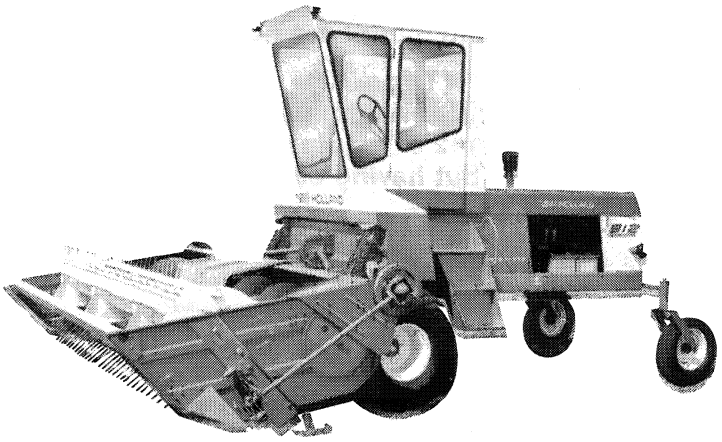
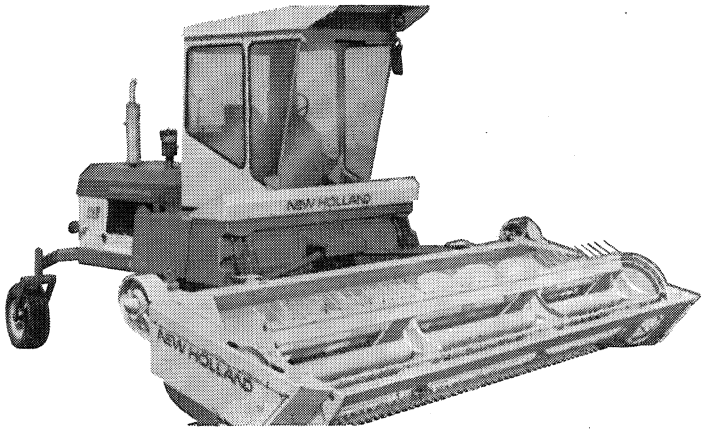
SERVICE MANUAL

SPEEDROWER®
912-1112-1114

90° GEARBOXES

SPERRY NEW HOLLAND





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Reprinted

90° GEARBOXES

IMPORTANT: TWO TYPES OF 90° GEARBOXES HAVE BEEN USED IN THE MODEL 1112 SPEEDROWER. IF THE 90° GEARBOX DOES NOT HAVE A SEPARATE INPUT NECK CASTING, REFER TO SERVICE PROCEDURES FOR TYPE 1 GEARBOX. IF THE 90° GEARBOX DOES HAVE A SEPARATE INPUT NECK CASTING AND COOLING FINS CAST INTO THE BOTTOM OF THE GEARBOX HOUSING, REFER TO SERVICE PROCEDURES FOR TYPE 2 GEARBOX.

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INTRODUCTION

90° GEARBOX (TYPE 1) —See Figure 1

A. **All** 912 Speedrowers

B. 1112 Speedrowers **below** serial number 287073

90° GEARBOX (TYPE 2) — See Figure 2

A. 1112 Speedrowers **on and above** serial number 287073

B. All 1114 Speedrowers

NOTE: Gearbox (Type 1) from 1112 Speedrowers, serial number 286076 and above, cannot be exchanged for a gearbox (Type 1) from an earlier 1112 or 912. (The right bearing cap and pump mount are not the same.)

Gearbox (Type 2) will fit in 1112 Speedrowers, serial numbers 286076 through 287072 (1112's equipped with Type 1 gearboxes, but having cooling fins).

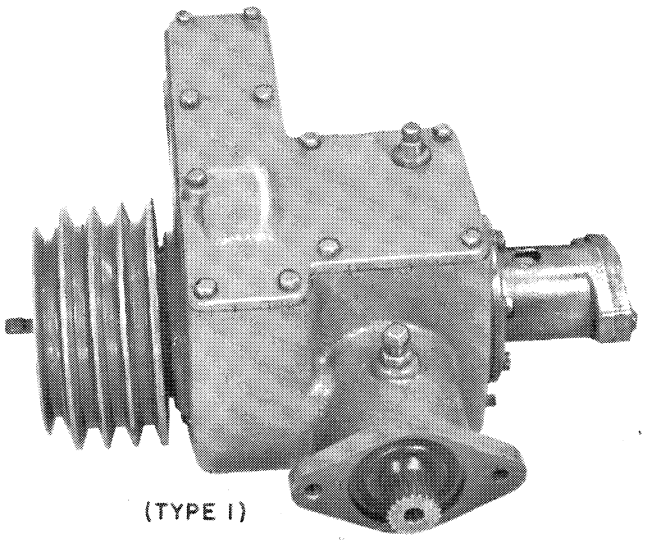


FIGURE 1

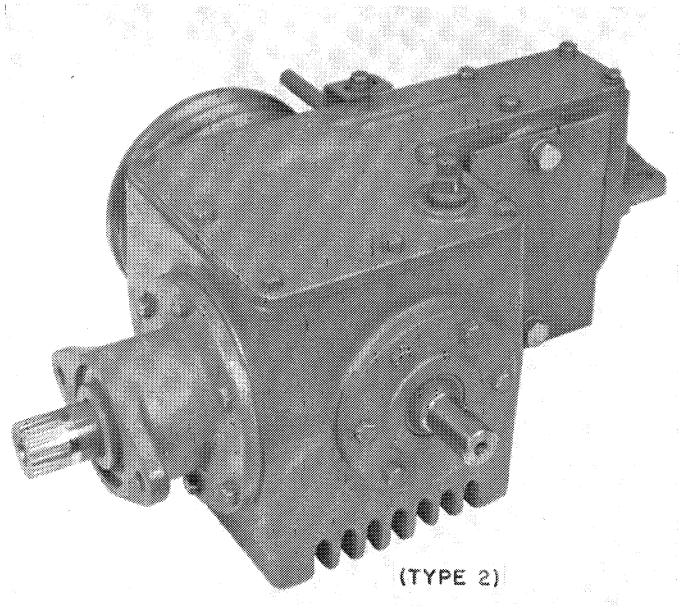


FIGURE 2

GEARBOX REMOVAL
TYPE 1 OR 2

MACHINE PREPARATION FOR GEARBOX REMOVAL

NOTE: It is not necessary to remove either header or conditioner when removing the gearbox.

1. Machine equipped with header and conditioner:

   A. Lower header and set parking brake.

   B. Disconnect warning light wires at upper header link.

   C. Remove PTO shafts from base unit and wire to header so they do not fall. Sit on the back beam of the header while working on the gearbox.

   OR

   D. Remove center header link from tractor.

   E. Tilt header forward and block securely. A plank or 2" x 4" wedged across both lower header arms and under header ribs will be satisfactory. You can now walk between front tires and header.

