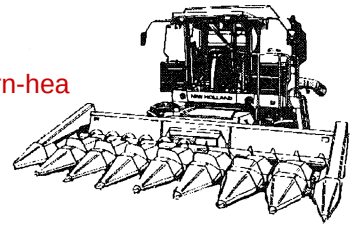
Corn Head 974



Issue 6/95
(Replaces All Previous Issues)

SERVICE MANUAL

NEW HOLLAND

40097412 6/95

CONTENTS

INTRODUCTION

This service manual provides the technical information needed to properly service and maintain the Model 974 corn head. Use this manual in conjunction with the operator's manual supplied with the corn head.

On New Holland equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

This manual details the service procedures found to be the easiest and least time-consuming. Modifying these procedures is not recommended.

Each section of this manual is divided into these subsections: Removal, Disassembly, Parts Layout, Inspection, Assembly, Installation, and Labor Guide.

Corn Head Drive - Power Flow

The initial drive for the 974 head is taken off a drive shaft on the lower portion of the feeder. A PTO shaft and yoke assembly are used to couple the feeder to the head drive.

One grease-filled gearbox drives both gathering chains and snapping rolls of each row unit. Each row unit drive is protected individually by a radial pin slip clutch.

The auger is chain driven from the lower shaft on the left side of the head. The auger is overload protected by a dry-type friction disc slip clutch.

SAFETY PRECAUTIONS

CAREFULLY STUDY THESE PRECAUTIONS AND THOSE INCLUDED IN THE COMBINE AND CORN HEAD OPERATOR'S MANUALS. INSIST THAT THE PRECAUTIONS BE FOLLOWED BY THOSE WORKING WITH YOU AND FOR YOU.

1. THOROUGHLY READ AND UNDERSTAND THE COMBINE AND CORN HEAD OPERATOR'S MANUALS BEFORE OPERATING THIS EQUIPMENT.
2. BE SURE EVERYONE IS CLEAR OF THE MACHINE BEFORE STARTING.
3. ONLY THE OPERATOR SHOULD BE ON THE COMBINE WHEN OPERATING. NEVER ALLOW ANYONE TO GET ON OR OFF WHILE THE COMBINE IS IN MOTION.
4. KEEP SHIELDS IN PLACE. NEVER WORK AROUND THE CORN HEAD OR COMBINE IN LOOSE CLOTHING THAT COULD CATCH ON MOVING OBJECTS.
5. OBSERVE THE FOLLOWING PRECAUTIONS WHENEVER LUBRICATING, MAKING ADJUSTMENTS, OR SERVICING THE 974 CORN HEAD.

   A. SHUT OFF THE COMBINE ENGINE.

   B. DISENGAGE ALL CLUTCHING LEVERS.

   C. LOWER THE CORN HEAD TO THE GROUND, OR RAISE THE HEAD COMPLETELY AND LOWER CYLINDER STOP, A, FIGURE 0-1. THIS STOP WILL PREVENT THE CORN HEAD FROM LOWERING.

   D. ENGAGE THE PARKING BRAKE AND PUT THE GEARSHIFT LEVER IN LOW OR REVERSE GEAR.

6. ALWAYS KEEP THE COMBINE IN GEAR WHILE GOING DOWNHILL.
7. THE COMBINE SHOULD ALWAYS BE EQUIPPED WITH SUFFICIENT REAR AXLE WEIGHT FOR SAFE OPERATION. UNDER SOME FIELD CONDITIONS, MORE WEIGHT MAY BE REQUIRED AT THE REAR AXLE FOR ADEQUATE STABILITY.
8. ALWAYS LOWER THE CORN HEAD, SHUT OFF THE COMBINE ENGINE, SET THE PARKING BRAKE, AND ENGAGE THE TRANSMISSION GEARS BEFORE LEAVING THE OPERATOR'S PLATFORM.
9. IF THE CORN HEAD SHOULD BECOME PLUGGED, STOP THE COMBINE ENGINE BEFORE REMOVING THE OBSTRUCTION.
10. NEVER DISCONNECT OR MAKE ANY ADJUSTMENTS TO THE HYDRAULIC SYSTEM UNLESS THE CORN HEAD IS LOWERED TO THE GROUND OR THE CYLINDER STOP IS IN THE DOWN POSITION AS SHOWN IN FIGURE 0-1.

    DANGER: FAILURE OF THE HYDRAULIC LIFT SYSTEM MAY CAUSE THE HEAD TO FALL RAPIDLY.

    LIFT CYLINDER STOPS MUST BE USED IN THE LOCK POSITION WHEN WORKING AROUND THE HEAD IN A RAISED POSITION.

    FAILURE TO USE LIFT CYLINDER STOPS MAY RESULT IN SERIOUS INJURY OR DEATH.

11. DO NOT ALLOW CHILDREN OR BYSTANDERS AROUND THE MACHINE WHILE IT IS BEING ADJUSTED, SERVICED, OR OPERATED.

12. ALWAYS USE A SAFETY STAND IN CONJUNCTION WITH HYDRAULIC JACKS OR HOISTS. DO NOT RELY ON THE JACK OR HOIST TO HOLD THE LOAD COMPLETELY BECAUSE THEY COULD FAIL.

13. ALWAYS WEAR SAFETY GLASSES WHEN USING A HAMMER, CHISEL, OR OTHER TOOLS THAT MAY CAUSE CHIPS TO FLY OFF THE WORK.

14. KEEP WORK ORGANIZED AND CLEAN. WIPE UP ALL OIL SPILLS TO MINIMIZE THE POSSIBILITY OF A FALL. KEEP TOOLS AND PARTS OFF THE FLOOR TO FURTHER REDUCE THE POSSIBILITY OF SERIOUS INJURY.

15. BE SURE TO REINSTALL SAFETY DEVICES, GUARDS, OR SHIELDS, AFTER ADJUSTING OR SERVICING THE CORN HEAD.

16. AFTER SERVICING THE CORN HEAD, BE SURE ALL TOOLS, PARTS, OR SERVICING EQUIPMENT ARE REMOVED FROM THE HEAD.

17. WHEN USING A GAS TORCH, ALWAYS WEAR WELDING GOGGLES AND GLOVES. KEEP A FULLY CHARGED FIRE EXTINGUISHER WITHIN EASY REACH. DO NOT HEAT OR WELD NEAR A FUEL TANK OR FUEL LINES. UTILIZE PROPER SHIELDING AROUND HYDRAULIC LINES.

18. ELECTRIC STORAGE BATTERIES GIVE OFF HIGHLY FLAMMABLE GAS WHEN CHARGING AND CONTINUE TO DO SO FOR SOME TIME AFTER RECEIVING A STEADY CHARGE. DO NOT, UNDER ANY CIRCUMSTANCES, ALLOW AN ELECTRIC SPARK OR FLAME NEAR THE BATTERY. ALWAYS DISCONNECT THE BATTERY BEFORE WORKING ON THE ELECTRIC SYSTEM.

19. HYDRAULIC FLUID ESCAPING UNDER PRESSURE CAN HAVE ENOUGH FORCE TO PENETRATE HUMAN SKIN. HYDRAULIC FLUID MAY INFECT A MINOR CUT OR OPENING IN THE SKIN. IF INJURED BY ESCAPING FLUID, SEE A DOCTOR AT ONCE.

    DO NOT ATTEMPT TO REPAIR OR TIGHTEN HOSES THAT ARE UNDER PRESSURE. CYCLE ALL HYDRAULIC CONTROL VALVES TO RELIEVE ALL PRESSURE BEFORE DISCONNECTING THE LINES OR BEFORE PERFORMING OTHER WORK ON THE HYDRAULIC SYSTEM. MAKE SURE ALL CONNECTIONS ARE TIGHT AND HOSES AND LINES ARE IN GOOD CONDITION BEFORE APPLYING PRESSURE TO THE SYSTEM.

    TO LOCATE A LEAK UNDER PRESSURE, USE A SMALL PIECE OF CARDBOARD. NEVER USE YOUR HANDS TO LOCATE A LEAK.

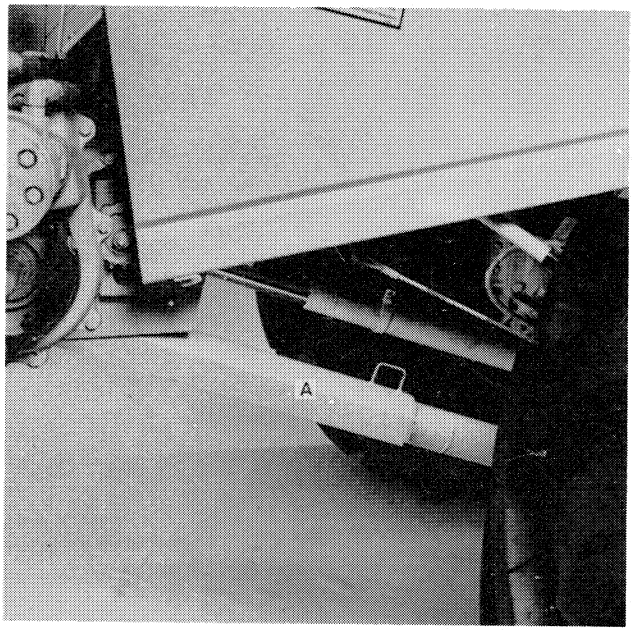


Figure 0-1

20. USE PULLERS TO REMOVE BEARINGS, BUSHINGS, CYLINDER SLEEVES, ETC. USE HAMMERS, PUNCHES, AND CHISELS ONLY WHEN ABSOLUTELY NECESSARY AND BE SURE TO WEAR SAFETY GLASSES.
21. BE CAREFUL WHEN USING COMPRESSED AIR. USE APPROVED AIR BLOW GUNS, DO NOT EXCEED 35 PSI, WEAR SAFETY GOGGLES, AND USE PROPER SHIELDING TO PROTECT EVERYONE IN THE WORK AREA.
22. DO NOT WEAR RINGS, WRISTWATCHES, OR LOOSE-FITTING CLOTHING WHEN WORKING ON MACHINERY BECAUSE THEY COULD CATCH ON MOVING PARTS AND CAUSE SERIOUS INJURY. WEAR STURDY WORK SHOES.
23. WHEN TRANSPORTING ON A ROAD OR HIGHWAY AT NIGHT OR DURING THE DAY, USE ACCESSORY LIGHTS AND DEVICES FOR ADEQUATE WARNING TO THE OPERATORS OF OTHER VEHICLES. IN THIS REGARD, CHECK YOUR LOCAL GOVERNMENT REGULATIONS. VARIOUS SAFETY LIGHTS AND DEVICES ARE AVAILABLE FROM YOUR NEW HOLLAND DEALER.

CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR OWN PERSONAL SAFETY IS INVOLVED. TAKE TIME TO READ AND FOLLOW THE INSTRUCTIONS. BE CAREFUL!

CAUTION: PICTURES IN THIS MANUAL MAY SHOW PROTECTIVE SHIELDING OPEN OR REMOVED TO BETTER ILLUSTRATE A PARTICULAR FEATURE OR ADJUSTMENT.

BE CERTAIN, HOWEVER, TO CLOSE OR REPLACE ALL SHIELDING BEFORE OPERATING THE MACHINE.

STANDARD TIGHTENING TORQUE FOR NORMAL ASSEMBLY APPLICATIONS

Size	SAE Gr. 2 Min. Torque Ft. Lbs.(N·m)	SAE Gr. 5 Min Torque Ft. Lbs. (N·m)		SAE Gr. 8 Min Torque Ft. Lbs. (N·m)		Carr Bolts & B RH SSQ Bolts Min. Torque Ft. Lbs. (N·m)
		Plain	Plated	Plain	Plated	
1/4″	5 (7)	8 (11)	7 (10)	12 (16)	10 (14)	4 (5)
5/16″	10 (14)	18 (24)	15 (20)	26 (35)	21 (29)	8 (11)
3/8″	18 (24)	31 (42)	25 (34)	48 (65)	39 (53)	15 (20)
7/16″	31 (42)	53 (72)	43 (58)	75 (102)	60 (81)	26 (35)
1/2″	45 (61)	82 (111)	66 (90)	115 (156)	92 (125)	38 (52)
5/8″	82 (111)	170 (231)	140 (190)	235 (319)	190 (258)	70 (95)
3/4″	155 (210)	290 (393)	230 (312)	415 (563)	330 (448)	130 (176)
7/8″	165 (224)	430 (583)	340 (461)	600 (814)	480 (651)	140 (190)
1″	250 (339)	640 (868)	510 (692)	900 (1220)	720 (976)	210 (285)

SPECIFICATIONS AND DESIGN SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE: If combining plated bolt with plain nut or vice versa, torque to plated bolt torque.

