NEW HOLLAND

GRAIN HEAD
960, 970, 971, 972, 973

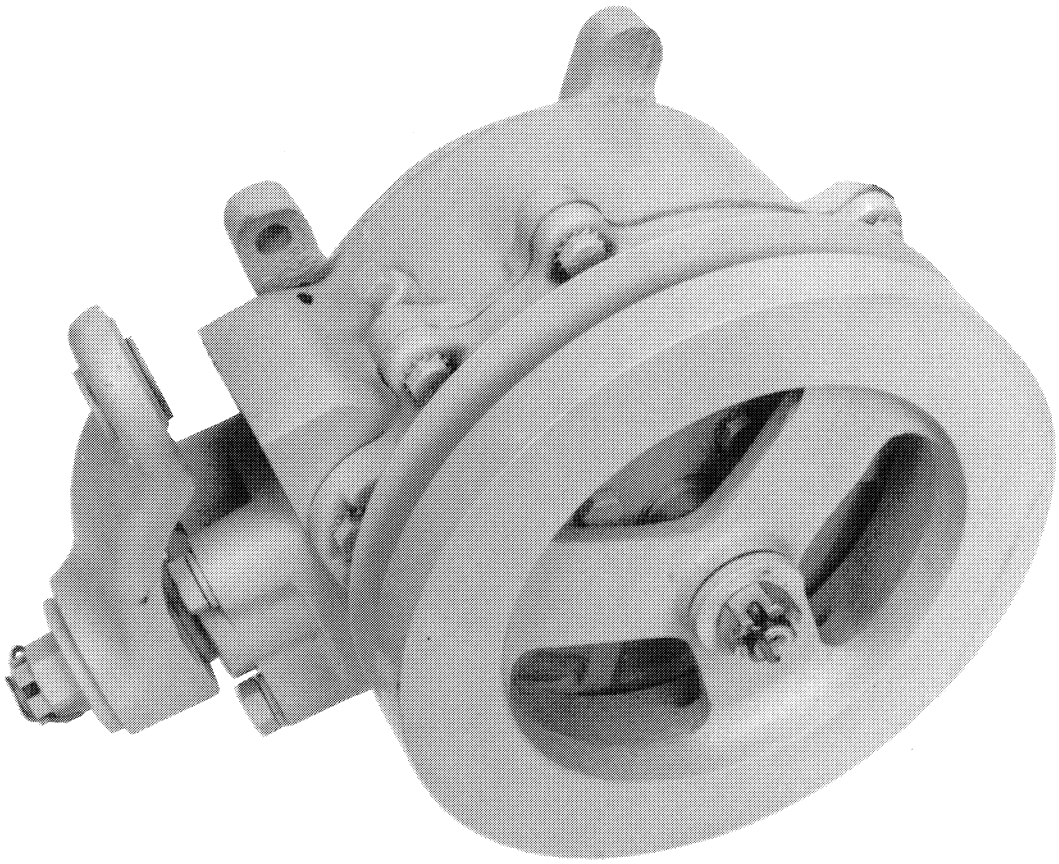
WOBBLE BOX

ISSUE 3-87

(REPLACES ALL PREVIOUS ISSUES)

SERVICE MANUAL

40482002



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INTRODUCTION

The wobble box is designed to convert rotating motion received from the drive belt into reciprocating motion to drive the grain head knife. Because of the forces involved, the wobble box must be correctly serviced and assembled if it is to perform trouble free.

This manual contains the service procedure for three separate styles of wobble boxes.

The following styles will be covered:

Style 1 - Model 960 heads

Style 2 - Models 970, 971, 972, and 973 heads. The base of this wobble box is mounted by 4 bolts.

Style 3 - Model 971 heads serial number 508237 and above
Model 973 heads serial number 508970 and above. The base of this wobble box is mounted by 5 bolts.

The hardware used in this wobble box is metric.

WOBBLE BOX REMOVAL

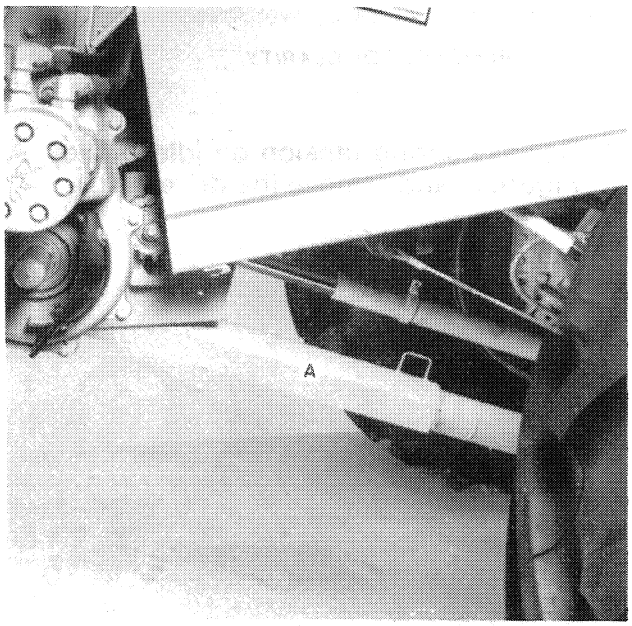
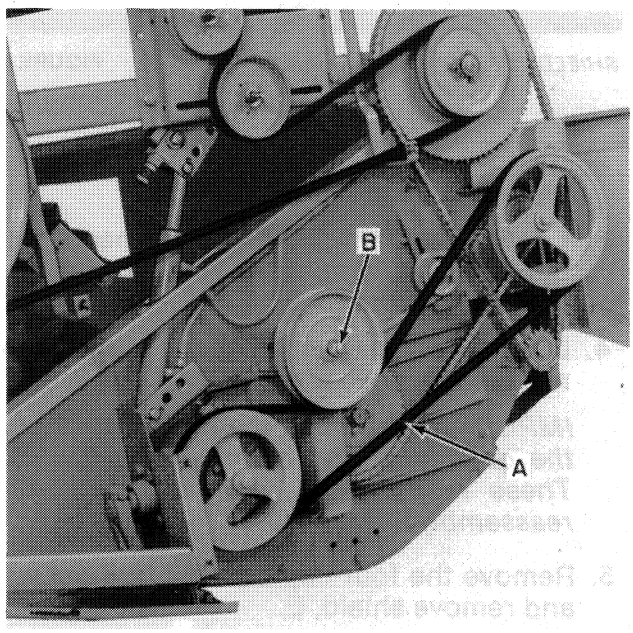


FIGURE 1



SHIELDS REMOVED FOR CLARITY.