2. Machine equipped with conditioner only (header removed):

   A. Retract hydraulics so lower header arms rest on the ground. Conditioner top should be about level.

3. Machine stripped (no conditioner or header):

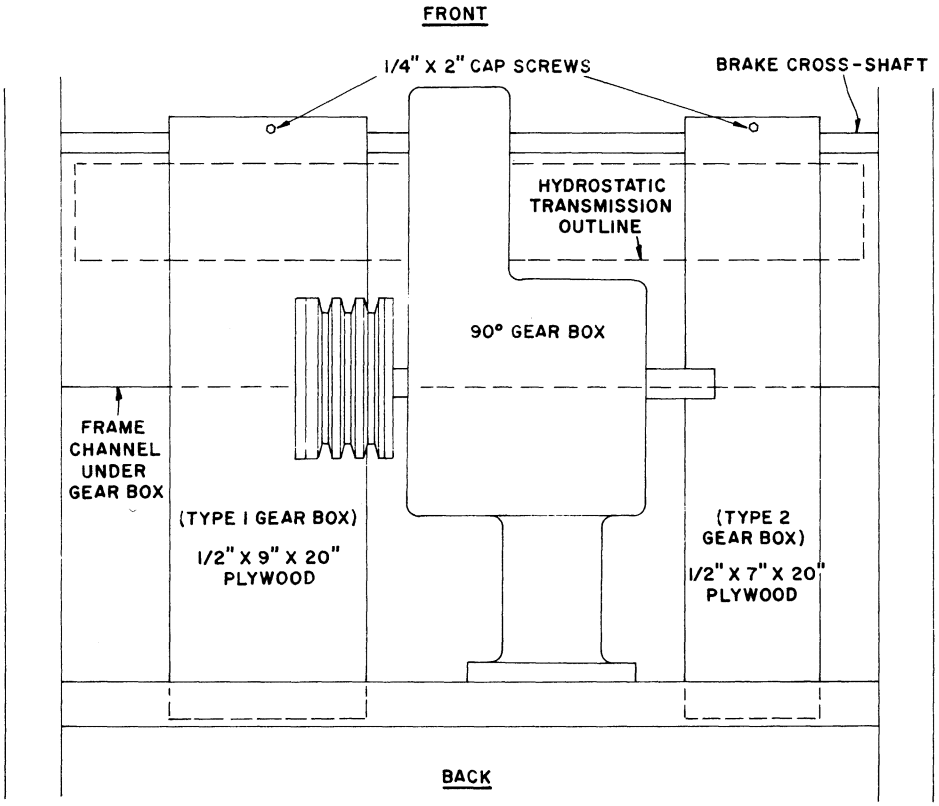
   IMPORTANT: TO AVOID HYDRAULIC HOSE DAMAGE, PREPARE SOME WAY TO HOLD THE HYDROSTATIC TRANSMISSIONS WHILE THE GEARBOX IS REMOVED.

   A. Cut two pieces from ½" plywood to the following dimensions: (See Figure 3).

      1. Gearboxes **without** cooling fans: Two pieces, ½" x 9" x 20"

      2. Gearboxes **with** cooling fans: One piece ½" x 7" x 20" and one piece, ½" x 9" x 20"

   B. Use one piece under each transmission. Insert plywood pieces (from the back) **over** the small frame channel and **below** the gearbox and transmissions. See Figure 3. The front



NOTE: R. H. PLYWOOD SHEET CAN BE 9" WIDE IF THERE IS NO COOLING FAN ON GEAR BOX.

FIGURE 3

of the plywood will rest on the brake cross shafts. Use two ¼" cap screws hooked over cross shaft to hold plywood from sliding off. See Figure 3.

REMOVING GEARBOX (TYPE 1 OR 2)

1. Steam clean gearbox area. Repairing gearbox will be easier if it can be cleaned properly.
2. Drain the gear lubricant.
   A. Type 1 — drain plug on **left** side of gearbox near the lower edge.
   B. Type 2 — Drain plug on **bottom** of gearbox.
3. Loosen PTO belts and slide belts off the sheaves. Wire belts to box channel beside hydraulic control valve.
4. Remove steel tube from the hydraulic valve to tee on front of main frame. Cap steel tube and tee to prevent dirt entry.
5. Remove the linkage which connects the two hydrostatic motors.
6. Remove the two short links which connect the steering shaft "U" to the hydrostatic pump pintle shaft extensions.
7. Remove the pintle shaft extension from the **left** hydrostatic pump. Remove the two pintle shaft extensions from the **right** hydrostatic pump and motor.
8. Hydraulic pump removal (Type 1 gearbox).
   A. Remove the two bolts holding the hydraulic pump to the gearbox housing. Slide the pump to the right. It should **not** be necessary to remove the hoses if the pump is wired to a cab floor cross member.

8A. Hydraulic pump removal (Type 2 gearbox).
   A. Remove pump coupler chain. Move pump and mounting (as one assembly) out of the way.
   B. Drive groove pin out of coupler sprocket and gearbox shaft. Remove fan, fan spring, and spacer.

   NOTE: When removing fan note direction fan is facing.

9. Remove the air conditioner compressor belt from the clutching belt sheave. (Type 1 gearbox **only**).
10. Swing the belt guide out of the way, and remove the header clutching belt.
11. Remove PTO yokes from hydrostatic motor shafts.
12. Remove outside mounting plates from each hydrostatic motor. Transmissions must move out 1¾" (44 mm) for pump shafts to clear gearbox. Main frame flanges may not allow this much clearance with plates on motor.

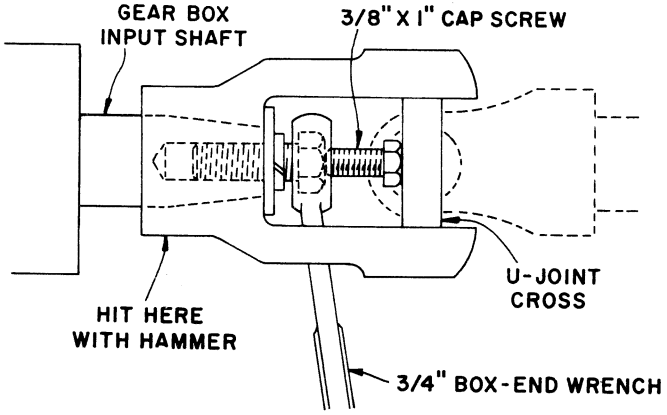


FIGURE 4

13. Remove PTO yoke from gearbox input shaft. Figure 4 shows one method of removing the yoke from the tapered splines of the input shaft. A ⅜" x 1" cap screw acts as a spacer and applies pressure to the "U" joint cross when the center bolt is turned out against the cap screw. Apply pressure to the "U" joint cross and hit the **hub** of the input shaft yoke with a hammer.
14. Remove four ½" bolts holding hydrostatic transmissions to gearbox. Place transmissions on blocks on top of conditioner or on specially prepared plywood sheets. (See Figure 3).
15. Remove four bolts holding gear box to main frame.

