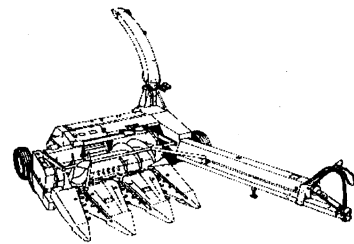


Harvester 900

SERVICE MANUAL



NEW HOLLAND

INTRODUCTION

This service manual provides the technical information needed to properly service the Model 900 harvester. By using this service manual, in addition to the operator's manual supplied with the harvester, you should be able to correctly service and maintain the harvester.

Whenever working on Ford New Holland equipment, left and right sides of the machine are determined by standing behind the machine, looking in the direction of travel.

This manual details the procedures of removal, disassembly, reassembly, etc., that have been found to be the easiest and least time-consuming. There may be several other ways of completing the same job, but it has been established the detailed methods in this manual are best. Modifications to these procedures are your own decision.

Certain hardware on the harvesters must be tightened to particular torque specifications. If there are no specific torque specifications for the hardware, tighten to the torque listed in the front section of this manual.

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CAUTION!

SOME PICTURES IN THIS MANUAL SHOW SAFETY SHIELDS REMOVED OR OPEN TO SHOW PARTS BEING SERVICED OR FOR CLARITY. ALL SHIELDS SHOULD BE CLOSED OR REPLACED PRIOR TO OPERATING THE MACHINE.

ABOUT IMPROVEMENTS

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

Sample of manual. Download All 174 pages at:

[ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.](https://www.aresrepairmanual.com/downloads/new-holland-harvester-900-service-repair-manual/)



YOUR SAFETY IS OF UTMOST CONCERN TO FORD NEW HOLLAND. PLEASE FOLLOW THE SAFETY RULES LISTED, NOT ONLY FOR YOUR OWN GOOD, BUT FOR THE PEOPLE AROUND YOU.

- 1. DO NOT ALLOW CHILDREN OR BYSTANDERS AROUND THE MACHINE WHILE IT IS BEING ADJUSTED, SERVICED, OR OPERATED.**
- 2. 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 AS THEY COULD FAIL.**
- 3. ALWAYS WEAR SAFETY GOGGLES WHEN USING A HAMMER, CHISEL, OR OTHER TOOLS THAT MAY CAUSE CHIPS TO FLY OFF THE WORK.**
- 4. KEEP WORK ORGANIZED AND CLEAN. WIPE UP OIL SPILLS TO MINIMIZE THE POSSIBILITY OF A FALL. KEEP TOOLS AND PARTS OFF THE FLOOR TO FURTHER REDUCE THE POSSIBILITY OF SERIOUS INJURY.**
- 5. BE SURE TO REINSTALL SAFETY DEVICES, SUCH AS GUARDS OR SHIELDS, AFTER ADJUSTING OR SERVICING THE HARVESTER.**
- 6. AFTER SERVICING THE HARVESTER, BE SURE ALL TOOLS, PARTS, OR SERVICING EQUIPMENT ARE REMOVED FROM THE MACHINE.**
- 7. WHEN USING A GAS TORCH, ALWAYS WEAR WELDING GOGGLES AND GLOVES. KEEP A FULLY-CHARGED FIRE EXTINGUISHER WITHIN REACH. DO NOT HEAT OR WELD NEAR A FUEL TANK OR FUEL LINES, AND UTILIZE PROPER SHIELDING AROUND HYDRAULIC LINES.**
- 8. HYDRAULIC FLUID ESCAPING UNDER PRESSURE CAN HAVE SUFFICIENT FORCE TO PENETRATE THE HUMAN SKIN. HYDRAULIC FLUID MAY INFECT A MINOR CUT OR OPENING IN THE SKIN. IF INJURED BY ESCAPING HYDRAULIC FLUIDS, 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.**
- 9. USE PULLERS TO REMOVE BEARINGS, BUSHINGS, ETC. USE HAMMERS, PUNCHES, AND CHISELS ONLY WHEN ABSOLUTELY NECESSARY, AND BE SURE TO WEAR SAFETY GOGGLES.**
- 10. BE CAREFUL WHEN USING COMPRESSED AIR. USE APPROVED AIR BLOW GUNS, DO NOT EXCEED 35 PSI (2.4 BAR), WEAR SAFETY GOGGLES, AND USE PROPER SHIELDING TO PROTECT EVERYONE IN THE WORK AREA.**
- 11. DO NOT WEAR RINGS, WRIST WATCHES, OR LOOSE-FITTING CLOTHING WHEN WORKING ON MACHINERY, AS THEY COULD CATCH ON MOVING PARTS AND CAUSE SERIOUS INJURY.**

THE ABOVE IS ONLY A PARTIAL LIST OF SAFETY WORK RULES. ALWAYS REFER TO THE OPERATOR'S MANUAL FOR ADDITIONAL SAFETY WORK RULES REGARDING THIS MACHINE.

PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("CAUTION", "WARNING", and "DANGER") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



CAUTION: THE WORD "CAUTION" IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.



WARNING: THE WORD "WARNING" DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.



DANGER: THE WORD "DANGER" DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

FAILURE TO FOLLOW THE "CAUTION", "WARNING", AND "DANGER" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

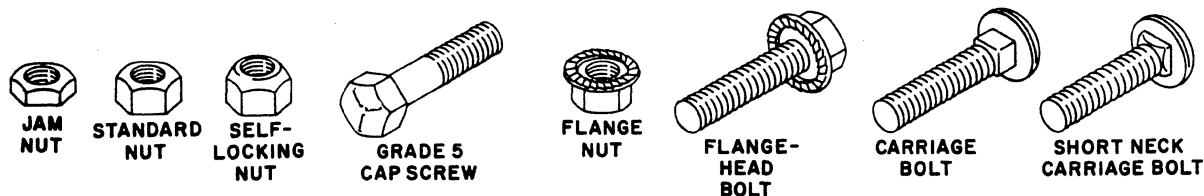
MACHINE SAFETY

Additional precautionary statements ("ATTENTION" and "IMPORTANT") are followed by specific instructions. These statements are intended for machine safety.

ATTENTION: The word "ATTENTION" is used to warn the operator of potential machine damage if a certain procedure is not followed.

IMPORTANT: The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.

HARDWARE KEY



Cap Screw — CS
 Carriage Bolt — CB
 Short Neck Carriage Bolt — SNCB
 Flat Washer — FW
 Lock Washer — LW
 Lock Nut — LN
 Regular Nut — N
 Jam Nut — JN

National Fine Thread — N.F.
 Grade 5 — GR. 5
 Grade 8 — GR. 8
 Cotter Pin — CP
 Machine Screw — MS
 Flange Nut — FN
 Flange Head Bolt — FHB



MINIMUM HARDWARE TIGHTENING TORQUES IN FOOT POUNDS (NEWTON-METRES) FOR NORMAL ASSEMBLY APPLICATIONS

	 GRADE 2 SAE	 GRADE 5 SAE 		 GRADE 8 SAE	
Bolt Size	Unplated or Plated	Unplated	Plated	Unplated	Plated
1/4"	5 (7)	8 (11)	7 (9)	12 (16)	10 (13)
5/16"	10 (13)	18 (24)	15 (20)	26 (35)	21 (28)
3/8"	18 (24)	31 (42)	25 (34)	48 (65)	39 (53)
7/16"	31 (42)	53 (72)	43 (58)	75 (101)	60 (81)
1/2"	45 (61)	82 (111)	66 (89)	115 (155)	92 (124)
5/8"	82 (111)	170 (230)	140 (189)	235 (317)	190 (256)
3/4"	155 (209)	290 (392)	230 (310)	415 (560)	330 (445)
7/8"	165 (223)	430 (580)	340 (459)	600 (810)	480 (648)
1"	250 (337)	640 (864)	510 (688)	900 (1215)	720 (972)

STANDARD TORQUE DATA FOR HYDRAULIC TUBES AND FITTINGS

TUBE NUTS FOR 37°FLARED FITTINGS							
SIZE	TUBING O.D.		THREAD SIZE	TORQUE			
	Inches	mm		FOOT POUNDS		NEWTON METERS	
				Min.	Max.	Min.	Max.
4	1/4	6.4	7/16-20	9	12	12	16
5	5/16	7.9	1/2-20	12	15	16	20
6	3/8	9.5	9/16-18	21	24	29	33
8	1/2	12.7	3/4-16	35	40	47	54
10	5/8	15.9	7/8-14	53	58	72	79
12	3/4	19.1	1-1/16-12	77	82	104	111
14	7/8	22.2	1-3/16-12	90	100	122	136
16	1	25.4	1-5/16-12	110	120	149	163
20	1¼	31.8	1⅝-12	140	150	190	204
24	1½	38.1	1⅞-12	160	175	217	237
32	2	50.8	2½-12	225	240	305	325

O-RING BOSS PLUGS, ADJUSTABLE FITTING LOCK NUTS, SWIVEL JIC — 37° SEATS			
TORQUE			
FOOT POUNDS		NEWTON METERS	
Min.	Max.	Min.	Max.
6	10	8	14
10	15	14	20
15	20	20	27
25	30	34	41
35	40	47	54
60	70	81	95
70	80	95	109
80	90	108	122
95	115	129	156
120	140	163	190
250	300	339	407

Above torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations.

Swivel nuts either swaged or brazed.

These torques are not recommended for tubes of 1/2" (12.7 mm) O.D. and larger with wall thickness of 0.035" (0.889 mm) or less. The torque is specified for 0.035" (0.889 mm) wall tubes on each application individually.

SECTION 1

BEVEL GEARBOX

SPECIFICATIONS

Output shaft rolling torque	8 in. lbs.-14 in. lbs.
Input shaft and output shaft combined rolling torque.....	15 in. lbs.-25 in. lbs.
Gear backlash	0.006"-0.015" (0.15 mm-0.38)
Oil capacity--	
Bevel gearbox	4 qt. (3.8 L)
Reversing gearbox.....	8 qt. (7.6 L)

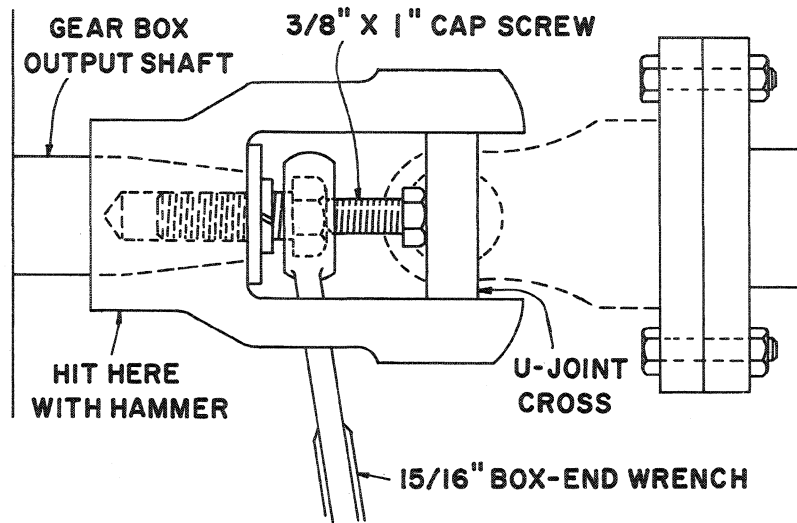


FIGURE 1-1

REMOVAL

The bevel gearbox cannot be removed without removing the reversing gearbox. Removal is easier if the reversing gearbox and bevel gearbox are removed as an assembly.

1. Remove the blower fan assembly. See "Blower" for removal instructions.
2. Remove the cutterhead drive shaft.
 - a. Shear bolt drive - Remove the U-joint assembly from the gearbox shaft as shown in Figure 1-1.
 - b. Slip clutch drive - Remove the four mounting bolts, A, Figure 1-2. Remove the clutch now or wait until the gearbox is out of the machine.

