

# TRANSMISSION ASSEMBLY OVERHAUL

TRAINING TIME: 3½ Hrs.

## TOOLS AND MATERIALS:

1. Standard Set of Mechanic's Hand Tools
2. Special Tools and Equipment
  - a. One set of basic tools available for the Tractor Service Tool Board #FT 47
  - b. One set of special tools available for the Ford Tractor Service Tool Board #FT 46
  - c. Hoist
  - d. Jack
  - e. Transmission Housing Stand .
  - f. Arbor Press
  - g. Sleeves for Installing Bushings

## JOB PROCEDURE:

### I. DISASSEMBLING THE GEARSHIFT UNIT

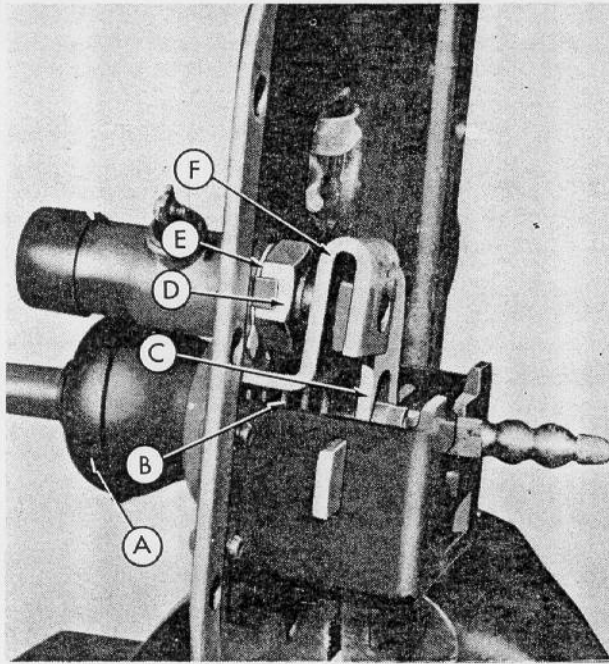


Fig. 1

- Step 1—Slide the shift lever rubber (A-Figure 1) up on the lever.
- Step 2—Remove the starter switch by removing the 1½" brass nut (D-Figure 1) and the lockwasher (E-Figure 1).
- Step 3—Remove the safety latch (F-Figure 1).
- Step 4—Compress the spring as shown in Figure 2 and remove the spring retainer.
- Step 5—Pull up on the gear shift lever and lift it out of the cover assembly.
- Step 6—Remove the spring (B-Figure 1).
- Step 7—Tilt the shifter lock plate (C-Figure 1) and remove it from the guide support.