Identification Grade Marking	Specification and Grade
 NO MARK	SAE—Grade 1
	ASTM—A 307
	SAE—Grade 2 (b)
	SAE—Grade 5
	ASTM—A 449
	SAE—Grade 8
	ASTM—A 354 Grade BD

GENERAL INFORMATION

The serial number plate, A, Figure 0-2, for the Model 974 corn head is located on the left side of the head.

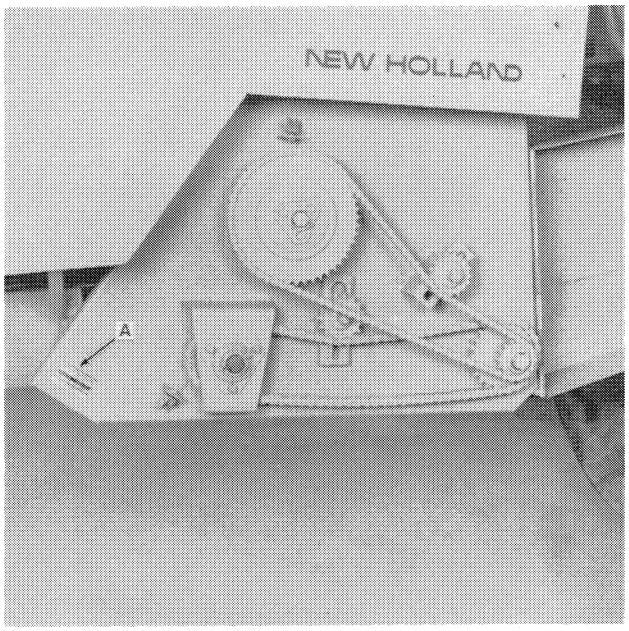


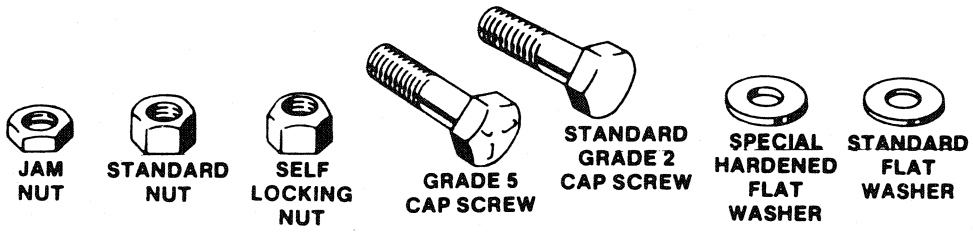
Figure 0-2

IMPROVEMENTS

New Holland North America, Inc. is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligations to make changes or additions to the equipment sold previously.

The information and specifications contained in this manual were accurate at the time of publication.

HARDWARE INFORMATION



HARDWARE KEY

Cap Screws – CS
Carriage Bolt – CB
Flat Washer – FW
Lock Washer – LW
Lock Nut – LN
Regular Nut – N
Jam Nut – JN
National Fine Thread – N.F.
Grade 5 – G.R. 5
Cotter Pin – CP
Machine Screw – MS

Install standard flat washers over all slotted holes, unless truss head bolts are used. Install special hardened washers where specified.

Install a lock washer on all bolts unless a jam nut or self-locking nut is specified.

On New Holland equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

SECTION 1

AUGER SLIP CLUTCH

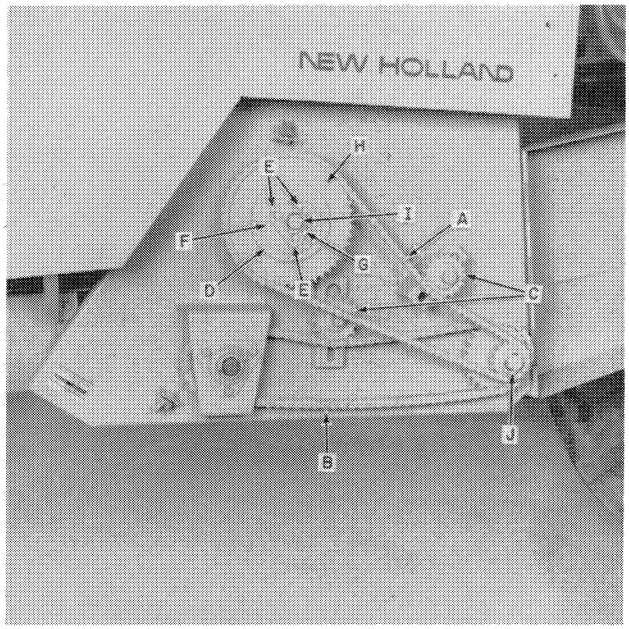


Figure 1-1

REMOVAL/DISASSEMBLY

Figure 1-1

1. Remove cotter pin, G.
2. Remove triangular locking plate, F, along with an inner sleeve (not shown).
3. Remove cap screws, E.
4. Loosen nuts, C, and move the idler sprocket away from the chain.
5. Remove chain, A.
6. Clean the paint off the end of shaft, I.
7. Remove the remaining clutch component parts from the shaft.
8. If necessary, use a suitable bushing driver to remove and replace the bushing in the sprocket.

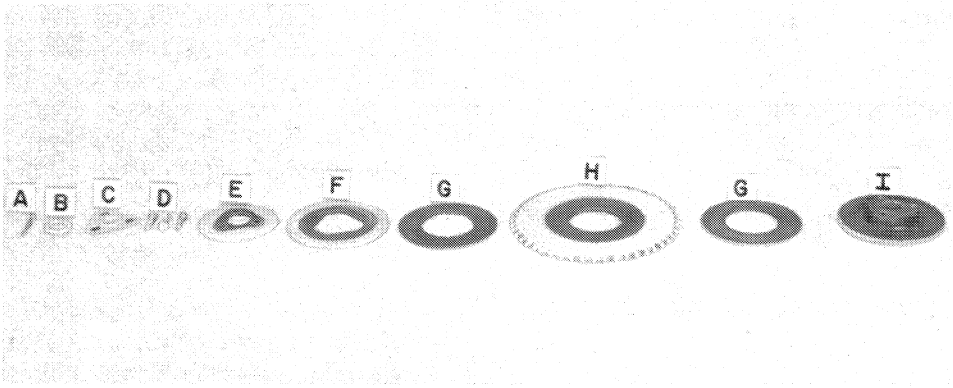


Figure 1-2

PARTS LAYOUT

Ref.	Qty.	Description
A	1	Cotter pin
B	1	Washer
C	1	Triangular locking plate
D	3	3/8″ x 1-1/4″ cap screw
E	1	Spring washer
F	1	Clutch plate
G	2	Friction disc
H	1	Sprocket - 48-tooth with bushing
I	1	Clutch hub

INSPECTION

Figure 1-2

IMPORTANT: Replace all parts which do not meet specification.

1. Check spring washer, E, for any damage or cracks.

   Use a straightedge and ruler to check the dish of the spring washer. Proper dish is 3/16″ + 1/32″ - 0″ (4.8 m + 0.8 mm - 0 mm). See Figure 1-3.

2. Inspect clutch plate, F, to be sure it is free of cracks and/or burrs. The clutch plate must be flat within 0.015″ (0.39 mm).

3. Inspect friction discs, G, to be sure they are not warped or worn excessively. Discs must be flat within 0.010″ (0.25 mm).

4. Inspect sprocket, H, for tooth wear and inner bushing wear. Maximum ID of the bushing is 3.010″ (76.5 mm).

5. Inspect clutch hub, I, to be sure it is not cracked or warped. The clutch hub should be flat within 0.010″ (0.25 mm). The friction disc surface of the hub should be free of any burrs.

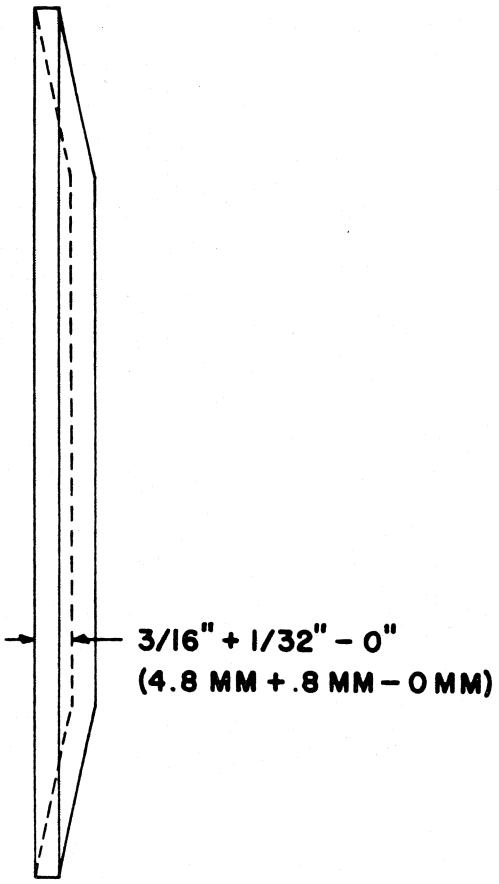


Figure 1-3

ASSEMBLY/INSTALLATION

Figure 1-2

1. Install clutch hub, I, onto the auger drive shaft.

2. Install one friction disc, G, onto the clutch hub.

3. Install sprocket, H.

4. Install the second friction disc, G.

5. Install clutch plate, F.

Figure 1-1

6. Install spring washer, D, with the dished center portion protruding outward as shown.

7. Install cap screws, E. Turn the screws in until they just touch the conical washer.

8. Tighten the three cap screws, E, evenly until the clutch slips at 240 ft. lbs. (325 N·m).

   IMPORTANT: Turn each screw a maximum of one-third turn each time adjustment is required.

   The torque can be checked by using a torque wrench and a 1″ socket placed on the end of the hex auger drive shaft, I. Lock the lower drive shaft, J.

9. Turn the cap screws, E, slightly to allow the triangular locking plate, F, to be installed.

10. Install the triangular locking plate, along with its inner sleeve.

11. Install the original shims between the locking plate and the cotter pin. The shims are used to eliminate side-to-side movement of the clutch assembly.

12. Install and adjust the drive chain, A. Adjust the chain using the upper tension idler sprocket, C, so that, when applying moderate finger pressure midway between the drive and driven sprockets on the strand of chain opposite the idler sprocket, the chain is deflected 3/4″ (19 mm).

13. Adjust the slip clutch to provide enough torque to drive the auger without slipping under normal conditions. Under extremely heavy loading, the slip clutch should slip to eliminate damage to the auger and its drives.

CAUTION: NEVER CLEAN, LUBRICATE, OR ADJUST THE CORN HEAD, FEEDER, OR COMBINE WHILE THE CORN HEAD IS OPERATING. STOP THE COMBINE AND SHUT OFF THE ENGINE BEFORE ATTEMPTING ANY OF THESE OPERATIONS. KEEP YOUR HANDS AND CLOTHING AWAY FROM MOVING PARTS.

LABOR GUIDE

The following labor amount is listed as a guide only. Working conditions and experience will vary the time the job actually takes. The time listed is estimated for someone who has done the job once before.

