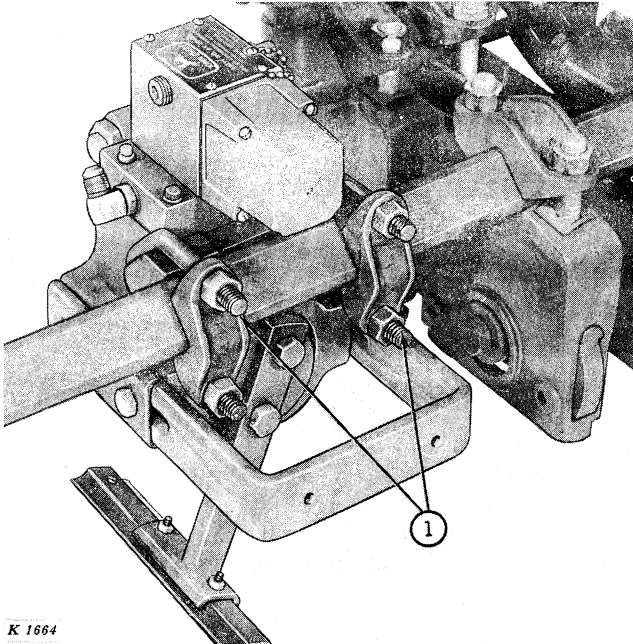
3. Attach spacers with cast cap on one end, to the front manifold bar using the dimension given for your model. The carrier hanger attaches to the other end of this spacer.

4. Single-Row only—Attach the main gauge beam to rear manifold bar and support bar. The clamp with the set screws attaches forward to the rear manifold bar.

5. Double-Row only—Attach rear manifold bar to gauge beam front clamp.

6. Attach support bar to gauge beam rear clamp. This clamp is locked in the rear position with six set screws.

ACTUATOR

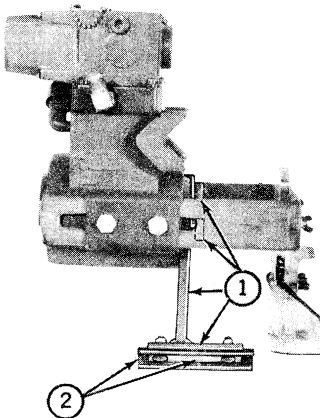


Actuator Attached to Front Side of Bar

1. Attach actuator to bar with the two V-bolts.

NOTE: The actuator can be attached to either the front or rear side of the bar. Some models require the actuator to be mounted to the rear. The solenoid valves can also be turned in either direction as long as the oil ports are lined up by turning the actuator manifold around.

KNIFE ARM AND KNIFE



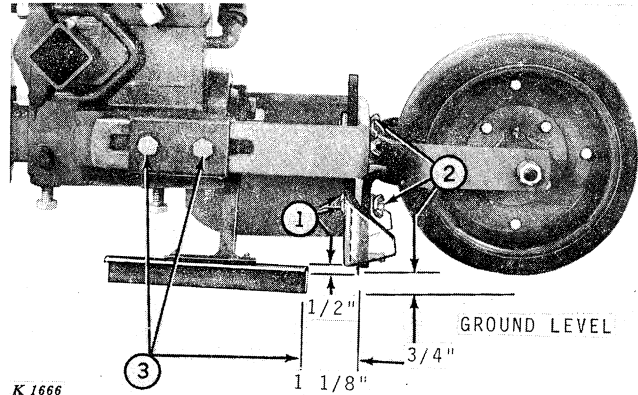
Knife Arm with 5-Inch Knife

1. Bolt knife arm to the rear of crankshaft using the two lug bolts. Keep bolts tight. When using a single knife arm for each actuator, attach

with long end of foot to the rear for 5-, 6-, and 7-inch knives. For 8- and 9-inch knives, turn the long end of foot forward. When using knife length of 10, 11, and 12 inches, two knife arms should be used. See "Knife Arm," page 13.

2. Attach knife to arm using clamp strap on the bottom with carriage bolts going up through strap, knife, and foot of arm. Tighten bolts.

PROBE AND SHIELD



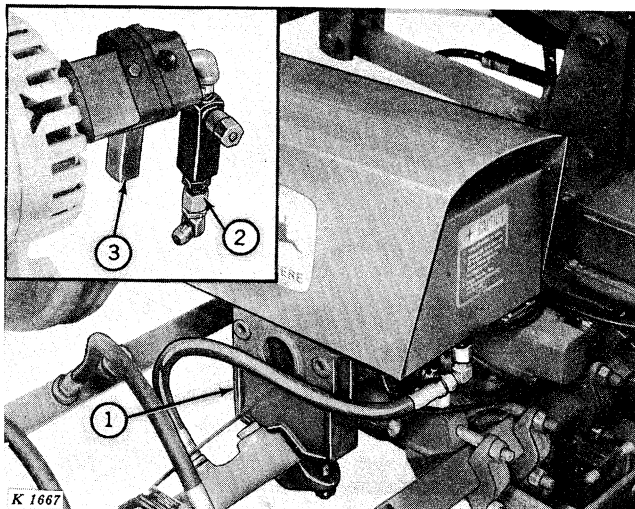
Probe Setting

1. Adjust probe 1/2 inch below bottom edge of shield to bottom edge of probe. Tighten wing nut bolts to hold this adjustment.

2. Attach shield to support using strap with carriage bolts and wing nuts. Set probe 3/4 inch above ground level by moving shield and probe up or down. Tighten wing nuts holding shield.

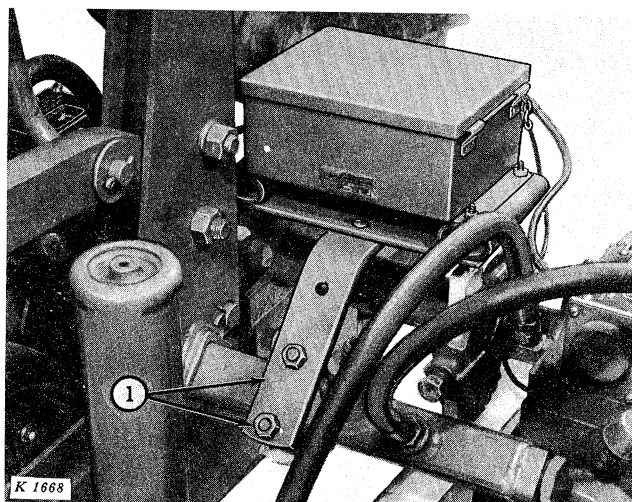
3. Loosen support bolts on both sides of actuator and adjust support allowing 1-1/8 inch distance from end of knife to probe. Tighten support bolts.

ALTERNATOR



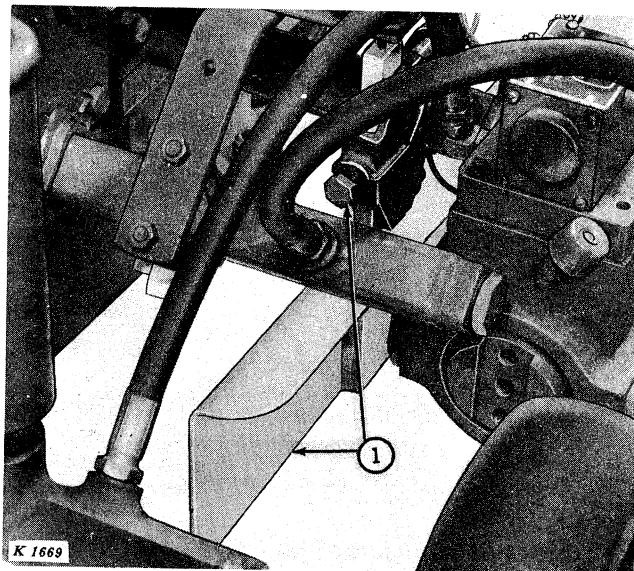
1. Attach alternator to rear manifold bar with clamp as shown. The electric outlet on alternator faces forward.
2. Attach hydraulic hose from pressure manifold to the flow control valve going to the hydraulic motor.
3. Attach hydraulic hose from return manifold to the check valve.

AMPLIFIER

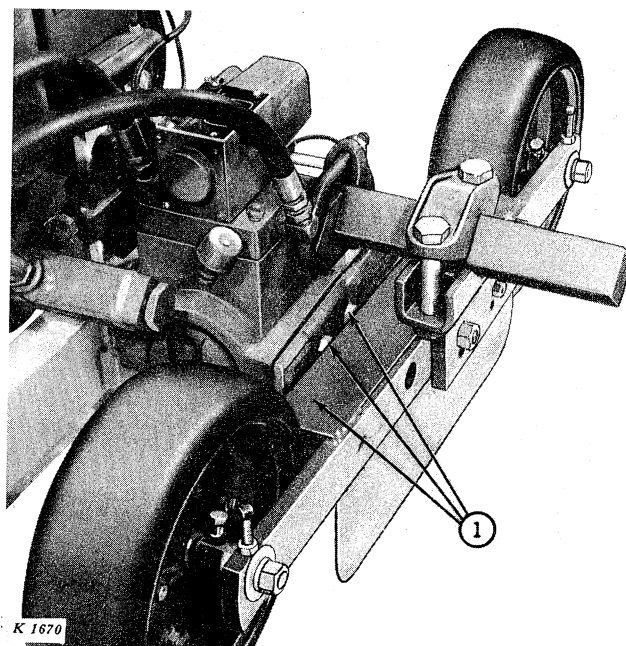


1. Attach amplifier bracket to manifold bar or support bar with U-bolt furnished. Bracket can be attached in a high or low position, above or below bar. The amplifier box can be attached to bracket in center as shown or to one end. Model 116K requires the middle amplifier box to be attached lengthwise to the bracket.

SHIELD

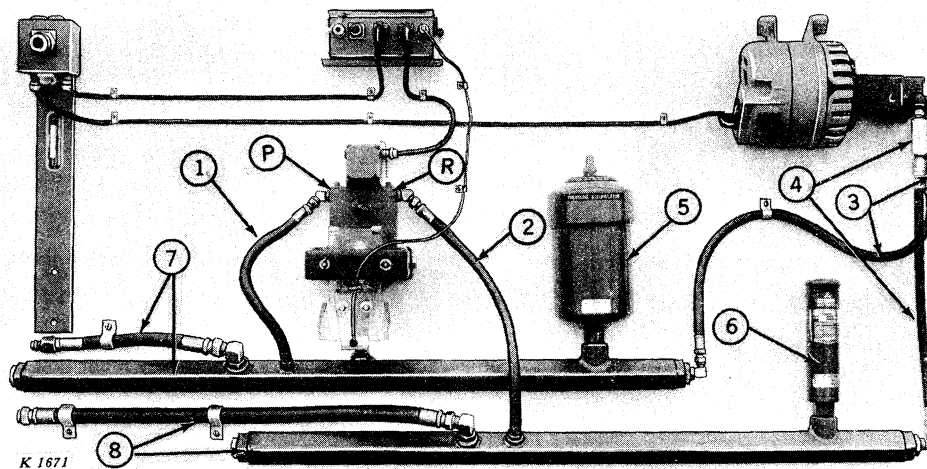


1. Attach shield to manifold bar or support bar with clamp as shown. Clamp the shield to the bar that carries the actuator. Single- and double-row machines require a shield opposite the gauge wheel for each actuator. On some models with narrow row spacing, some of the shields may have to be eliminated.