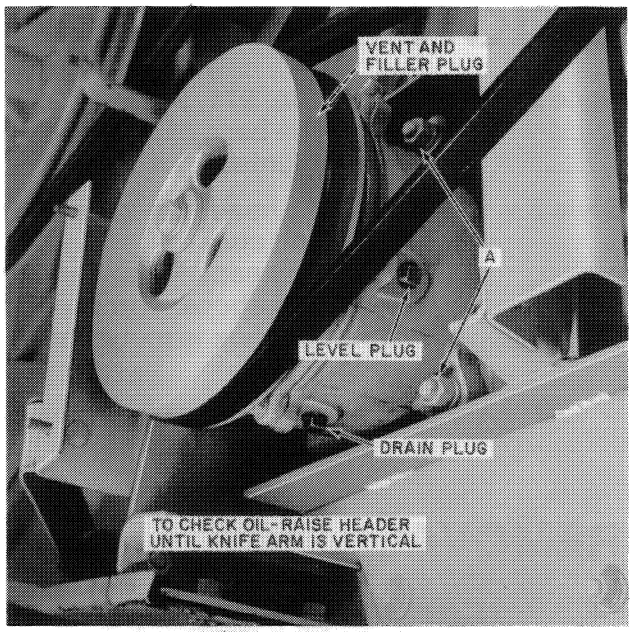
FIGURE 2

STYLE 1 - Model 960

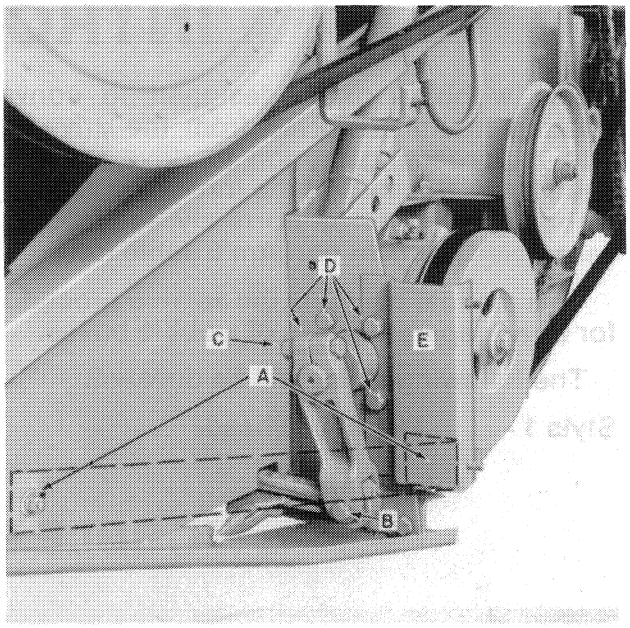
WARNING: BEFORE MAKING ANY REPAIRS, BE SURE THE COMBINE ENGINE IS SHUT OFF AND THE HEADER IS EITHER RESTING ON THE GROUND OR THE CYLINDER STOPS, A, FIGURES 1 AND 24, ARE ENGAGED.

Raise the reel and engage cylinder stop, A, Figure 25.

1. Loosen and remove the drive belt, A, Figure 2, by loosening nut, B, on the idler sheave.



SHIELDS REMOVED FOR CLARITY. **FIGURE 3**



SHIELDS REMOVED FOR CLARITY. **FIGURE 4**

2. Remove the guard shown in Figure 4 by removing its mounting bolts, A.
3. Loosen and remove the knife head bolt, B, Figure 4, and push the knife inward, free of the drive arm fork.
4. Loosen the clamping bolt, C, Figure 4, and remove the drive arm.

   IMPORTANT: Notice the timing marks on the drive arm and on the splined shaft. These marks must be lined up during reassembly.

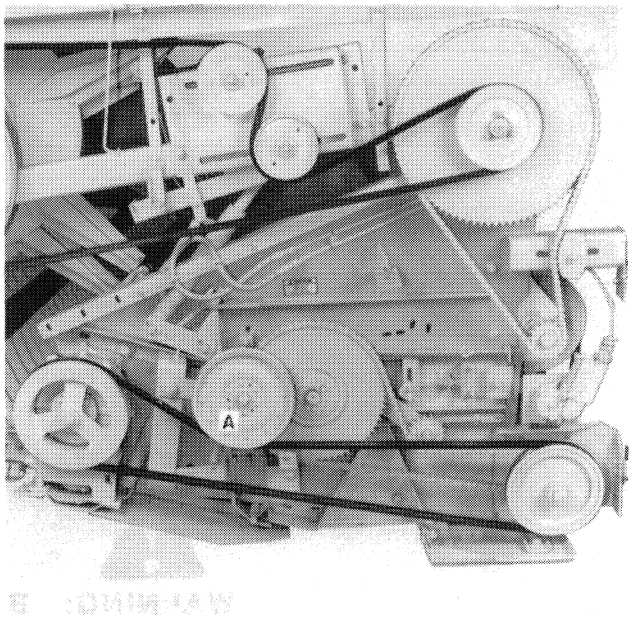
5. Remove the four cap screws, D, Figure 4, and remove shield, E.
6. Remove the two rear mounting bolts, A, Figure 3, and remove the wobble box from the head.

   IMPORTANT: Note the shims behind the wobble box which are used to align the wobble box to the cutter bar.