Job Description	Man-Hours
Remove, rebuild, and install auger slip clutch	0.75

SECTION 2

ROW UNIT SLIP CLUTCH

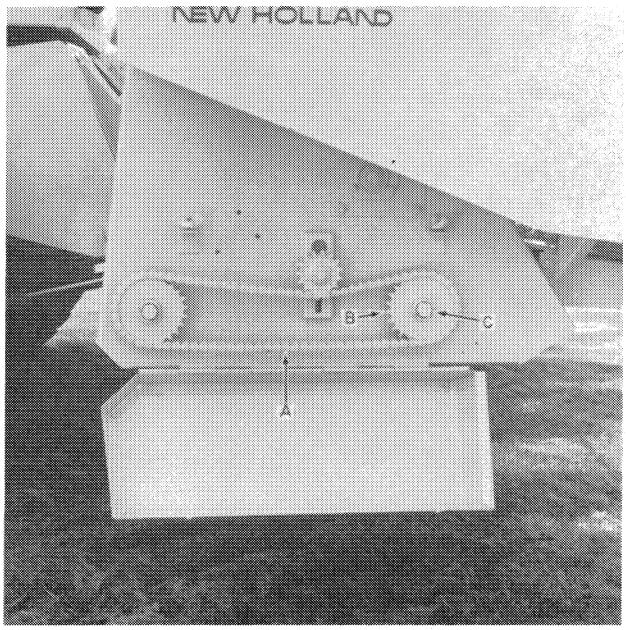


Figure 2-1

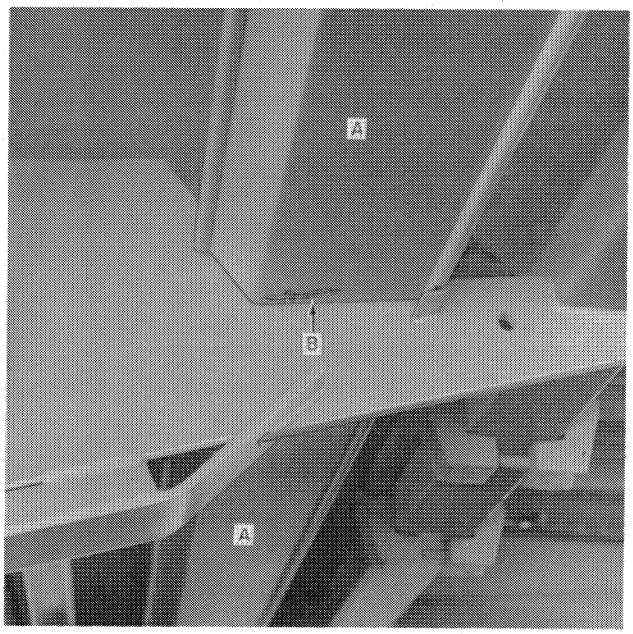


Figure 2-2

REMOVAL - STYLE 1

Head Without Outboard Bearing

To remove the row unit slip clutches, it is easiest to remove a row unit drive shaft and slip clutches as a unit.

To change slip clutch sprockets, B, Figure 2-14, remove the bolts securing the sprocket and cut the sprocket off. Use a saw and cut the new sprocket in two, then bolt it on to the slip clutch. This will prevent removing the hex shaft.

1. Raise the head fully.

CAUTION: LOWER CYLINDER STOP, A, FIGURE 0-1, TO PREVENT THE HEAD FROM LOWERING ACCIDENTALLY.

Left side disassembly is similar.

2. Remove chain, A, Figure 2-1.
3. Remove cotter pin and sprocket, B, from the row unit drive shaft, C. Clean paint from the shaft before removing the sprocket.
4. Remove the row unit drive shaft shields, A, Figure 2-2, by removing a hairpin cotter, B, or safety pin, B, Figure 2-3, at each end of the shield.

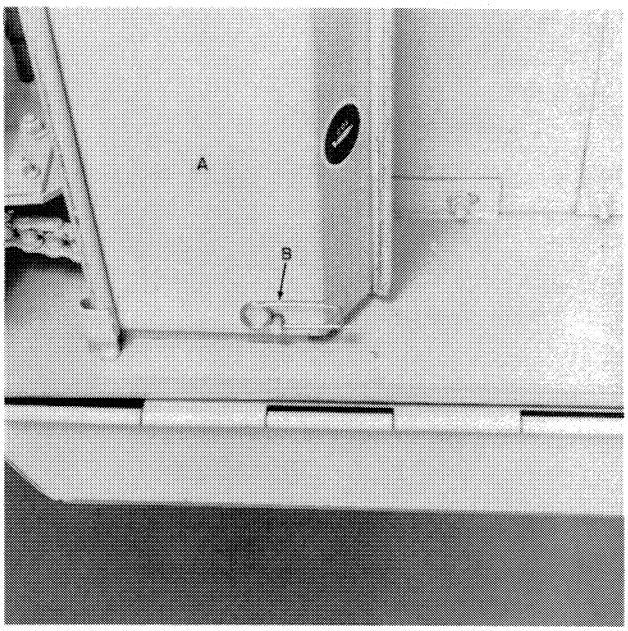


Figure 2-3

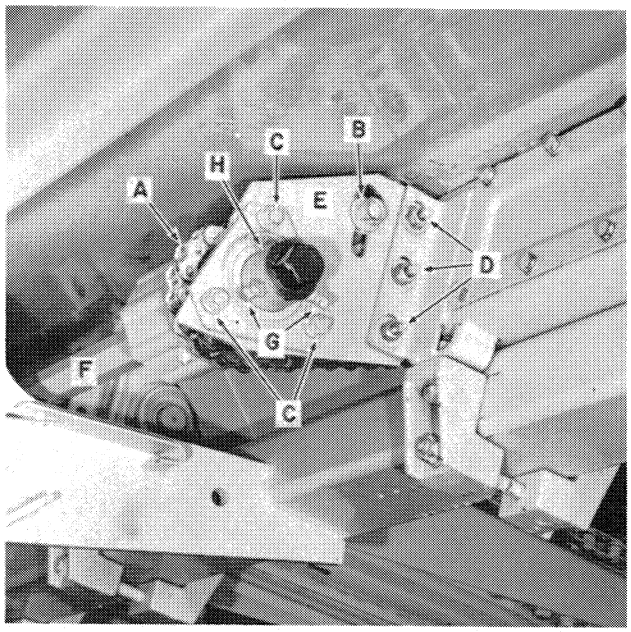


Figure 2-4

5. Loosen cap screw, B, Figure 2-4, to relax chain tension. Disconnect the slip clutch to row unit drive chain, A. Separate the chain at the connector link.
6. Remove carriage bolts, C, from the bearing flangette.
7. Remove carriage bolts, D, and remove plates, E.

   Repeat for the remaining plates.
8. Move the shaft assembly (shaft and clutches), F, Figure 2-4, toward the center of the corn head until the end of the shaft next to the drive sprocket, B, Figure 2-1, has come out of its bearing.
9. To remove the shaft assembly, F, Figure 2-4, move the shaft down, toward the rear, and back toward the drive sprocket (outside) end of the shaft.
10. Clean all paint from the row unit drive shaft so the slip clutches can be removed easily.
11. Loosen setscrews, G, Figure 2-4, on the collar which secures the bearings to the row unit drive shaft. Remove bearings and collars, H. Note the location of the bearings, bearing flangettes, and lock collars.

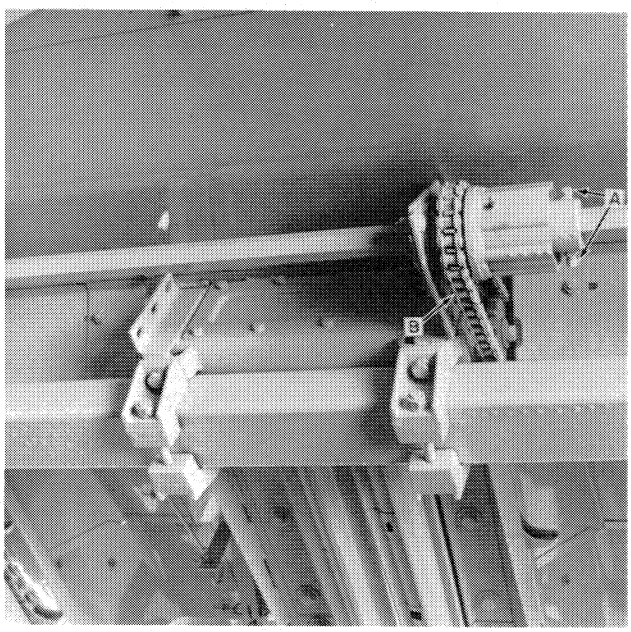


Figure 2-5

12. Loosen the two setscrews, A, Figure 2-5, which secure the row unit slip clutch on the row unit drive shaft.
13. Slide the slip clutch off the row unit drive shaft.

    Proceed to “Inspection” in this section.

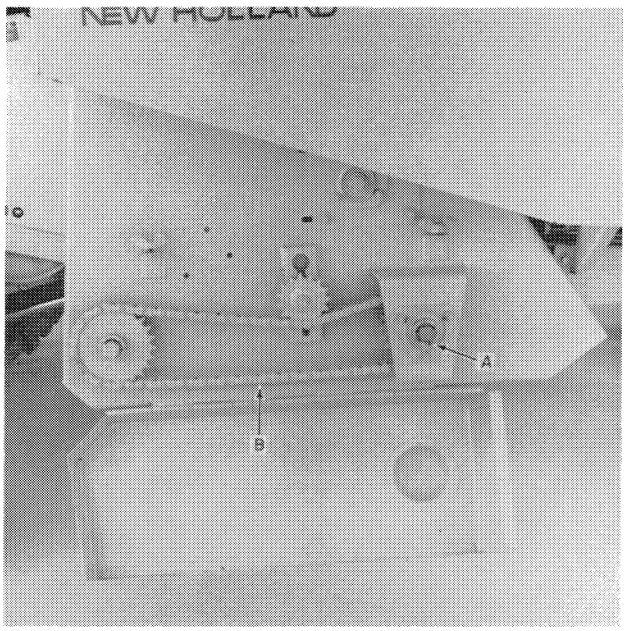


Figure 2-6

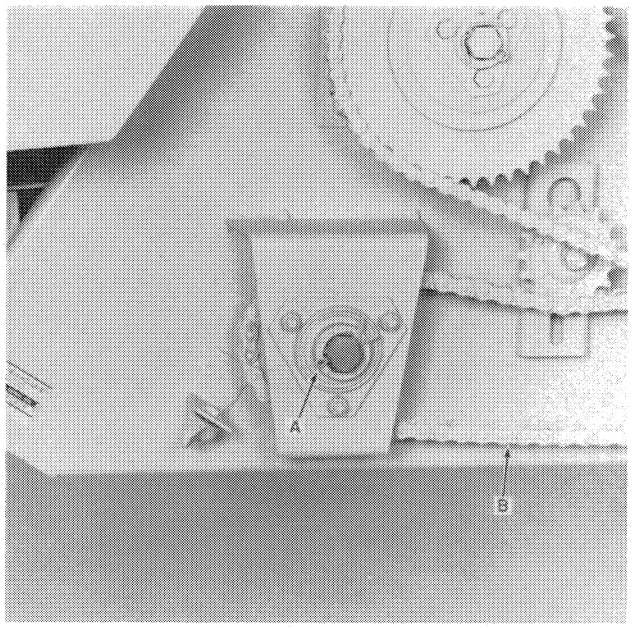


Figure 2-7

REMOVAL - STYLE 2

Head With Outboard Bearing

To remove the row unit slip clutches, it is easiest to remove the row unit drive shaft and slip clutches as a unit.

To change slip clutch sprockets, B, Figure 2-14, remove the bolts securing the sprocket and cut the sprocket off. Use a saw and cut the new sprocket in two, then bolt it on to the slip clutch. This will prevent removing the hex shaft.

1. Raise the head fully.

CAUTION: LOWER CYLINDER STOP, A, FIGURE 0-1, TO PREVENT THE HEAD FROM LOWERING ACCIDENTALLY.

2. Remove chain, B, Figure 2-6.
3. Remove cotter pin, A, Figure 2-6 or 2-7, from the row unit drive shaft. Clean paint from hex shaft. Loosen lock collar, C, Figure 2-8.
4. Remove the row unit drive shaft shield, A, Figure 2-3, by removing safety pin, B, at each end of the shield.