    NOTE: Check for shim washers between gearbox and frame at front bolts. These shims must be put back in the same place when replacing gearbox.

16. The charge hose going to the **back** of the right hydrostatic transmission can be disconnected at the upper swivel end (tee at 65 psi check valve) to prevent damaging the hose while removing gearbox. The hose end should be covered and tied up so oil does not drain from the hydrostatic transmission.
17. Lift the gearbox out through the front opening to the right of the PTO shaft. Place the gearbox on a bench for repair.

CAUTION: THE GEARBOX WEIGHS ABOUT 90 POUNDS.

SERVICING 90° GEARBOX
TYPE 2

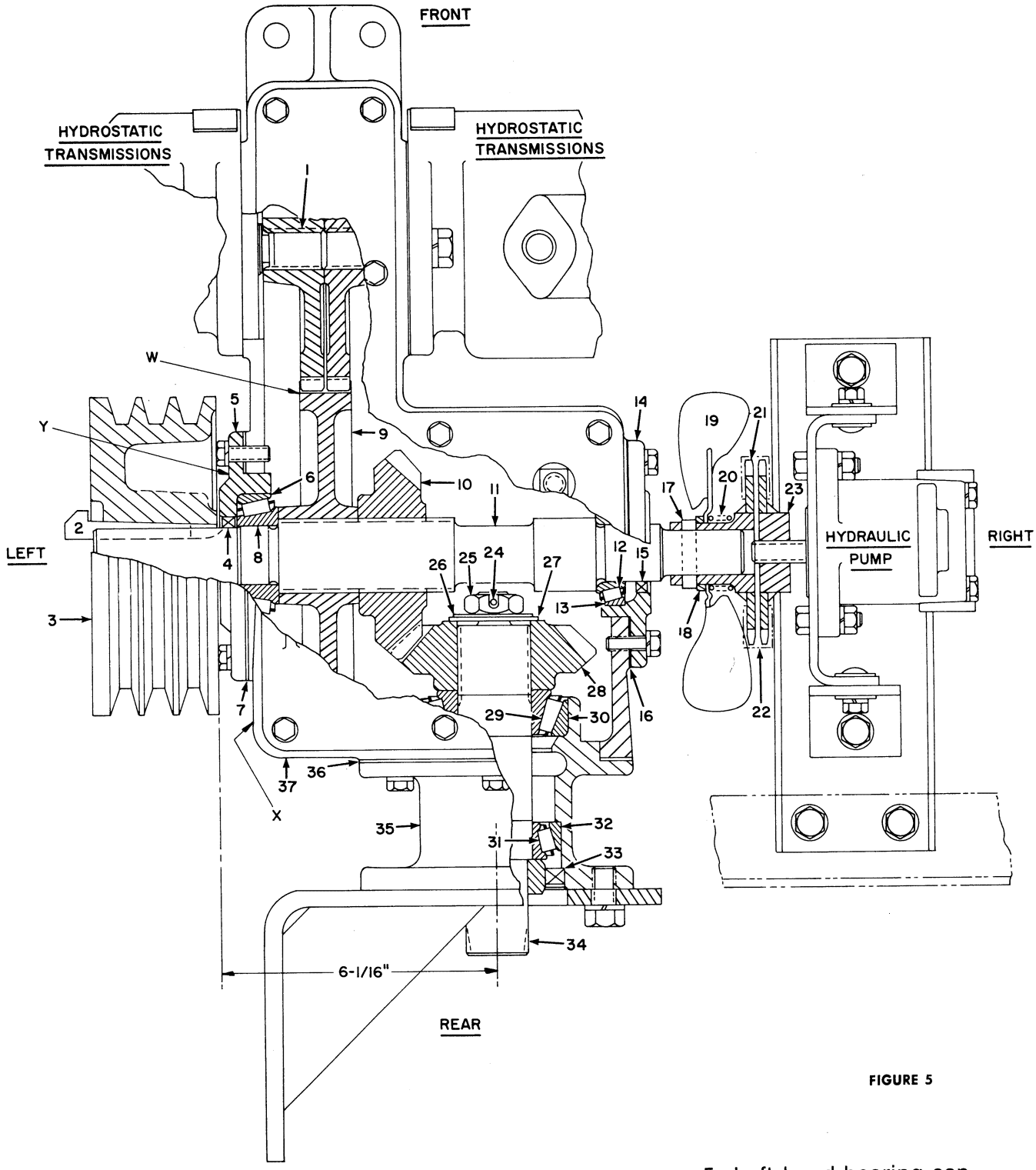


FIGURE 5

PARTS LIST (Figures 5 and 6)

1. Pump gear
2. Gib key
3. Clutching belt pulley
4. Left-hand oil seal
5. Left-hand bearing cap
6. Left-hand bearing cup
7. Shims (as required)
8. Left-hand bearing cone
9. Output gear
10. Output bevel gear

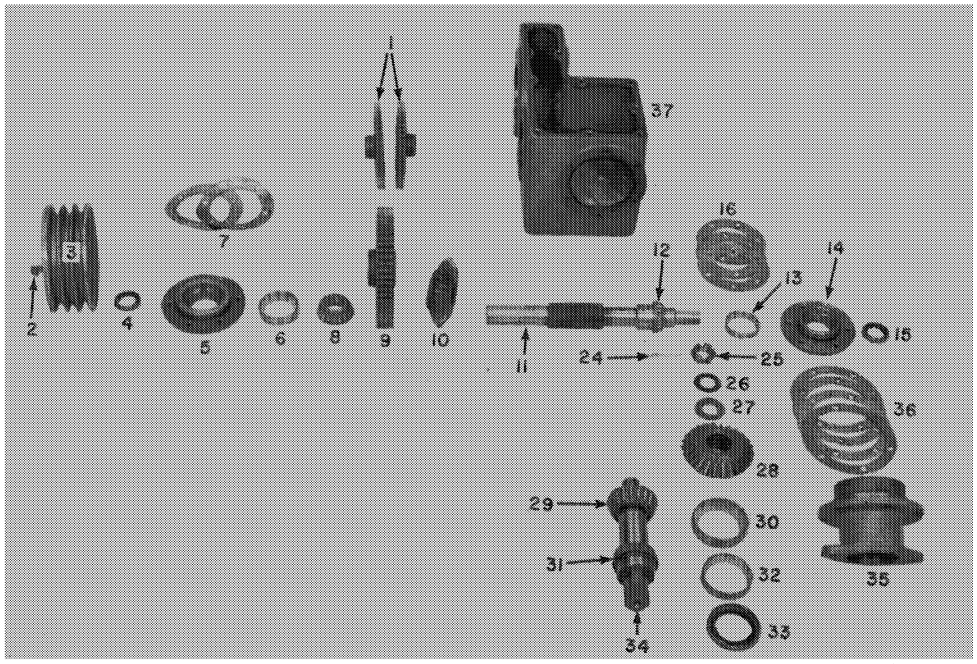


FIGURE 6

11. Output shaft
12. Right-hand bearing cone
13. Right-hand bearing cup
14. Right-hand bearing cap
15. Right-hand oil seal
16. Shims (as required)
17. Grooved pin, 5/16" x 1½"
18. Spacer
19. Fan
20. Spring
21. Sprocket weld assembly
22. Coupling chain (#60 roller chain)
23. Sprocket weld assembly
24 Cotter pin (3/16" x 1½")
25. Slotted hex nut
26. Shim washer (.030" thick). Add as required to obtain 2-4 in. lbs.
27. Special washer (⅛" thick)
28. Input bevel gear (26-tooth)
29. Front bearing cone
30. Front bearing cup
31. Rear bearing cone
32. Rear bearing cup
33. Oil seal