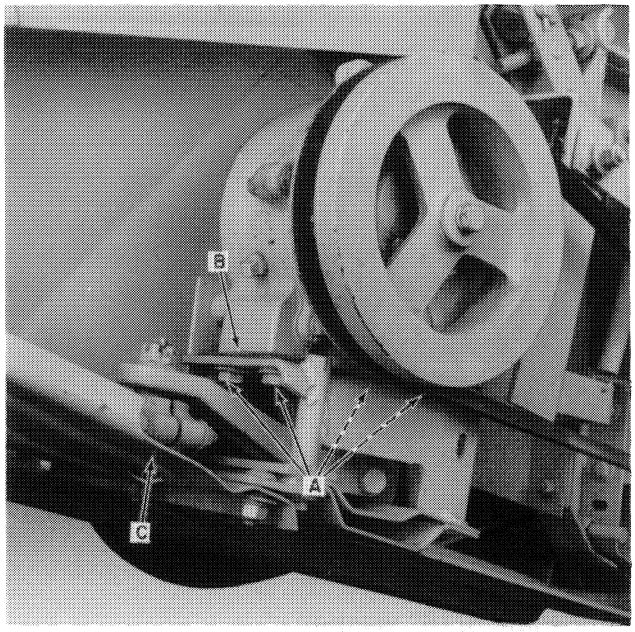
STYLE 2 - Models 970, 971, 972, and 973 (4 BOLT BASE)

WARNING: BEFORE MAKING ANY REPAIRS, BE SURE THE COMBINE ENGINE IS SHUT OFF AND THE HEADER IS EITHER RESTING ON THE GROUND OR THE CYLINDER STOPS ARE ENGAGED.

1. Release spring tension on idler pulley, A, Figure 5, and remove the drive belt.



SHIELDS REMOVED FOR CLARITY. **FIGURE 5**



SHIELDS REMOVED FOR CLARITY. **FIGURE 6**

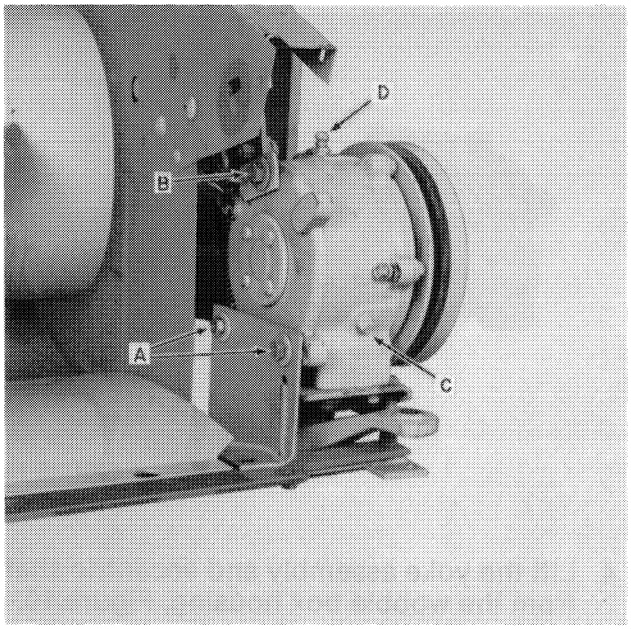


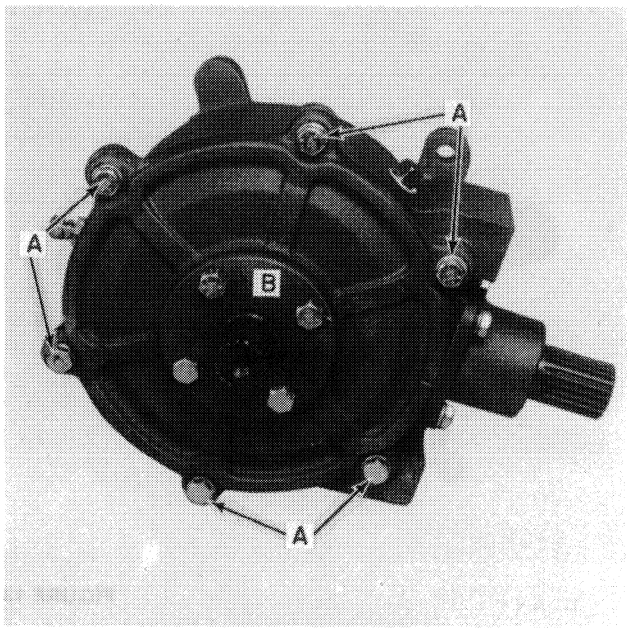
FIGURE 7

2. Remove the knife head bolt, C, Figure 6.
3. Remove the wobble box securing hardware, A, Figures 6 and 7. On Model 972 flex heads, the wobble box limit chain must be removed, B, Figure 7.

NOTE: Use care when removing the wobble box and record the amount of shims under the wobble box base at B, Figure 6.

DISASSEMBLY

Style 1 and Style 2



SHIELDS REMOVED FOR CLARITY. **FIGURE 8**

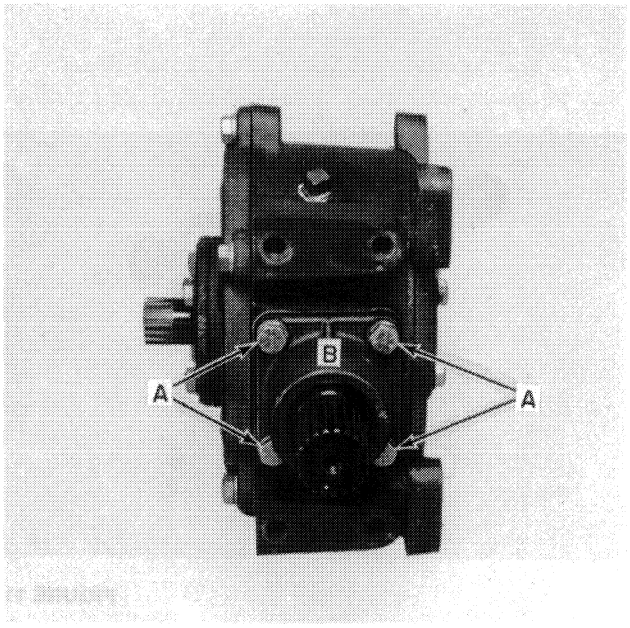


FIGURE 9

1. Drain the oil from the gearbox.
2. Remove the six cap screws, A, Figure 8, that secure the side cover to the gearbox. Remove bearing cap, B, shims, seals, and bearing cup.
3. Remove cap screws, A, Figure 9, and slide the bearing housing, B, off the shaft. The seals and needle bearings in this housing can be replaced if necessary.