GAUGE WHEEL
(Single-Row)

1. Mount single gauge wheels, with wheels offset in toward the plant row or the actuator. Set gauge wheels close to the actuator with top shield just clearing the two cap screws holding the probe support.

HYDRAULIC HOSE HOOKUP



1. Attach hydraulic hose to pressure manifold and to actuator manifold, marked "P."

2. Connect hydraulic hose to return manifold and to actuator manifold, marked "R."

3. Attach hydraulic hose to end of pressure manifold and to the flow control valve attached to the hydraulic motor.

4. Attach the second hydraulic hose to end of return manifold and to check valve attached to hydraulic motor.

5. Attach large pressure accumulator to the pressure manifold. Use O-ring supplied. Tighten with wrench.

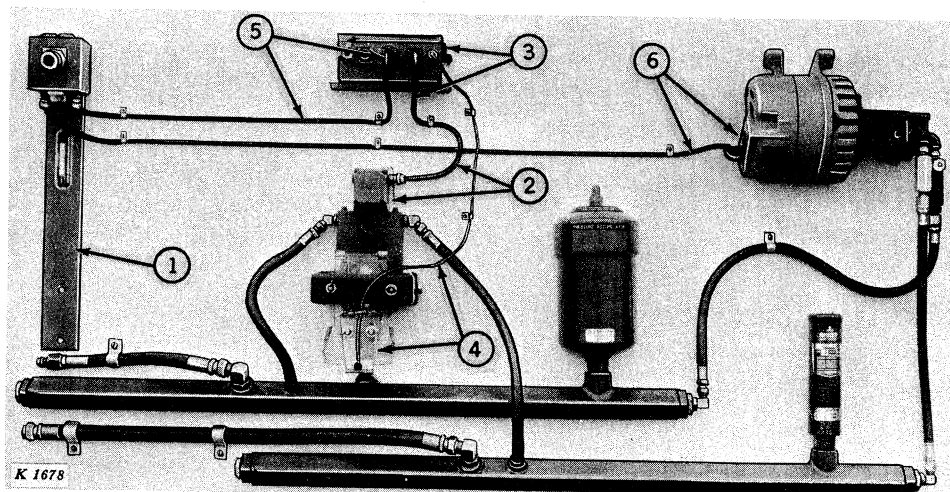
6. Attach small return accumulator to the return manifold. Use O-ring supplied. Tighten with wrench.

7. Attach pressure hydraulic hose to the pressure manifold. Secure breakaway coupler fitting to end of hose.

8. Attach return hose (large) to return manifold. See "Hydraulic System," page 24.

After thinner is attached to carrier, connect hoses to tractor as shown on pages 57 and 58.

ELECTRIC WIRE HOOKUP



1. Attach electric switch to tractor fender as shown on page 36.

2. Attach solenoid valve wire to solenoid. Remove inspection plate and slide locking ring and rubber grommet over wire. Insert wire through the side of valve that is closest to the amplifier box. Place each end of wire in clip and shove in with screwdriver till it locks in place. Slide rubber grommet up to fitting and secure with locking ring.

3. Plug solenoid valve wire in amplifier box next to the probe wire going to the same actuator. Secure with locking ring.

4. Place probe wire under attaching bar, along side of actuator and down through probe holder. Lock in keeper by pushing in on end, insert probe end and release.

Note: DO NOT pass probe wire close to the solenoid as it may short through.

5. After thinner is attached to carrier, plug in wire from the electrical switch on each amplifier box. Secure with lock ring.

6. After thinner is attached to carrier, plug the power source wire into the alternator. Hold electric wires in place with the electric ties furnished. See page 25 for wiring diagram.

ROW SPACING

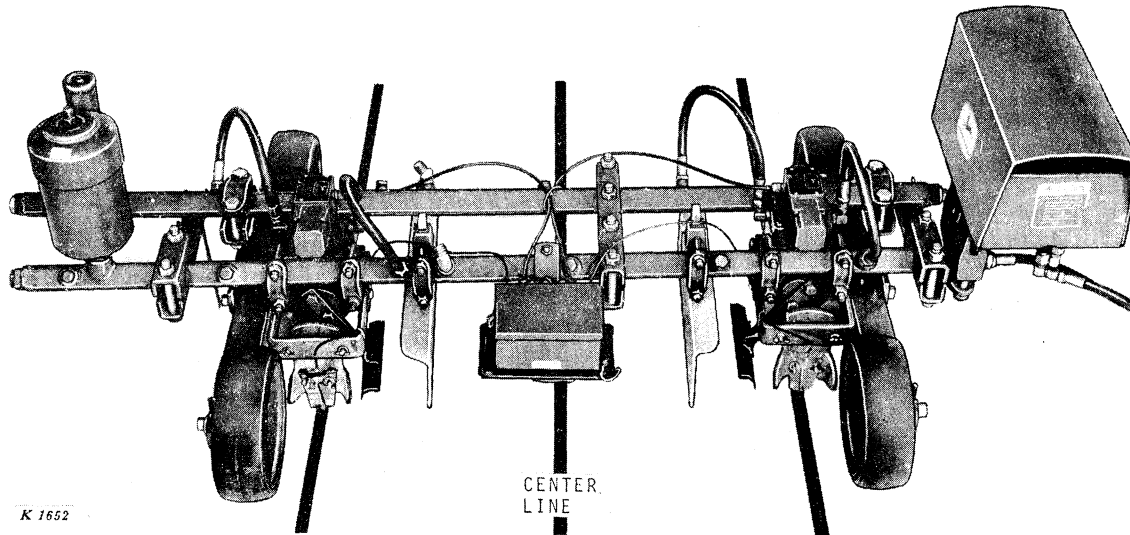
The illustrations below and on the following pages give the dimensions for the location of the various components on the thinner you are assembling.

Gauge wheels (single-row) must be set as

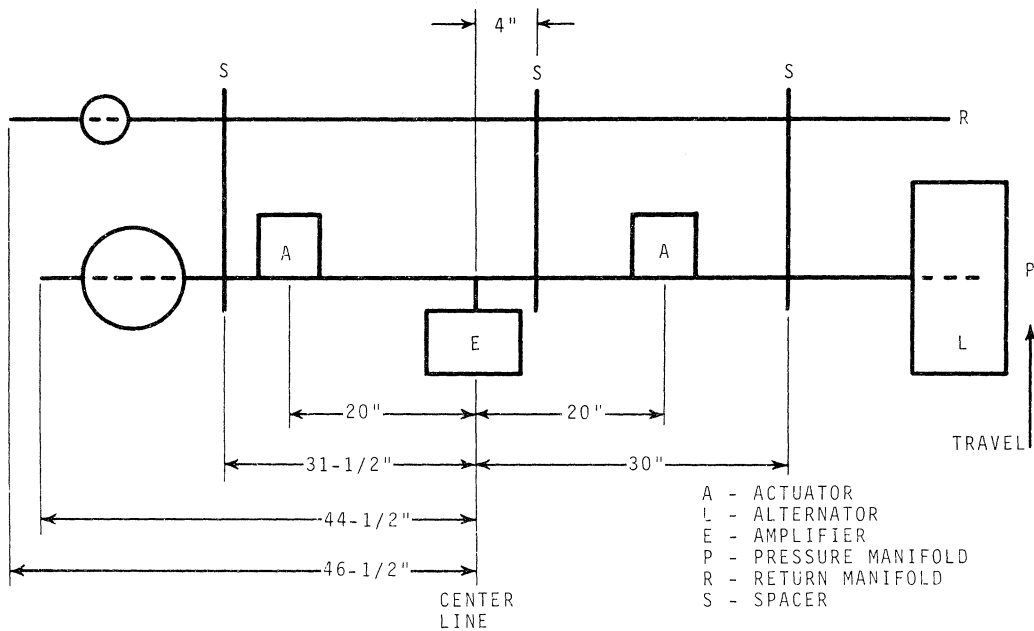
close to actuator as possible. The shield can be attached where convenient.

IMPORTANT: When one of the amplifier boxes is located in center of thinner, attach to manifold bar with attaching strap offset down, allowing box to clear the underside of tractor when raised.

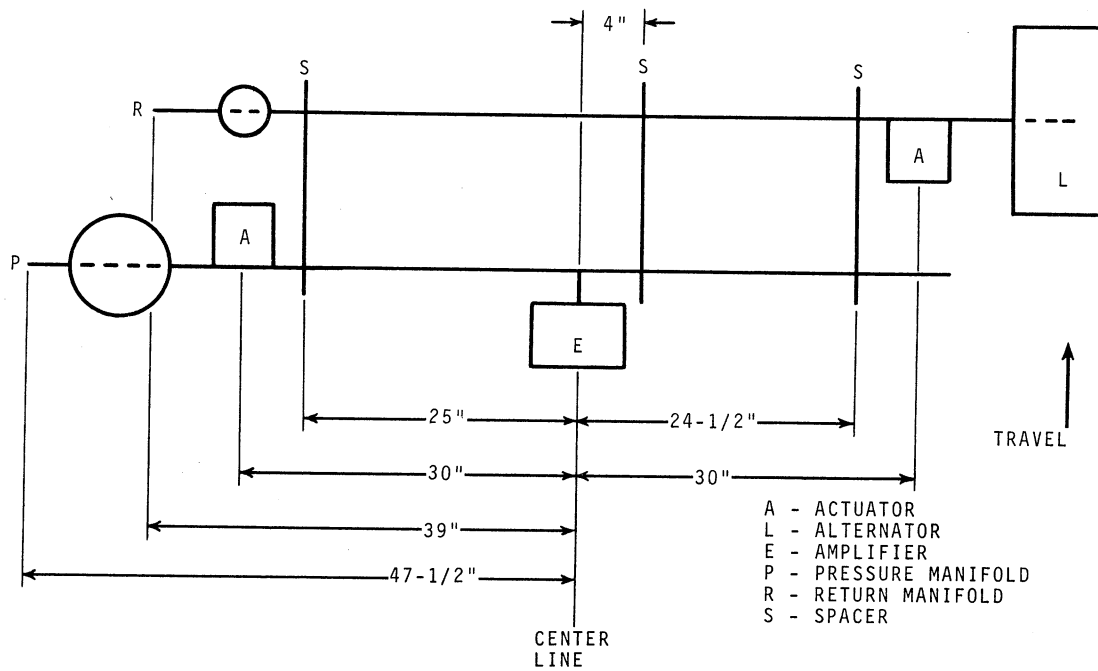
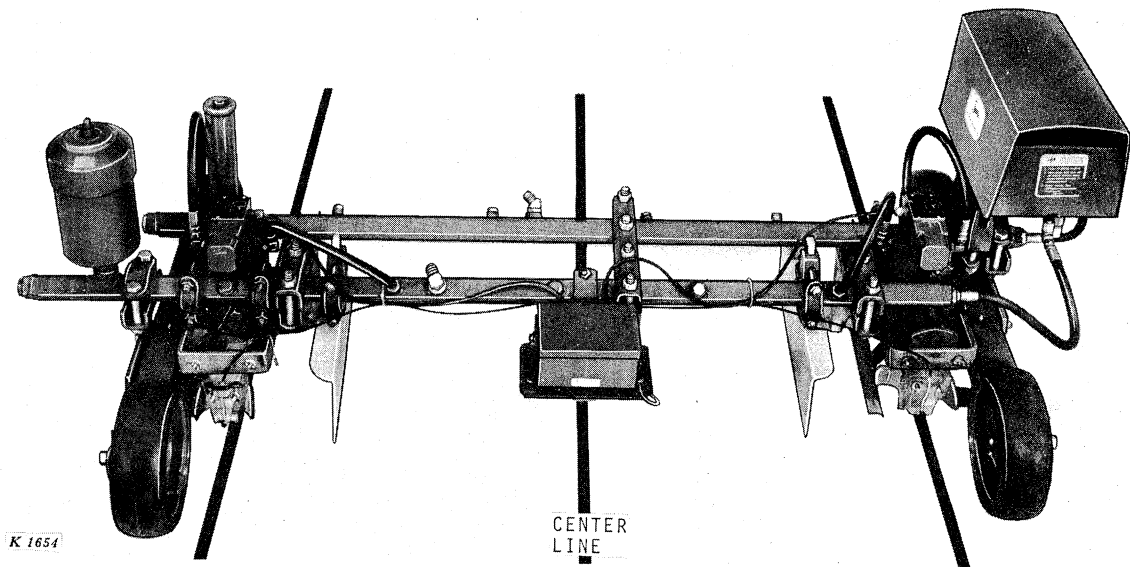
MODEL 112K THINNER SET ON 40-INCH ROW SPACING*