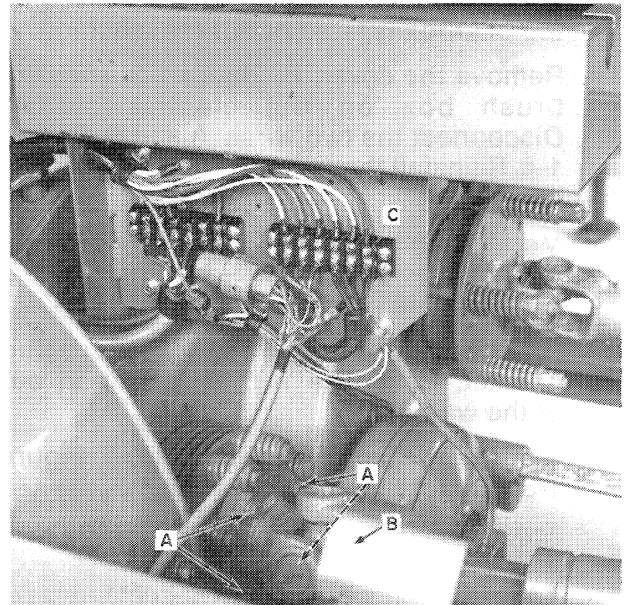


FIGURE 1-2

BEVEL GEARBOX

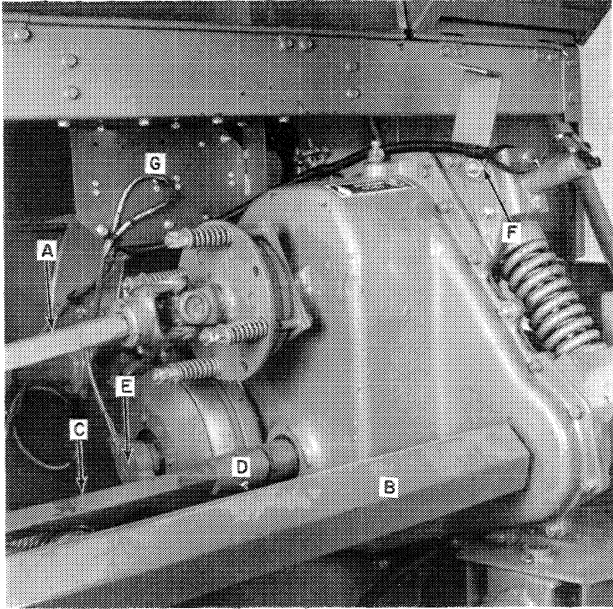


FIGURE 1-3

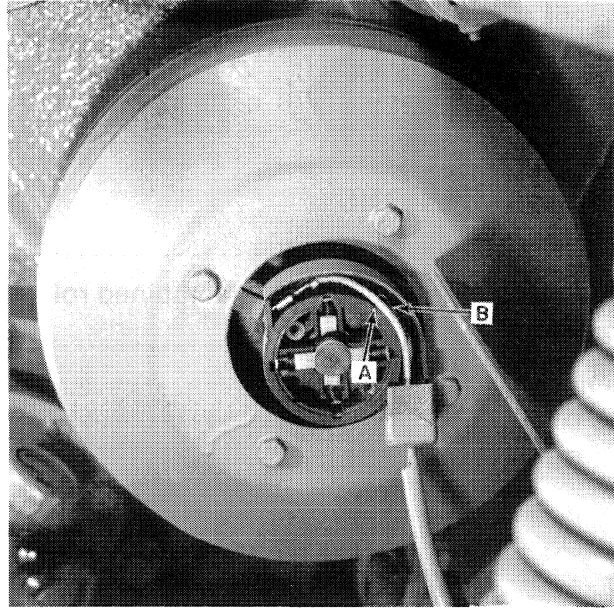


FIGURE 1-4

3. Remove the upper feed roll drive shaft, A, Figure 1-3.
4. Remove the shield, B, Figure 1-3, over the attachment drive shaft. Remove the attachment drive shaft.
5. Remove the lower feed roll drive shaft, C, Figure 1-3. To remove the shaft, remove the paint from the end of the shaft next to the gearbox and slide the sleeve, D, toward the feed rolls. The shaft should then be able to slide to the left by the gearbox shaft. If not, the shaft can be removed as the gearbox is lifted out of the machine.
6. Remove the cover, E, Figure 1-3, over the brush box on the electric clutch. Disconnect the two wires, A and B, Figure 1-4. Reinstall the cover to keep the brushes in place.
7. Metalert® only - Remove the wire harness, F, Figure 1-3, for the stopping system solenoid and pawl switch.
8. Remove the terminal block mounting bracket, G, Figure 1-3, and position out of the way.
9. Remove the length-of-cut chain, A, Figure 1-5, and idler bracket, B.

10. Remove the coupler bolt, C, Figure 1-5. Remove the paint from the shaft splines and slide the coupler forward off the gearbox shaft.

NOTE: Do not loosen the hardware holding the bearing at the front of the shaft.

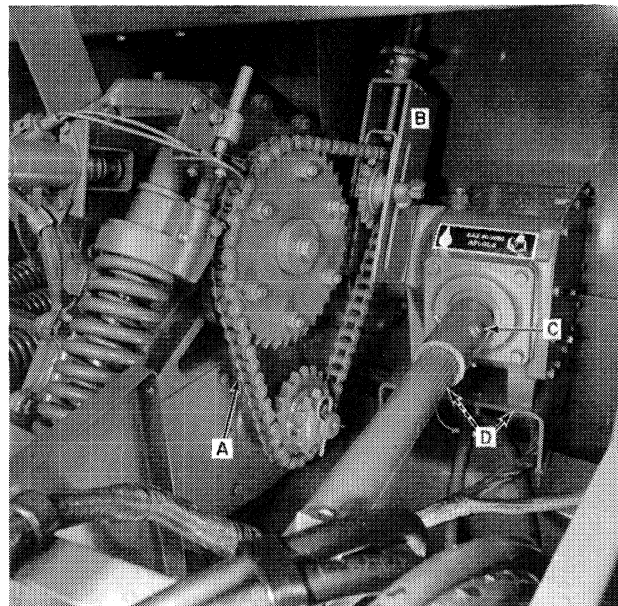


FIGURE 1-5

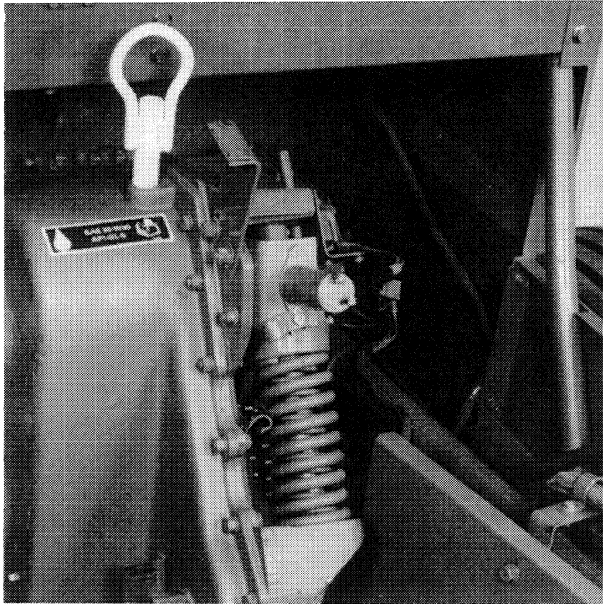


FIGURE 1-6

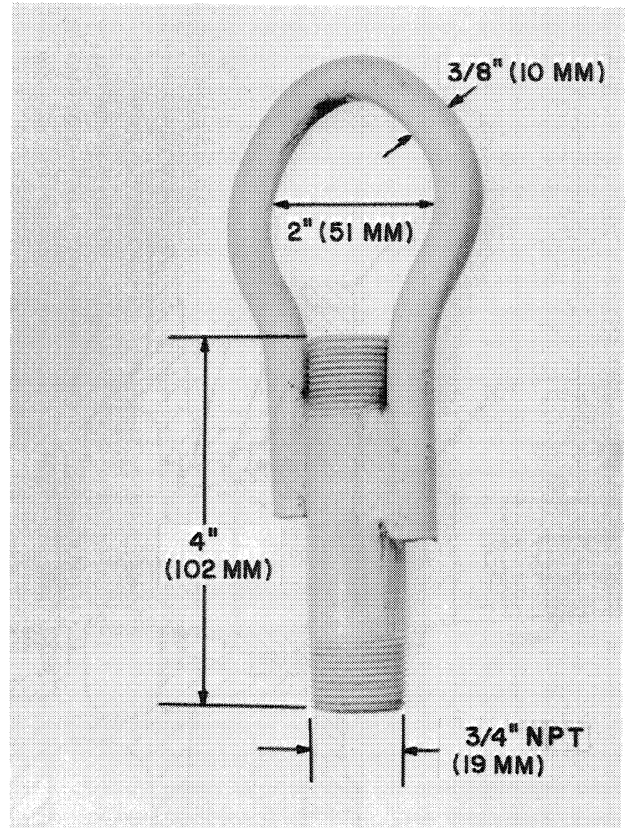


FIGURE 1-7

11. Remove the reversing gearbox fill plug and install a lift bracket, as shown in Figure 1-6. See Figure 1-7 for lift bracket dimensions.
12. Remove the four bevel gearbox mounting bolts, D, Figure 1-5.
13. Support the gearboxes with a hoist and remove the two reversing gearbox mounting bolts, A, Figure 1-8. Note the position and number of shims and washers between the gearbox and mounting bracket.
14. Lift the gearbox assembly out of the machine.

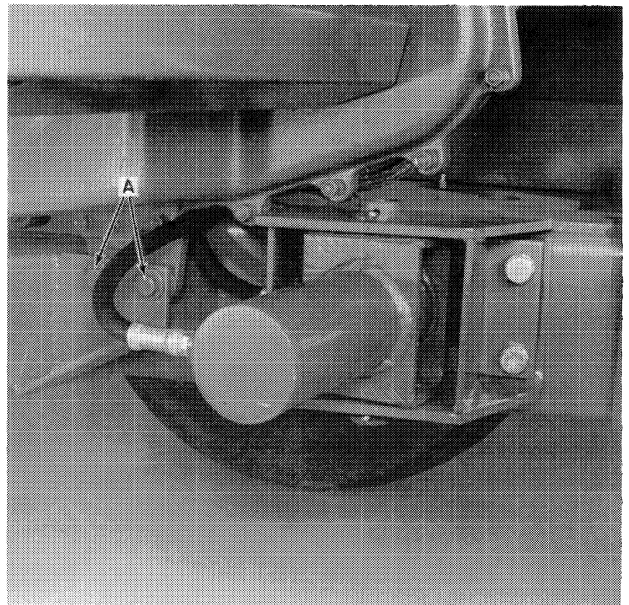


FIGURE 1-8

BEVEL GEARBOX

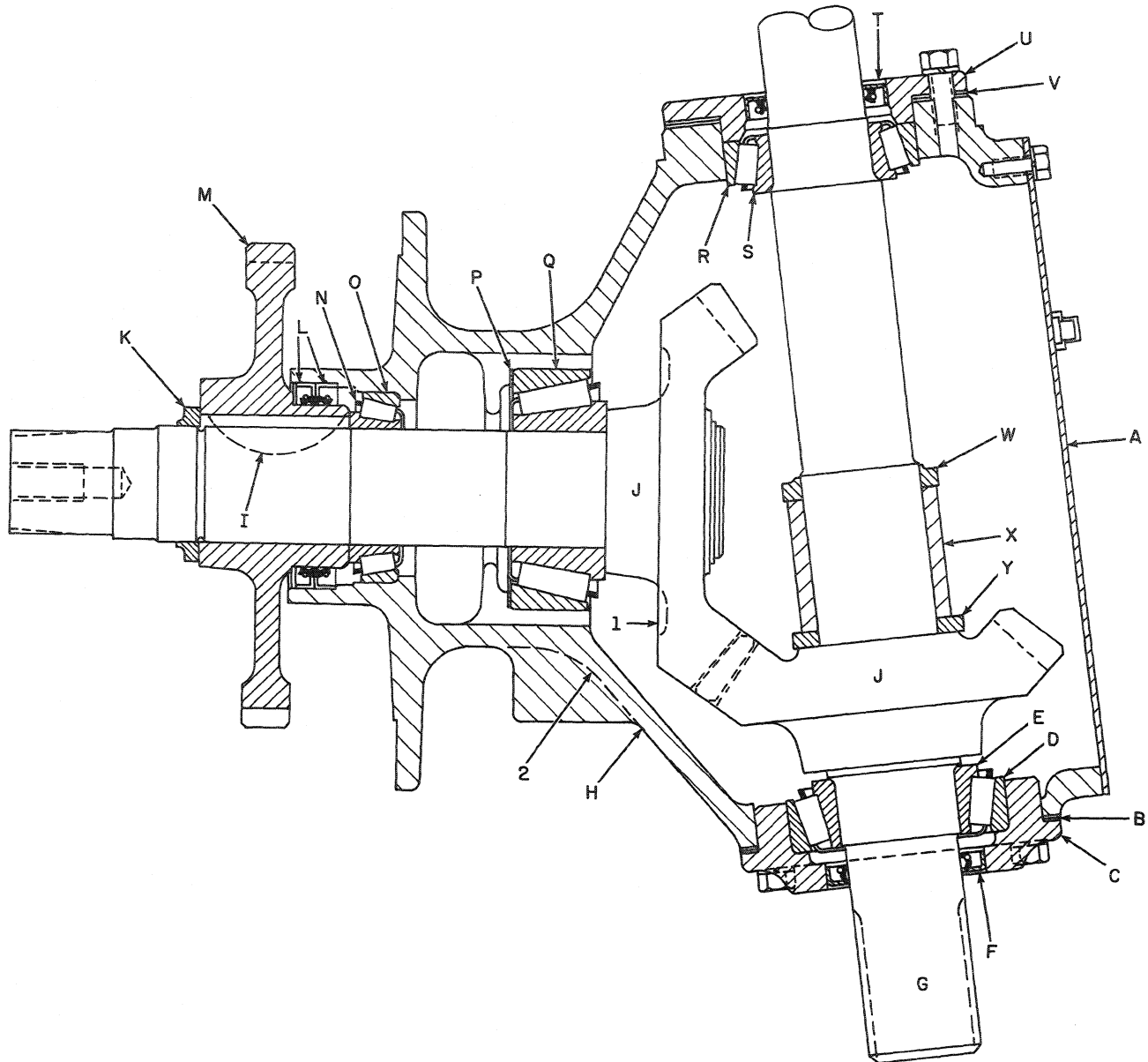


FIGURE 1-9

Figure 1-9
BEVEL GEARBOX

A	Cover	J	Gear set	S	Bearing cone
B	Shims	K	State nut	T	Seal
C	Bearing cap	L	Seal - 2	U	Bearing cap
D	Bearing cup	M	Gear	V	Shims
E	Bearing cone	N	Bearing cone	W	Stake nut
F	Seal	O	Bearing cup	X	Spacer
G	Input shaft	P	Shims	Y	Spacer
H	Housing	Q	Bearing assembly	1	Output gear code
I	Woodruff key	R	Bearing cup	2	Housing code