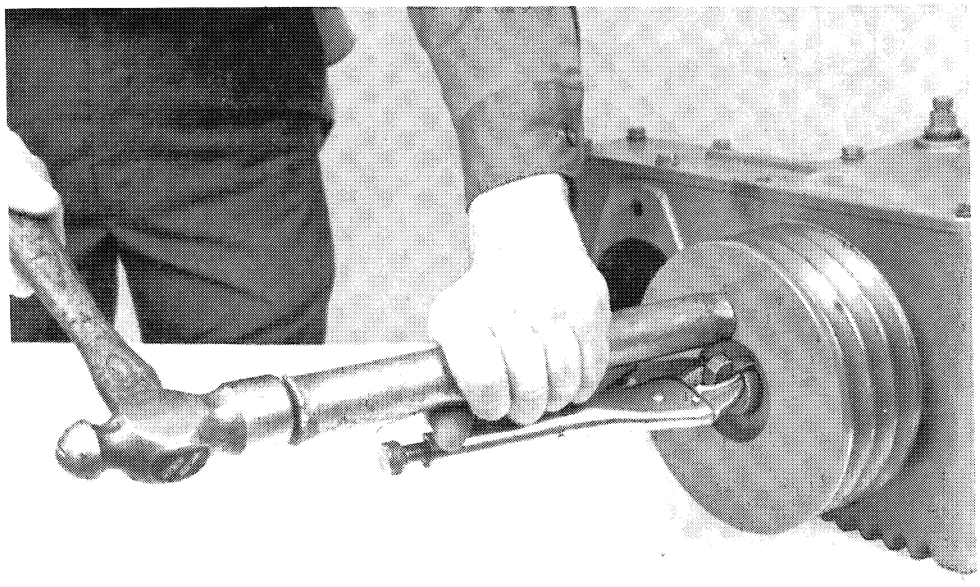


FIGURE 7

34. Input shaft
35. Mount assembly
36. Shims (as required)
37. Gearbox housing

DISASSEMBLY (TYPE 2)

Refer to Parts List and Figures 5 and 6.

NOTE: Bearing cones will be a drive or press fit on both shafts.

1. Lock vise grips on the gib key (2) and against the end of the shaft (11) as shown in Figure 7. Support the shaft on the opposite end and then drive the sheave (3) in with a suitable drift and hammer.
2. Remove all paint and rust from the end of the shaft (11) as shown in Figure 8.

FIGURE 8

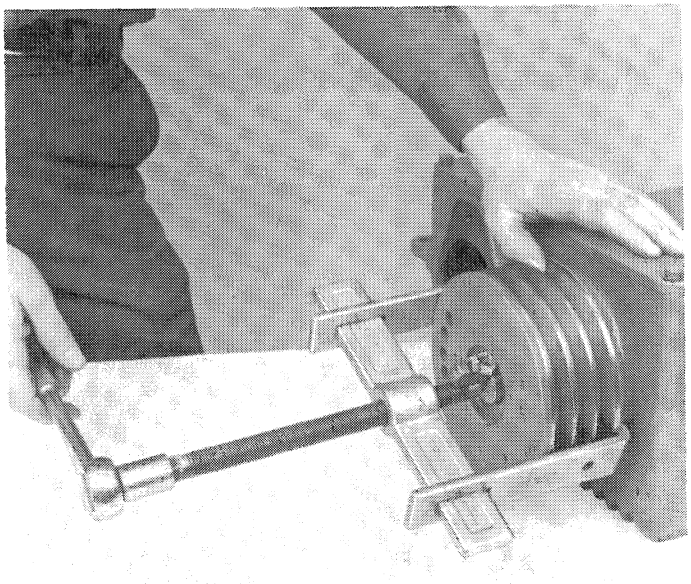


FIGURE 9

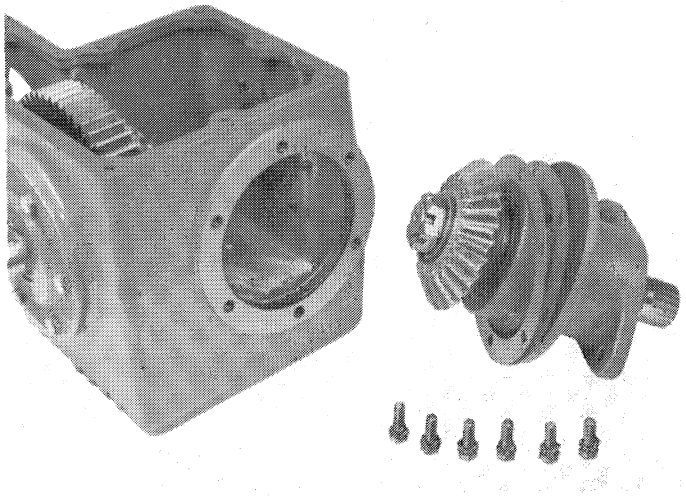


FIGURE 10

3. Install scrap nut(s) that will fill **all** of the gap between the sheave (3) and the gib key (2) head, see Figure 9. With a suitable two-jaw puller, pull sheave and key together, as shown in Figure 9.

   NOTE: Smooth sharp edges on shaft (11) keyway to prevent damaging seal (4) during removal.

4. Remove gearbox cover and input neck assembly from gearbox housing (37) as shown in Figure 10.
5. Remove right-hand bearing cap (14) from gearbox housing (37). See Figure 11.

   NOTE: Use care not to damage the areas of the shaft (11) which contact the oil seals.