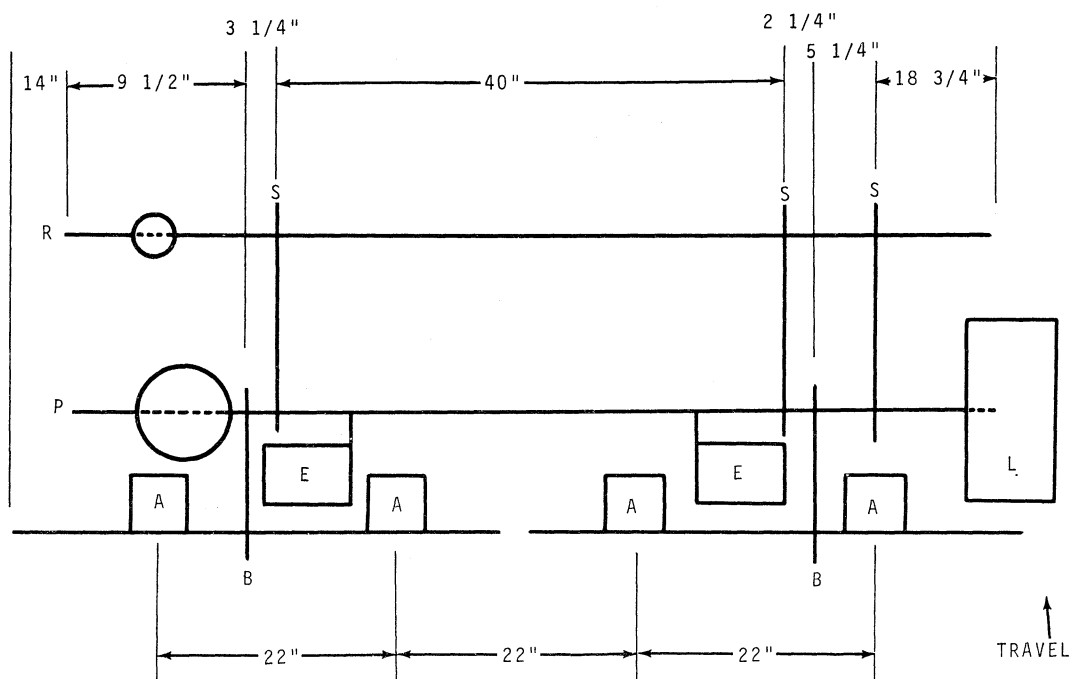
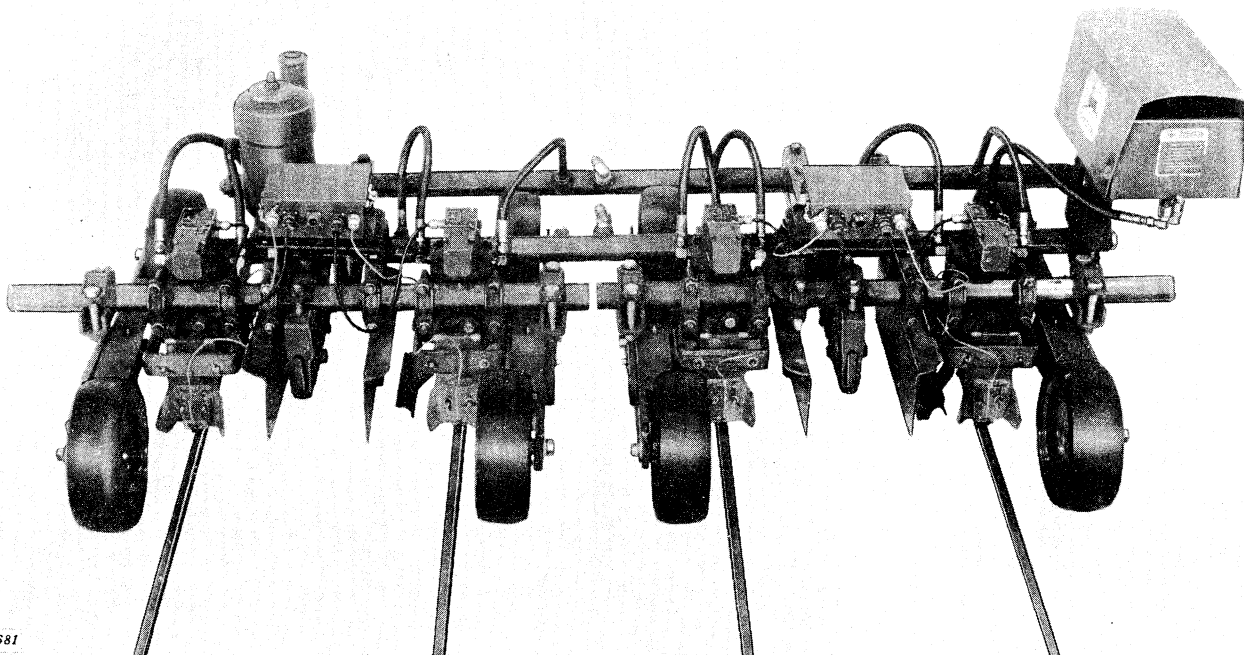
**Use for 38-Inch Spacing Also by Moving Actuators only.*



MODEL 112K THINNER SET ON 60-INCH ROW SPACING



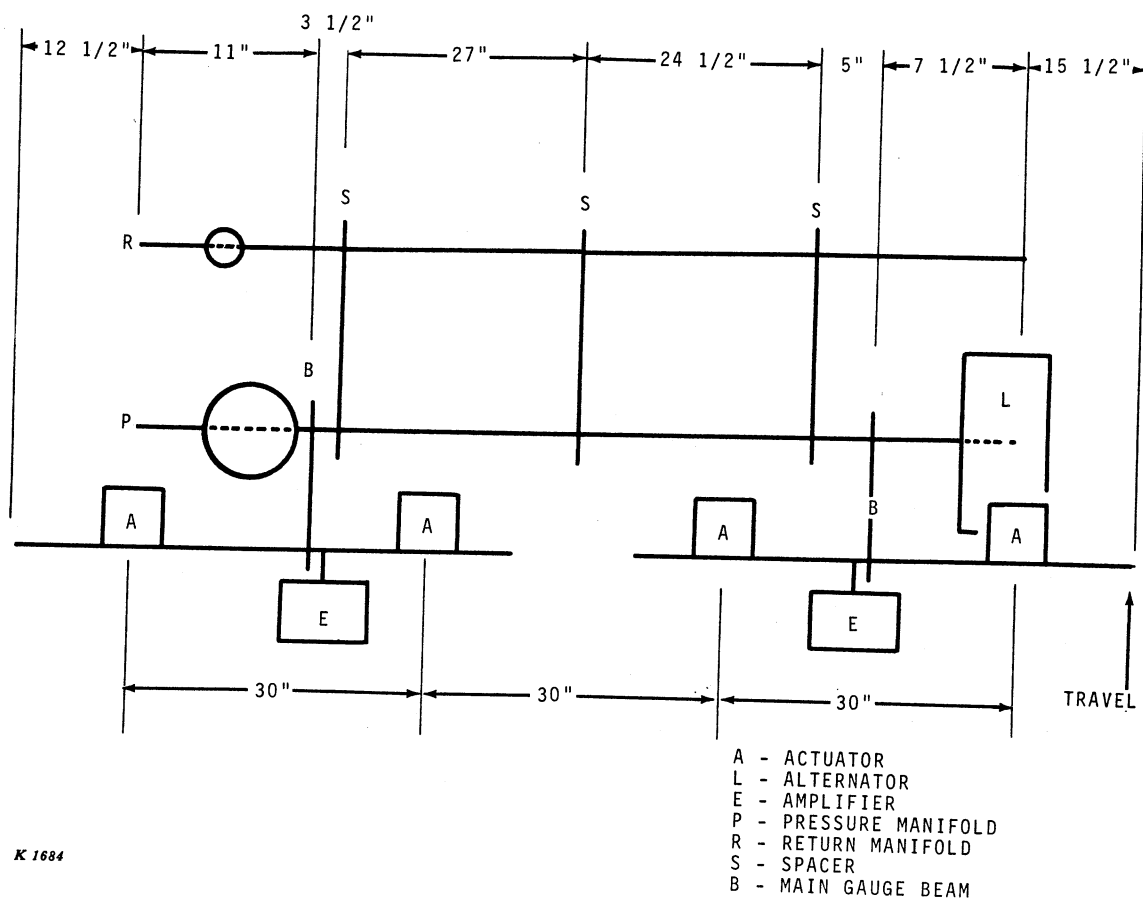
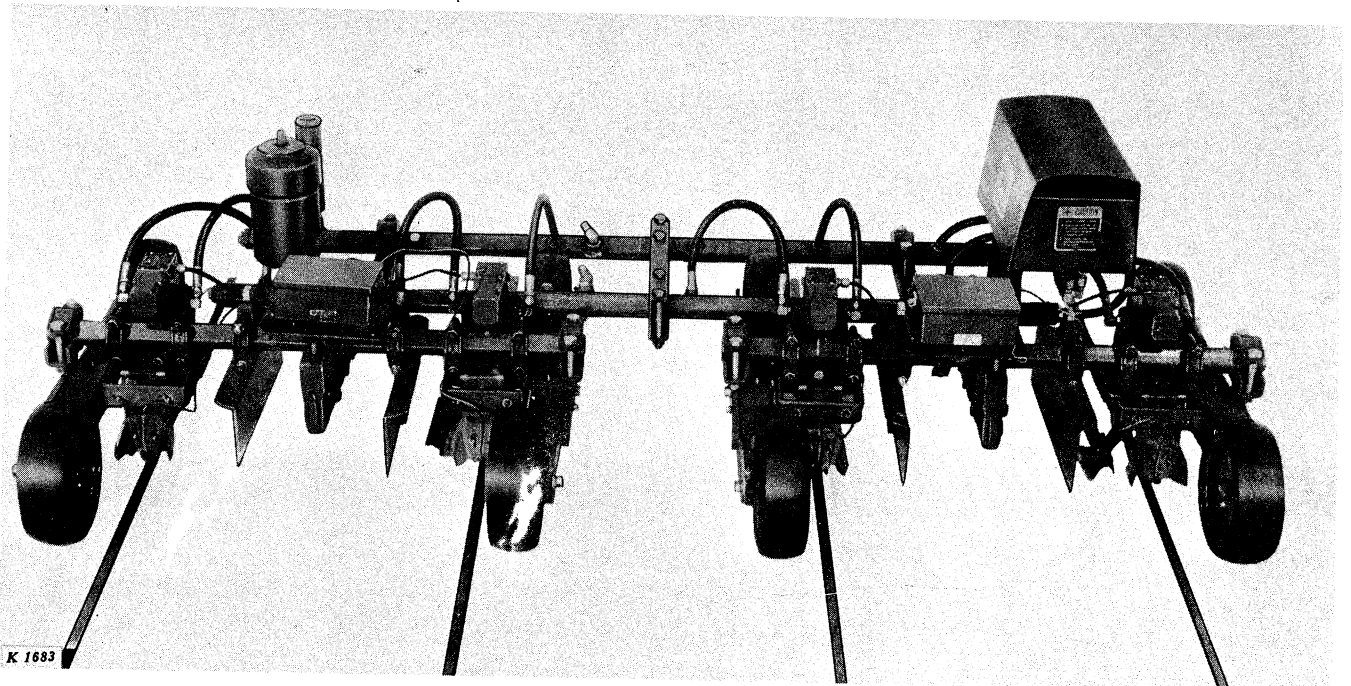
K 1655