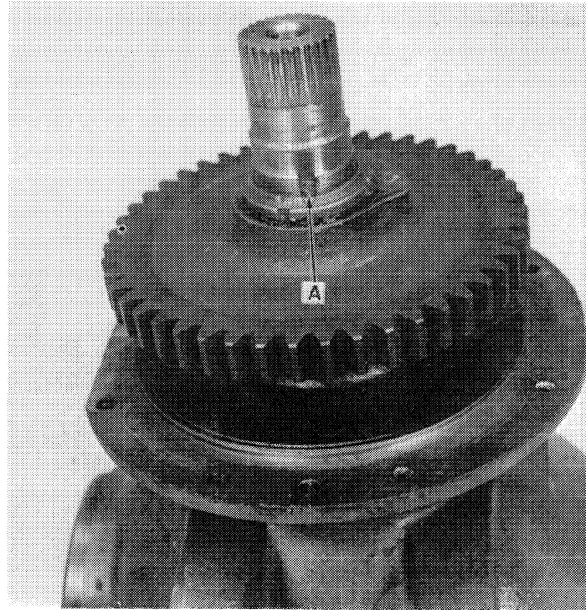


FIGURE 1-10

DISASSEMBLY

NOTE: Remove the optional cutterhead clutch if it was not removed earlier.

1. Support the reversing gearbox and bevel gearbox. Remove the eight mounting bolts and separate the two gearboxes.
2. Refer to Figure 1-9. Drain the oil.
3. Remove the access cover, A.
4. Remove the input shaft bearing caps, C and U. Remove bearing cups, D and R.
5. Remove the input shaft assembly.
6. Unlock the stake nut, K, by driving a chisel in the groove shown at A, Figure 1-10. Remove the stake nut.
7. Clean the Permatex from the shaft next to gear, M.
8. Remove gear, M. If possible, support the gear in a press and push the shaft and housing off.

If the press does not have sufficient clearance for the housing while supporting the gear, then support the housing. Press the shaft no more than $\frac{1}{8}$ " (3 mm). This will start the gear moving. Do not press further as the bearing, N, will contact the woodruff key, I. Use a puller to finish removing the gear.

9. Remove the output shaft.

Input Shaft Disassembly

1. Unlock the stake nut, W, Figure 1-9, by driving a chisel into the groove in the shaft.
2. Remove the stake nut and press the gear off the shaft.

INSPECTION OF PARTS

Replace the gear set if there is visible wear.

NOTE: The output shaft and gear set are only serviced as a matched set.

Replace all bearings if there are any filings in the housing.

Replace all damaged seals.

ASSEMBLY

Thoroughly clean all parts.

Output Shaft Assembly

1. Install shims, P, Figure 1-9.

If the gear set, J, bearing assembly, Q, and housing, H, are not replaced, reinstall the original shim pack thickness.

If new parts are used, the shim pack thickness must be calculated.

$$\begin{aligned}
 & \text{output gear code} \\
 & + \text{housing code} \\
 & + \text{bearing code} \\
 & \hline
 & = \text{shim thickness in thousandths}
 \end{aligned}$$

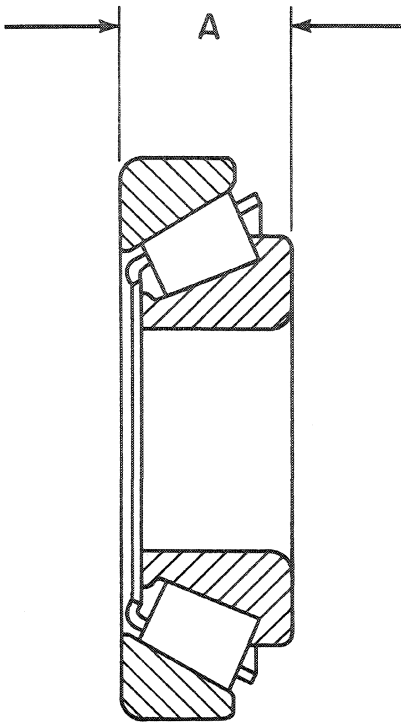


FIGURE 1-11

The output gear code is etched on the back side of the output gear at 1, Figure 1-9. The number should be 0-4. The housing code is located on the neck of the gearbox at 2, Figure 1-9. The code should be in the range 8-13. The bearing code is determined from dimension, A, Figure 1-11. The code number should be written on a piece of paper packed with the replacement bearing.

Dimension A	Code Number
1.57"	0
1.569"	1
1.568"	2
1.567"	3
1.566"	4
1.565"	5
1.564"	6
1.563"	7
1.562"	8

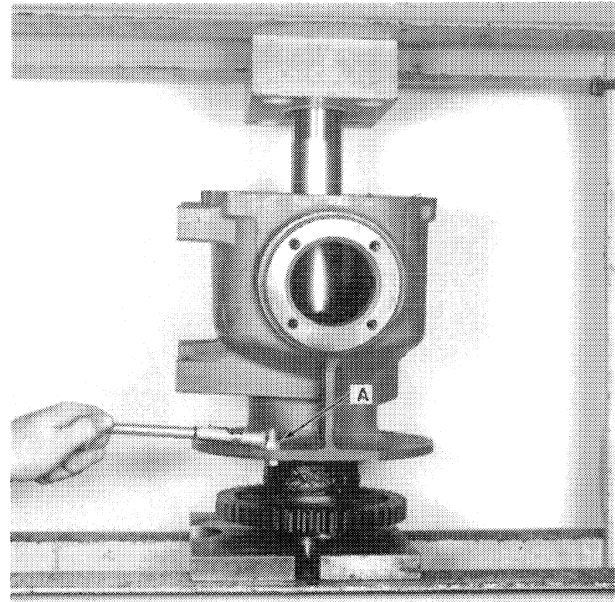


FIGURE 1-12

Example:

+ 2 (output gear code)
 + 10 (housing code)
 + 4 (bearing code)

+ 16 = 0.016" shims installed at P,
 Figure 1-9

2. Install bearing cups, O and Q, Figure 1-9. The bearing cups must be firmly seated.
3. Seat the bearing cone, Q, against the pinion gear.
4. Insert the output shaft in the gearbox and install bearing cone, N, Figure 1-9.
5. Install the inner seal at L, Figure 1-9, in the housing. Install the outer seal on the gear, M. The seals must be installed as shown.
6. Install the woodruff key, I, and start gear, M, on the shaft.
7. Position the housing in a press as shown in Figure 1-12. The gear should rest on the press. The ram should press against the shaft. The housing must be free to rotate.
8. Press the shaft down until the seal on the gear is about to contact the housing. Install the outer seal in the housing before pressing further.

9. Continue to press the shaft onto the gear to obtain the correct bearing preload. Preload should be 8 in. lbs.-14 in. lbs. (0.9 N·m-1.58 N·m) rolling torque.
10. After the correct preload is obtained, fill the end of the gear, M, with Permatex and then install the stake nut, K, Figure 1-9. Securely tighten the stake nut and lock it by deforming it in the groove in the shaft, A, Figure 1-10.
4. Adjust the shaft to obtain 0.006"-0.015" (0.15-0.38 mm) backlash. Measure backlash at the outer edge of the input gear. Measure backlash at several points to determine the tightest spot.
5. Install enough shims at B, to obtain the required backlash. Coat the bearing cap, C, mounting bolt threads with a thread sealant.

Bearing Pre-Load

Adjust bearing pre-load after backlash adjustment is complete.

Input Gear Assembly

1. Press gear, J, Figure 1-9, on the input shaft with a force of 5500 lbs.-7000 lbs. (2450 N-3100 N).
2. Install spacers, Y and X, Figure 1-9. Seat stake nut, W, against spacer, X, and then tighten ¼ turn. Lock the stake nut by deforming it into the groove in the shaft.
3. Install the bearing cones on the shaft and seat them against the shoulder.
4. Install the shaft in the gearbox.

Backlash Adjustment

Adjust backlash between the gears first. Refer to Figure 1-9.

1. Install bearing cup, R, and cap, U. Do not install any shims, V, or the seat, T.
2. Install bearing cup, D, and cap, C, without shims or seal.

NOTE: If the shims, B, removed during disassembly are in good condition, they can be installed as a starting point for adjusting backlash.

3. Loosen the cap screws holding bearing cap, U, as the cap screws holding bearing cap, C, are tightened. This will push the input gear toward the output gear reducing gear backlash.

1. Tighten the cap screw holding the bearing cap, U, to obtain 15 in. lbs.-25 in. lbs. (1.7 N·m-2.7 N·m) rolling torque on the input shaft, G, without seals, F and T, installed. The rolling torque is measured with both shafts installed.
2. Install enough shims, V, to obtain the required torque. Coat the bearing cap cap screws with thread sealant.
3. Install all seals, F and T.
4. Use a gasket eliminator to seal the cover, A. Install cover, A.

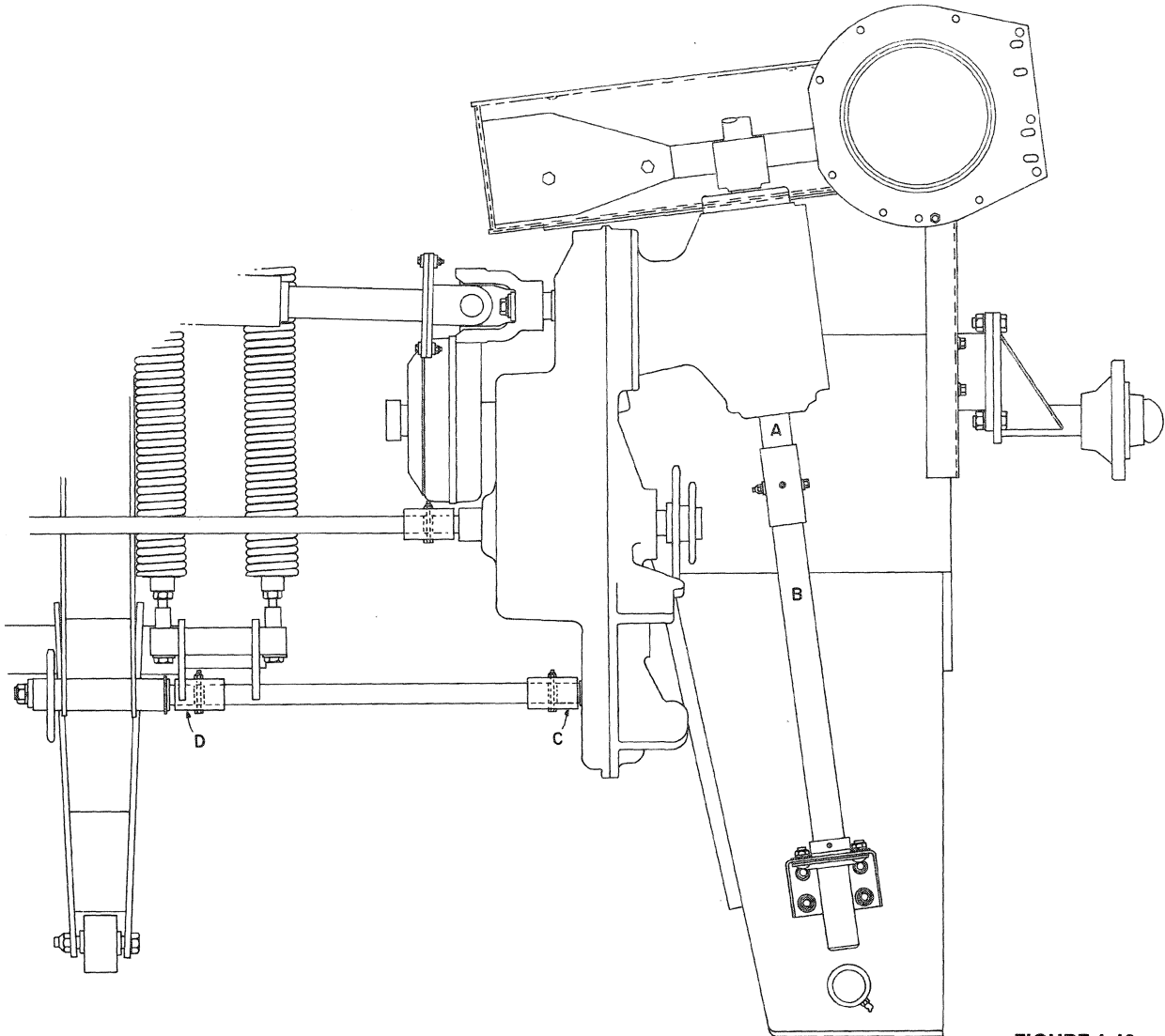


FIGURE 1-13

INSTALLATION

1. Bolt the bevel gearbox to the reversing gearbox. Use a gasket eliminator between the gearboxes.

NOTE: It is recommended the seal in the reversing gearbox be removed before installing the bevel gearbox.