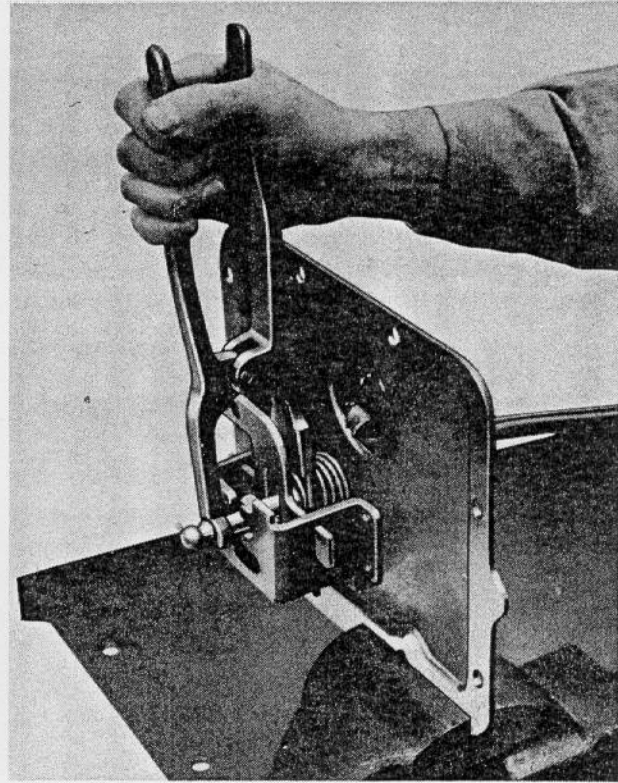


Fig. 2

### II. REASSEMBLING THE GEARSHIFT UNIT (REVERSE THE DISASSEMBLY PROCEDURE.)

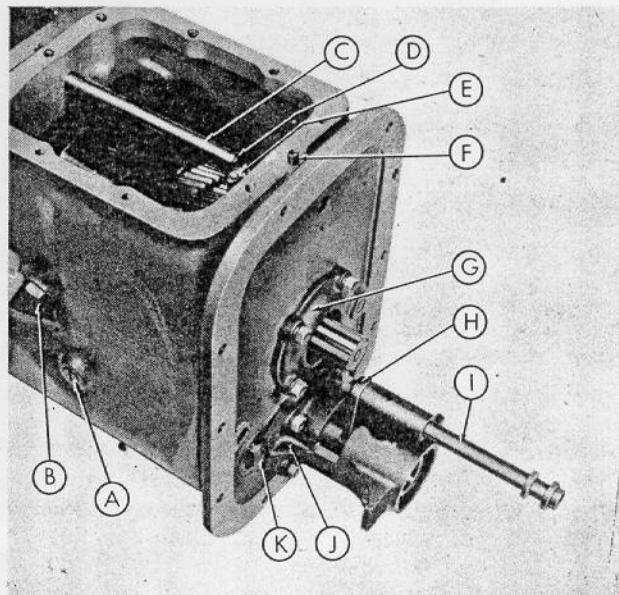


Fig. 3

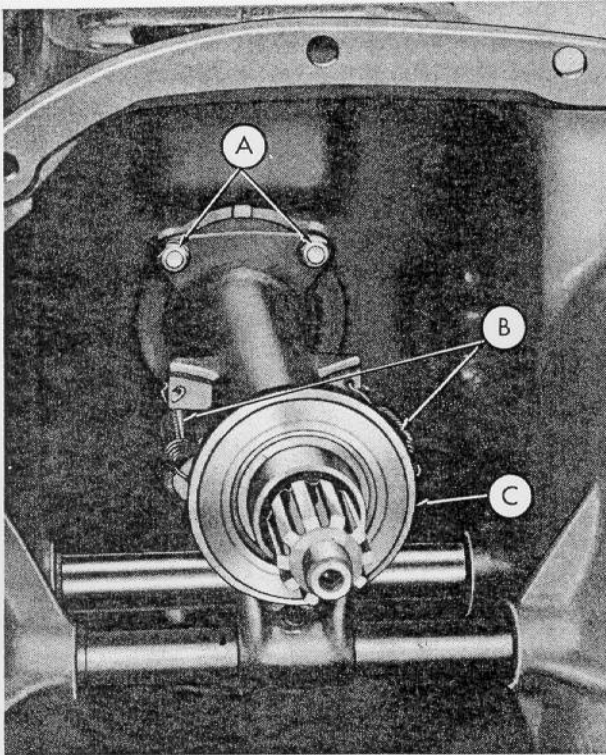


Fig. 4

### III. DISASSEMBLING THE TRANSMISSION

Step 1—Remove the top shift fork.

- a. Loosen the locknut on the fork screw (E-Figure 3) and back off the screw until the shaft (C-Figure 3) is free to slide out the rear of transmission housing.
- b. Remove the shifter rod fork spring (F-Figure 3).

**NOTE:** Remove the steel ball from the casting after the shaft is removed.

- c. Lift out the shift fork (D-Figure 3).

Step 2—Remove the shift plates.

- a. Remove the hex head pivot screws (B-Figure 3) from both sides of the housing.
- b. Lift out the shift plates.

Step 3—Disconnect the clutch release bearing retaining springs (B-Figure 4) and remove bearing (C-Figure 4).

Step 4—Remove the main drive gear and shaft.

- a. Remove the four cap screws (A-Figure 4).
- b. Remove the shaft and bearing retainer as a unit.

Step 5—Remove the main shaft.