- A - ACTUATOR
L - ALTERNATOR
E - AMPLIFIER
P - PRESSURE MANIFOLD
R - RETURN MANIFOLD
S - SPACER
B - MAIN GAUGE BEAM

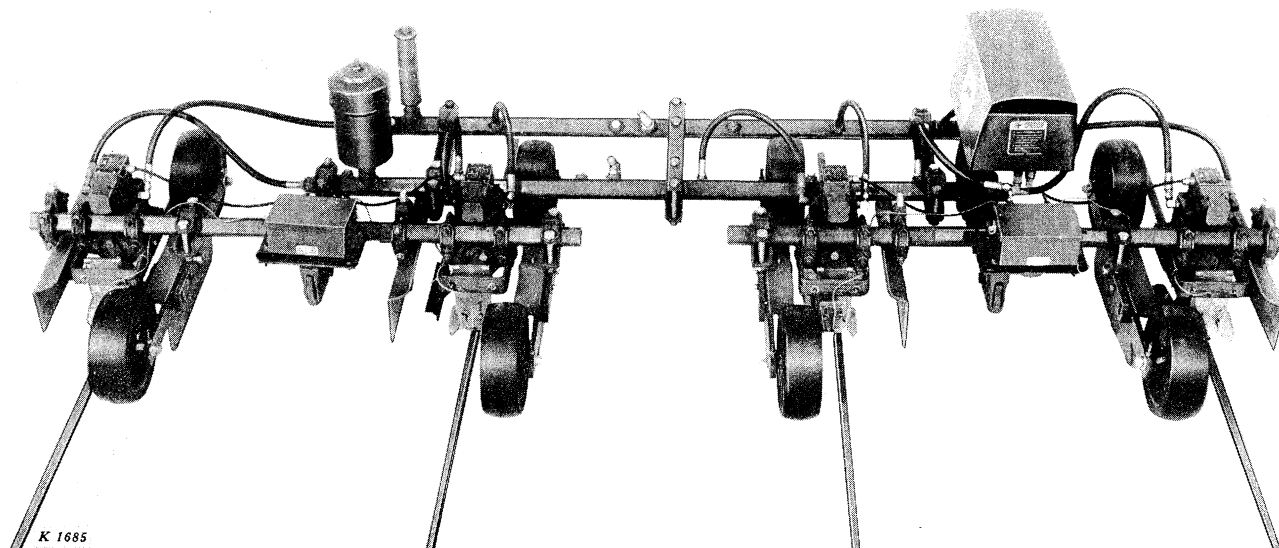
K 1682

MODEL 114K THINNER SET ON 30-INCH ROW SPACING

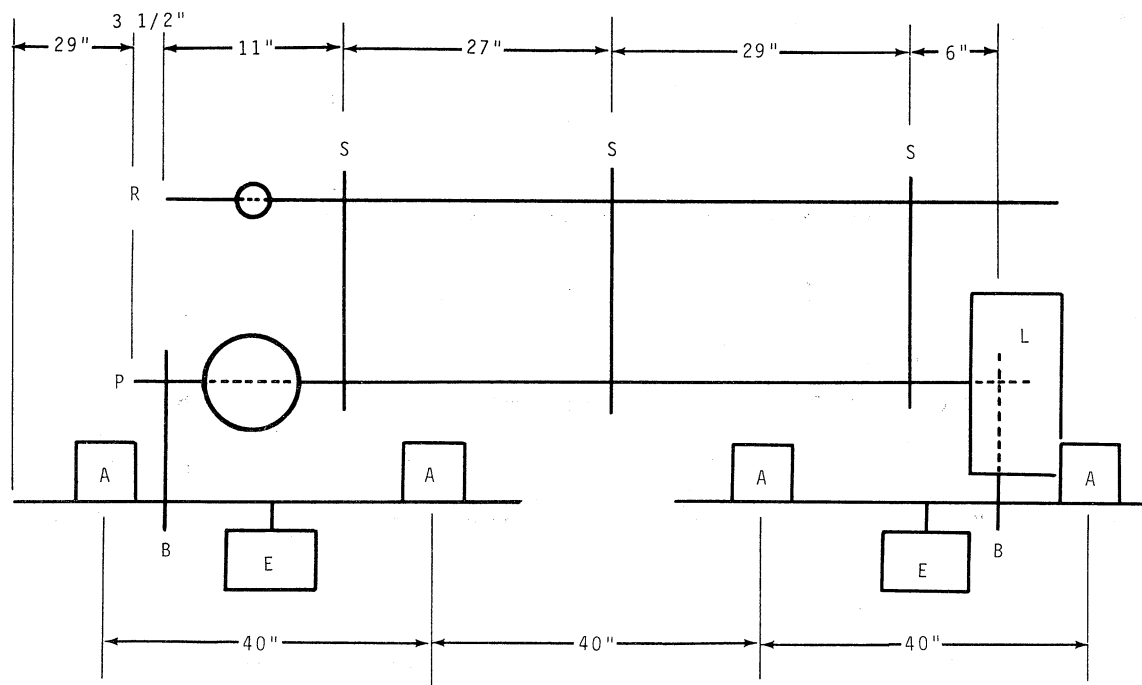


K 1684

MODEL 114K THINNER SET ON 40-INCH ROW SPACING



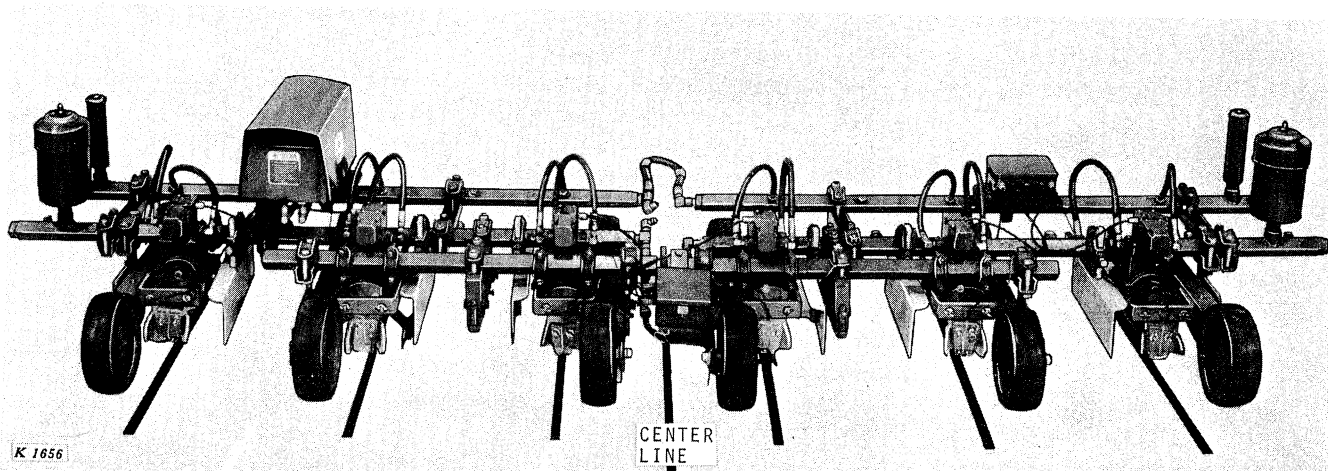
K 1685



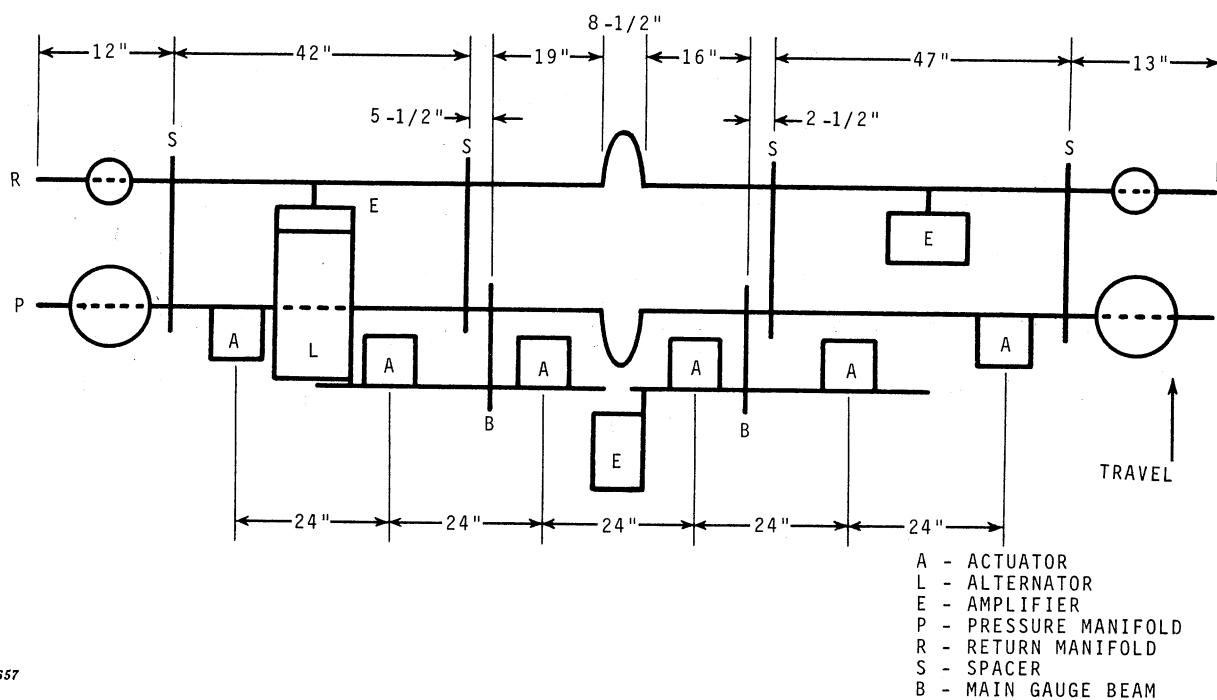
- A - ACTUATOR
- L - ALTERNATOR
- E - AMPLIFIER
- P - PRESSURE MANIFOLD
- R - RETURN MANIFOLD
- S - SPACER
- B - MAIN GAUGE BEAM