2. Install the gearbox assembly and reinstall the bevel gearbox mounting bolts. Align the bevel gearbox input shaft, A, Figure 1-13, with the drive shaft, B. Align the reversing gearbox output shaft, C, with the attachment drive shaft, D. Tighten the bevel gearbox mounting bolts securely.
3. Install the reversing gearbox mounting bolts, A, Figure 1-14. Completely fill the space between the gearbox and frame with shims and washers.

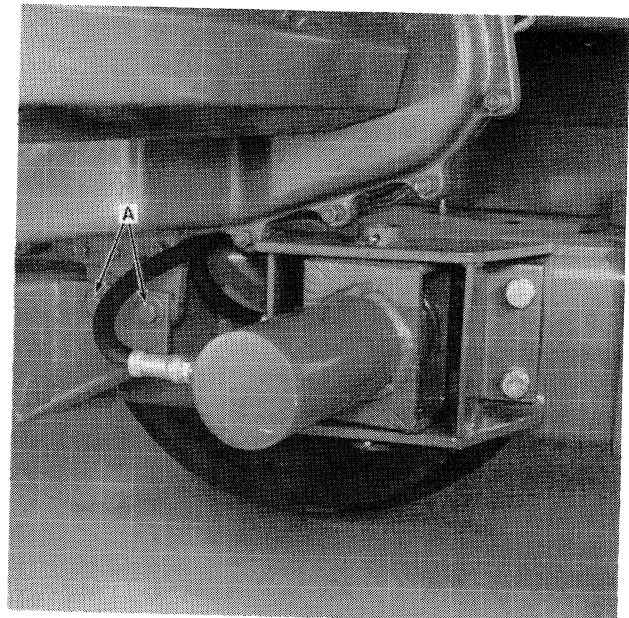


FIGURE 1-14

BEVEL GEARBOX

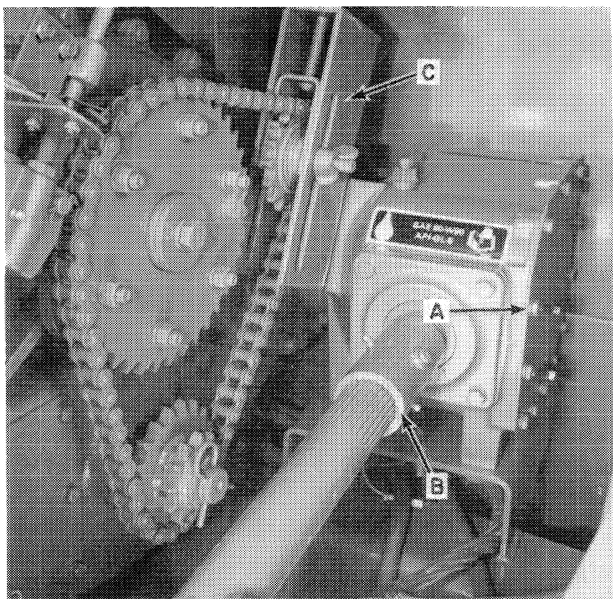


FIGURE 1-15

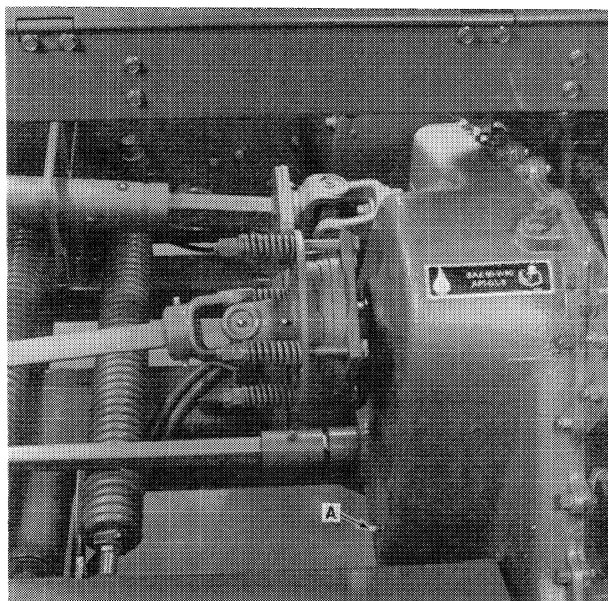


FIGURE 1-16

4. Install the input shaft coupler, B, Figure 1-15. Do not overtighten the retaining bolt.

NOTE: When the input shaft is properly aligned, the coupler, B, will slide easily on the spline.

5. Install the length-of-cut chain idler bracket, C, Figure 1-15, and align the sprockets.
6. Reinstall all remaining parts in reverse order of removal.

7. Fill the gearboxes with 80W-90 GL5 oil. Capacity of the bevel gearbox is 4 qt. (3.8 L). Capacity of the reversing gearbox is 8 qt. (7.6 L).

The level plug for the bevel gearbox is at A, Figure 1-15. The reversing gearbox level plug is at A, Figure 1-16.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the time it actually takes to complete each job.

Job	Man-Hours
Remove gearbox	4.0
Rebuild gearbox	2.5
Install gearbox	6.0

SECTION 2

REVERSING GEARBOX

OPERATION

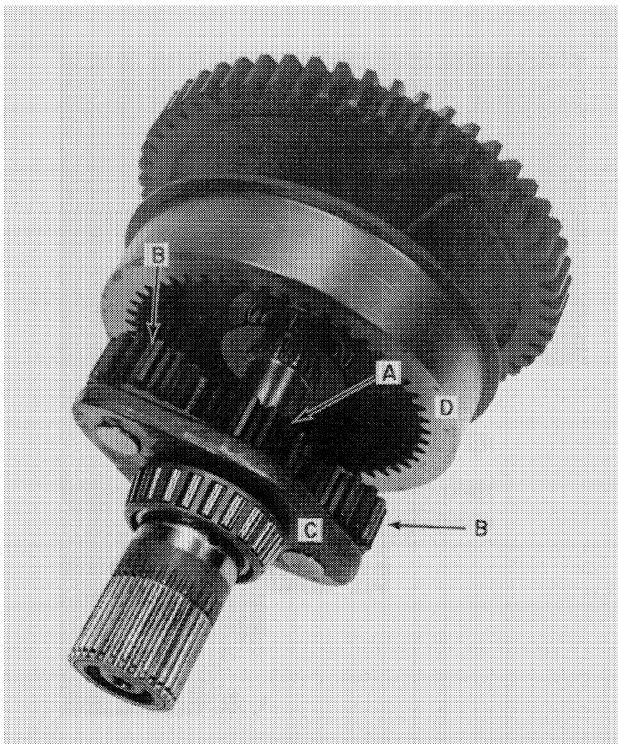


FIGURE 2-1

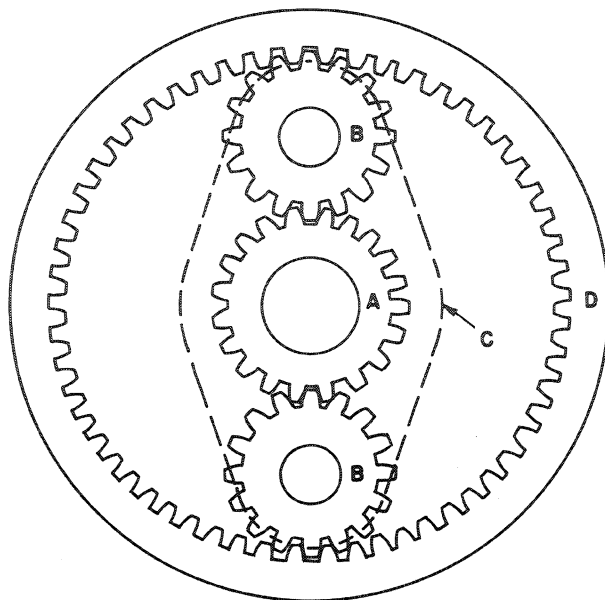


FIGURE 2-2

The reversing gearbox uses a planetary gear system controlled by electric clutches to turn the feed rolls in forward and reverse.

A planetary gear assembly consists of the parts shown in Figures 2-1 and 2-2.

Figure 2-1 and 2-2

- A Sun gear
- B Planet gears
- C Planet carrier
- D Ring gear

The forward magnet, Figure 2-13, is fastened to the sun gear and rotates with it. The armature is fastened to the planet carrier and rotates with it. The reverse magnet is fastened to the gearbox housing and does not turn. The sun gear is driven by the 97° gearbox. It rotates all the time.

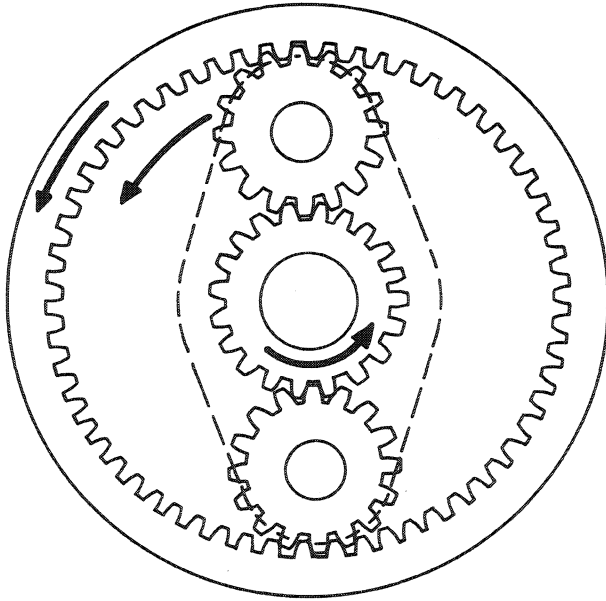


FIGURE 2-3

In forward, the forward magnet clamps to the armature so they rotate together. This locks the planets to the sun gear, causing the planets, planet carrier, and sun gear to rotate as a unit as shown in Figure 2-3. The planets, being locked solid to the sun, do not turn. They drive the ring gear which is connected to the feed roll drives.

In reverse, the stationary rear magnet clamps the armature and prevents it from turning. This causes the planet carrier to be fixed. The sun gear then turns the planet gears, which rotate, turning the ring gear in reverse. This causes the feed rolls to reverse, Figure 2-4.