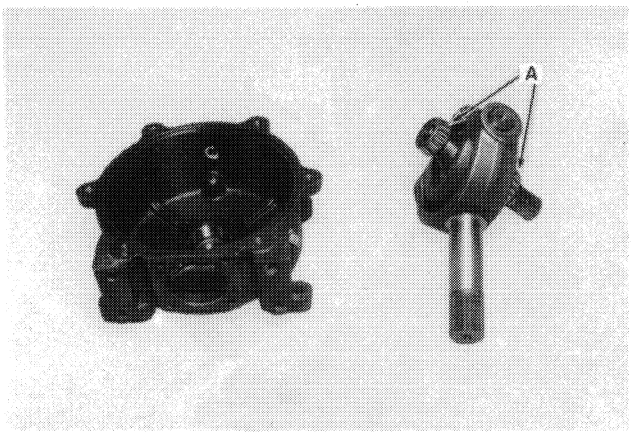


FIGURE 10

4. Lift the yoke assembly and eccentric shaft from the wobble box housing, Figure 10.

YOKE DISASSEMBLY

1. Remove the retaining ring, A, Figure 11, and washer, B.
2. Loosen locking tab, C, and remove set-screw, D.
3. Pull pin, E, Figure 11, from the yoke. A special tool can be made as shown in Figure 12.

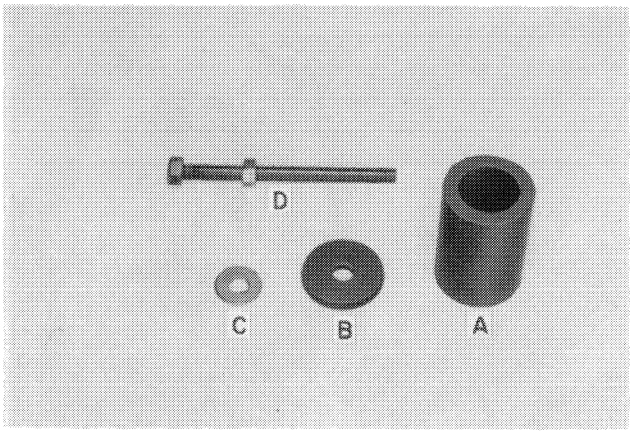


FIGURE 12

A 2½" long x 1⅛" ID pipe

B #264198 washer

C Plain 5/16" washer

D 5/16" x 6" all thread bolt and 5/16" nut

4. Place the pipe over the pin, placing the washers over the end of the pipe. Thread the 5/16" all thread bolt into the pin and tighten the nut to pull the pin out, as shown in Figure 13.
5. Repeat the procedure for the opposite side.

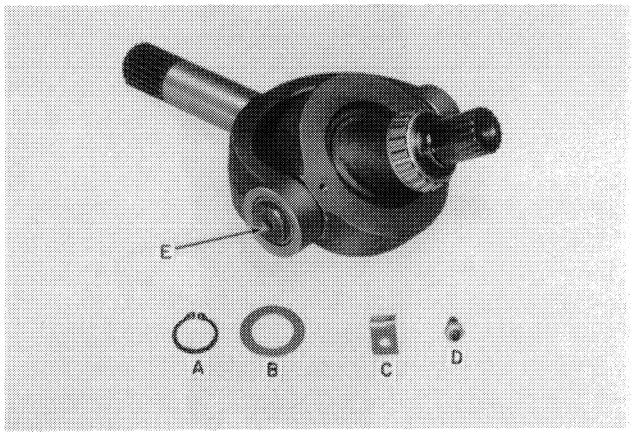


FIGURE 11

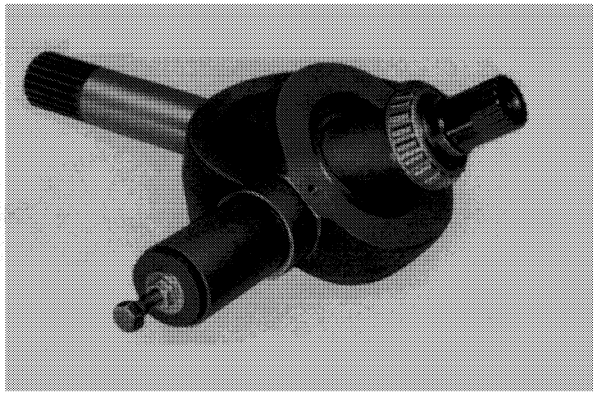


FIGURE 13

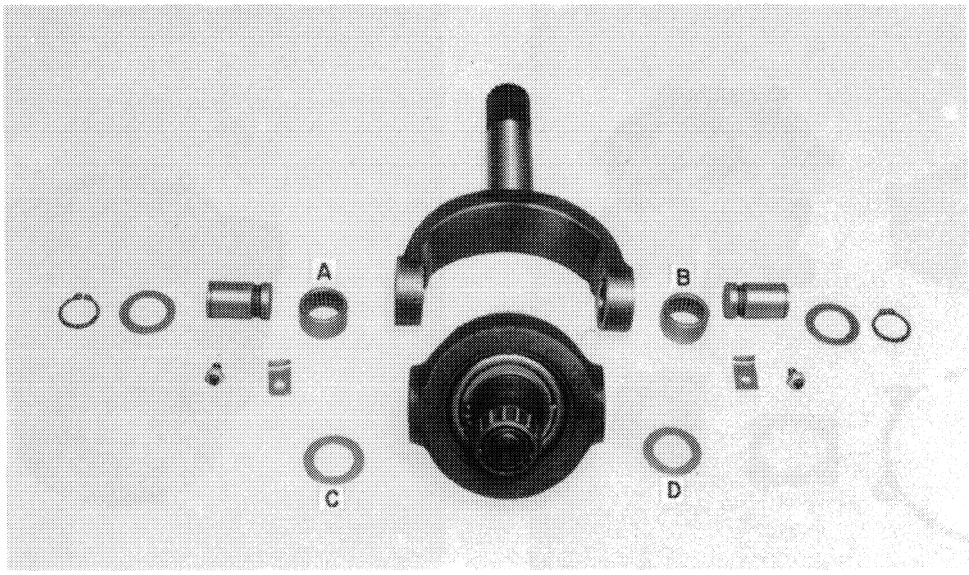


FIGURE 14

6. Press the needle bearings, A and B, Figure 14, out of the yoke.
7. Inspect and replace any damaged or worn components.