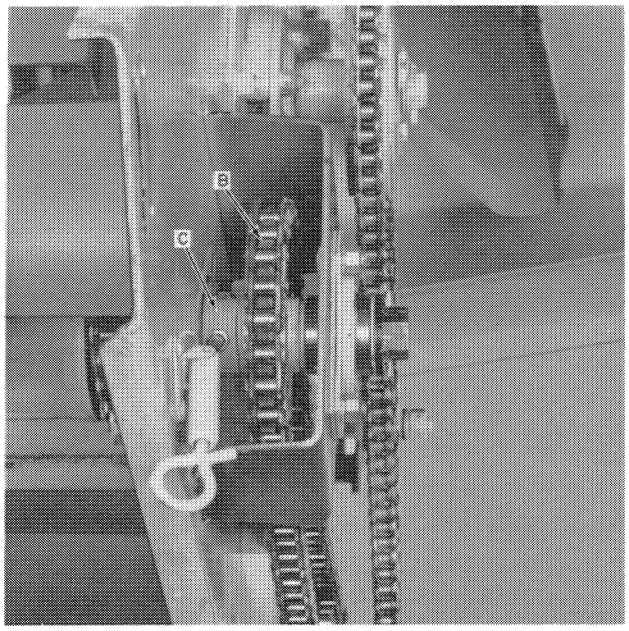


Figure 2-8

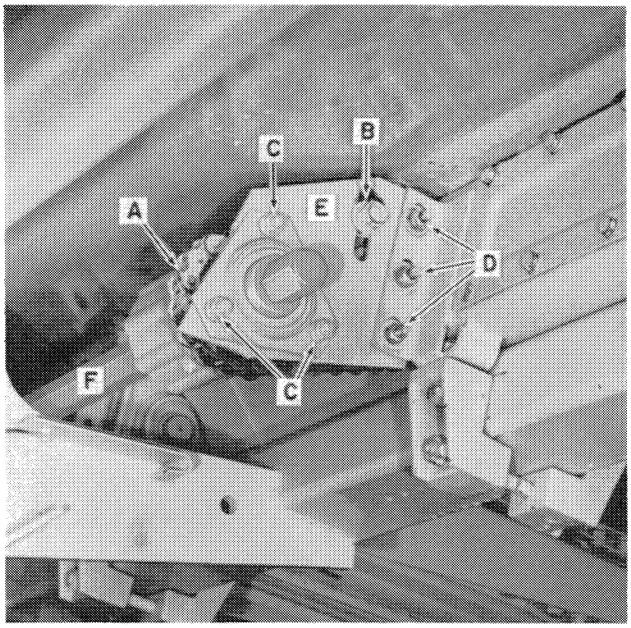


Figure 2-9

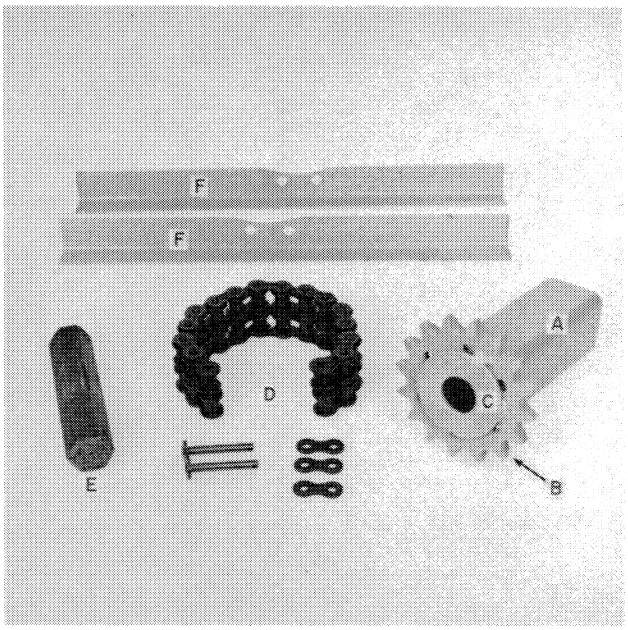


Figure 2-10

5. Loosen cap screw, B, Figure 2-9, to relax chain tension. Disconnect the slip clutch to row unit drive chain, A. Separate the chain at the connector link.
6. Remove carriage bolts, C, from the bearing flangette.
7. Remove carriage bolts, D, and remove plates, E.

   Repeat for the remaining bearing plates.
8. Move the shaft assembly (shaft and clutches), F, Figure 2-9, toward the center of the corn head until the end of the shaft next to the drive sprocket, B, Figure 2-8, has come out of the side sheet.
9. To remove the shaft assembly, F, Figure 2-9, move the shaft down, toward the rear, and back toward the drive sprocket (outside) end of the shaft.
10. Clean all paint from the row unit drive shaft so the slip clutches can be removed easily.
11. Remove the bearings next to the slip clutch, Figure 2-9.
12. Loosen the two setscrews, A, Figure 2-5, which secure the row unit slip clutch on the row unit drive shaft.
13. Slide the slip clutch off the row unit drive shaft.
14. The procedure is the same for the rest of the slip clutches and bearings.

SLIP CLUTCH SERVICE TOOLS

Figure 2-10

Ref. Description

A Square tube - 2″ sq. x 1/4″ thick x 5″ long.

B 16-tooth sprocket P/N 612506 uses #60 chain. Weld the sprocket to one end of the square tube.

C 1″ flat washer. Weld washer to the top of the sprocket. This washer spaces the sprockets when the double 60 chain is used.

D Double 60 chain, 16 pitches, P/N 711257.

E Hex shaft - 1-1/8″ x 7″.

F Angle iron - 2 pieces, 3/16″ thick x 3/4″ x 3/4″ x 15″ long. Drill two 11/32″ holes 1-1/4″ apart in the center of the angle iron. Grind a bevel between the two holes as shown. This allows access for the punch. Four 5/16″ x 1″ cap screws and lock washers. Shaft 1-1/2″ x 10″ to drive slip clutch apart.

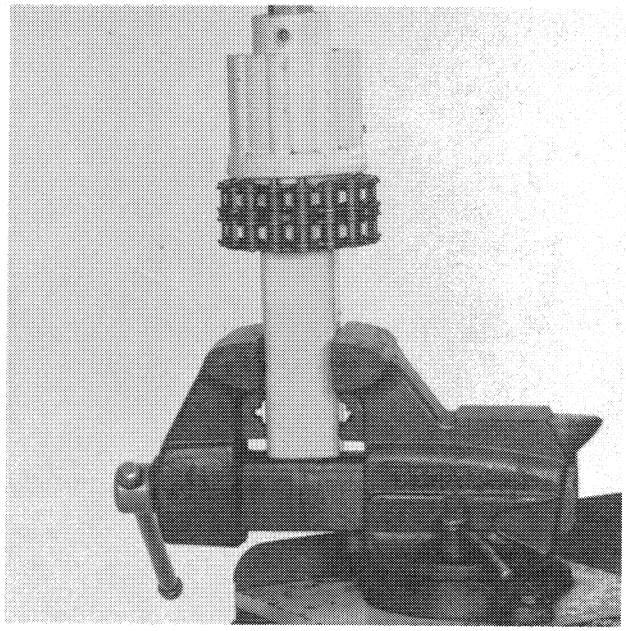


Figure 2-11

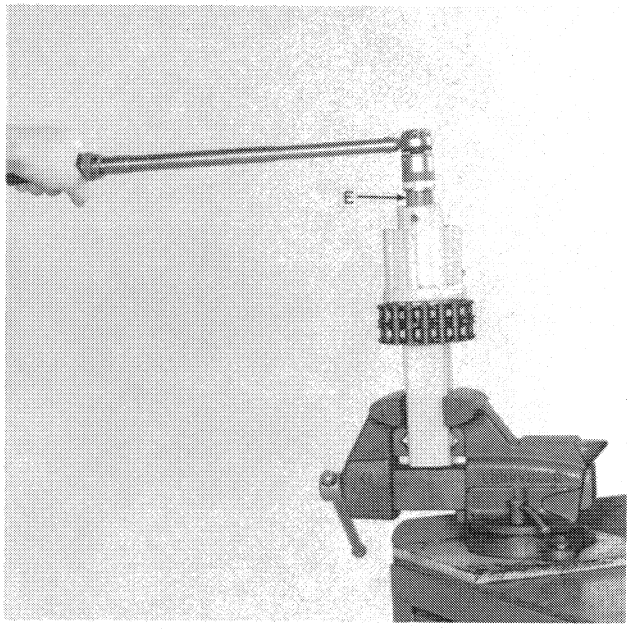


Figure 2-12

INSPECTION

Inspect the clutch assembly for discolored paint. If the paint on the clutch housing is burned or blackened, replacement may be necessary. The heat which caused the discoloration will also have caused internal parts to lose their hardness.

If the slip clutch assembly has both an outer spring, I, Figure 2-20, and an inner spring, J, it should slip at 335 ft. lbs. - 385 ft. lbs. (454 N·m - 522 N·m).

If the slip clutch assembly has only the outer (heavier) spring, it should slip at 400 ft. lbs. - 485 ft. lbs. (542 N·m - 658 N·m).

If the slip clutch assembly has 24 outer springs and 11 to 14 inner springs it should slip at 553 ft. lbs. (750 N·m).

To measure the torque required to slip the row unit slip clutch:

1. Clamp the square tube, A, Figure 2-10, in a sturdy vise.

   IMPORTANT: Be sure the vise is attached to a heavy bench or is secured to the floor.

2. Attach the slip clutch to the sprocket using double 60 chain as shown in Figure 2-11.

3. Insert the hex shaft, E, Figures 2-10 and 2-12, into the slip clutch.

4. Check the torque with a torque wrench and 1-1/8″ socket as shown in Figure 2-12.

   The torque wrench must be capable of measuring at least 500 ft. lbs. (677.5 N·m).

   A bar and spring scale could be used with the same clutch securing arrangement as shown in Figure 2-11.

   Use a 5′ (1.52 m) bar with a spring scale capable of measuring 100 lbs. (445 N). Attach the spring scale to the bar 5′ (1.52 m) from the center of the hex shaft.

CAUTION: BE SURE THE SPRING SCALE IS ATTACHED SECURELY TO THE BAR.

If the torque is not within the specified range, continue with disassembly.

If the torque is within the specified range, reinstall the slip clutch.

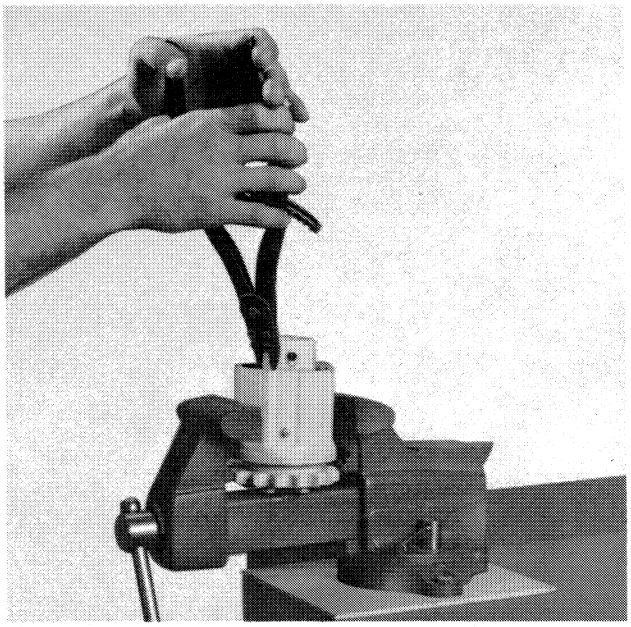


Figure 2-13

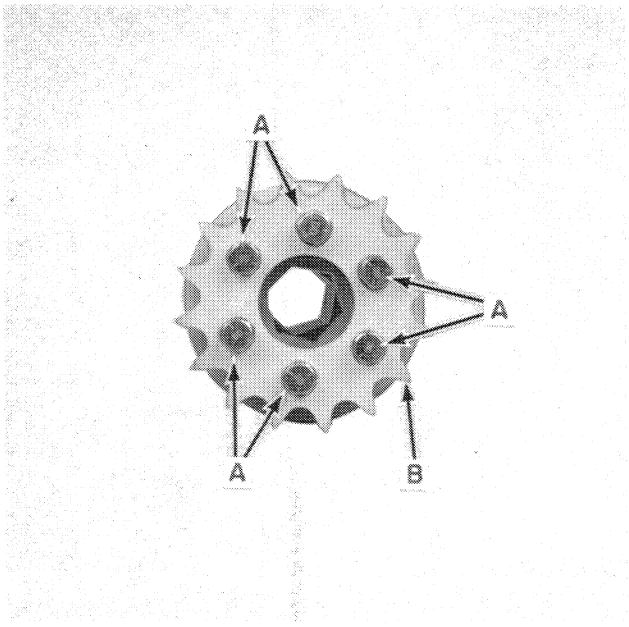


Figure 2-14

DISASSEMBLY

1. Remove the retaining ring as shown in Figure 2-13.
2. Remove sprocket, B, Figure 2-14, by removing the six 5/16″ bolts, A.
3. Mount the two pieces of angle iron, F, Figure 2-10, on the clutch using four 5/16″ x 1″ cap screws and lock washers. Place the assembly in a 5-gallon bucket as shown in Figure 2-15.