- a. Remove the PTO shift rail stop (H-Figure 3) and slide the shift rail (I-Figure 3) rearward so that the bearing retainer will clear.
- b. Remove the main shaft rear bearing retainer (G-Figure 3) and the shims.

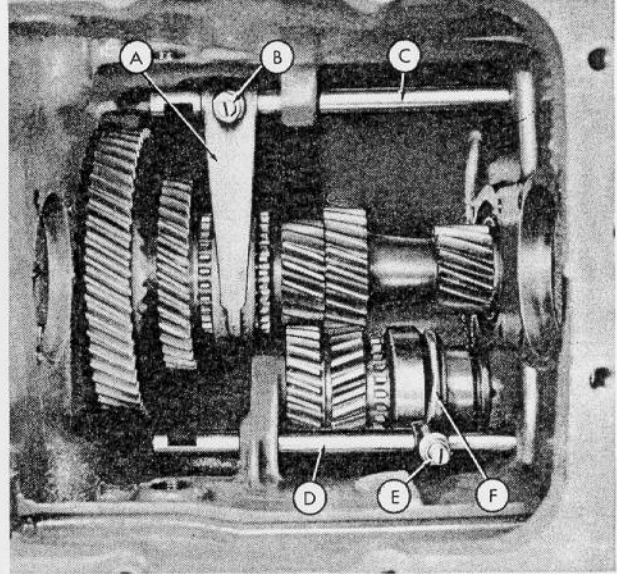


Fig. 5

**NOTE:** Be sure the metal shim pack is identified as a unit. This will facilitate adjustment in reassembly.

- c. Remove the main shaft gear cluster as a unit.

**NOTE:** This should be done slowly to avoid damaging the gear teeth.

Step 6—Remove the two lower shift rails and forks. (C and D-Figure 5).

- a. Remove the interlock screw plug (A-Figure 3) and the spring from both sides of the housing.
- b. Loosen the locknuts (B and E-Figure 5) on the shift forks and release the screws until the shafts are free to slide out of the forks.

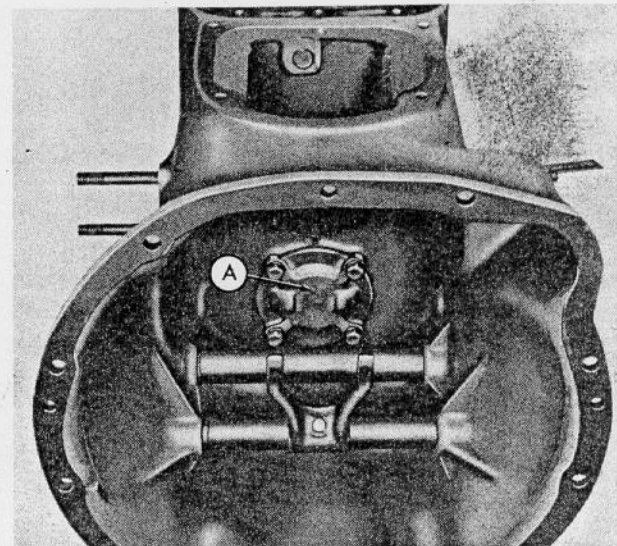


Fig. 6

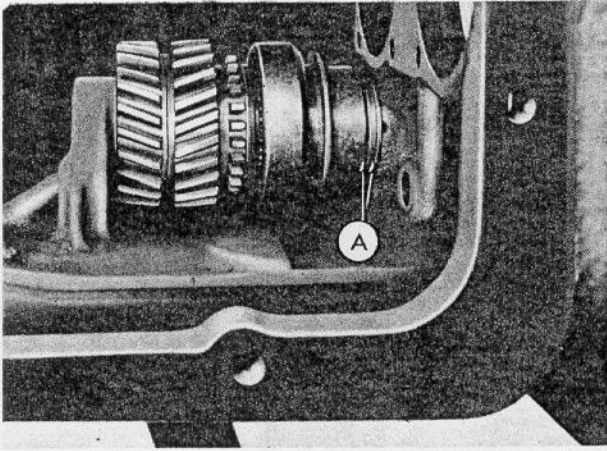


Fig. 7

- c. Slide the shafts out of the rear of the transmission housing.