K 1686

MODEL 116K THINNER SET ON 24-INCH ROW SPACING*

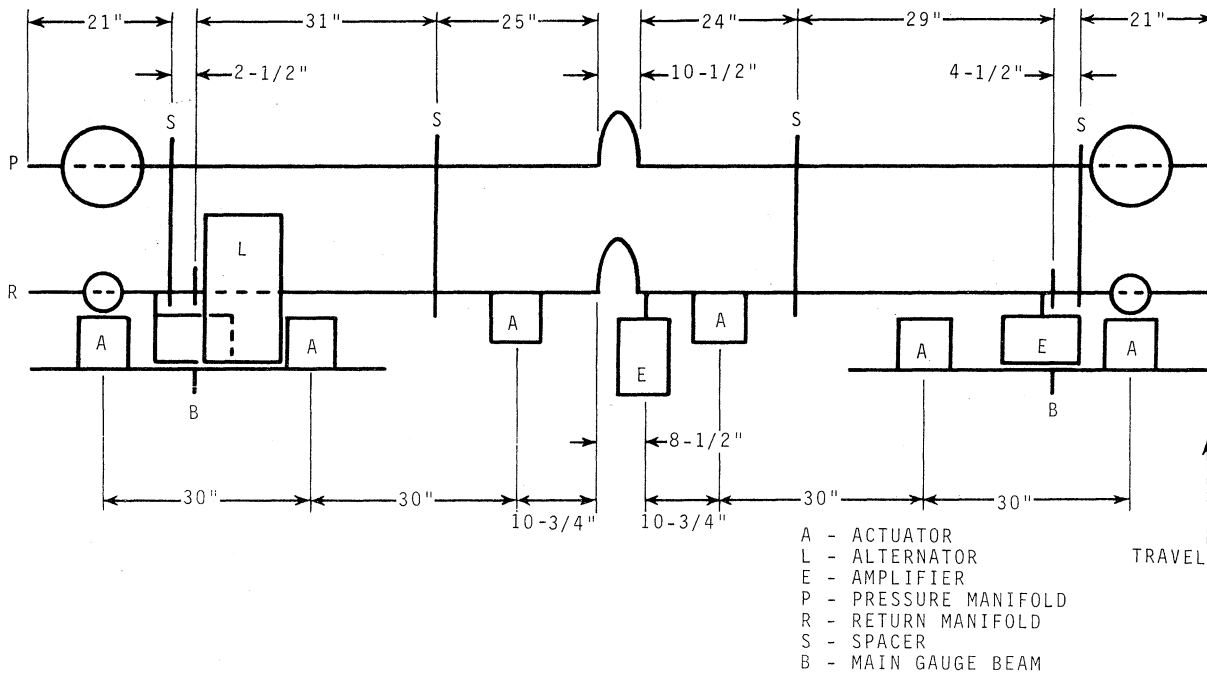
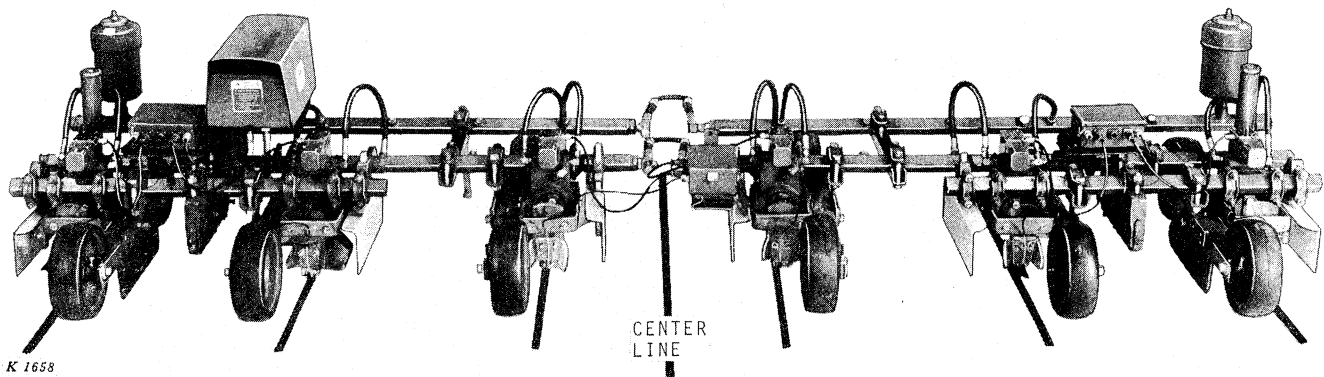


**Use for 22-inch Spacing Also by Moving Actuators only.*

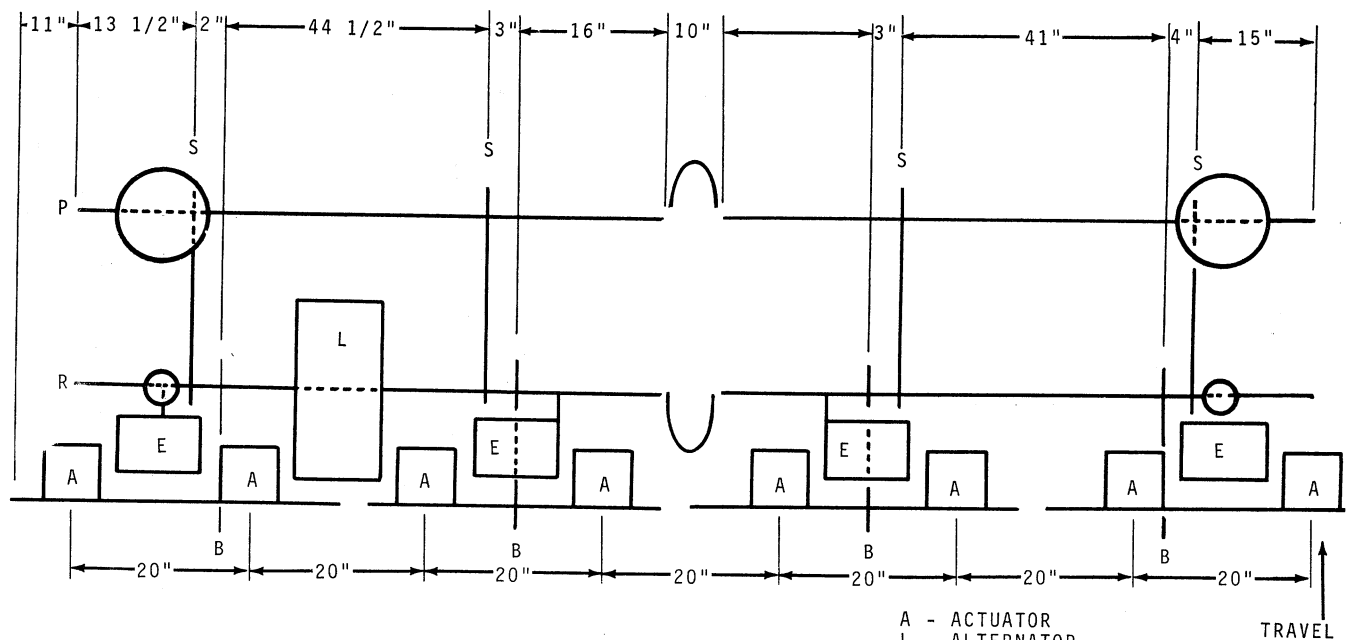
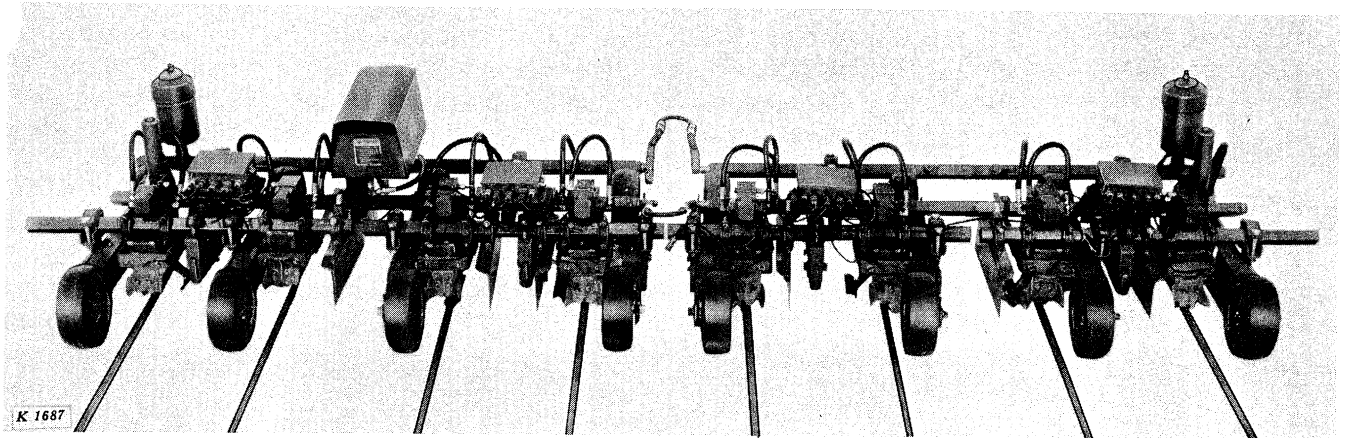