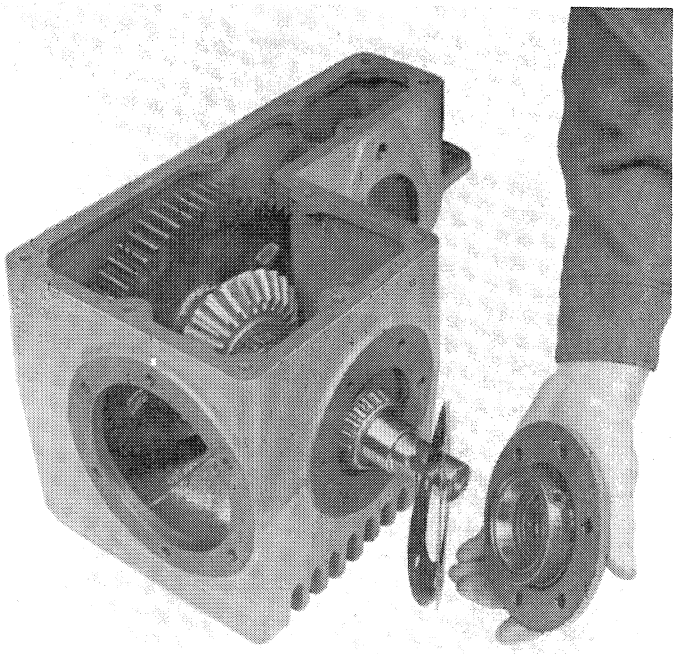


FIGURE 11

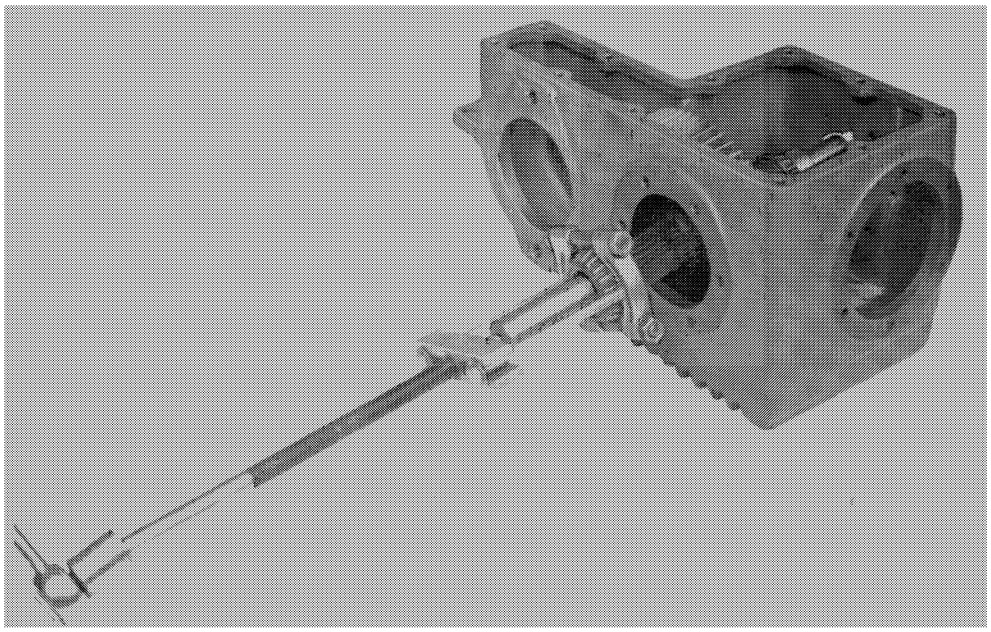


FIGURE 12

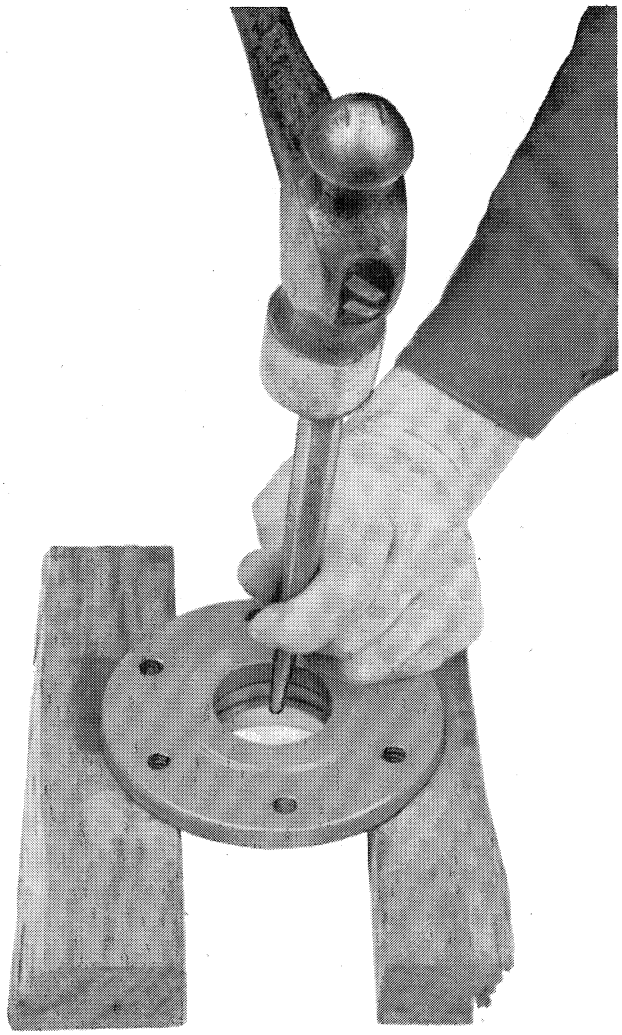


FIGURE 13

6. Remove left-hand bearing cap (5) and pull left-hand bearing cone (8) as shown in Figure 12.
7. The output shaft (11) and right-hand bearing cone (12) can **now** be removed through the right side of the gearbox housing (37). Remove the output gear (9) and the bevel output gear (10) through the top of the housing.
8. Use a punch to remove bearing cups (6 and 13) from the left-hand and right-hand bearing caps (5 and 14) as shown in Figure 13.
9. Remove cotter pin (24), slotted nut (25), and special washers from input shaft (34). Press input shaft out of mount assembly (35), using care not to damage threaded end of shaft.

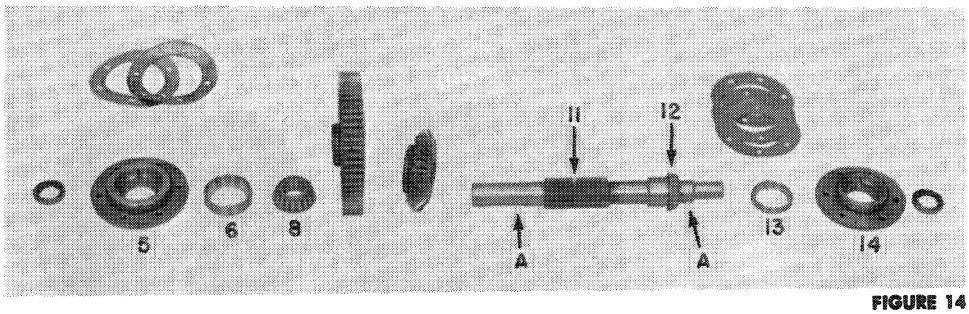


FIGURE 14

PARTS INSPECTION (TYPE 2)

1. **Output shaft components** (See Figure 14)
   - A. Check shaft (11) for excessive wear under oil seal lips at A, Figure 14.
   - B. Bearing cones (8 and 12) must be a tight fit on shaft.
   - C. Oil ports in left-hand and right-hand. Bearing caps (5 and 14) must be open for free passage of oil.
   - D. Bearing cups (6 and 13) must be tight and properly seated in bearing caps.
2. **Input shaft components** (See Figure 15)
   - A. Check shaft (34) for worn splines where front bearing cone (29) seats, A, Figure 15.
   - B. Check oil seal collar for wear at B, Figure 15.
   - C. Bearing cups (30 and 32) must be tight and fully seated in mount assembly (35).
   - D. Oil port, C, Figure 15, at top of mount assembly must be open for free passage of oil.