**NOTE:** The detent balls can now be removed.

- d. Remove the forks (A and F-Figure 5).

**Step 7**—Remove the countershaft assembly.

- a. Remove the PTO shifter assembly (J-Figure 3).

**NOTE:** Keep the metal shim pack identified as a unit. This will facilitate adjustment upon reassembly.

- a. Remove the countershaft gear cluster as a unit.

**NOTE:** This should be done slowly to avoid damaging the teeth.

**Step 8**—Remove the countershaft front bearing retainer (A-Figure 6).

**Step 9**—Remove the reverse idler assembly (Figure 7).

- a. Pull the shaft K-Figure 3) rearward.
- b. Remove the reverse idler assembly.

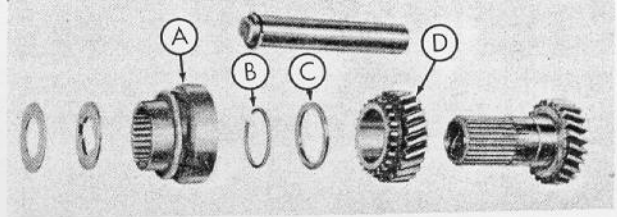


Fig. 8

**Step 10**—Remove the washer and spacer (A-Figure 7).

#### IV. SERVICING THE REVERSE IDLER GEAR ASSEMBLY

**Step 1**—Disassemble the unit.

- a. Remove the coupling (A-Figure 8).
- b. Remove the snap ring (B-Figure 8).
- c. Remove the thrust washer (C-Figure 8).
- d. Remove the driver gear (D-Figure 8).

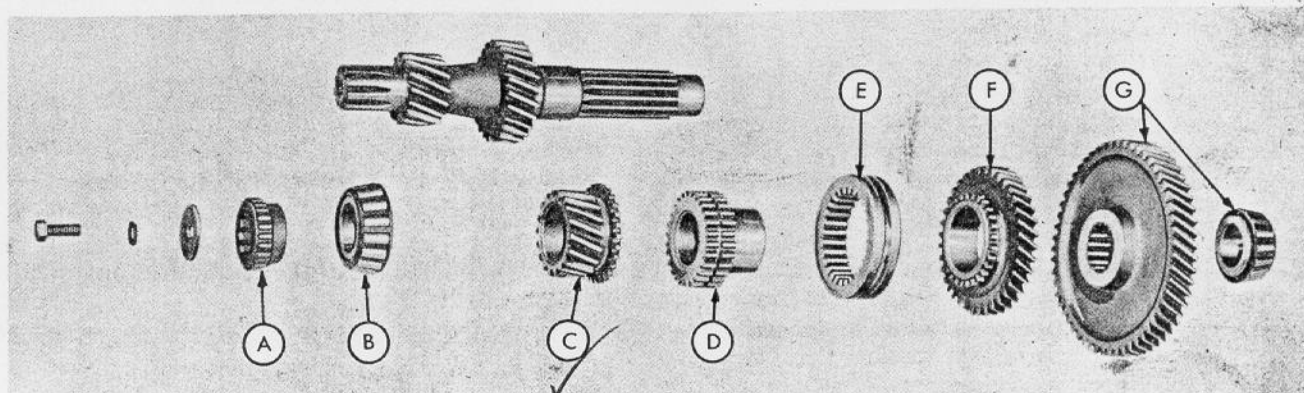
**Step 2**—Remove and install the reverse idler gear bushings.

**NOTE:** When using new tractors in training, do not perform this job.

- a. Place the gear and bushing assembly on an arbor press and with a proper size pilot tool press out the bushings.
- b. Install new bushings by using pilot tools and arbor press.
- c. Line ream the new bushings.

**Step 3**—Assemble the unit.

- a. Reverse the disassembly steps.
- b. Install in the transmission housing.