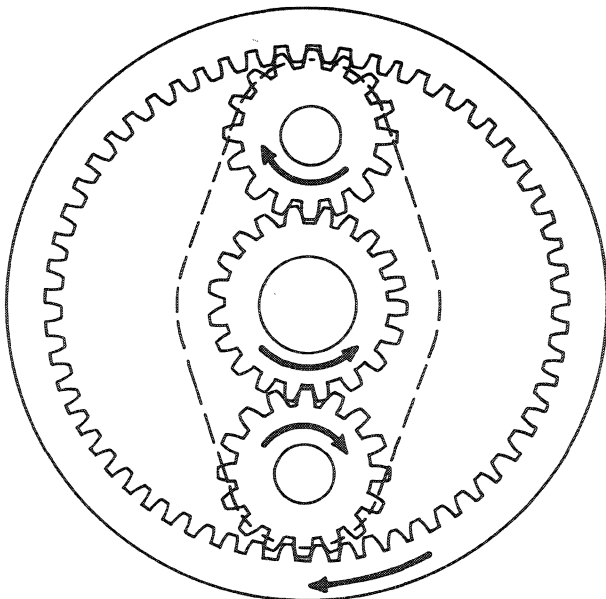


FIGURE 2-4

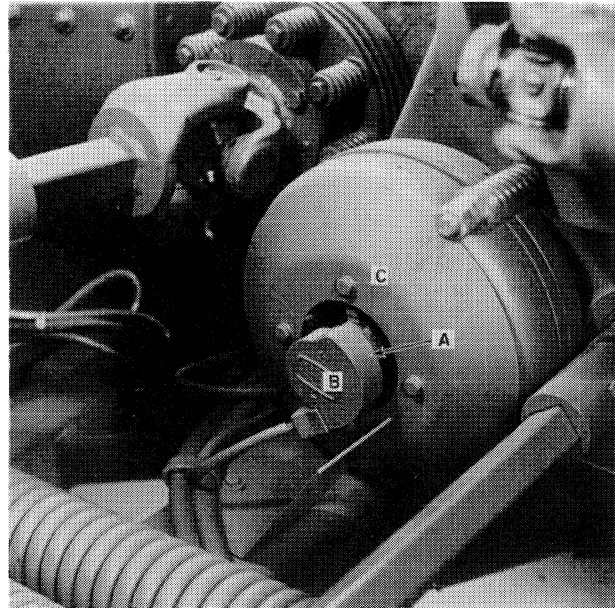


FIGURE 2-5

ELECTRIC CLUTCH SERVICING

The electric clutch assembly can be serviced without removing the gearbox.

BRUSH BOX -- To replace the brushes, remove cover, A, Figure 2-5. Pull out the four brushes, A, Figure 2-6, and install the new brushes.

Inspect the two slip rings, B, Figure 2-6, for arcing or wear. Replace the complete brush box, A, Figure 2-5, if there is any wear.

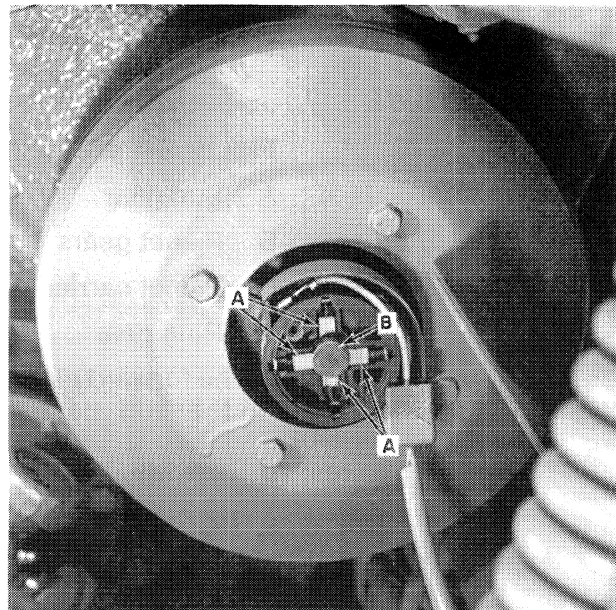


FIGURE 2-6

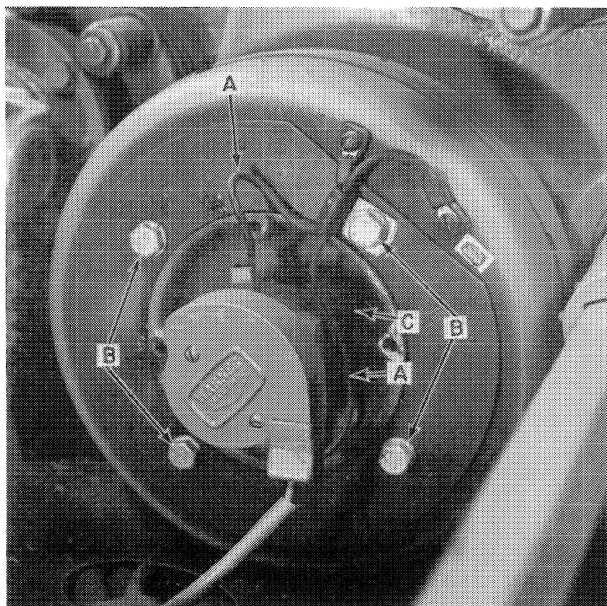


FIGURE 2-7

To replace the brush box, unhook the two wires at the terminal block. Remove shield, C, Figure 2-5. Unplug the two wires, A, Figure 2-7, and then unscrew the brush box from the shaft.

Tighten the brush box to 40 ft. lbs.-50 ft. lbs. torque when installing on the shaft.

MAGNETS AND ARMATURE

The armature, A, Figure 2-8, should have a minimum air gap, to the forward magnet, B, Figure 2-8, and reverse magnet, C, of 0.010" (0.3 mm). The air gap should be readjusted when the gap exceeds 3/32" (2.5 mm).

NOTE: The size of the air gap does not affect the driving torque of the electric clutch. The durability of the armature mounting straps decreases as the air gap increases.

Wear grooves appear on the armature and magnet surfaces. This is a normal wear condition and does not affect function of the unit. Never machine either the armature or magnet contact surfaces to remove grooves or score marks.

Re-machining the face of a worn armature is not recommended. If a replacement armature is to be used with a magnet, it is necessary to re-machine the worn magnet face. To re-face a magnet:

1. Machine only enough material to clean the complete face of the magnet.
2. Hold the face within 0.005" (0.13 mm) of parallel with the mounting plate.

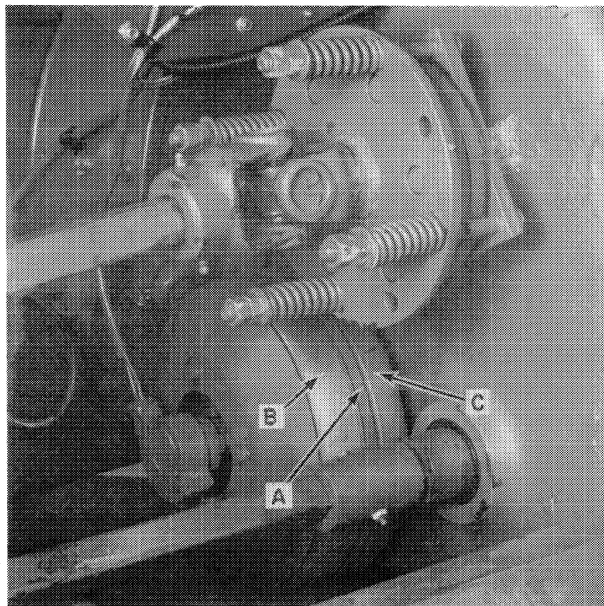


FIGURE 2-8

Normally, the magnet and armature, as a mating pair, will wear at the same rate. It is the usual recommendation that both components be replaced at the same time.

Replace the armature if it is less than 3/16" (5 mm) thick or is warped. Replace the armature if it is discolored due to heat or if metal transfer has occurred.

Oil and grease should be cleaned from the magnet and armatures as well as any surrounding surface which would allow lubricants to deposit on the clutch.

A severe loss of driving ability will occur if the clutch mating parts are lubricated.

Magnet resistance at 70° F

Aluminum coil - 2.8 ohms

Copper coil - 1.6 ohms

4-pole magnet - 1.6 ohms

Resistance increases as the temperature increases.

Voltage must be a minimum of 10 volts. Loss of driving ability will occur below 10 volts.

Adjusting Armature Air Gap

Forward Magnet

1. Measure the air gap between the armature, A, Figure 2-8, and forward magnet, B.
2. Remove shield, C, Figure 2-5.

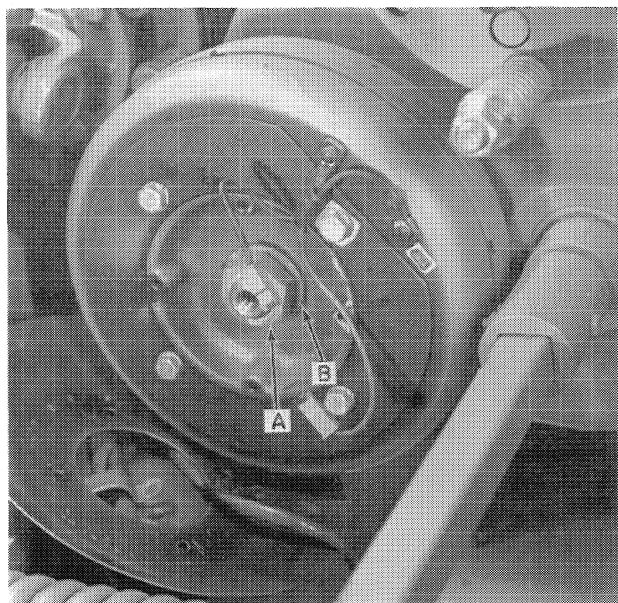


FIGURE 2-9

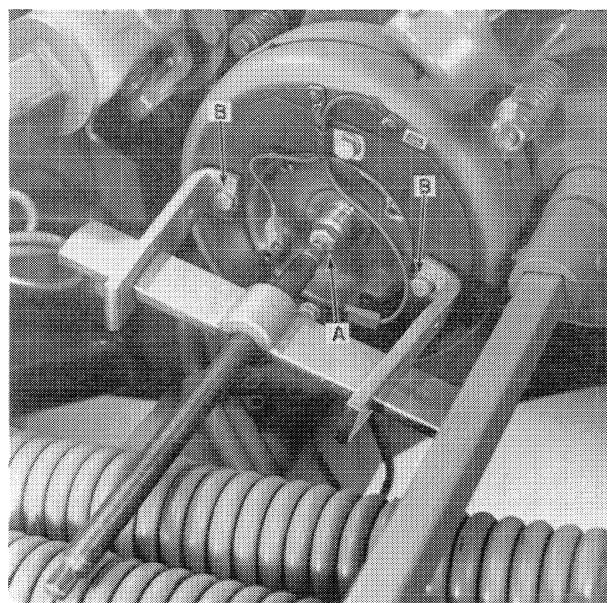


FIGURE 2-10

3. Disconnect the wires, A, Figure 2-7, from the brush box.
4. Remove the four magnet mounting bolts, B, Figure 2-7, and remove the magnet assembly from hub, C.

NOTE: Individual shim stacks are used at each mounting bolt position.

5. Make four equal stacks of shims removed from the magnet assembly. The shims are in two thicknesses, 0.024" (0.6 mm) and 0.060" (1.5 mm).

Remove an equal number of shims from each stack to obtain a minimum air gap of 0.010" (0.3 mm).

6. Coat the remaining shim stacks with a small amount of grease. The shims will stick together making assembly of the magnet on the hub easier. Install the magnet on the hub and tighten the hardware securely. Rotate the magnet one revolution to check for rubbing between the magnet and armature.
7. Complete the assembly.

ELECTRIC CLUTCH REMOVAL

1. Remove the brush box assembly. See "Brush Box" for procedure.
2. Unlock the nut, A, Figure 2-9, by bending up the tang washer, B.

3. Install a 1/2" cap screw at A, Figure 2-10. Loosen the magnet mounting bolts at B, Figure 2-10, and install a puller as shown.
4. Remove the hub and magnet assembly from the tapered spline.
5. Remove the snap ring, A, Figure 2-11, and shims, B. The armature, C, will slide off the straight splined shaft.

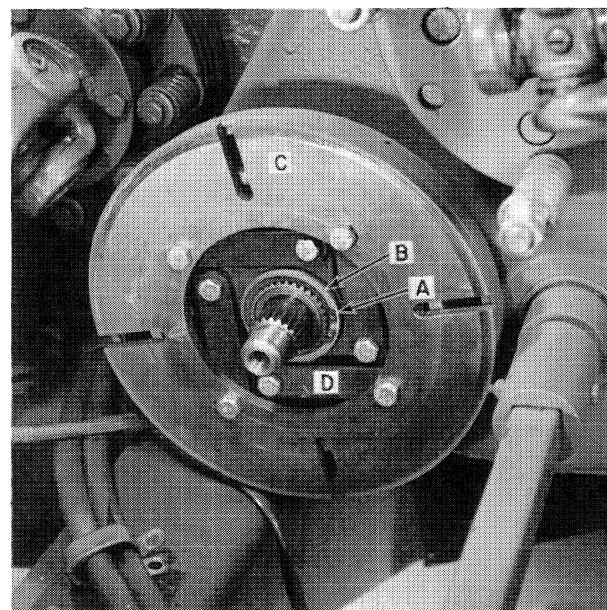


FIGURE 2-11

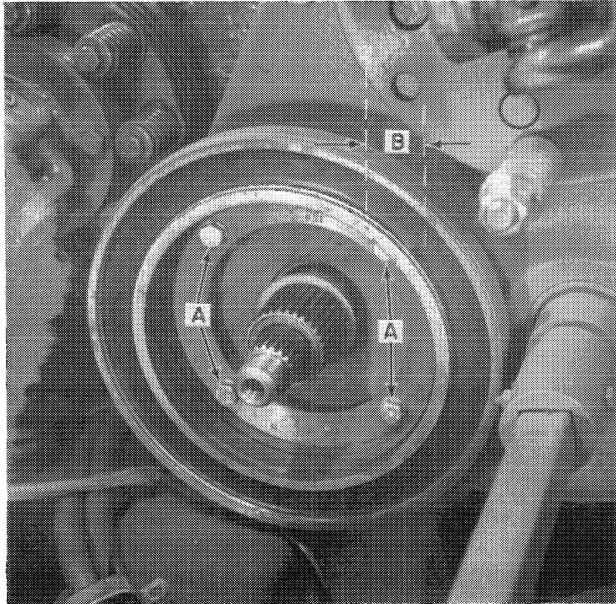


FIGURE 2-12

6. Remove the four cap screws, A, Figure 2-12, to remove the reverse magnet. The two wires fastened to the magnet can be removed after the magnet is removed.