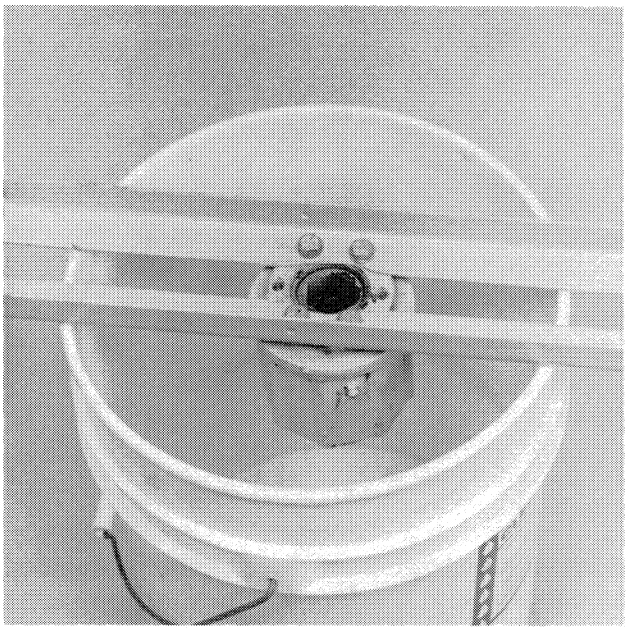


Figure 2-15

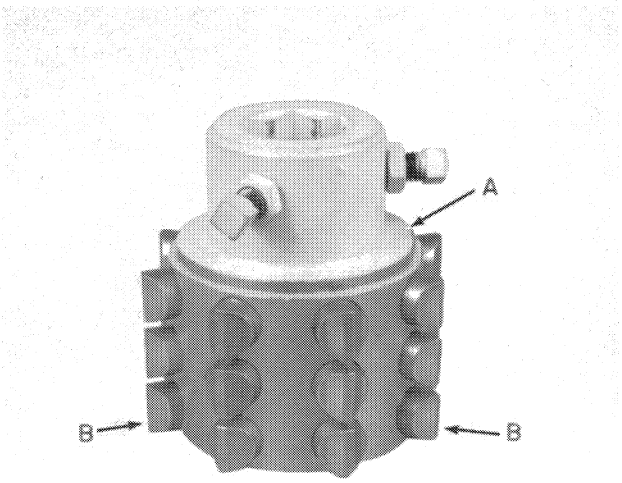


Figure 2-16

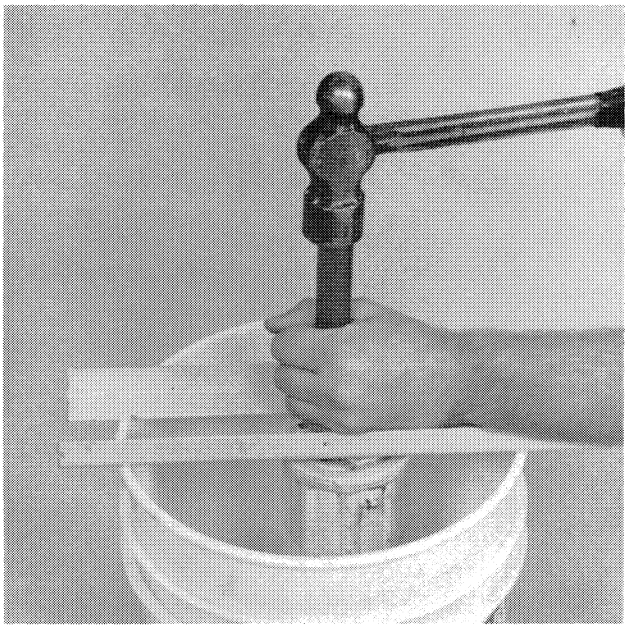


Figure 2-17

WARNING: THE SLIP CLUTCH SPRINGS AND PINS, B, FIGURE 2-16, ARE UNDER EXTREME PRESSURE. USE CAUTION WHEN DRIVING PIN CYLINDER, A, OUT OF THE HOUSING TO PREVENT INJURY.

4. Drive the cylinder out of the housing using a 1-1/2″ shaft as shown in Figure 2-17.

CAUTION: WEAR SAFETY GLASSES WHEN USING A HAMMER AND PUNCH.

A metal ring, A, Figure 2-18, and nylon ring, B, will also be removed with the pin cylinder assembly.

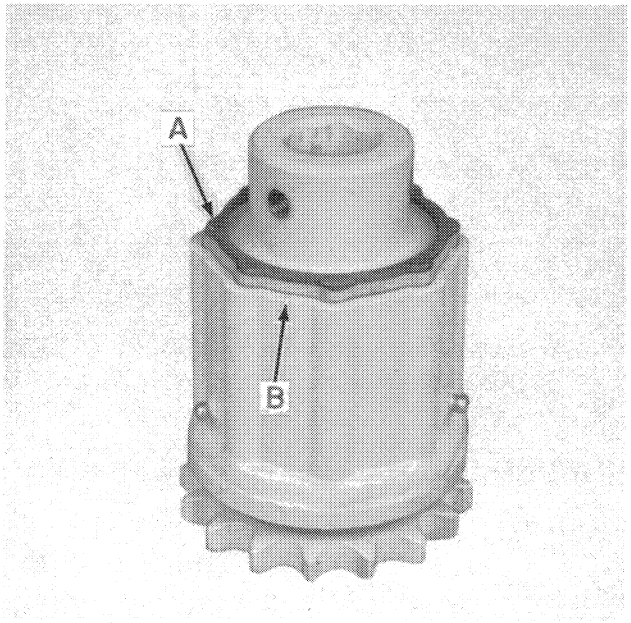


Figure 2-18

5. The bronze bushing, B, Figure 2-19, can be removed using a pilot bearing puller and slide hammer.

   The hex bushing, A, was driven out in step 4.

INSPECTION

Inspect all internal parts for wear, damage, or discoloration from heat. Replace any worn, damaged, or discolored parts.

1. Inspect the metal and nylon rings for cracks or heat damage (metal discolored or nylon melted or brittle).
2. Inspect the inner pin contact surface of housing, E, Figure 2-20, for wear. Replace the housing when the corners are rounded and grooves are present where the pins press against the housing.

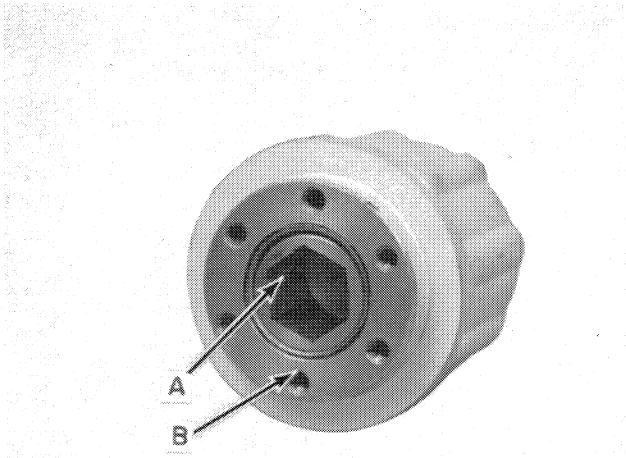


Figure 2-19

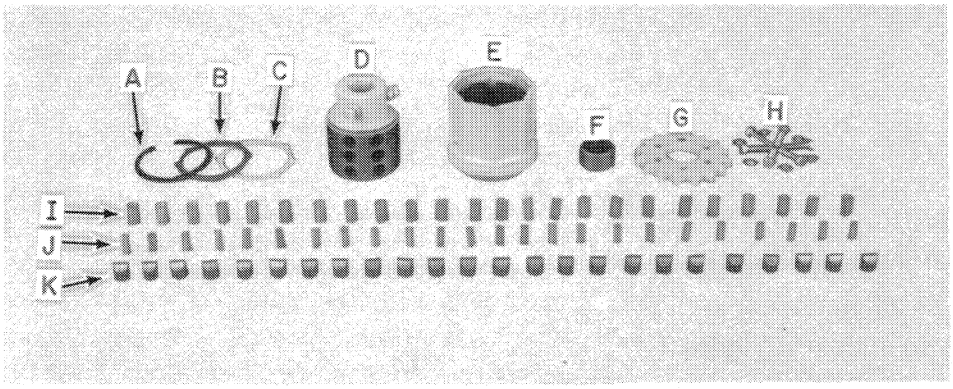


Figure 2-20

ROW UNIT SLIP CLUTCH PARTS LAYOUT

Figure 2-20

Ref.	Qty.	Description
A	1	Retaining ring
B	1	Metal ring
C	1	Nylon ring
D	1	Clutch pin cylinder assembly
E	1	Clutch housing
F	1	Hexagonal bore bushing
G	1	Drive sprocket
H	6	5/16″ cap screws with locking patch and lock washer
I	24	Outer springs*
J	24	Inner springs*
K	24	Clutch pins

*** NOTE: Earlier slip clutches use both an outer spring, I, and an inner spring, J (24 of each). Later slip clutches use 24 heavier outer springs (not shown). The latest clutches use 24 outer and 11 to 14 inner springs.**

#786149 shims (0.010″) and #517566 shims (0.021″) are available to shim the double springs back to the proper torque. Place a shim in each pin, then install the springs.

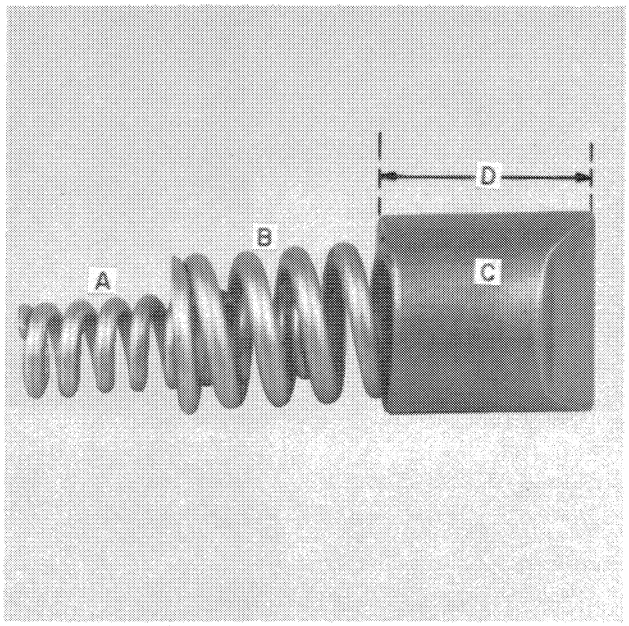


Figure 2-21

3. Inspect bushing, B, Figure 2-19, to be sure it is fitted tightly in the housing and is not worn excessively. Maximum ID is 1.630″ (41.4 mm).

4. Check hexagonal bore bushing, F, Figure 2-20, for wear or damage. Bushing OD should be 1.563″ - 1.573″ (39.7 mm - 40 mm).

5. Inspect drive sprocket, G, Figure 2-20, for wear.

6. Springs, I and J, Figure 2-20, should be free from heat discoloration or cracks. The springs must also meet the following specifications:

		FREE HEIGHT	OUTSIDE DIAMETER
*	Inner Spring #276333	0.87″ (22 mm)	0.30″ (7.6 mm)
*	Outer Spring #275245	0.87″ (22 mm)	0.50″ (12.7 mm)
**	Outer Spring #386510	0.91″ (23 mm)	0.50″ (12.7 mm)
***	Inner Spring #279346	0.83″ (21 mm)	0.28″ (7.1 mm)

* Used together in clutch assembly #612508
** Used by itself in clutch assembly #774469
*** Used together in clutch assembly #86512809

7. Inspect pins, K, Figure 2-20, for damage, wear, cracks or discoloration. Replace the pins if necessary.

   Total height of the pins, D, Figure 2-21, should not be less than 0.650″ (18.5 mm). Use a 0-1″ (0-25 mm) micrometer to measure the pins accurately.