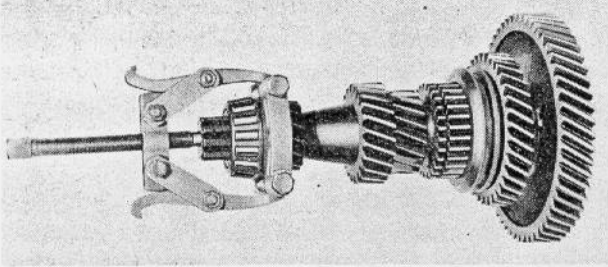


Fig. 10

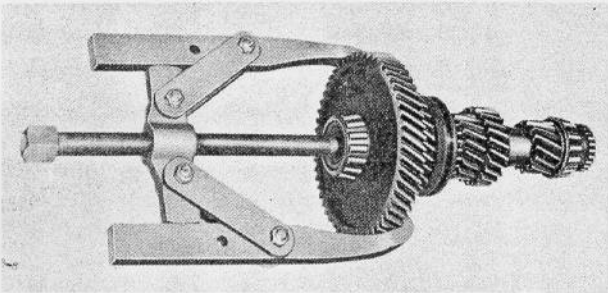


Fig. 11

## V. SERVICING THE COUNTERSHAFT ASSEMBLY

Step 1—Disassemble the unit.

- a. Remove the PTO hub (A-Figure 9) by removing the cap screw, lockwasher and flat washer that secure it.
- b. Remove the rear roller bearing (B-Figure 9), as shown in Figure 10.
- c. Remove the front bearing and countershaft gear (55T) (G-Figure 9) as shown in Figure 11.
- d. Slide the countershaft fourth gear (36T) (F-Figure 9) from the shaft.
- e. Remove the sliding coupling (E-Figure 9).
- f. Remove the countershaft connector (D-Figure 9) as shown in Figure 12.
- g. Remove the countershaft second gear (C-Figure 9).

Step 2—Assemble the countershaft. (See Figure 9).

- a. Install the countershaft second gear (C).
- b. Install the countershaft connector (D).
- c. Install the sliding coupling (E).
- d. Install the countershaft fourth gear (F).
- e. Press the countershaft gear (G-Figure 9) and bearing on the shaft.
- f. Install the rear roller bearing (B-Figure 9) and the PTO hub (A).

Step 3—Renew the countershaft front bearing race.

- a. Remove the race as shown in Figure 13.
- b. Install the new race by pressing or driving it into position.
- c. Install the countershaft front bearing retainer. Be sure the gasket is in position.

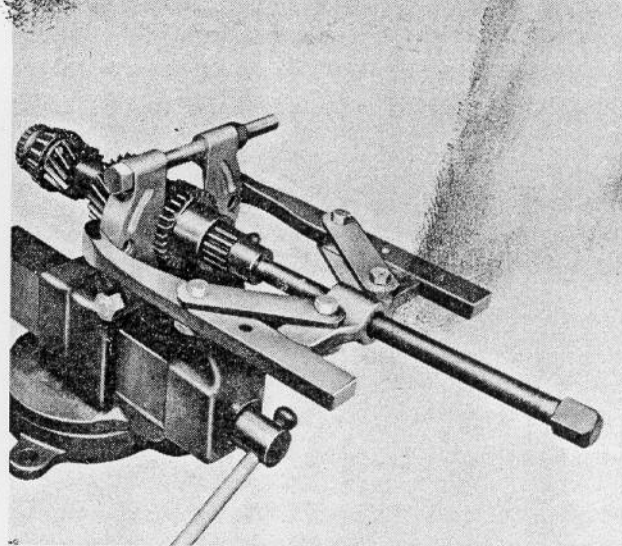


Fig. 12

Step 4—Install the countershaft assembly in the transmission housing.

## VI. SERVICING THE PTO SHIFTER ASSEMBLY

Step 1—Disassemble the shifter assembly.

- a. Remove the shift rail, interlock ball and spring (A-Figure 14).
- b. Remove the snap ring (B-Figure 14) from the rear of bearing support.
- c. Lift out the bearing (C-Figure 14).
- d. Remove the snap ring (D-Figure 14) which is located in front of the rear bearing.
- e. Remove the clutch sleeve (E-Figure 14) from the bearing support.
- f. Remove the front bearing race as shown in Figure 15.

Step 2—Assemble the PTO shifter.

- a. Reverse the disassembly procedure.