   IMPORTANT: Carefully inspect all snap rings and snap ring grooves for wear or breaks. Worn grooves could cause a snap ring failure and result in destruction of the wobble box components.
8. Thoroughly clean all components of the wobble box.

ASSEMBLY

Whenever the wobble box has been disassembled, and especially if any components of the eccentric group and yoke assembly have been replaced, center the wobble shaft and properly preload the tapered bearings, A, Figure 10. Remove and clean the bearing caps, shims, and housing so correct feeler gauge measurements can be taken.

YOKE ASSEMBLY

IMPORTANT: The bearing loading slots, B, Figure 15, must be located at the top or bottom in the bearing housing away from the yoke pins. The eccentric shaft must be in line with the yoke pins. The snap rings opening, A, Figure 15, must be located at the side opposite the loading slots.

1. Press the needle bearings, A and B, Figure 14, into the yoke. Always press on the lettered side of the needle bearing. Support both sides of the yoke as the bearings are pressed in to prevent the yoke from bending.
2. Install washers, C and D, Figure 14, inside the yoke and press the grooved pins in. Be sure to support both sides of the yoke to prevent bending of the yoke. The pins are installed with the grooved end to the inside. The groove must line up with the setscrew hole.
3. Install setscrews, locknuts, and locking tabs, C, and D, Figure 11.
4. Install washers, B, and retaining rings, A, Figure 11.

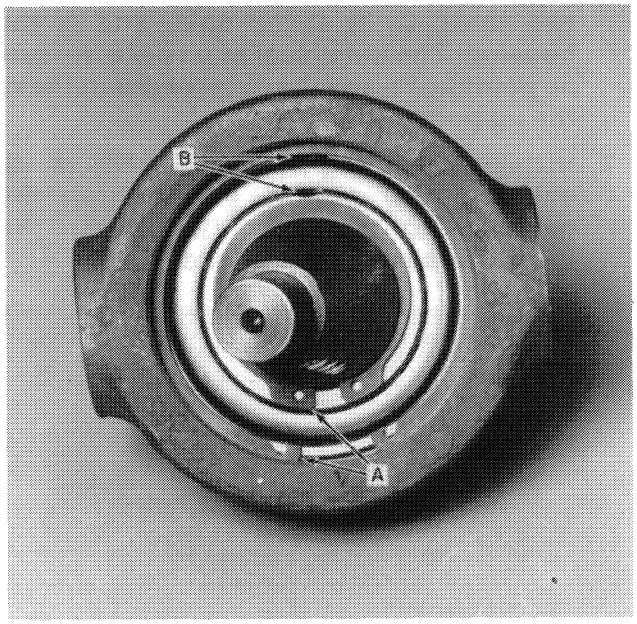


FIGURE 15

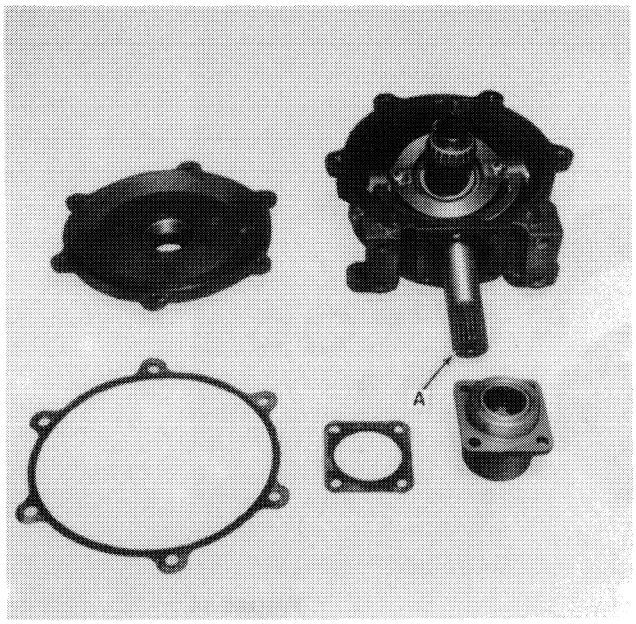


FIGURE 16

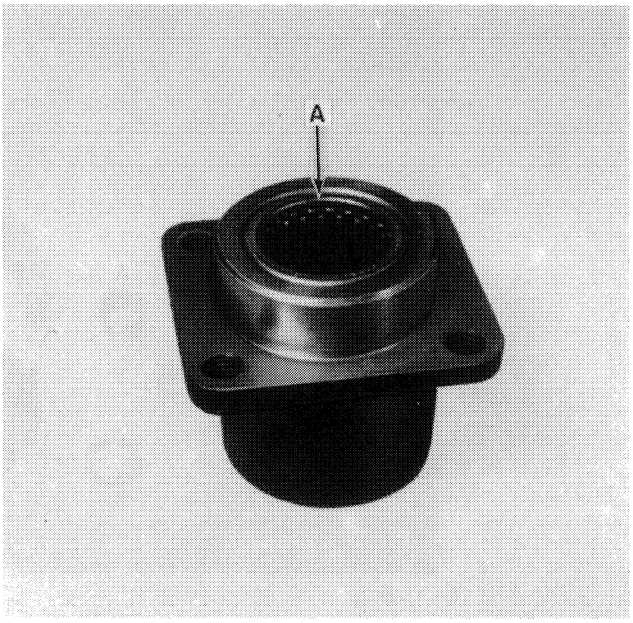


FIGURE 18

5. Place the yoke and eccentric shaft into the gearbox housing as shown in Figure 16.

   NOTE: Be certain the yoke is positioned correctly. The timing mark is shown at A, Figure 16, and is always located toward the cutter bar.