K 1657

MODEL 116K THINNER SET ON 30-INCH ROW SPACING



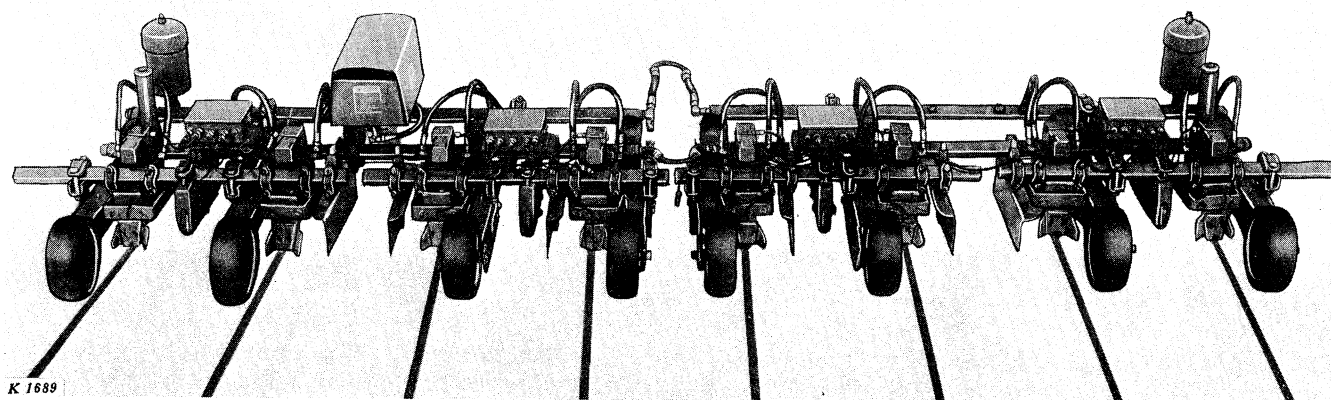
MODEL 118K THINNER SET ON 20-INCH ROW SPACING



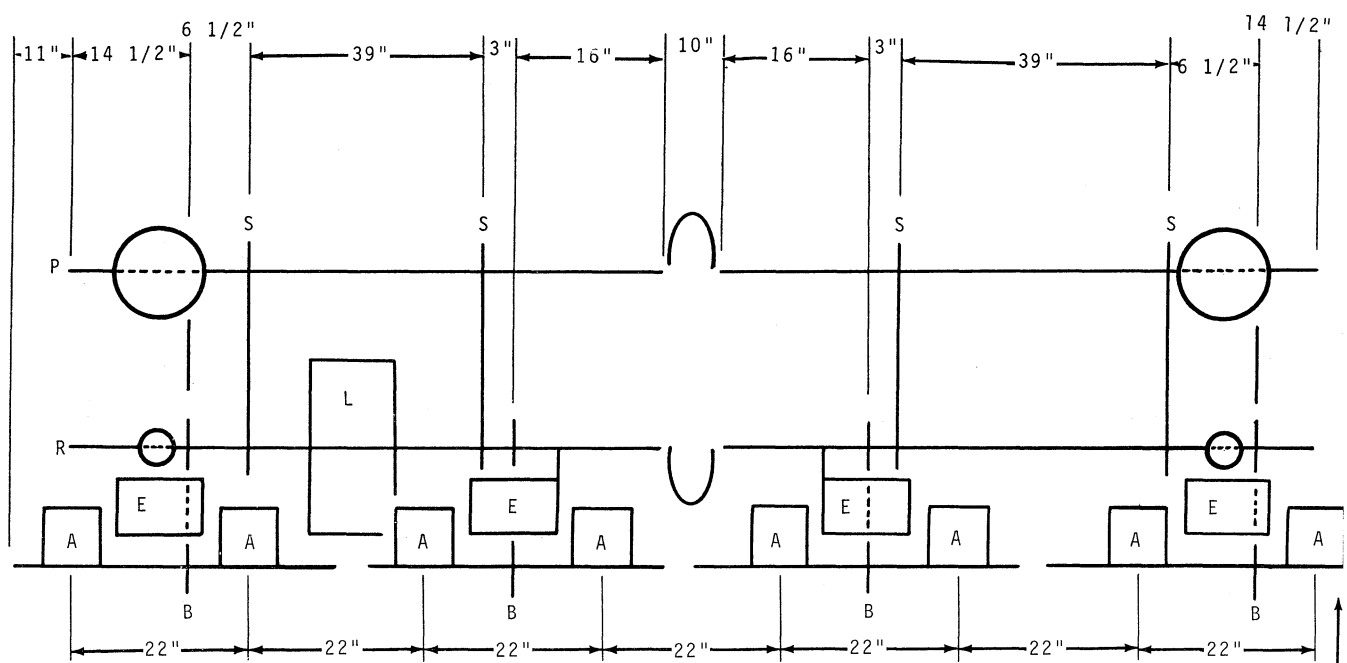
NOTE: CUT THE TWO CENTER REAR
BARS TO 44-INCHES LONG.

- A - ACTUATOR
L - ALTERNATOR
E - AMPLIFIER
P - PRESSURE MANIFOLD
R - RETURN MANIFOLD
S - SPACER
B - MAIN GAUGE BEAM

MODEL 118K THINNER SET ON 22-INCH ROW SPACING



K 1689

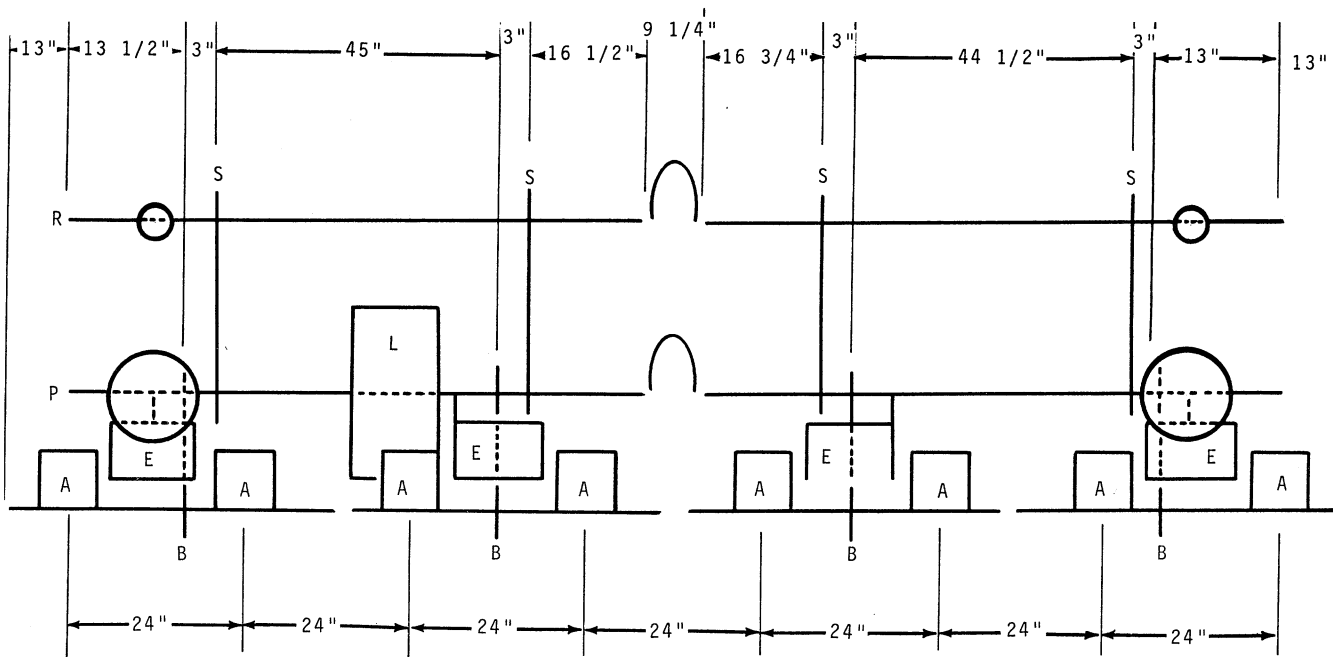
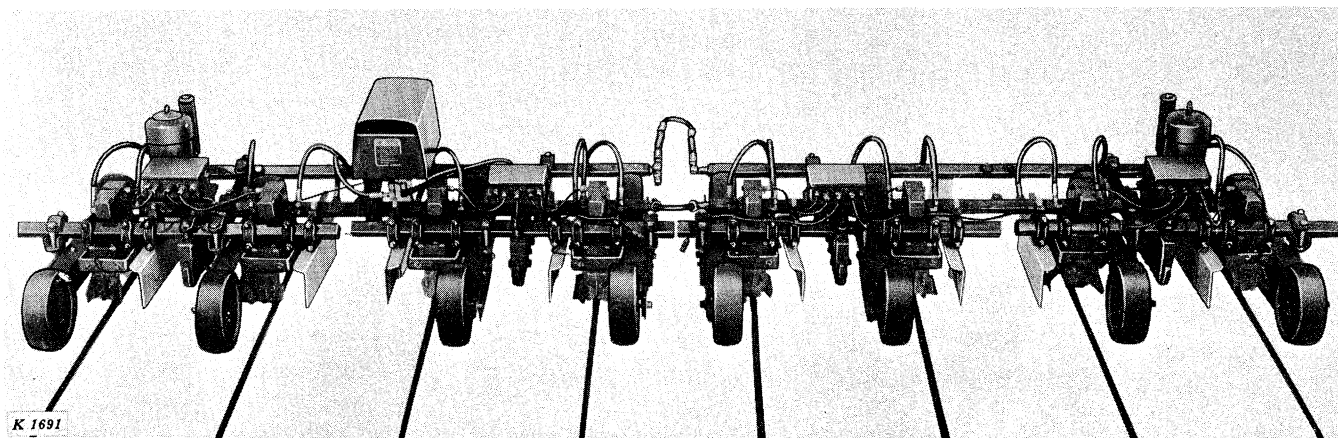


- A - ACTUATOR
- L - ALTERNATOR
- E - AMPLIFIER
- P - PRESSURE MANIFOLD
- R - RETURN MANIFOLD
- S - SPACER
- B - MAIN GAUGE BEAM

NOTE: CUT THE TWO CENTER REAR
BARS TO 44-INCHES LONG.