8. Check the pin pockets in pin cylinder assembly, D, Figure 2-20, for burrs. Remove all burrs which could restrict pin movement.

ASSEMBLY

1. Install the bronze bushing, B, Figure 2-19, into the clutch housing if it was removed. Use a suitable bushing driver.

2. Apply multipurpose grease to the ID of the bronze bushing and the ID of the housing.

3. Install the hexagonal inner bore bushing, A, Figure 2-19.

4. Install sprocket, G, Figure 2-20. Use new cap screws, H, (5/16″ x 1-1/4″ Grade 5 plated) and lock washers to secure the sprocket to the clutch housing. Apply Loctite #242 to the threads of each cap screw. Torque to 15 ft. lbs. (20 N·m).

5. Insert inner spring, A, Figure 2-21, (if applicable) and outer spring, B, into pin C. Do this for each pin.

6. Apply a light coating of multipurpose grease to the sides of each pin in the pin cylinder assembly, A, Figure 2-16.

   IMPORTANT: Do not fill the pin pockets in the pin cylinder assembly with grease. Excessive grease in the pin pockets will not allow the pins to move in quickly. The clutch will not function properly.

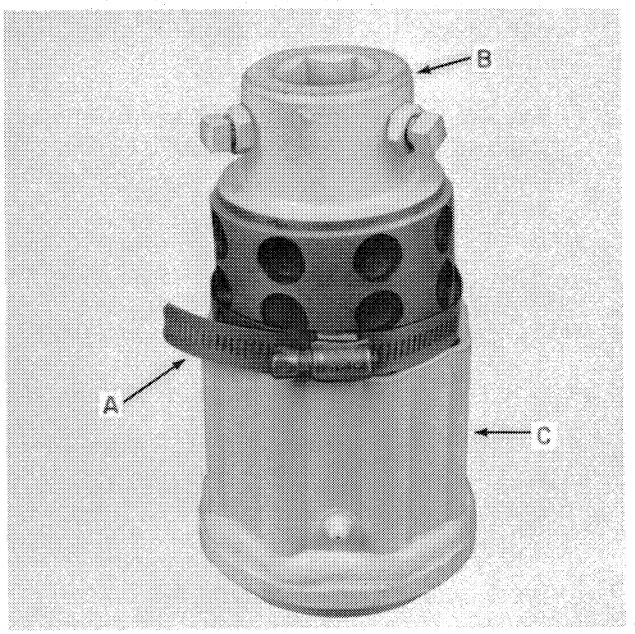


Figure 2-22

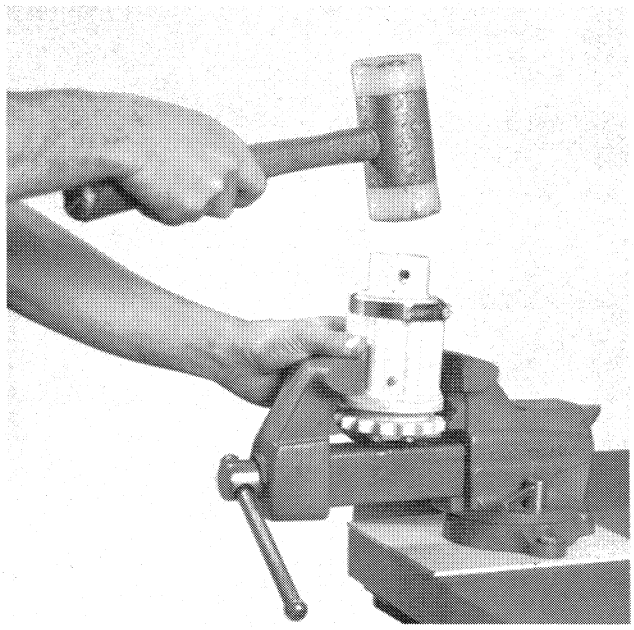


Figure 2-23

7. Install one row of springs and pins in the pin cylinder, B, Figure 2-22.
8. Use a 4″ (102 mm) hose clamp, A, Figure 2-22, to compress the row of pins.
9. Push the pin cylinder assembly into the clutch housing, C, Figure 2-22, using a heavy soft hammer as shown in Figure 2-23.
10. Follow the same procedures for the remaining rows of pins. Push the pin cylinder assembly in fully.
11. Install nylon ring, B, Figure 2-18.
12. Install metal ring, A, Figure 2-18.
13. Install retaining ring, A, Figure 2-20.
14. Slip the clutch using the same arrangement shown in Figure 2-12. This will insure that the clutch will slip. See "Row Unit Slip Clutch Inspection," in this section, for information on securing the clutch in a vise and how to slip using a bar or torque wrench.

    For Style 2 Installation proceed to "Installation - Style 2," in this section.

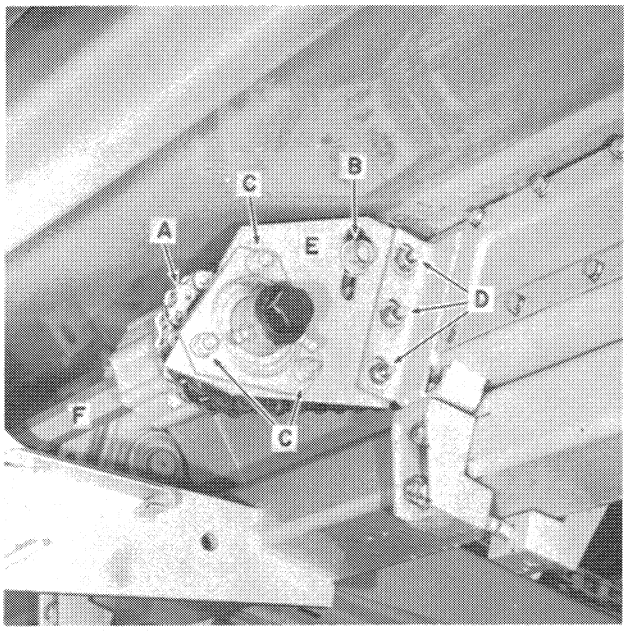


Figure 2-24

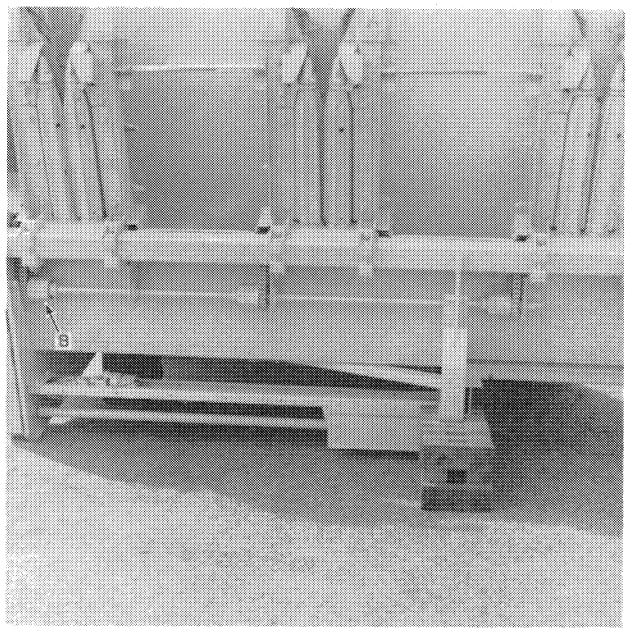


Figure 2-25

INSTALLATION - STYLE 1

Heads Without Outboard Bearing

1. Install each slip clutch assembly on the row unit drive shaft, F, Figure 2-24.

   IMPORTANT: Install the clutch assembly as shown at B, Figure 2-25, if the row spacing is set for 38″ or 40″ (965 mm or 1016 mm).

   Install the clutch assembly as shown at A, Figure 2-26, if the row spacing is set for 36″ (914 mm).

2. Install all bearings, bearing flangettes, and lock collars in their original locations on the row unit drive shaft.
3. Install the preassembled row unit drive shaft (with slip clutches, bearings, etc.) into its original position.
4. Insert the outside end of the shaft through the outside bearing in the side sheet of the head.
5. Position the clutches, bearings, bearing flangettes, and lock collar in alignment with each row unit as originally located.
6. Install plates, E, Figure 2-24, attaching row unit drive shaft, F, to the row unit assembly. Use the original hardware. Snug hardware, C, securing the bearing flangettes to mount plate, E. Tighten hardware, D, only finger tight.

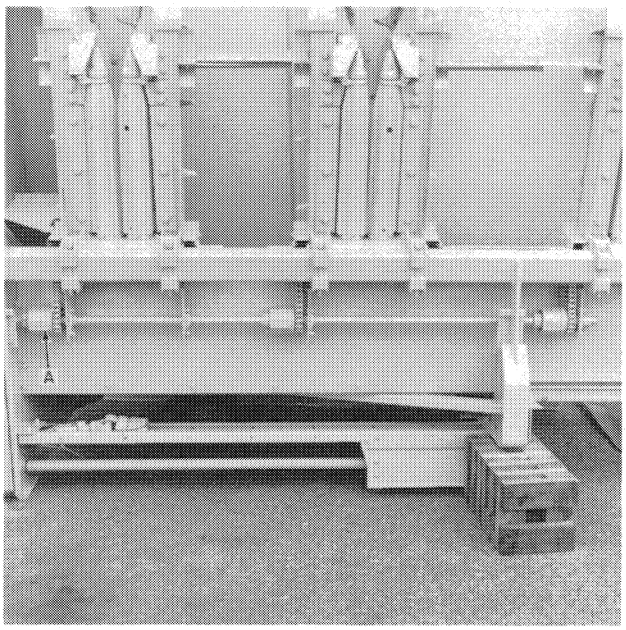


Figure 2-26

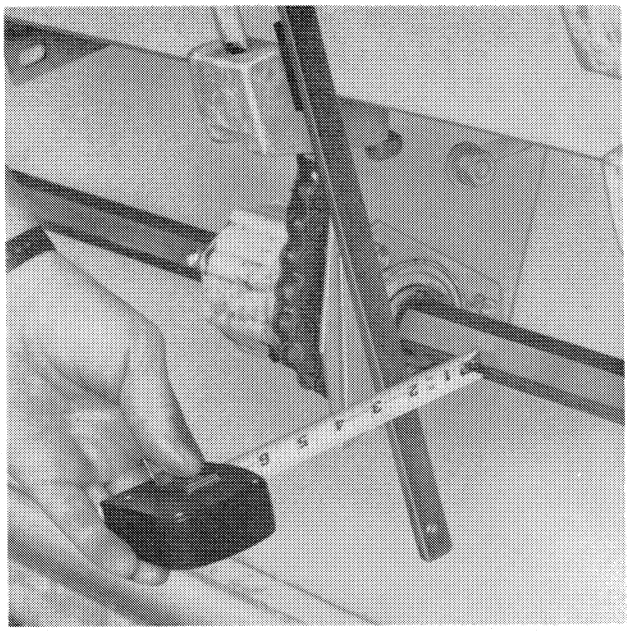


Figure 2-27

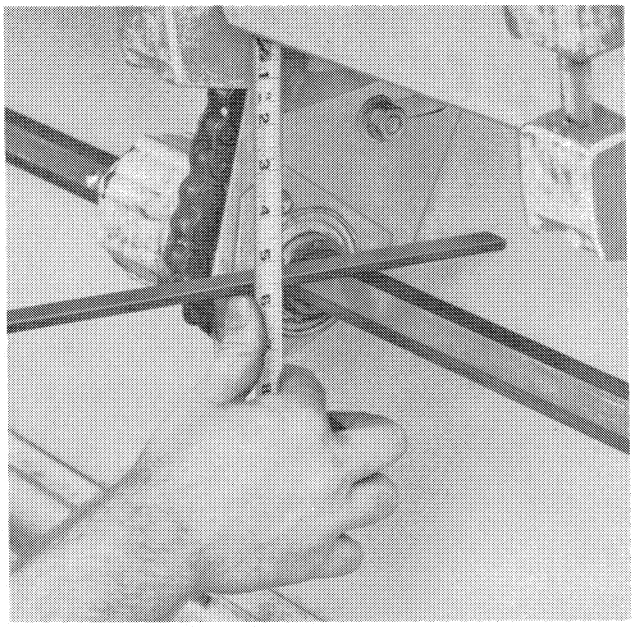


Figure 2-28

7. Check to make sure the hex shaft is straight. See Step 8 for optional hex shaft alignment method. Measure from the header beam to the shaft, as shown in Figures 2-27 and 2-28, at the fixed bearing in the side sheet on the tine end. Adjust the other end of the shaft to match the first measurement.