6. Press the needle bearings, A, into shaft housing, B, Figure 17. Always press on the lettered side of the needle bearings as shown at A, Figure 18.

   NOTE: Press the outer bearing past the outer edge of housing, B, Figure 17, by 13/32" (10.3 mm). This is to allow room for the seals to be pressed in. Press the two seals, C, in at the outer end of the housing. The inner seal must have the seal lip pointing in, and the outer seal must have the lip pointing out.

7. Install the bearing housing, B, Figure 19, using a new gasket, and tighten the hardware to 18 ft. lbs. (24.4 N·m). Put Permatex sealer on the bolts.

8. Install the side cover and new gasket. Torque the hardware to 18 ft. lbs. (24.4 N·m).

   IMPORTANT: The eccentric shaft must be centered in the housing. The tapered shaft bearings must be properly preloaded. To do this, proceed as follows.

9. Install both eccentric shaft bearing races into their openings.

10. Without shims, draw bearing cap, A, Figure 19, down evenly finger tight. Tap lightly to move the shaft as the cap hardware is tightened. This will shift the eccentric shaft toward the side cover as far as it will go.

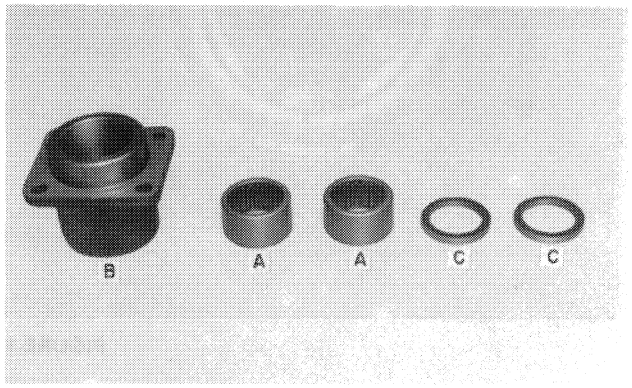


FIGURE 17

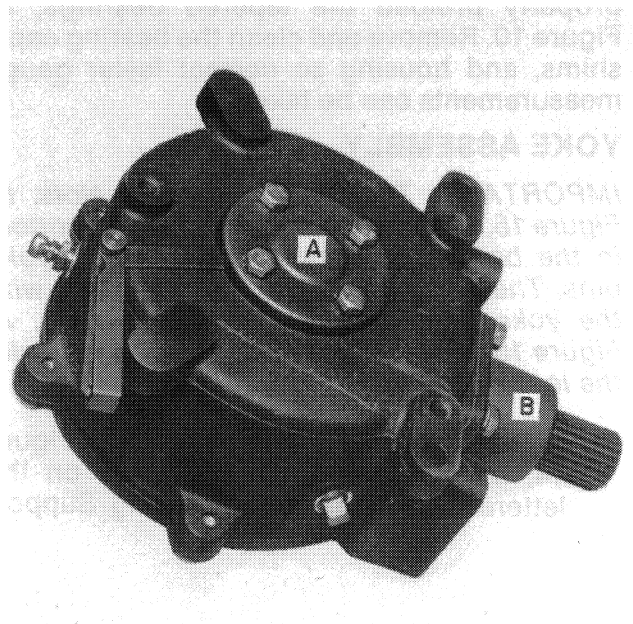


FIGURE 19

CALCULATION OF SHIM PACK THICKNESS

REFERENCE		DIMENSION EXAMPLE	DIMENSION ACTUAL
1	The distance between cap, A, Figure 19 (A, Figure 21), and the housing with the eccentric shaft shifted as far toward the cover as possible. Bearing cap, B, Figure 22, (B, Figure 21), not installed at this time.	0.050″	_____
2	The distance between cap, A, Figure 19, (A, Figure 21), and the housing with the eccentric shaft moved away from the cover as far as possible. Both bearing caps are finger tight.	0.060″	_____
3	Subtract reference 1 from reference 2 to obtain the total axial movement of the eccentric shaft.	0.010″	_____
4	Divide the total axial movement (reference 3) by 2	0.005″	_____
5	Add ½ of the axial movement (reference 4) to the dimension recorded at reference 1. This sum equals the shim pack to be installed under cap, A, Figure 19.	0.055″	_____
6	Measurement at bearing cap, B, Figure 22, when cap, A, Figure 19, is tightened down with the shim pack equal to this dimension.	0.035″	_____

FIGURE 20

11. Measure the space between the bearing cap and the wobble box housing as shown in Figure 19. Check the clearance in three or four locations around the bearing cap. This will insure that the bearing cap is drawn down evenly.

    Record the measurement at reference 1, Figure 20.