K 1690

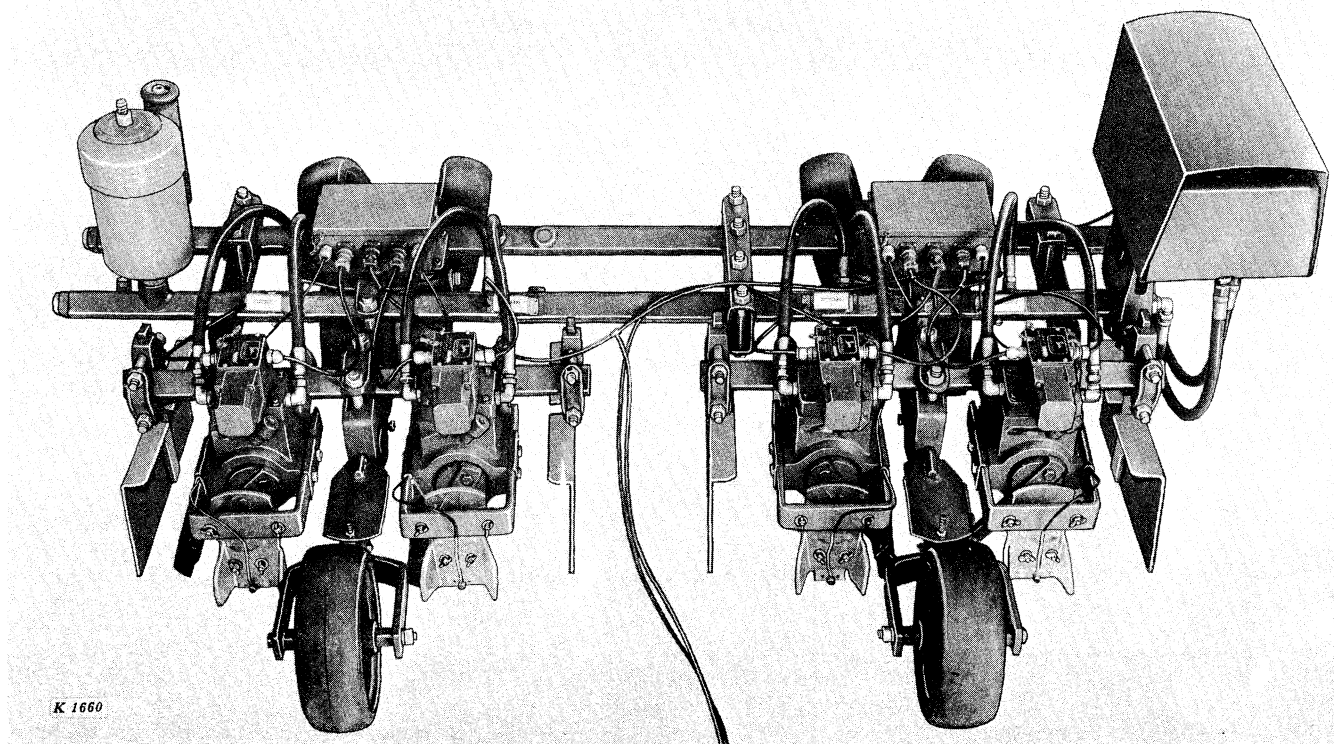
MODEL 118K THINNER SET ON 24-INCH ROW SPACING



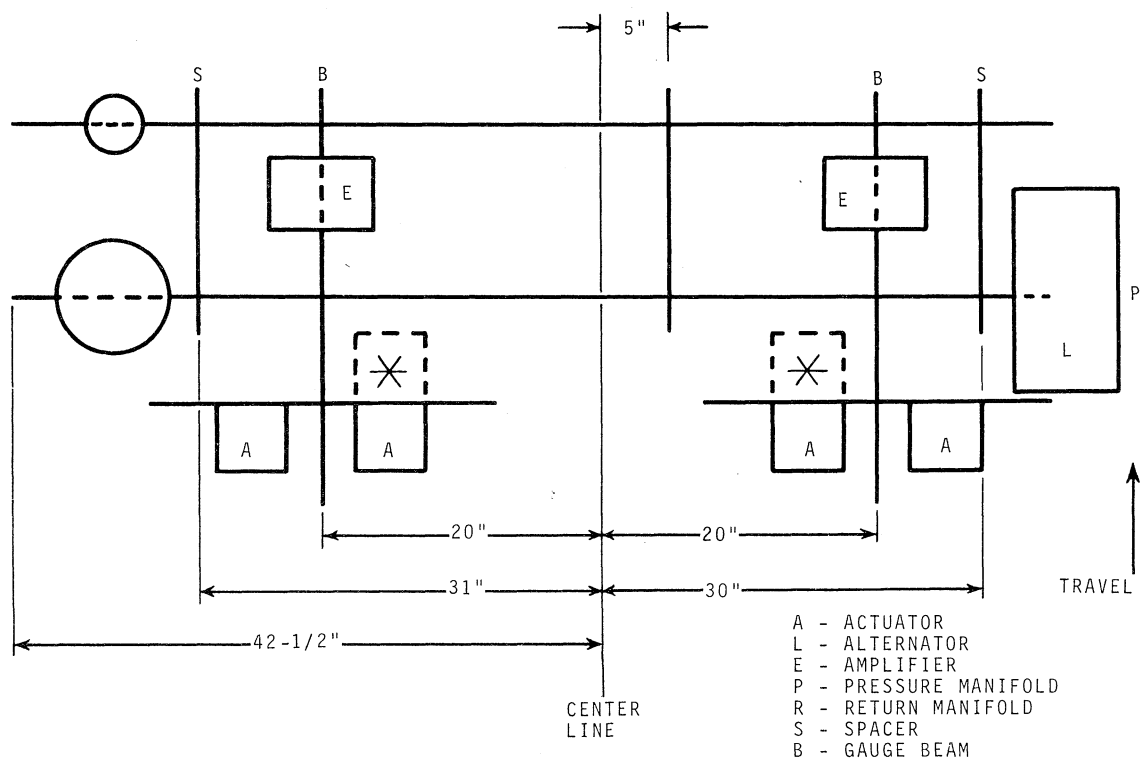
- A - ACTUATOR
- L - ALTERNATOR
- E - AMPLIFIER
- P - PRESSURE MANIFOLD
- R - RETURN MANIFOLD
- S - SPACER
- B - MAIN GAUGE BEAM

K 1692

MODEL 124K THINNER SET ON 40-INCH BED SPACING*



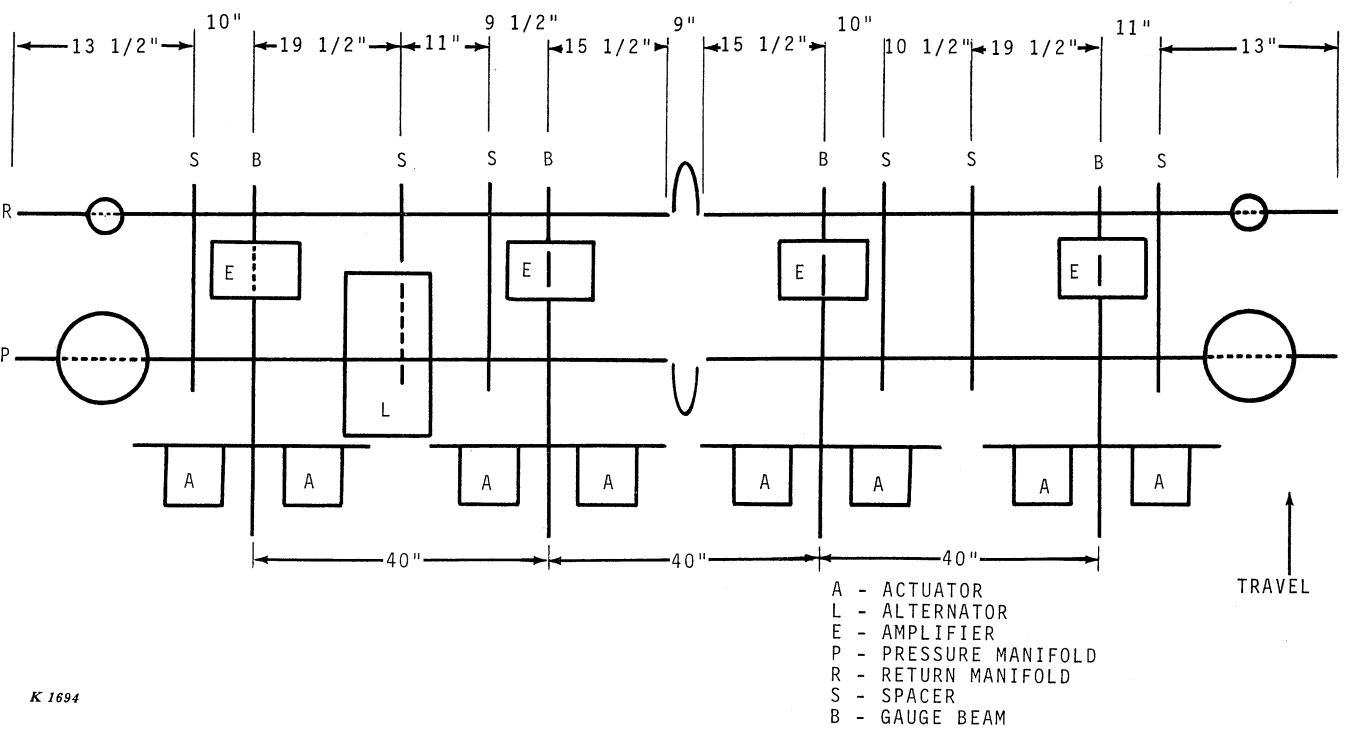
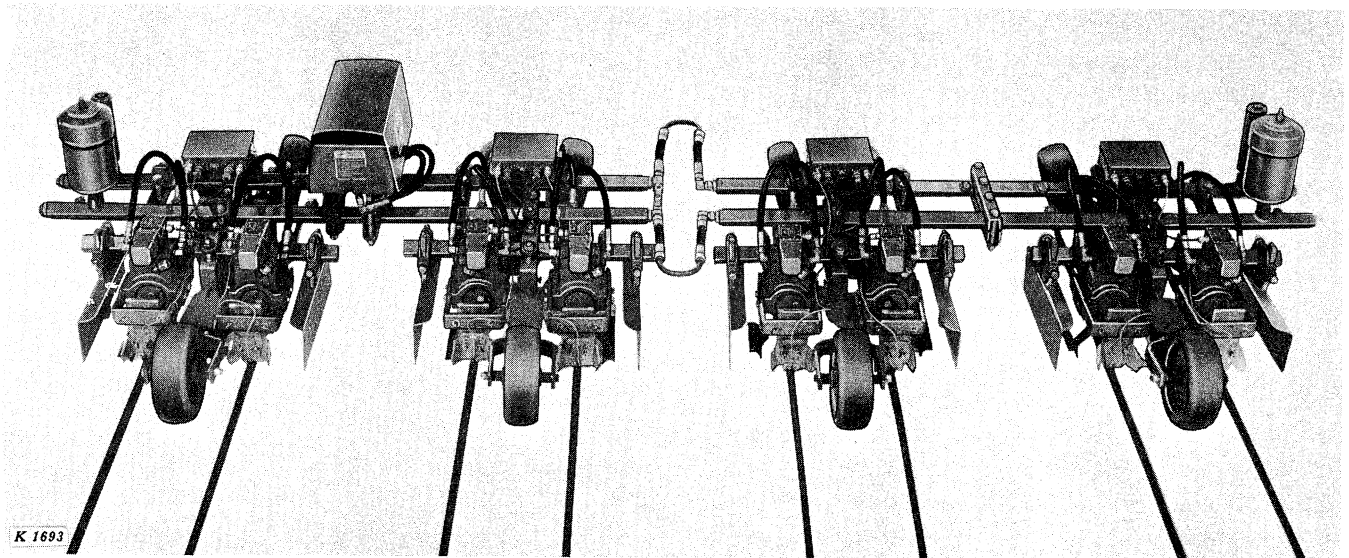
*Use for 38-Inch Also by Moving Gauge Beam only.