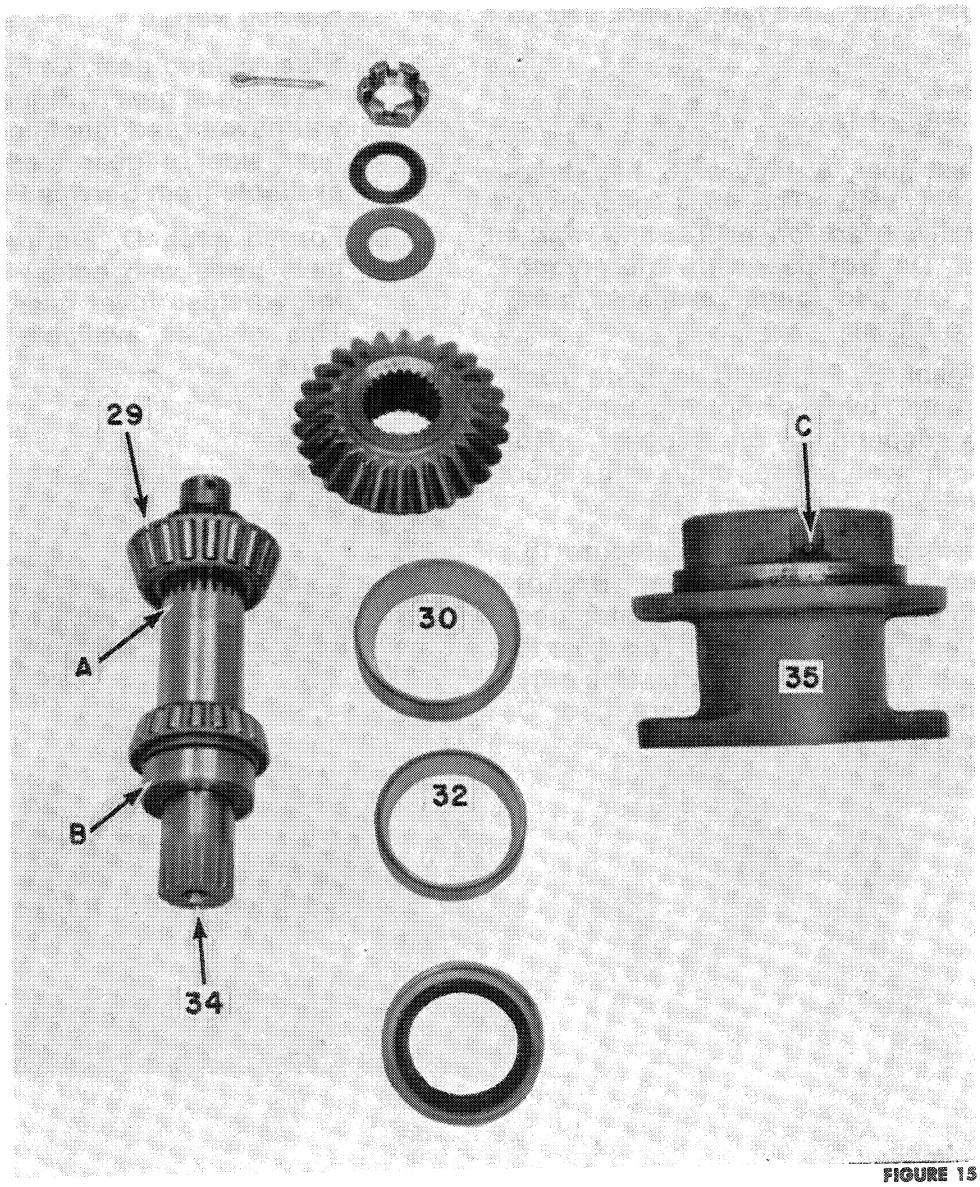


FIGURE 15

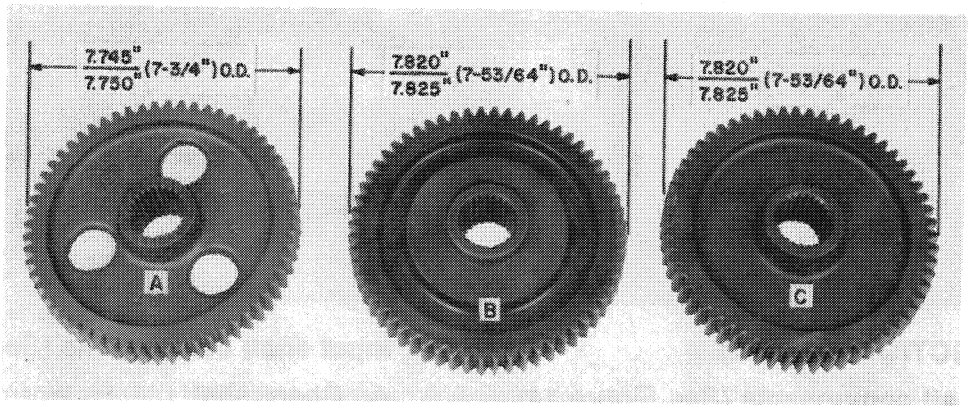


FIGURE 16

GEAR IDENTIFICATION

ATTENTION! DO NOT MIX OLD AND NEW STYLE GEARS! IF **ONE OLD** STYLE GEAR IS DAMAGED OR WORN, INSTALL **THREE NEW** STYLE GEARS

1. **Output Gear**
   (Refer to Figure 16)

   A. Old **cast** gear, A, Figure 16, has **three** holes in web. The cast gear was originally used on 912's and early 1112's. Do **not use** with later pump gears (1). **(No longer available** from Service Parts).

   B. **Steel** gear, B, Figure 16, is made from solid plate. Height of tooth rim may vary widely depending on supplier. **(No** holes in web.) Use only with later transmission drive gears (1).

   C. **Latest forged** steel gear, C, Figure 16. (No holes in web.) Supplier (Brand) identification — H or ETN is stamped on side of rim near teeth. This gear **is available** from Service Parts. Use **only** with newer steel pump gears, C or D Figure 17.

2. **Pump Gears**
   (Refer to Figure 17)

   A. Old cast gear, A, Figure 17, has three 1¼" diameter holes in the web. **(No longer available** from Service Parts.)

   B. Steel gear with splined hub welded in. Three 17/32" diameter holes in gear web and **no** brand identification letters on rim of gear near the teeth, see B, Figure 17. **(No longer available** from Service Parts).