ELECTRIC CLUTCH ASSEMBLY

NOTE: Two magnets have been used on Model 900 harvesters as standard equipment. 2-pole aluminum coil magnets have a resistance, when cold, of 2.8 ohms. 2-pole copper coil magnets have a resistance of 1.6 ohms. There is no external difference between the magnets. Measure the resistance of both magnets. If both a copper coil and an aluminum coil magnet are present, install the copper coil magnet on the forward side.

1. Install the reverse magnet. The two wires should be fastened to the magnet before installation. The terminals should be positioned at B, Figure 2-12.
2. Install a snap ring at N, Figure 2-13, if not already installed. Install the armature, I, Figure 2-13, with straps, D, Figure 2-11, pointed in the direction shown. Install enough shims, M, Figure 2-13, to obtain a minimum of 0.010" (0.3 mm) air gap to the reverse magnet. Rotate the armature one full turn to insure there is no contact between the parts.

NOTE: Clearance may vary considerably due to normal variation in armature straps.

Figure 2-13

- A Shield
- B Forward magnet hub
- C Brush box
- D Nut
- E Tang washer
- F Snap ring
- G Shims
- H Forward magnet
- I Armature
- J Reverse magnet
- K Gearbox housing
- L Shims
- M Shims
- N Snap ring

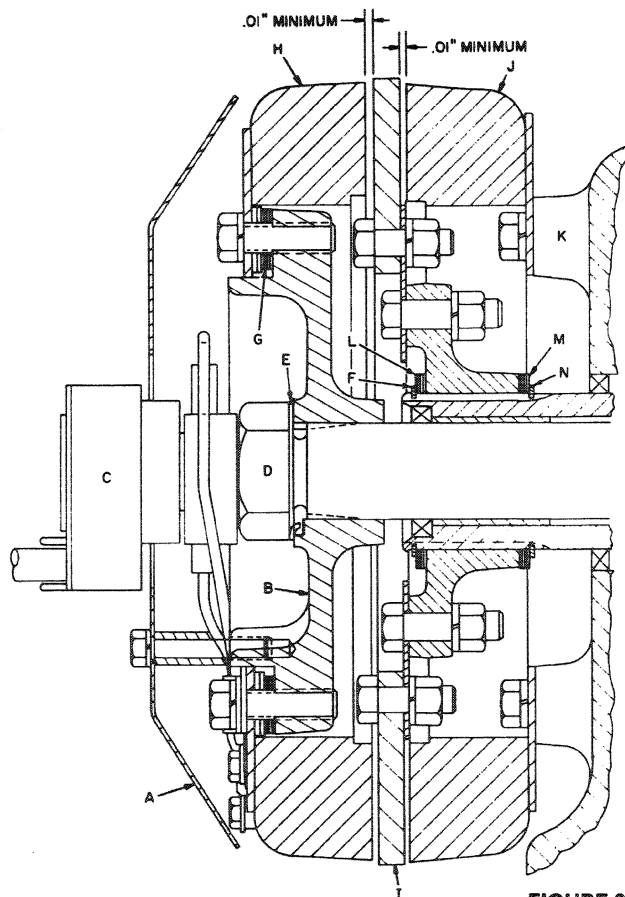


FIGURE 2-13

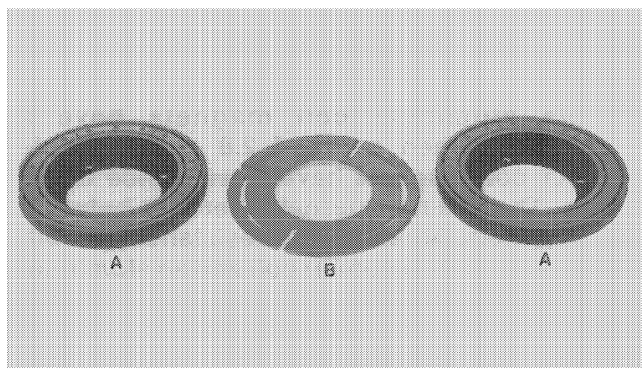


FIGURE 2-14

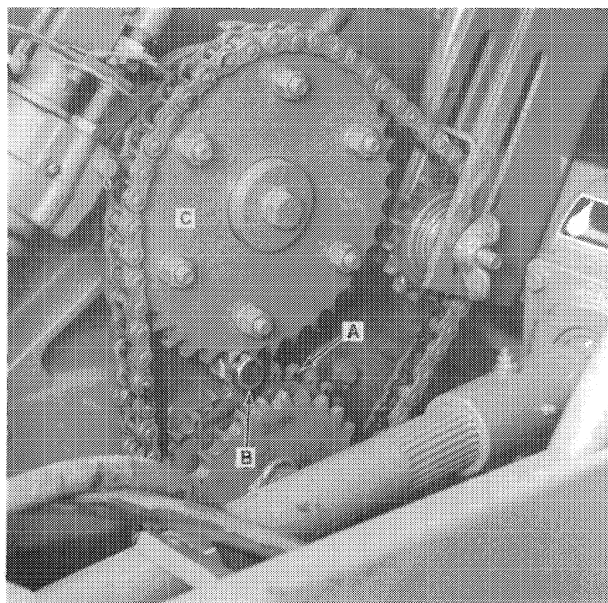


FIGURE 2-15

3. Install enough shims, L, Figure 2-13, along with the snap ring, F, so the armature hub cannot move on the splined shafts.
4. Install the forward magnet hub, B, Figure 2-13. Install the tang washers, E, and nut, D. Torque the nut to 125 ft. lbs. Bend the tang washer against a flat of the nut to prevent it from turning.
5. Install the forward magnet, H, and adjust the air gap to a minimum of 0.010" (0.3 mm). See "Adjusting Armature to Forward Magnet Air Gap" for procedure.
6. Install the brush box, C, Figure 2-13, and torque to 40 ft. lbs.-50 ft. lbs. torque.
7. Connect the forward magnet wires to the brush box. The wires can be connected to either terminal.
8. Install shield, A, Figure 2-13.

Optional 4-Pole Magnet

The optional 4-pole magnet, A, Figure 2-14, and 4-pole armature, B, should not be installed in combination with a 2-pole magnet or armature. The magnet and armature will not clamp properly.

Installation is the same as the 2-pole magnet.

ELECTRIC CLUTCH BURNISHING

Once a slipping problem has occurred, changing the armature will NOT correct the problem unless the magnet is also resurfaced or replaced and correct burnishing procedures are used.

NOTE: Correctly or incorrectly burnishing a new magnet and armature can make as much as a 60% difference in output torque capacity of the clutch.

Once a magnet has been burnished or "matched" to a certain armature, it should never be used with a different armature without having its driving surface machined to take out the rough spots.

BURNISHING PROCEDURE

1. Lock up the gearbox.

Install the 30-tooth L.O.C. sprocket (largest), A, Figure 2-15. Install a 5/8" Grade 5 cap screw, B, in the teeth between the upper sprocket, C, and lower sprocket, A, as shown.

2-7

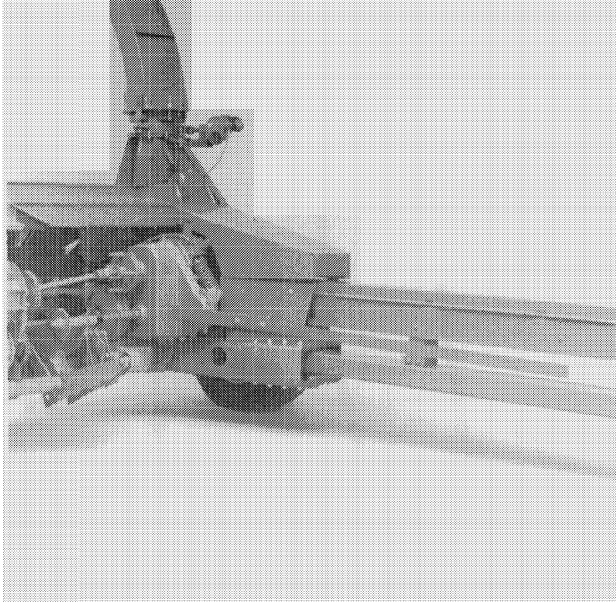


FIGURE 2-19

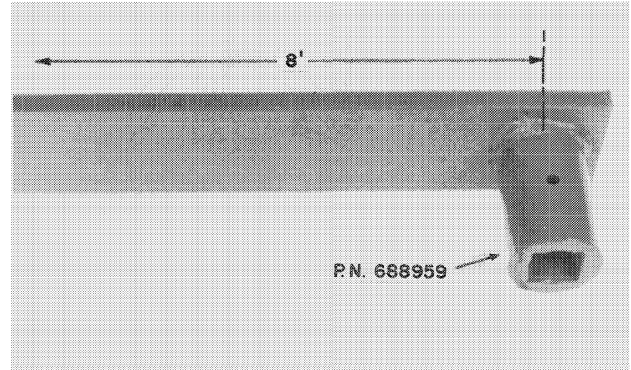


FIGURE 2-20

CHECKING ELECTRIC CLUTCH SLIP TORQUE

1. Operate PTO at full rated RPM.
2. Engage the forward magnet, and, without turning off the electric clutch, turn off the tractor PTO and the tractor engine.
3. Block the cutterhead to prevent it from turning.
4. Remove the attachment drive shaft shield, A, Figure 2-21, and the drive shaft under it.
5. Install a bar on the gearbox attachment shaft as shown in Figure 2-19. See Figure 2-20 for bar dimensions.
6. Using a spring scale, lift up on the bar until the electric clutch slips.

The minimum slip torque is as follows:

Aluminum coil magnet - 1165 ft. lbs.

Copper coil magnet - 1400 ft. lbs.

4-pole magnet - 1630 ft. lbs.

REVERSING GEARBOX REPAIR

SPECIFICATIONS

Shaft end play	0.001"-0.004" (0.025 mm-0.01 mm)
Bottom feed roll shaft bushings ID	1.251"-1.253" (31.78 mm-31.83 mm)
Planet carrier bushings ID	1.251"-1.253" (31.78 mm-31.83 mm)
Planet gear bushings ID	0.876"-0.880" (22.25 mm-22.35 mm)
Ring gear bushings ID	2.125"-2.129" (53.97 mm-54.08 mm)
Oil capacity	8 qt. (7.6 L)

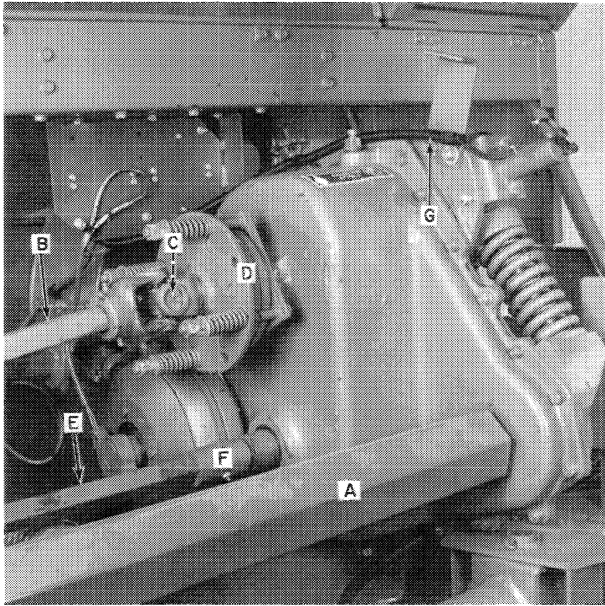


FIGURE 2-21

REMOVAL

NOTE: Metal detector stopping system repair is covered in the electrical section.

The reversing gearbox can be removed without removing the bevel gearbox.

1. Drain the oil from the reversing gearbox.
2. Remove the attachment drive shaft shield, A, Figure 2-21. Remove the attachment drive shaft.
3. Remove the upper feed roll drive shaft, B, Figure 2-21. Remove the snap ring or cap screw, C, holding the upper feed roll drive shear bolt hub or slip clutch, D. Remove the hub or slip clutch assembly.
4. Remove the lower feed roll drive shaft, E, Figure 2-21. To remove the shaft, it may be necessary to remove paint from the shaft, E, to be able to slide coupler, F, to the right.