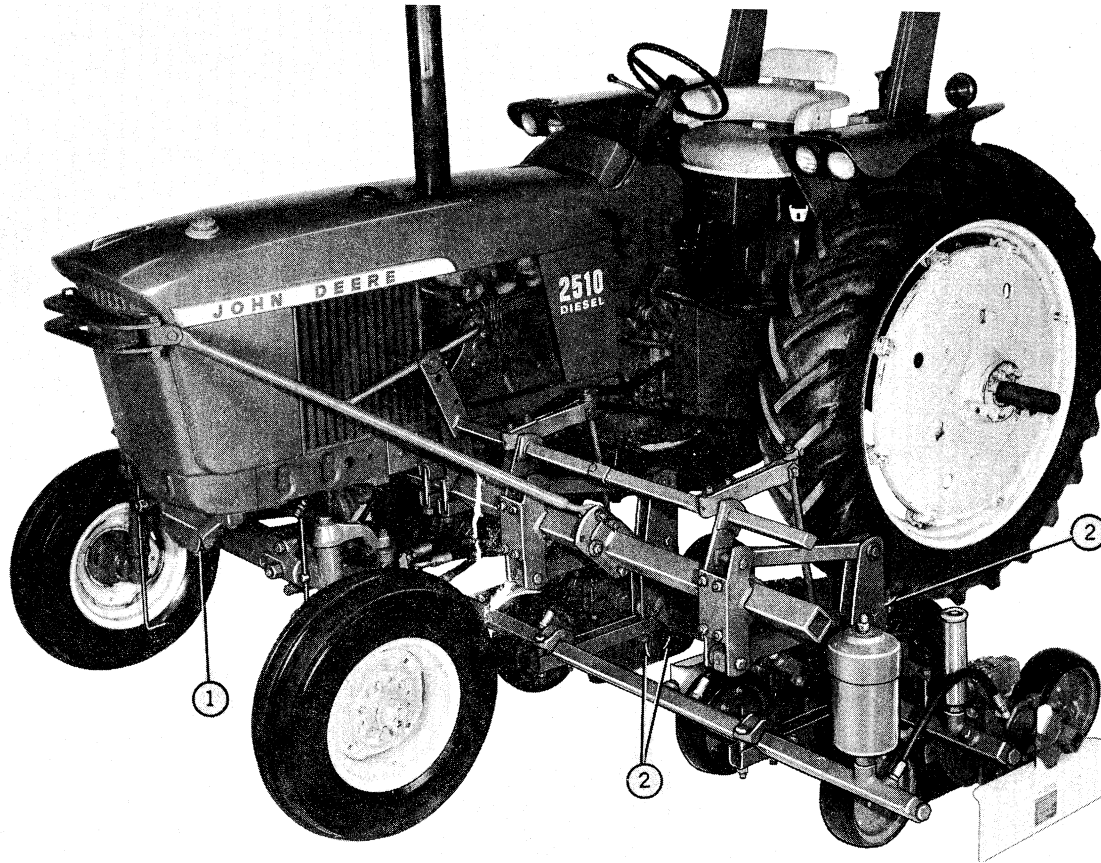
K 1661

NOTE: When used on John Deere 1020, 1520 or 2020 Tractors, turn actuator around.
Keep all solenoid valves in same direction.

MODEL 128K THINNER SET ON 40-INCH BED SPACING

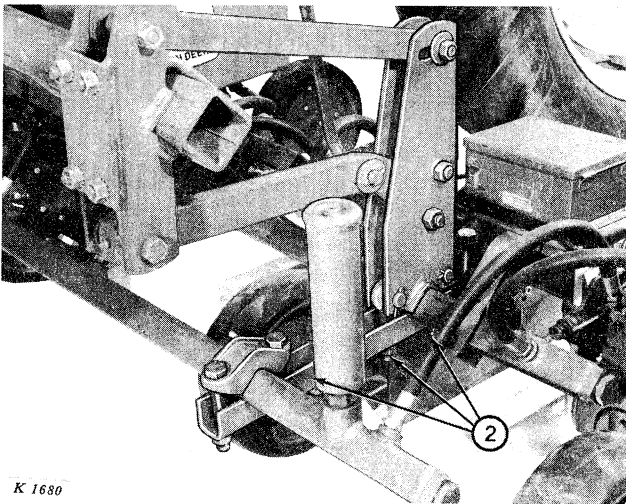


ATTACHING THINNER TO CARRIER



1. Lift front end of tractor with a hoist and roll thinner into position under the tractor. Lower tractor.

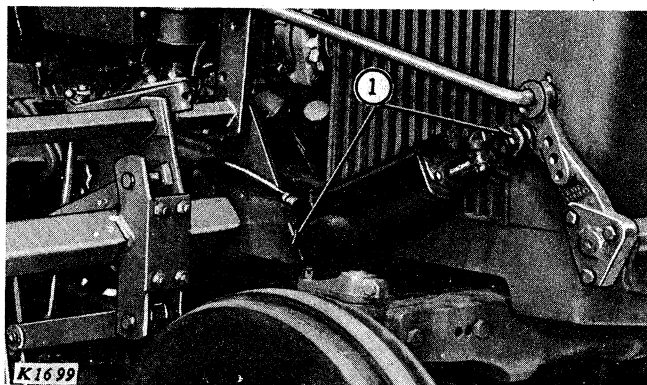
HANGER AND SPACER



2. Attach carrier hanger to the rear manifold bar and spacer as shown.

CONNECTING THINNER TO TRACTOR HYDRAULIC SYSTEM

ATTACHING REMOTE CYLINDER TO TRACTOR



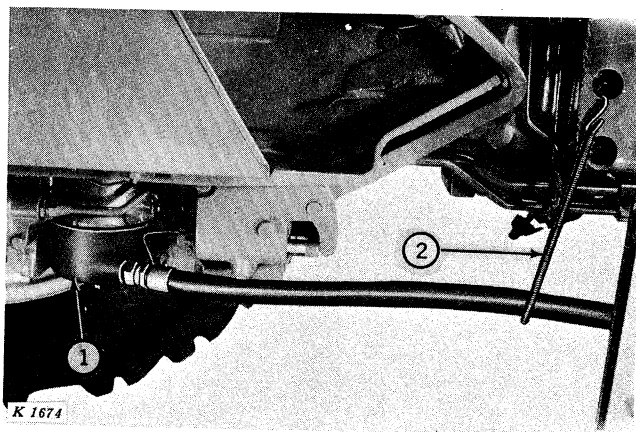
1. Attach remote cylinder to rockshaft on right-hand side of tractor.

Connect the hoses to the breakaway coupler as shown on page 58.

See your tractor operator's manual for instructions on operation and care of the remote cylinder.

INSTALLING RETURN HOSE TO TRACTOR

1020, 1520, AND 2020 TRACTORS

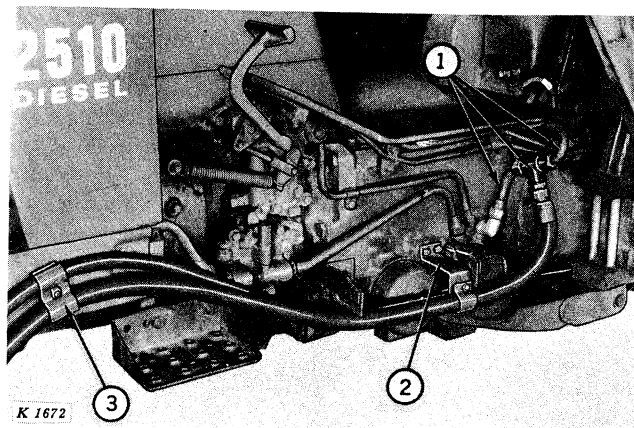


1. Remove transmission filter cover and replace with filter cover having an inlet to receive the return hose. Attach return hose (large).

2. Support both pressure and return hydraulic hoses with spring as shown.

2510, 2520, 3020, AND 4020 TRACTORS

Power Shift Transmission



1. Remove rockshaft return tubing from tractor and remove 1-11/16 inches from the center of the straight portion which is 3-3/4 inches long. Attach the flareless tube fitting over each end of tube. Position before tightening fitting and attach return hose (large).

2. Attach hose support bracket over battery bracket. Attach the pressure hose to the inside of the bracket, and the return hose to the outside of the bracket.

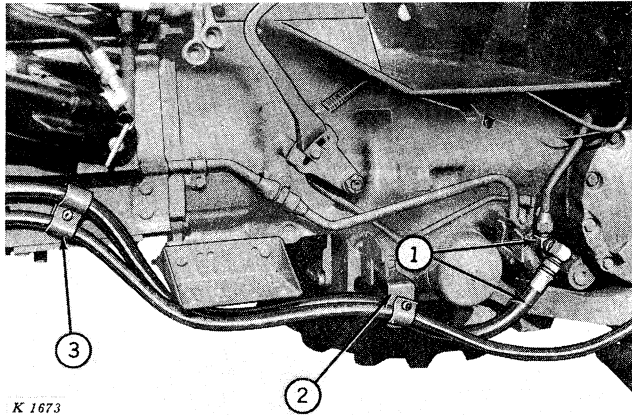
3. Attach hose clamp to the engine frame as shown.

NOTE: On all tractors with serial numbers above those listed below, the return line will splice into the tubing on both syncro-range and power shift tractors.

Tractor	Serial Number
2510	017000
2520	017000
3020	123000
4020	201000

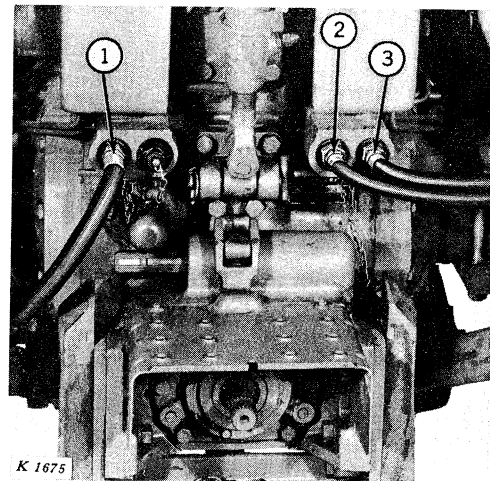
**INSTALLING RETURN HOSE TO TRACTOR—
Continued**

2510, 2520, 3020, AND 4020 TRACTORS—
Continued
Syncro-Range Transmission



1. Remove 90° elbow from tractor, replace with tee and elbow. Attach return hose (large).
2. Attach hose support bracket over battery bracket. Attach the return hose to the inside of the bracket and the pressure hose to the outside of the bracket.
3. Attach hose clamp to engine frame for the support of the hoses forward.

**CONNECTING PRESSURE HOSE AND REMOTE
CYLINDER HOSES**



1. Connect thinner pressure hose to break-away coupler.
2. Connect carrier remote cylinder hose, cylinder stop rod side.
3. Connect the other remote cylinder hose.

When the hoses are attached as shown above, the inner remote cylinder operating lever raises the thinner when pushed forward and lowers when pulled to the rear. The outer remote cylinder operating lever is locked forward, putting hydraulic pressure in the system.

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nobody can fill them like you can!

That's what the owner of this pair of work shoes is finding out—the hard way. Through a careless action, he has become the victim of an accident. It's a mighty tough way to find out that nobody else can wear your shoes or practice safety for you. And a needless, costly lesson to learn that safety is an everyday need.

Put safety into each of your workdays; read the operator's manual thoroughly; know how to operate each machine properly and safely; take the safety precautions specified; think before you act.

Make sure you wear your "shoes" everyday. Outfit yourself with a safety program now.