   Adjust the center bearing support next, then work to the ends. Tighten the bearing mounts, then finish tightening the flangettes. If the shaft is straight, the shaft will spin free and slide back and forth easily.

   IMPORTANT: Failure to align the hex shaft properly will result in repeated failures.

8. Optional hex shaft alignment.

   Make an alignment tool as shown in Figure 2-29.

   Materials

   Angle 1/8″ x 1-1/2″ x 1-1/2″
   Angle 1/4″ x 1-1/2″ x 12″
   Cap screw 7/16″ x 2-1/2″
   Cap screw 5/16″ x 1-1/4″
   Nuts 2 - 7/16″
   Lock collar 1-1/8″ P/N 197631 cut in half

   The alignment process will be speeded up if two tools are made.

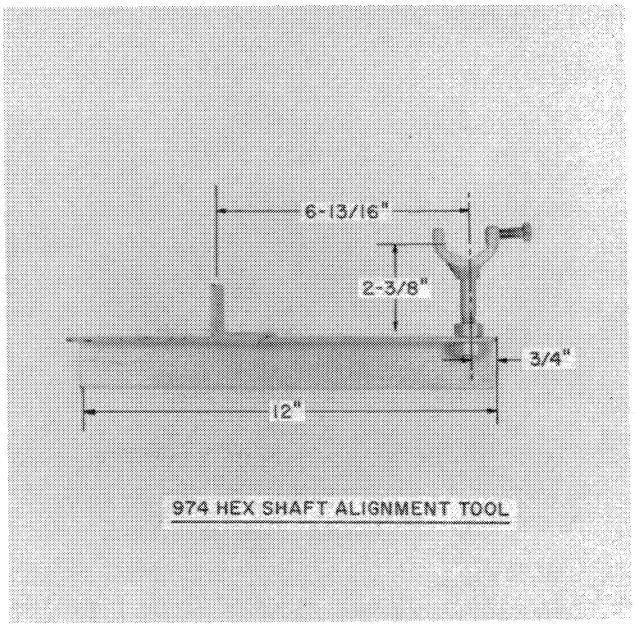


Figure 2-29

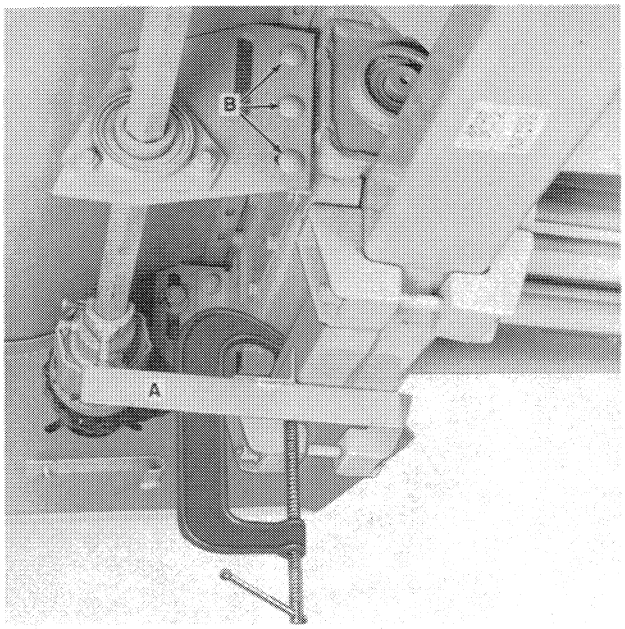


Figure 2-30

Attach the tool, A, Figure 2-30, on the fixed bearing end of the hex shaft. Tighten mounting bolts, B, and snug the bearing flangettes in the side sheet. Go to the opposite end of the shaft and repeat the procedure.

After the end bearings supports are positioned, adjust the center bearing supports, then work to the ends of the shaft. Tighten the bearing mounts, then tighten the flangettes.

If the shaft is straight, it will spin freely and slide back and forth easily.

IMPORTANT: Failure to align the hex shaft properly will result in repeated shaft failures.

9. Position the hex shaft so there is one shim between the cotter pin and sprocket, Figure 2-1.

10. Align the slip clutch drive chain using a straightedge.

11. Tighten all slip clutch setscrews, A, Figure 2-5

12. Install the slip clutch to row unit drive chains, A, Figure 2-24.

13. Insert the chain tension idler if it was removed.

14. Tension each chain, A, Figure 2-24, using the tension idler. Proper tension is when 1/4″ (6 mm) free movement is obtained with moderate finger pressure on the bottom strand of chain, midway between the drive and driven sprockets. Rotate the sprocket to allow for sprocket runout. Maintain 1/4″ (6 mm) movement at the tightest point.

    Adjust each chain by loosening the idler mount cap screw, B, Figure 2-24. Reposition the idler. Tighten cap screw, B

15. Install the row unit drive shaft shields, A, Figure 2-2 or 2-3. Be sure hairpin cotter, B, is installed as shown.

    If installed incorrectly, the crop passing below the head will remove the hairpin cotter.

16. Install drive sprocket, B, Figure 2-1.

17. Install chain, A, Figure 2-1. Adjust the chain tension using the idler sprocket. Proper chain tension is when moderate finger pressure applied midway between the drive and driven sprockets on the strand of chain opposite the idler sprocket will deflect the chain 3/4″ (19 mm). Rotate the sprockets and make allowances in adjustment for runout (out of round). Maintain 3/4″ (19 mm) at the tightest point.

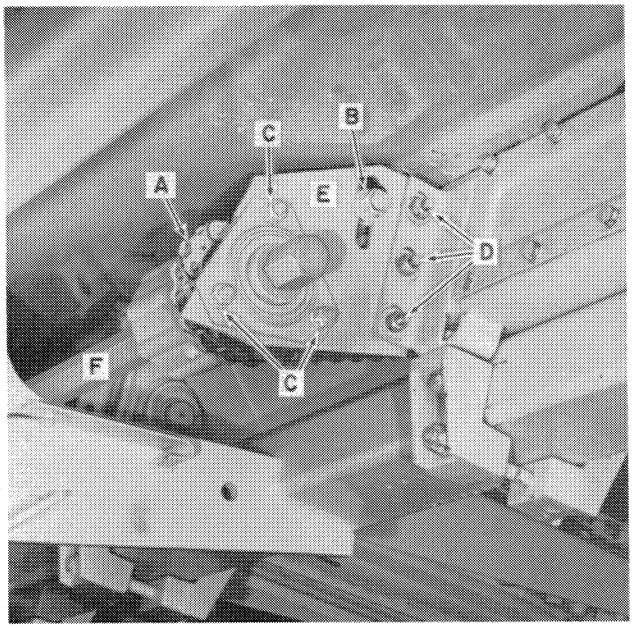


Figure 2-31

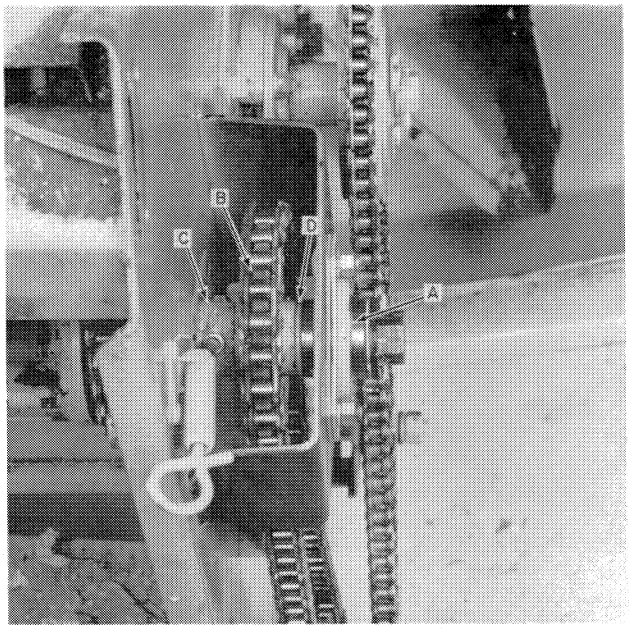


Figure 2-32

INSTALLATION - STYLE 2

Heads With Outboard Bearing

1. Install the slip clutch assembly on the row unit drive shaft, F, Figure 2-31.
2. Install the slip clutches and bearing brackets on the hex shaft as shown in Figures 2-39 to 2-46 for the particular head and row spacing. These charts are for the following heads:

   4-row S/N 483431 and above
   5-, 6- & 8-row S/N 483839 and above

3. Install the preassembled row unit drive shaft (with slip clutches, bearing, etc.) on the head.
4. Insert the outside end of the shaft through the side sheet and install in order: lock collar, C; sprocket, B; shim washer, D; and bearing, A, Figure 2-32. Snug the bearing flangette hardware. Leave lock collar, C, loose.
5. Install plate, E, Figure 2-31, attaching row unit drive shaft, F, to the row unit assembly. Use the original hardware. Snug hardware, C, securing the bearing flangettes to mount plate, E. Tighten hardware, D, only finger tight.

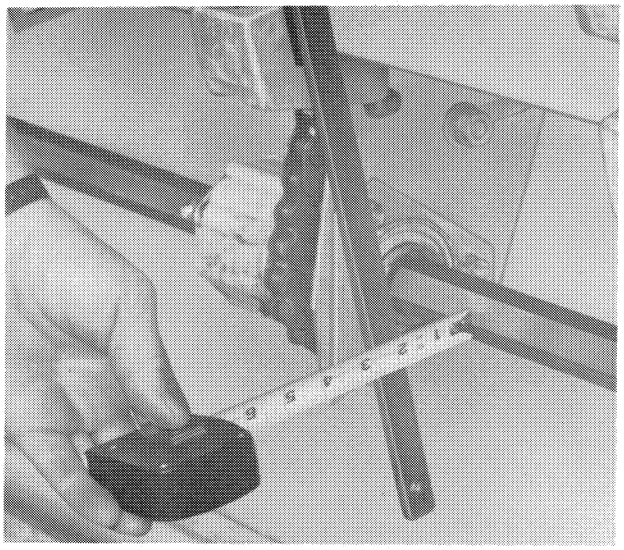


Figure 2-33

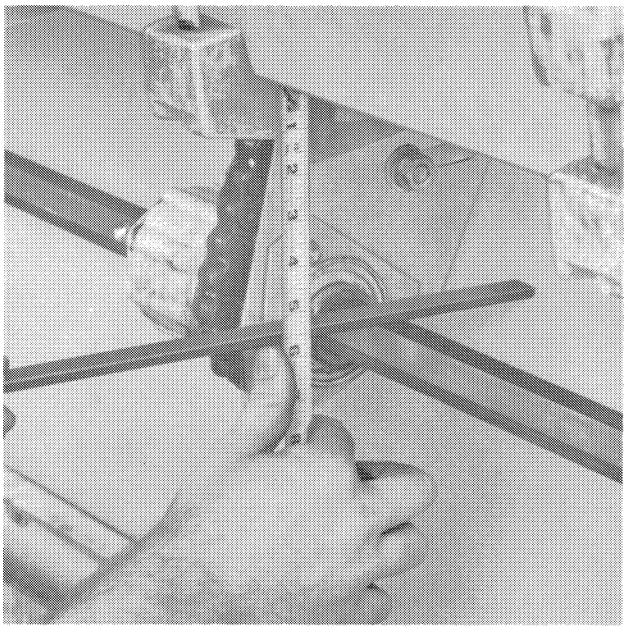


Figure 2-34

6. Check to make sure the hex shaft is straight. Refer to Step 7 for optional hex shaft alignment method.

   Measure from the header beam to the shaft, as shown in Figures 2-33 and 2-34, at the fixed bearing in the side sheet. Adjust the other end of the shaft to match those measurements. Tighten bolts, D, Figure 2-31.