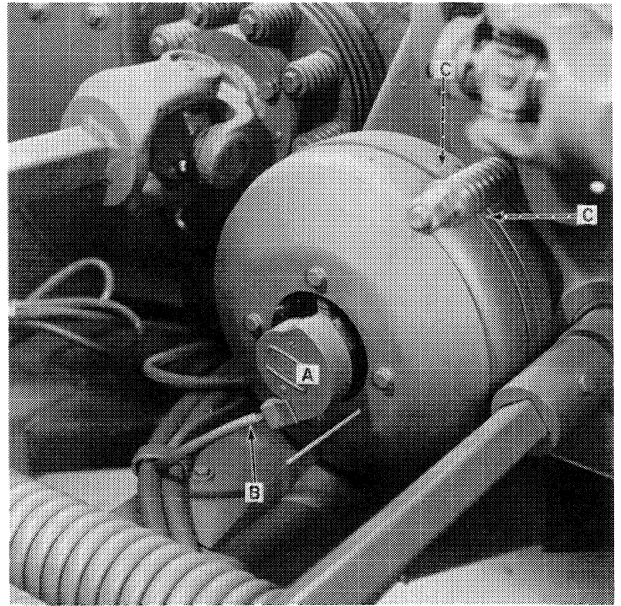


FIGURE 2-22

The shaft should be able to drop down enough to slide by the gearbox shaft. If not, the shaft can be removed at the time the gearbox is lifted out.

5. Metal Detector only - Disconnect the wire harness, G, Figure 2-21, from the stopping system solenoid, A, Figure 2-23. Remove the pawl switch, B, Figure 2-23.

NOTE: The electric clutch assembly can be removed at this time or after the gearbox has been removed from the harvester. See "Electric Clutch Servicing" for procedure.

6. If the electric clutch assembly will be disassembled after the gearbox is removed, remove the brush box cover, A, Figure 2-22, and disconnect the two wires, B. Loosen the two mounting screws at C, Figure 2-27, enough to remove the wires. The wire ends are slotted for easy removal.

REVERSING GEARBOX

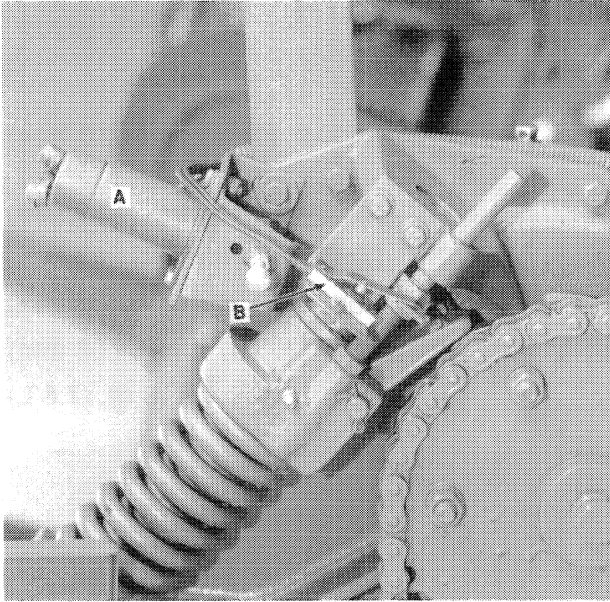


FIGURE 2-23

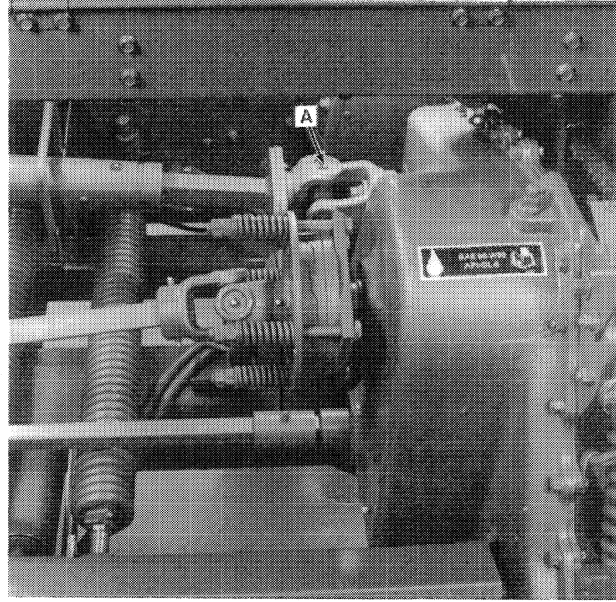


FIGURE 2-24

7. Shear bolt drive - Remove the U-joint assembly, A, Figure 2-24, from the gearbox output shaft as shown in Figure 2-25.

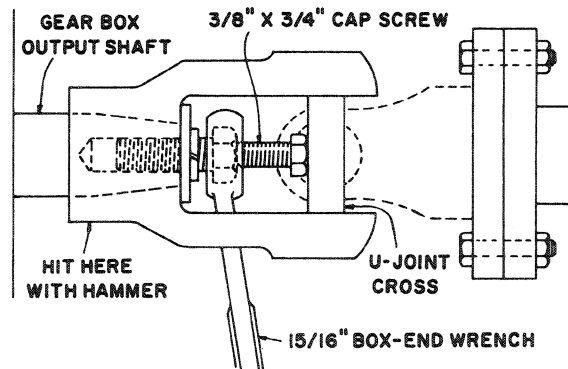


FIGURE 2-25

REVERSING GEARBOX

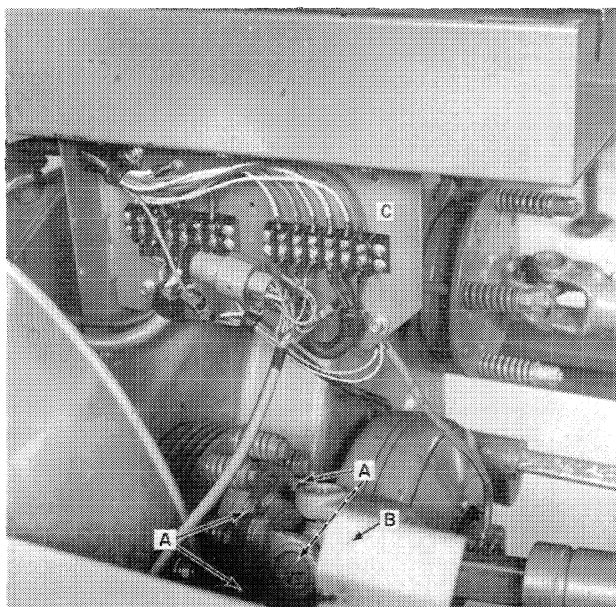


FIGURE 2-26

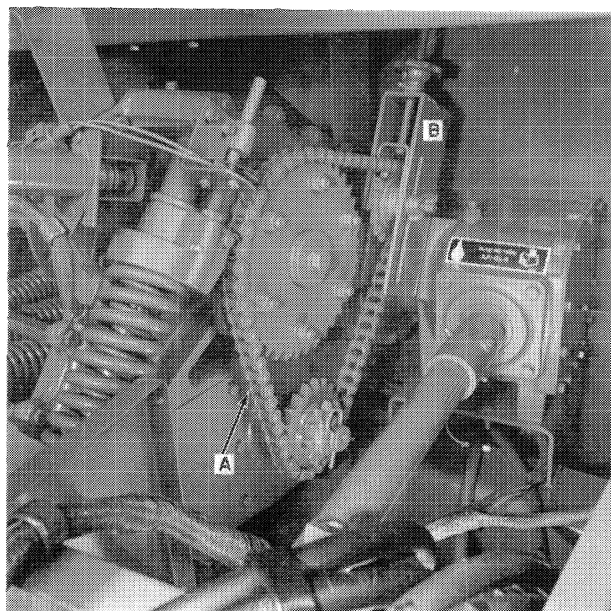


FIGURE 2-27

Slip clutch drive (Figure 2-26). Remove the drive shaft, B, by loosening the four mounting bolts, A. If the electric clutch assembly has not been removed, remove one clutch spring bolt and spring. Loosen the clutch assembly retaining bolt. Use a puller to remove the assembly from the tapered spline.

8. Unfasten the terminal mounting bracket, C, Figure 2-26, from the gearbox and harvester. Position the bracket out of the way.
9. Remove the length-of-cut chain, A, Figure 2-27, and idler bracket, B.
10. Remove the eight mounting bolts, A, Figure 2-28, fastening the reversing gearbox to the bevel gearbox.

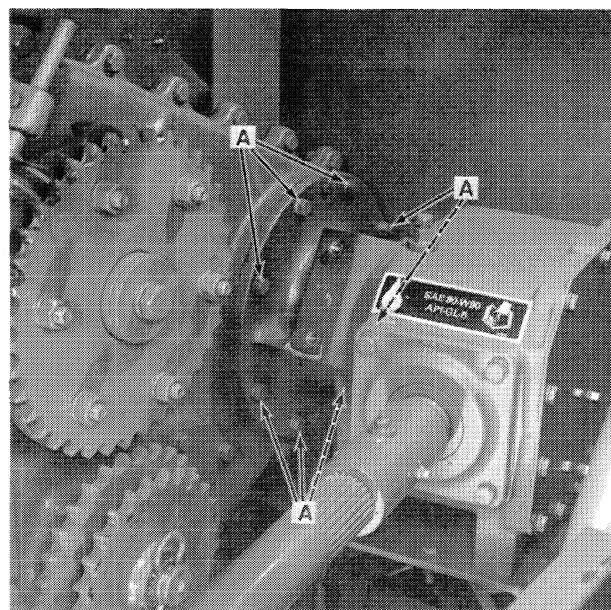


FIGURE 2-28

REVERSING GEARBOX

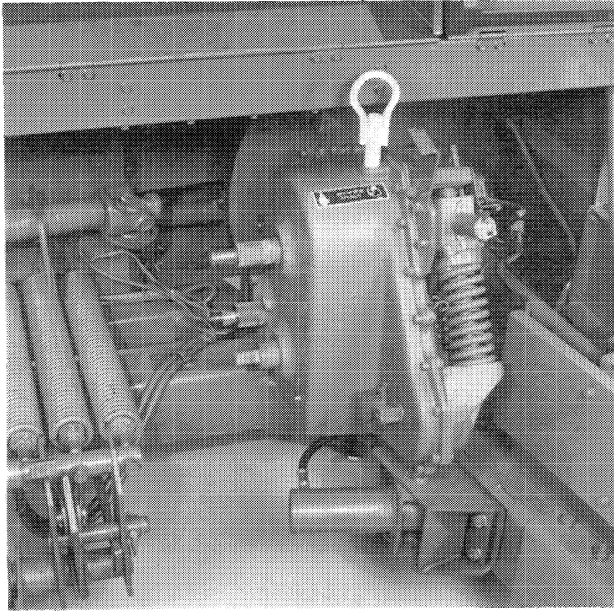


FIGURE 2-29

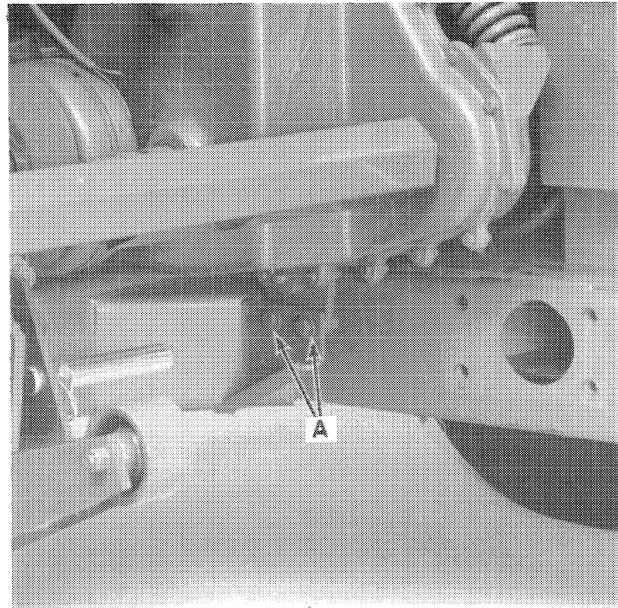


FIGURE 2-31

11. Remove the reversing gearbox fill plug, and install a lift bracket as shown in Figure 2-29. See Figure 2-30 for lift bracket dimensions.

12. Support the gearbox, and then remove the two lower mounting bolts, A, Figure 2-31. Note the position of the shims located between the gearbox and mounting bracket.
13. Separate the reversing gearbox from the bevel gearbox as shown in Figure 2-32, until gearbox aligning pins, A, are free.