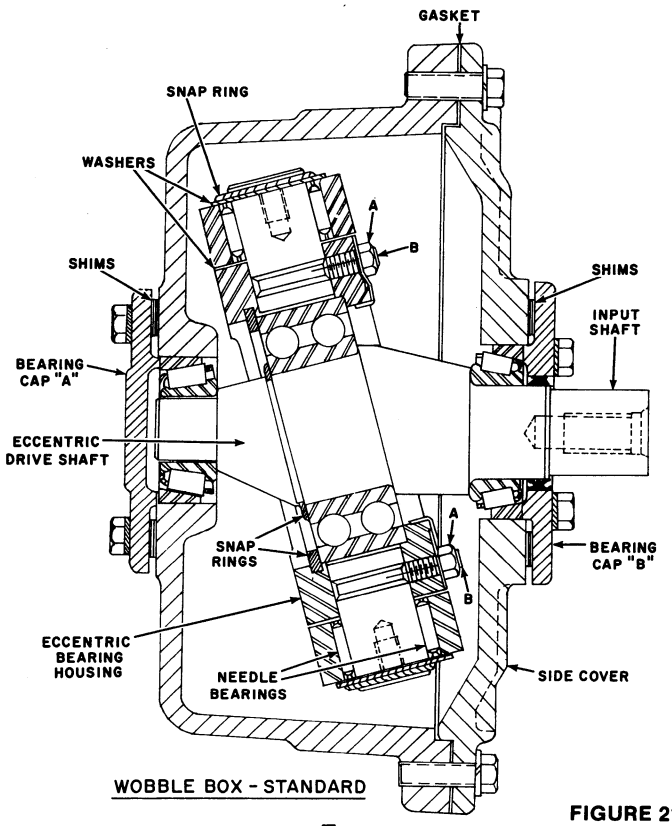


FIGURE 21

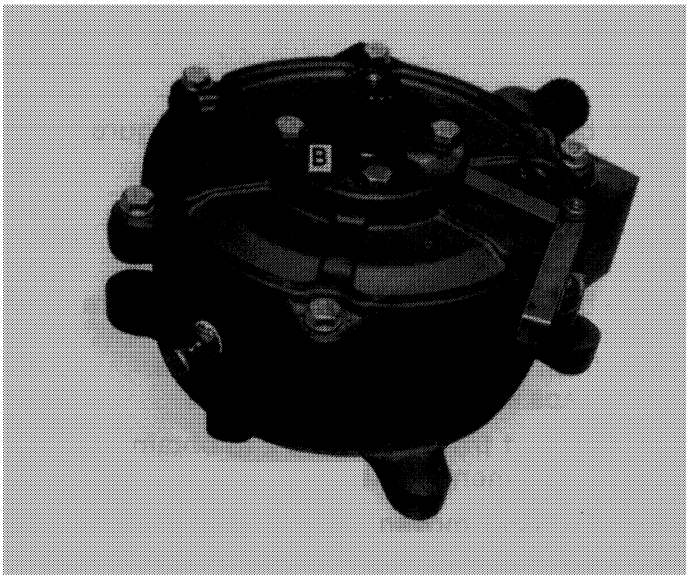


FIGURE 22

12. Remove bearing cap, A, Figure 19, and install bearing cap, B, Figure 22, without shims. Draw it up snugly using the method detailed in step 10. Be sure the bolts are not drawn tighter than the bolts in step 10. After cap, B, Figure 22, is drawn up, reinstall cap, A, Figure 19, and tighten it as detailed in step 10. At this time, both bearing caps are installed and the yoke assembly is pushed as far away from the cover as it will go.

    Measure the distance between bearing cap, A, Figure 19, and the housing. Record at reference 2, Figure 20.

13. Subtract reference 1 from 2 to find the axial movement of the eccentric shaft. Record this at reference 3.

14. Divide reference 3 by 2 to find ½ of the axial movement. Record this at reference 4.

15. Add reference 1 to reference 4 to determine the shim pack required for bearing cap, A, Figure 19. Record this at reference 5. Install the reference 5 shim pack under bearing cap, A, Figure 19, and tighten the hardware to 18 ft. lbs. (24.4 N·m). Apply Permatex sealer to each bolt.

    NOTE: Bearing cap, B, Figure 22, must be removed before the shim pack and cap, A, Figure 19, are installed and tightened.

    The part numbers of shims for cap, A, Figure 19, are:

    #857198 - 0.015"

    #857199 - 0.005"

    #857200 - 0.003"

16. Install and draw down on bearing cap, B, Figure 22, evenly until it is finger tight. Measure the distance between the bearing cap and housing, and record the measurement at reference 6. This dimension is equal to the shim pack required under this cap.

17. Install the shim pack equal to reference 6 under bearing cap, B, Figure 22. Torque the hardware to 18 ft. lbs. (24.4 N·m). Apply Permatex sealer to each bolt.

    The part numbers of shims for cap, B, Figure 22, are:

    #857195 - 0.015"

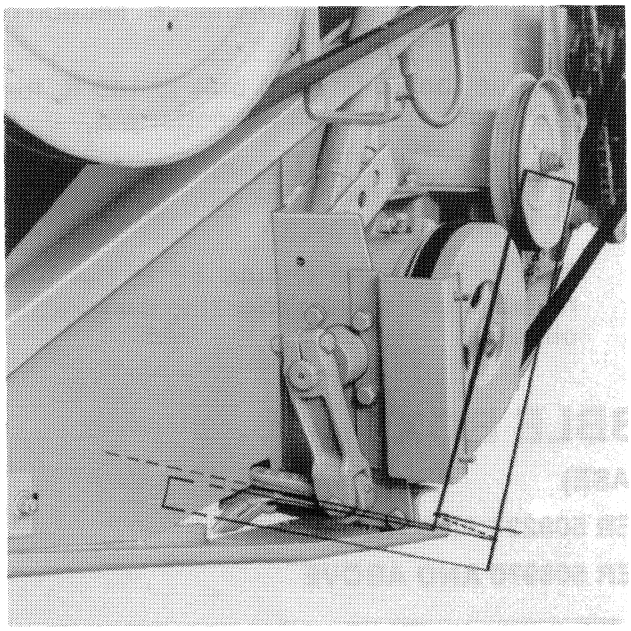
    #857196 - 0.005"

    #857197 - 0.003"

    IMPORTANT: After tightening bearing cap, B, Figure 22, to the correct torque, the drive shaft should turn by hand only (without sheave). If it cannot be rotated, start over beginning with step 10.

18. Reinstall the drive sheave on the wobble box and tighten the cap screw to hold it in place.

WOBBLE BOX REINSTALLATION



SHIELDS REMOVED FOR CLARITY. **FIGURE 23**

MISALIGNMENT CHART	
Header Size	**Maximum Misalignment**
11′	2-1/16″ (52.3 mm)
13′	2-7/16″ (61.9 mm)
15′	2-13/16″ (71.4 mm)
17′	3-3/16″ (80.9 mm)
19′	3-9/16″ (90.4 mm)
22′	4-1/8″ (104.7 mm)

STYLE 1 - Model 960

1. Remove the four cap screws holding bearing housing, B, Figure 19.
2. Install the wobble box assembly into position on the grain head and, after replacing the spacers between the wobble box and head, install bolts, A, Figure 3.