   Adjust the center bearing mount next, to match both ends, then move the other bearing mounts. Tighten the bearing flangettes.

   If the hex shaft is straight, it will turn easily and slide back and forth easily.

   IMPORTANT: Failure to properly align the hex shaft will result in repeated hex drive shaft failure.

7. Optional hex shaft alignment.

   Make an alignment tool as shown in Figure 2-35.

   Angle, 1/8″ x 1-1/2″ x 1-1/2″
   Angle, 1/4″ x 1-1/2″ x 1-1/2″ x 12″
   Cap screw, 7/16″ x 2-1/2″
   Cap screw, 5/16″ x 1-1/4″
   Nuts, 2 - 7/16″
   Lock collar, 1-1/8″ - #197631
   Cut lock collar in half.

   Making two tools will speed up the alignment process.

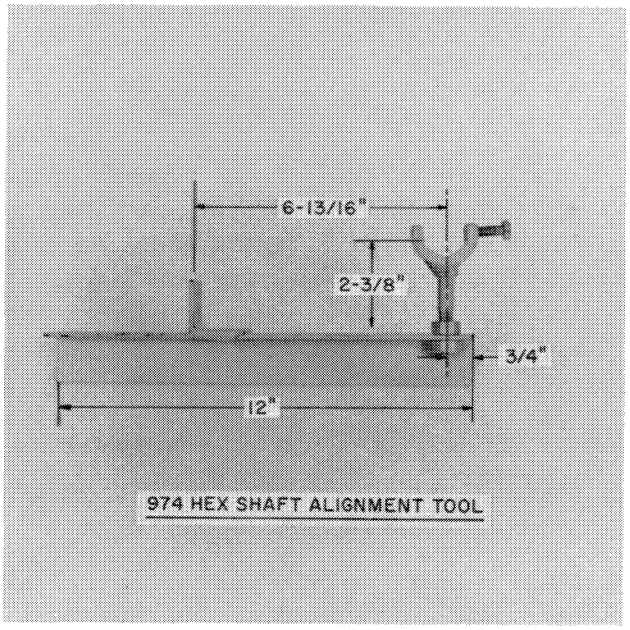


Figure 2-35

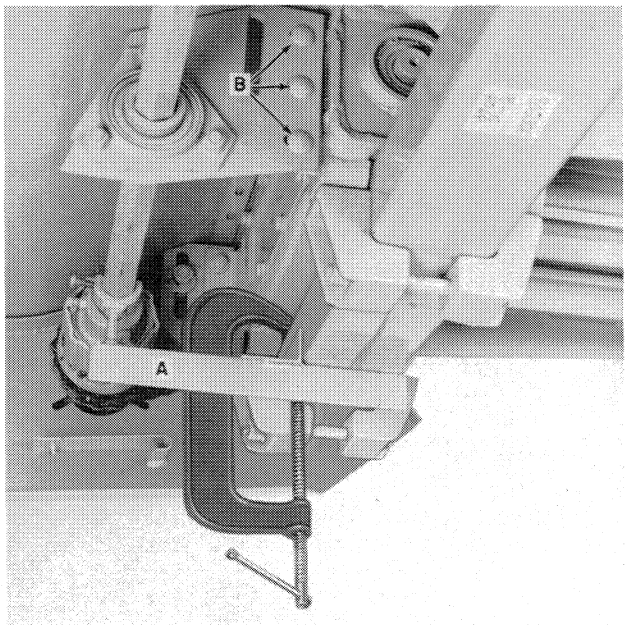


Figure 2-36

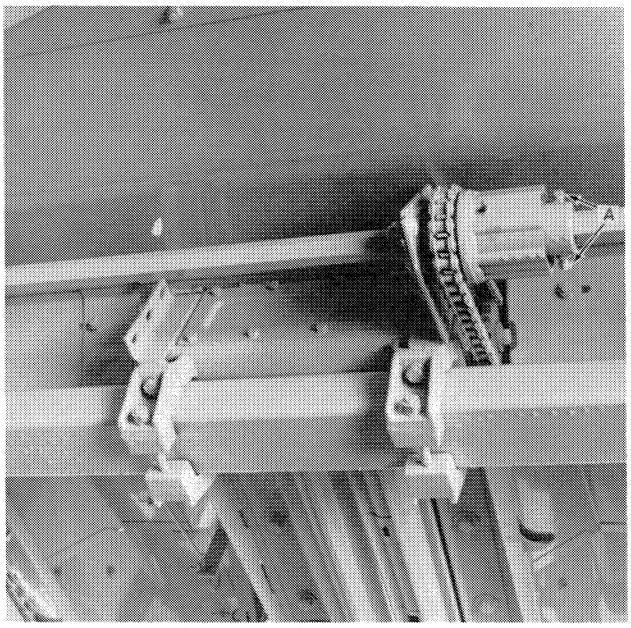


Figure 2-37

Attach the tool, A, Figure 2-36, on the fixed bearing end of the hex shaft. Tighten mounting bolts, B, and snug the bearing flangettes in the side sheet. Go to the opposite end of the shaft and repeat the procedure.

After the end bearing supports are positioned, adjust the center bearing supports, then work to the ends of the shaft. Tighten the bearing mounts, then tighten the flangettes.

If the shaft is straight, it will spin freely and slide back and forth easily.

IMPORTANT: Failure to align the hex shaft properly will result in repeated shaft failures.

8. Position the drive shaft so a washer can be placed between the cotter pin and bearing, A, Figure 2-32.
9. Align sprocket, B, Figure 2-23, and lock the lock collar, C, next to the sprocket.

   NOTE: Make sure there is enough shaft exposed past bearing, A, Figure 2-32, for one or two shim washers between the bearing and cotter pin.

   Use a shim washer, D, Figure 2-32, between the sprocket and bearing. Shim between the outboard bearing and cotter pin.
10. Position the clutches, bearings, and flangettes in alignment with each row unit. Use a straightedge to align the sprockets. Tighten setscrews, A, Figure 2-37, on the clutches.

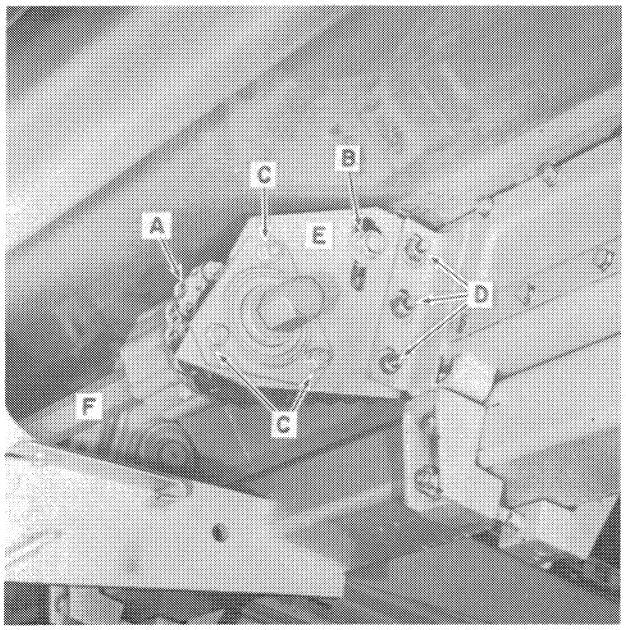


Figure 2-38

11. Install the slip clutch to row unit drive chain, Figure 2-38.

12. Insert chain tension idler, B, if removed.

13. Tension chain, A, using the tension idler. Proper tension is when 1/4″ (6 mm) free movement is obtained with moderate finger pressure on the bottom strand of chain, midway between the drive and driven sprockets. Maintain at least 1/4″ (6 mm) movement at the tightest point.

    Adjust each chain by loosening the idler mount cap screw, B. Reposition the idler. Tighten the cap screw, B.

14. Install the row unit drive shaft shield, A, Figure 2-3. Be sure safety pin, B, is installed as shown.

    If installed incorrectly, the crop passing below the head will remove the safety pin.

15. Install chain, B, Figure 2-6. Adjust the chain tension using the idler sprocket. Proper chain tension is when moderate finger pressure applied midway between the drive and driven sprockets on the chain opposite the idler sprocket will deflect the chain 3/4″ (19 mm). Rotate the sprockets and adjust the chain at the tightest spot.

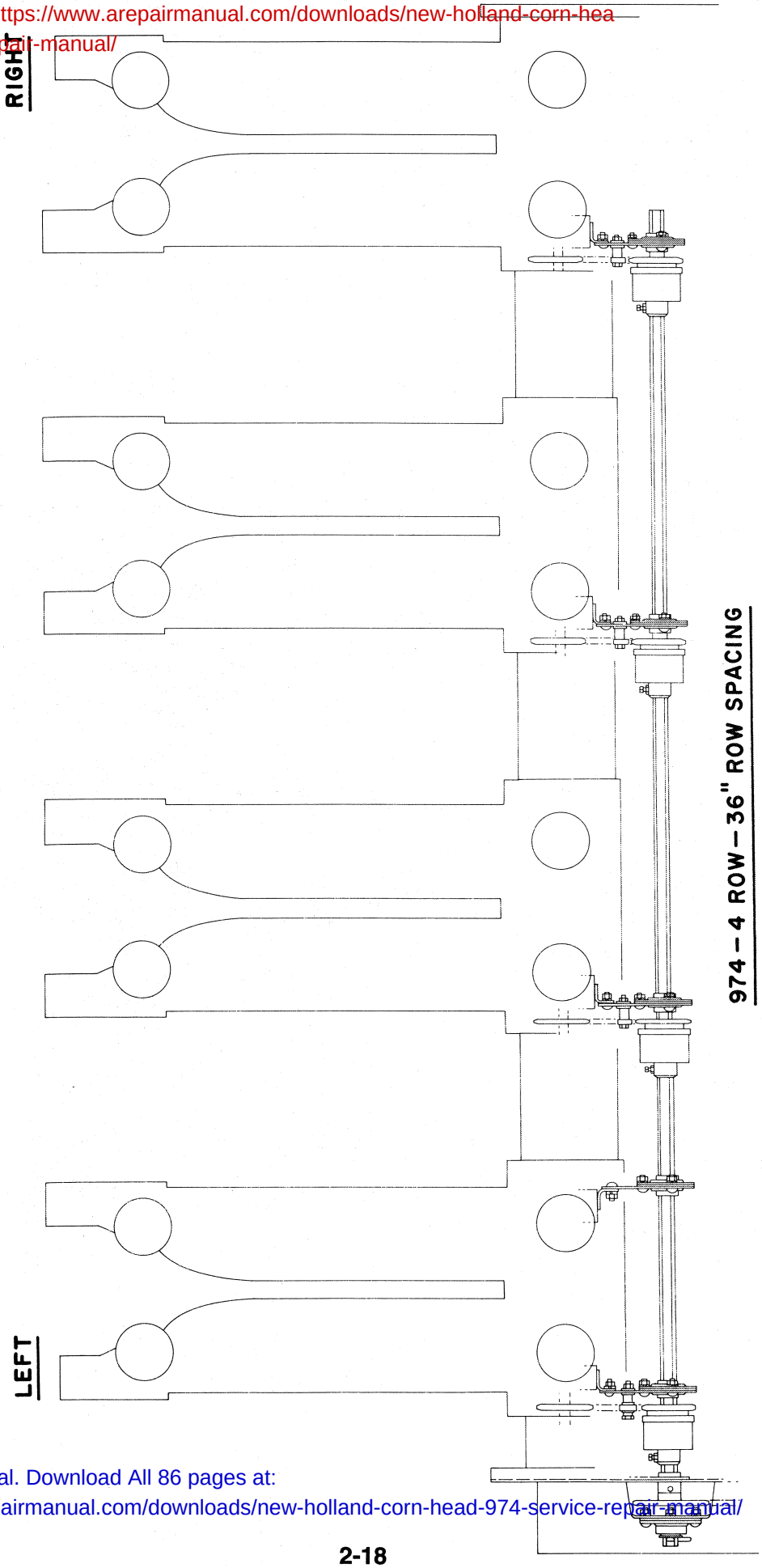


Figure 2-39