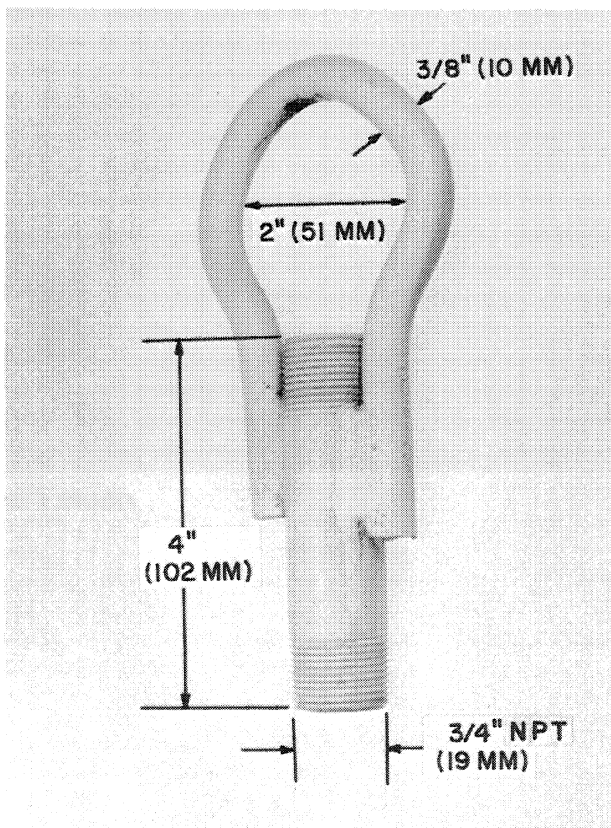


FIGURE 2-30

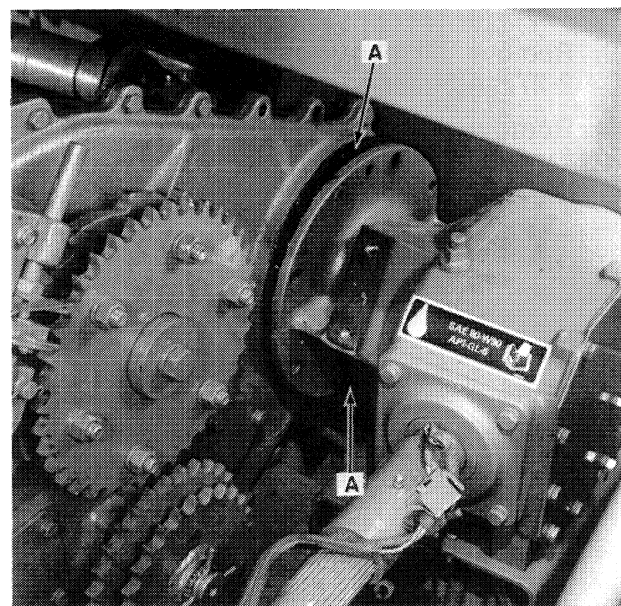


FIGURE 2-32

REVERSING GEARBOX

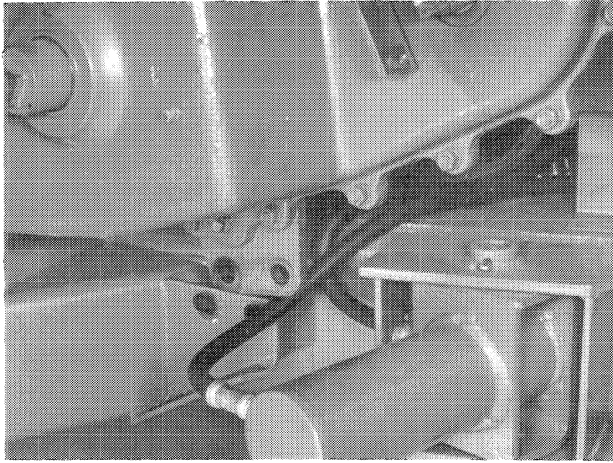


FIGURE 2-33

14. Lift the gearbox until the gearbox clears the lower mounting bracket as shown in Figure 2-33.
15. Separate the reversing gearbox from the bevel gearbox so the gear, A, Figure 2-34, is outside the case. Lift the gearbox out of the harvester.

DISASSEMBLY

NOTE: Remove the electric clutch assembly and feed roll jaw clutch assembly if not already removed.

1. Support the gearbox on blocks as shown in Figure 2-35. Remove the length-of-cut sprocket assembly, A, and sprocket assembly, B, from the straight spline shaft.

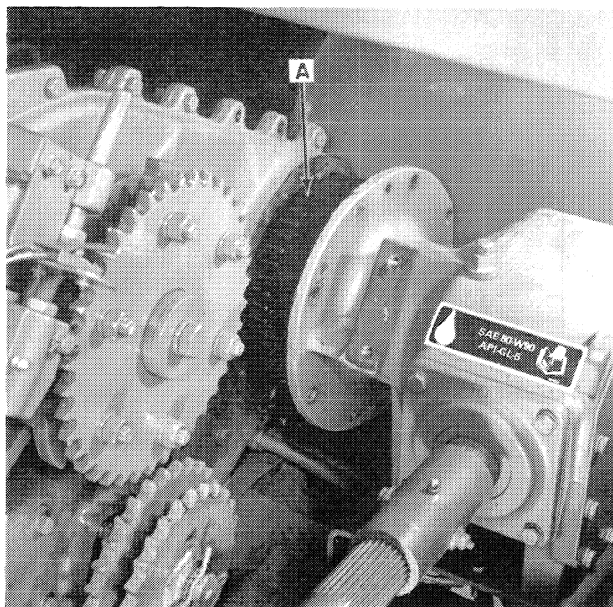


FIGURE 2-34

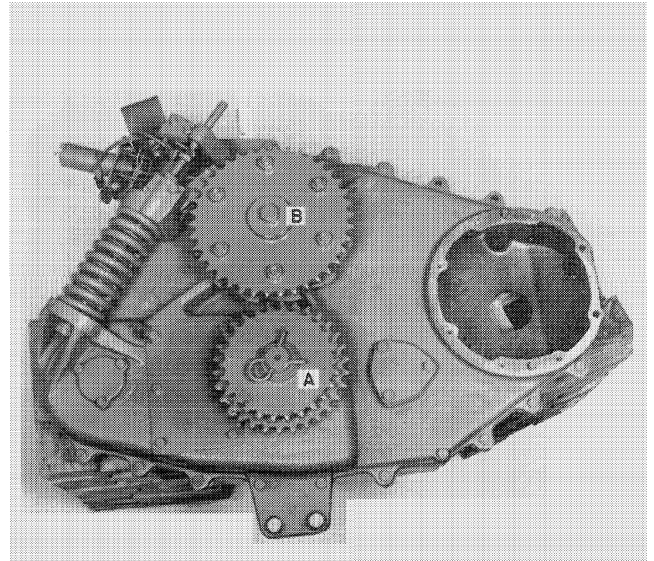


FIGURE 2-35

2. Remove the housing mounting bolts and lift off the top housing half.

NOTE: It is not necessary to remove the Metalert II feed roll stopping system.

3. Lift out the attachment drive shaft assembly, A, Figure 2-36, to remove the roller chain, B.
4. Lift out the primary drive shaft and gear assembly, C, Figure 2-36.

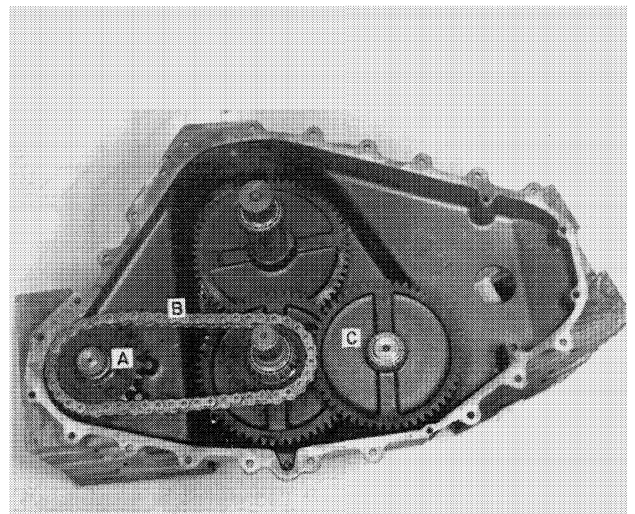


FIGURE 2-36

REVERSING GEARBOX

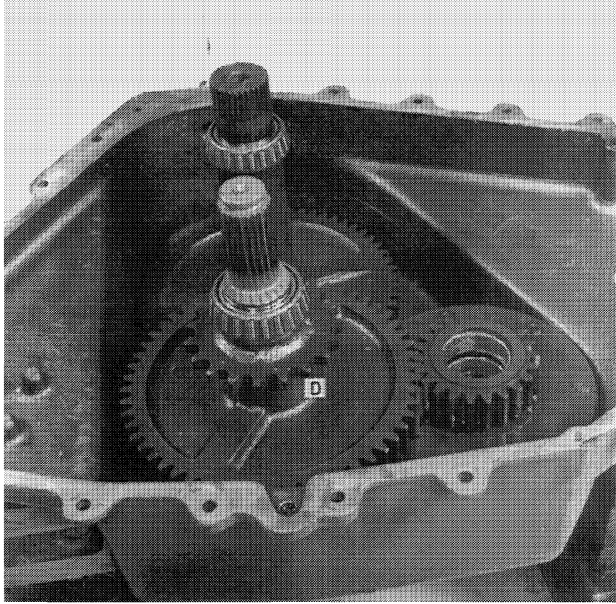


FIGURE 2-37

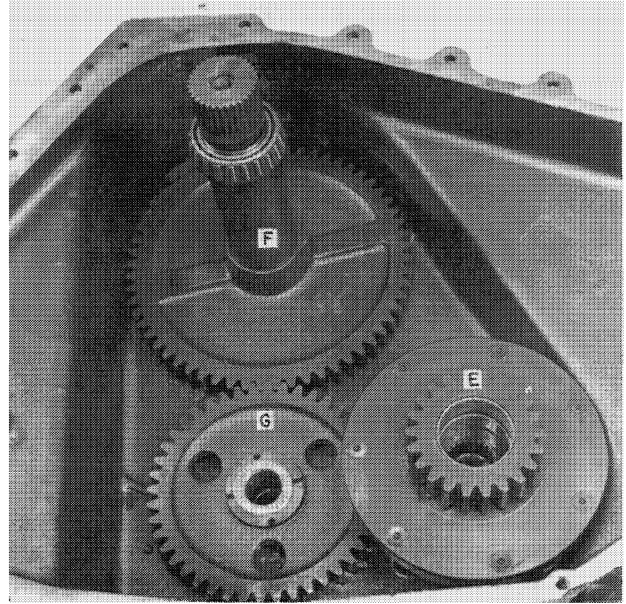
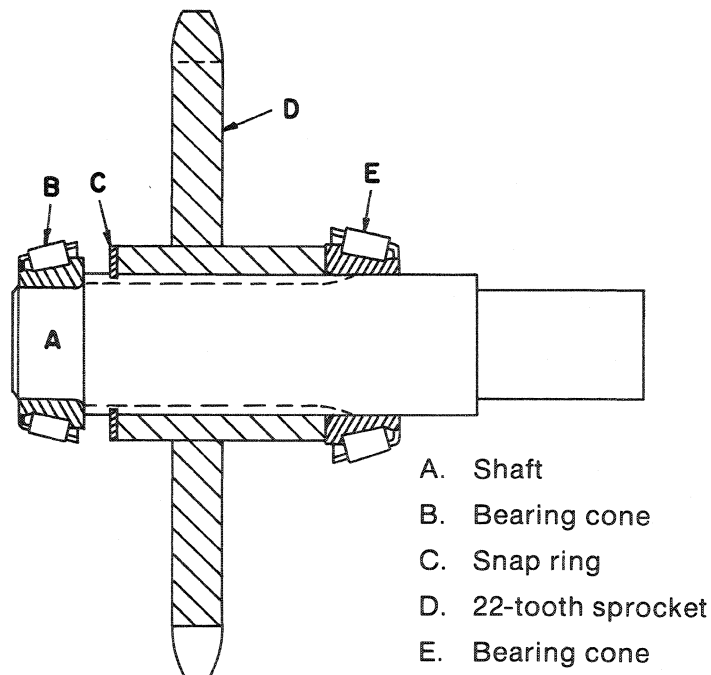


FIGURE 2-38

5. Lift out the intermediate shaft assembly, D, Figure 2-37.
6. Lift out the planetary gear assembly, E, Figure 2-38. Remove the top feed roll drive shaft, F, and bottom feed roll drive shaft, G.

Attachment Drive Shaft Disassembly (Figure 2-39)

Remove bearing, B, and snap ring, C. Slide or press gear, D, off the straight splined shaft.



- A. Shaft
- B. Bearing cone
- C. Snap ring
- D. 22-tooth sprocket
- E. Bearing cone

FIGURE 2-39