   NOTE: Leave these bolts loose temporarily.
3. Temporarily install the four cap screws, D, Figure 4, and tighten them to 82 ft. lbs. (111 N·m) torque. Leave shield, E, off during the alignment procedure that follows.
4. Tighten bolts, A, Figure 3, to 90 ft. lbs. (122 N·m) torque.
5. Check the wobble box shaft alignment with the cutter bar by placing a carpenter's square across the face of the drive sheave, Figure 23.

   Pull a string along the square and across the cutter bar to the right-hand end sheet. The wobble box must align with the cutter bar as specified in the misalignment chart. Refer to the chart to find how much misalignment can be allowed at the right-hand end sheet.

   If alignment is not within this limit, loosen all bolts and add or remove spacers as required at bolts, A, Figure 3, to correct the alignment.
6. Tighten bolts, A, Figure 3, to 90 ft. lbs. (122 N·m) if loosened to align the wobble box.
7. Remove the four bolts, D, Figure 4, and apply Permatex to each bolt. Position shield, E, when reinstalling the two outer bolts. Tighten the bolts to 82 ft. lbs. (111 N·m) torque.
8. Install the knife arm as shown in Figure 4, making sure to align the timing punch marks properly. Tighten bolt, C.
9. Install and tighten the knife head bolt, B, Figure 4.
10. Install the shield with bolts, A, Figure 4, and tighten securely.
11. Install the wobble box drive belt as shown in Figure 2 and tighten it to ½″ deflection with 14 pounds of pull at point A, Figure 2. Hold the belt tight by tightening nut, B, on the belt idler.
12. Reinstall the oil drain plug as shown in Figure 3 and fill to the level plug with SAE 80W-90 multipurpose gear oil (approximately one pint). Pour the oil in through the vent and filler plug as shown in Figure 3.
13. Install and tighten the oil level plug and vent filler plug.

    NOTE: Check the oil level with the wobble shaft parallel to the ground.

STYLE 2 - Models 970, 971, 972, and 973

1. Install the wobble box housing using the shims removed earlier. Torque the ½" mounting hardware to 82 ft. lbs. (111 N·m). Use #677287 special bolts to mount the wobble box.
2. Add shims under the gearbox housing to obtain alignment. The knife head bolt should be able to pass through the knife head and knife arm without binding. The distance between the knife arm and knife head should be a parallel distance. The knife section should rest on the ledger plate of the guards after the knife head bolt is tightened. See "Maintenance" section of operator's manual.
3. Torque the knife head bolt to 140 ft. lbs. (190 N·m) and install the cotter pin.
4. Fill the wobble box through the vent plug, D, Figure 7, to the check plug, C, with 80W-90 multipurpose oil.

   NOTE: The head should be in the fully raised position when checking the gearbox oil level.

STYLE 3 WOBBLE BOX

(5 BOLT BASE)

MODEL 971 - SERIAL NUMBER 508237 AND ABOVE

MODEL 973 - SERIAL NUMBER 508970 AND ABOVE

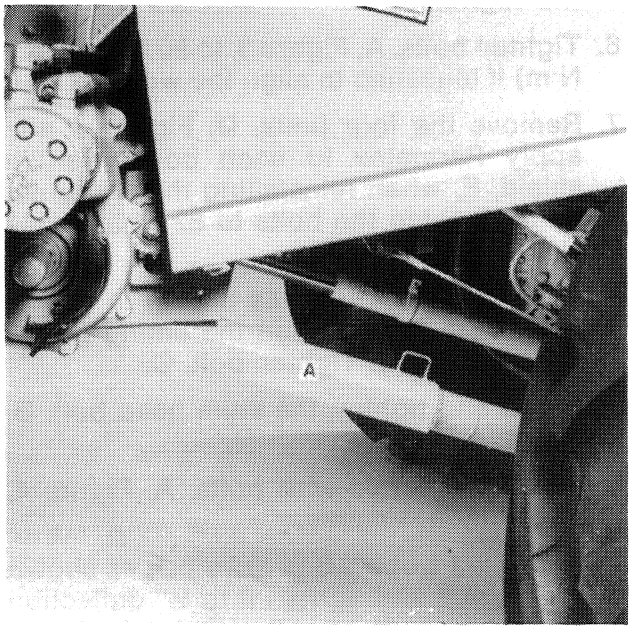
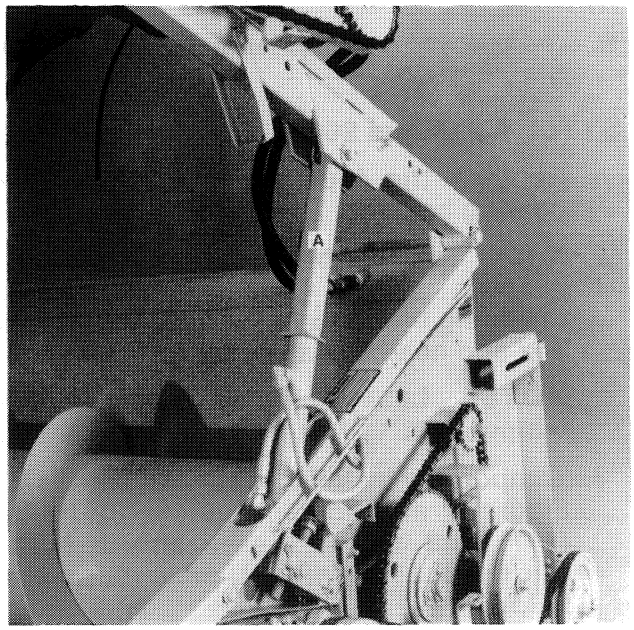


FIGURE 24



SHIELDS REMOVED FOR CLARITY. FIGURE 25

REMOVAL

WARNING: BEFORE MAKING ANY REPAIRS, BE SURE THE COMBINE ENGINE IS SHUT OFF AND THE HEADER IS EITHER RESTING ON THE GROUND OR THE CYLINDER STOPS, A, FIGURE 24, ARE ENGAGED.

NOTE: All hardware used in the wobble box is metric.

NOTE: These pictures are for single knife drive heads. Double knife drives are similar.

1. Raise the reel and install cylinder stops, A, Figure 25 (left side shown).