   C. Steel welded gear, C, Figure 17, looks the same as gear B, Figure 17. This gear **will** have brand identification stamped near side of gear teeth. **(No longer available** from Service Parts).

   D. Forged gear, D, Figure 17, **does not** have three web holes. Use only with forged steel driver gear, C, Figure 16. This gear **is available** from Service Parts.

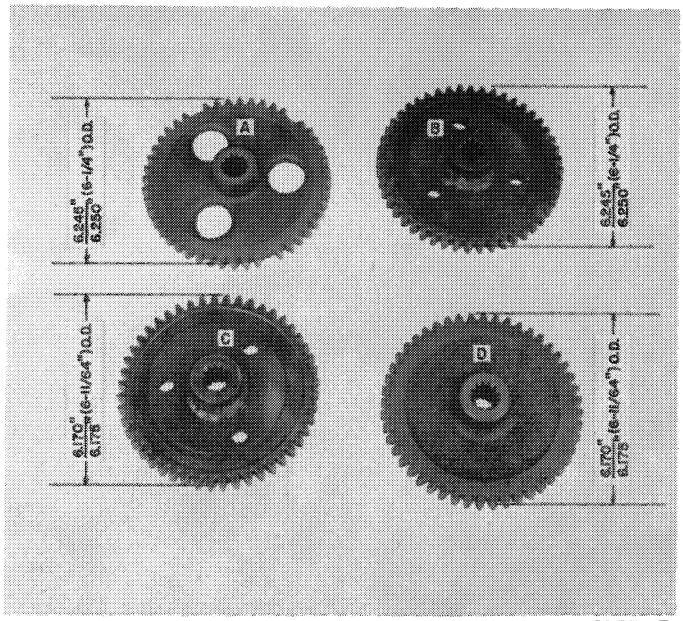


FIGURE 17

ASSEMBLY (TYPE 2 GEARBOX)

NOTE: During the final assembly all cap screws must be coated with #2 Permatex.

Input Shaft Assembly (See Figures 18 and 19)

1. Pack rear bearing cone (31) with light grease. **Do not** pack the front bearing cone (29) with grease, but it may be coated with SAE 90 multi-purpose oil.
2. Assemble input shaft assembly. Bearing cups (30 and 32) must be tight in the mount (35) and seated properly. Oil port at A, Figure 19, on top of mount (35) must be open.
3. Adjust input shaft bearings to 2-4 in. lbs. (.23-.45 N:m) pre-load (rotating torque) with the slotted nut (25) and thick washer (27) to get this pre-load.

   IMPORTANT: PRE-LOAD (ROTATING TORQUE) MUST BE OBTAINED WITH SEAL (33) REMOVED. BEARINGS MUST BE LUBRICATED WHEN PRE-LOAD IS ADJUSTED.
4. After the 2-4 in. lbs. (.23-.45 N:m) preload has been obtained, install the cotter pin (24) in the shaft (34). Clip off one leg of cotter pin so it **does not** extend over the end of shaft (34) and bend the other leg back over the slotted nut.

   IMPORTANT: MAKE SURE THE COTTER PIN DOES NOT EXTEND OVER THE INPUT SHAFT, SEE A, FIGURE 19A.

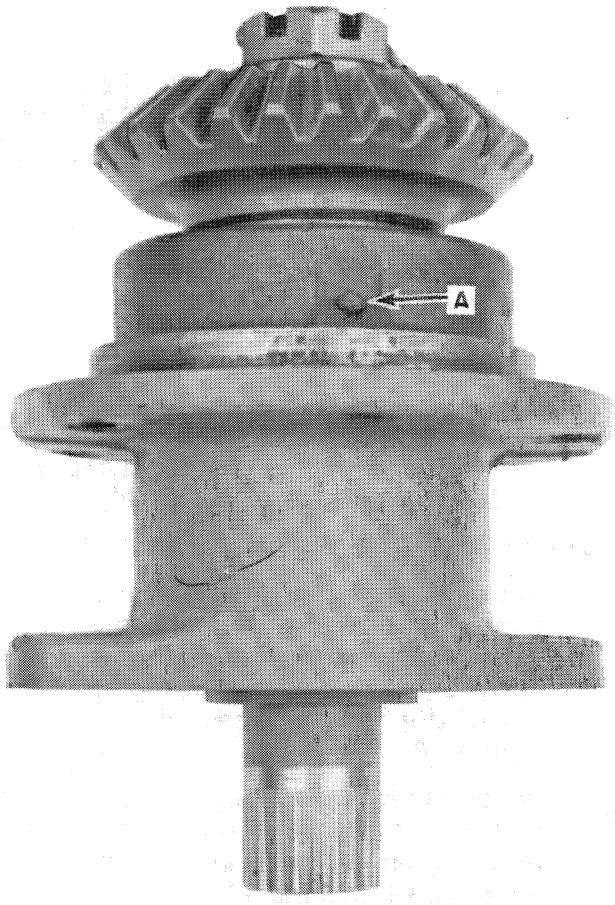


FIGURE 19

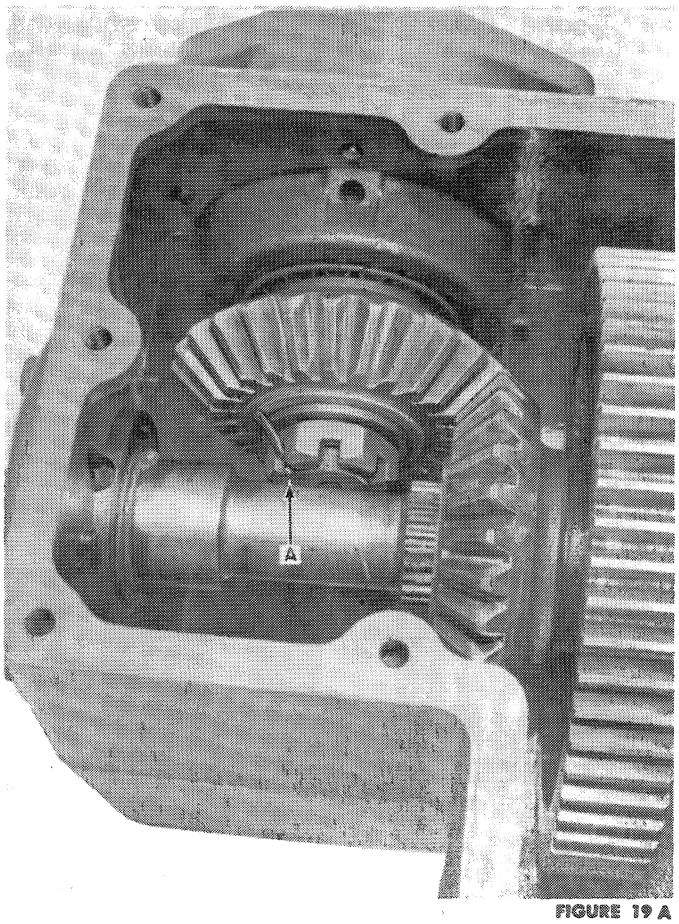


FIGURE 19 A

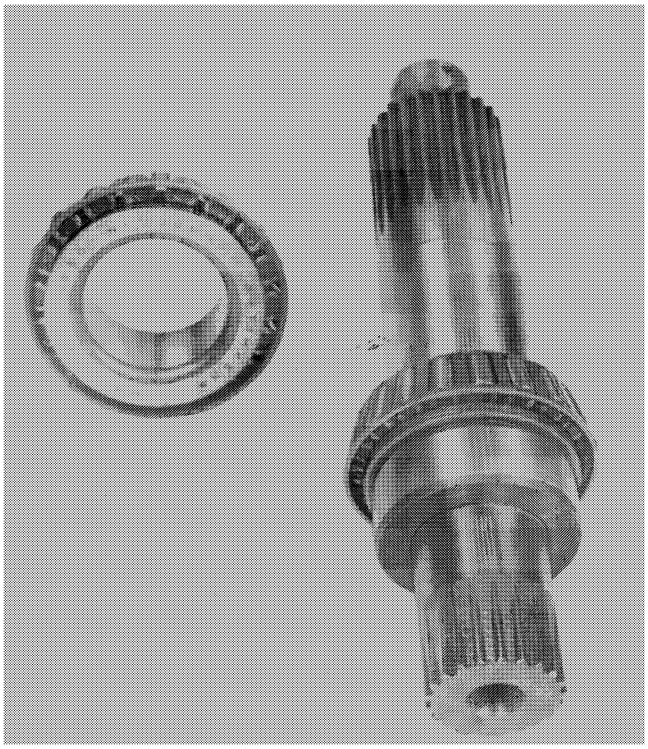


FIGURE 18

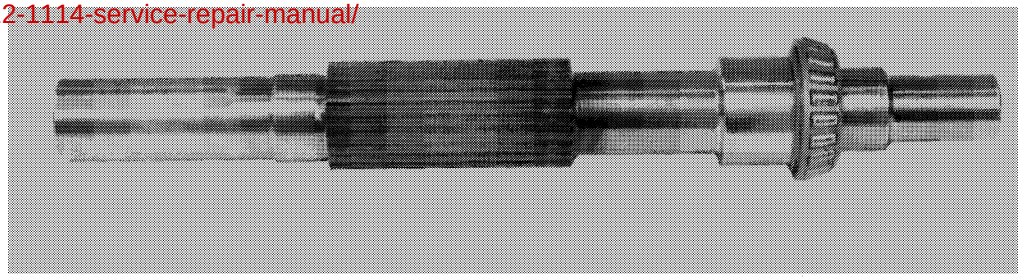


FIGURE 20

5. After pre-load has been set, lubricate lips of oil seal (33). Install seal, being careful not to damage seal during assembly.

Output Shaft (See Figures 20 and 21)

1. Pack left-hand and right-hand bearing cones (8 and 12) with light grease. Install right-hand bearing cone on output shaft (11). Use a suitable bearing driver and make sure bearing is seated properly. See Figure 20.
2. Install shaft (11) through bevel gear (10) and output gear (9). The **wider** hub of the output gear (9) **must be** next to the left-hand bearing cone (8). Install left-hand bearing cone on shaft using a suitable driver to prevent damaging the bearing cone during assembly. Make sure the bearing cone is seated properly on the shaft.

IMPORTANT! THE CORRECT THICKNESS OF SHIMS (7) MUST BE USED BETWEEN LEFT BEARING CAP AND GEARBOX HOUSING FOR CORRECT TOOTH MESH OF THE BEVEL GEARS.

3. The shim pack for the left-hand bearing cap (5) must be determined by the following method:
   A. Output gear (9) has shim factor stamped on outer rim near teeth. See Figure 22. **NOTE: Shim factor should not be confused with gear supplier identification.** The gear shim factor may range from 0 through 5. The gear shown has a shim factor of 1.

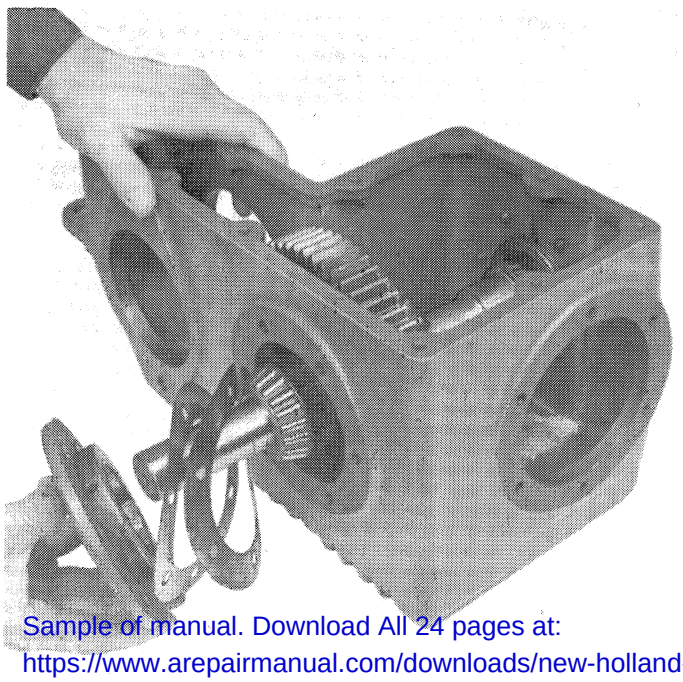


FIGURE 21

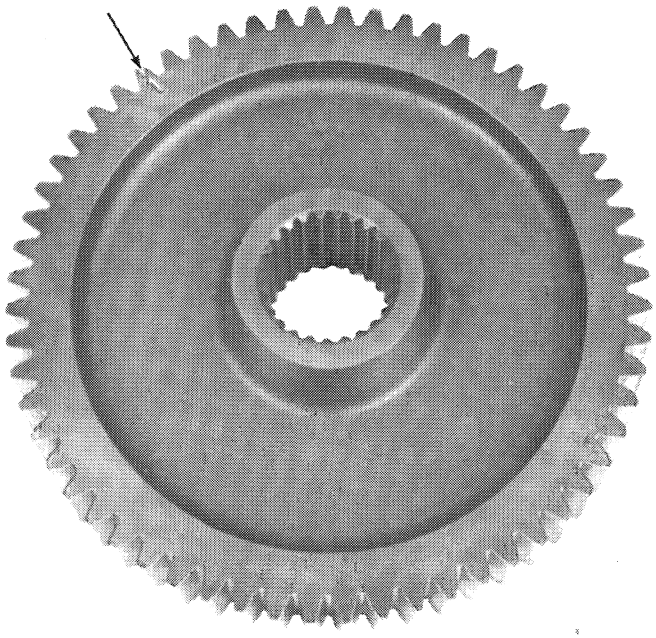


FIGURE 22