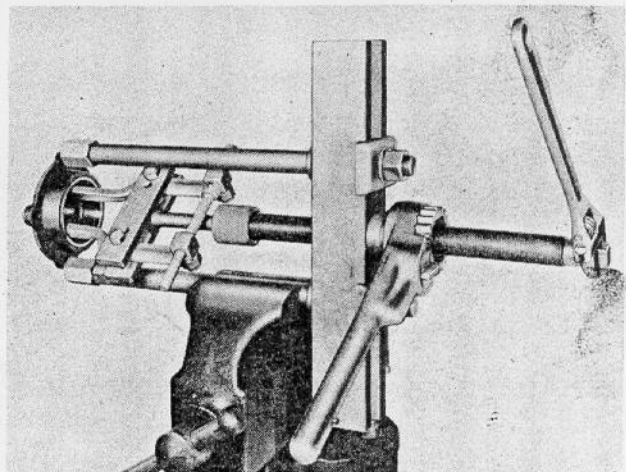


Fig. 13

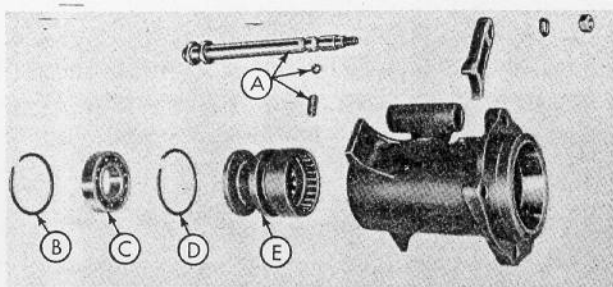


Fig. 14

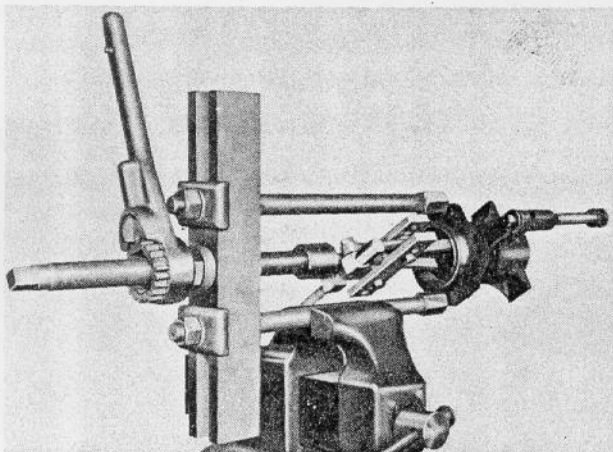


Fig. 15

**NOTE:** The eraser end of a lead pencil may be used to hold the interlock ball spring in place when installing the shift rail in the housing.

Step 3—Install the shifter assembly on transmission housing. See Figures 3 and 16.

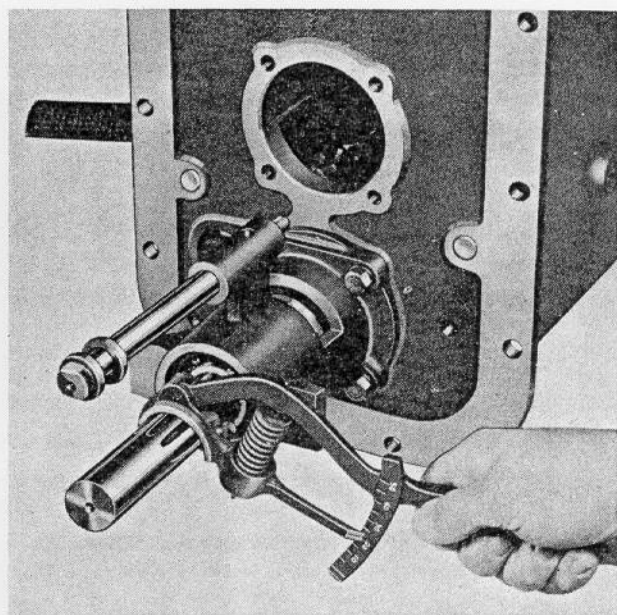
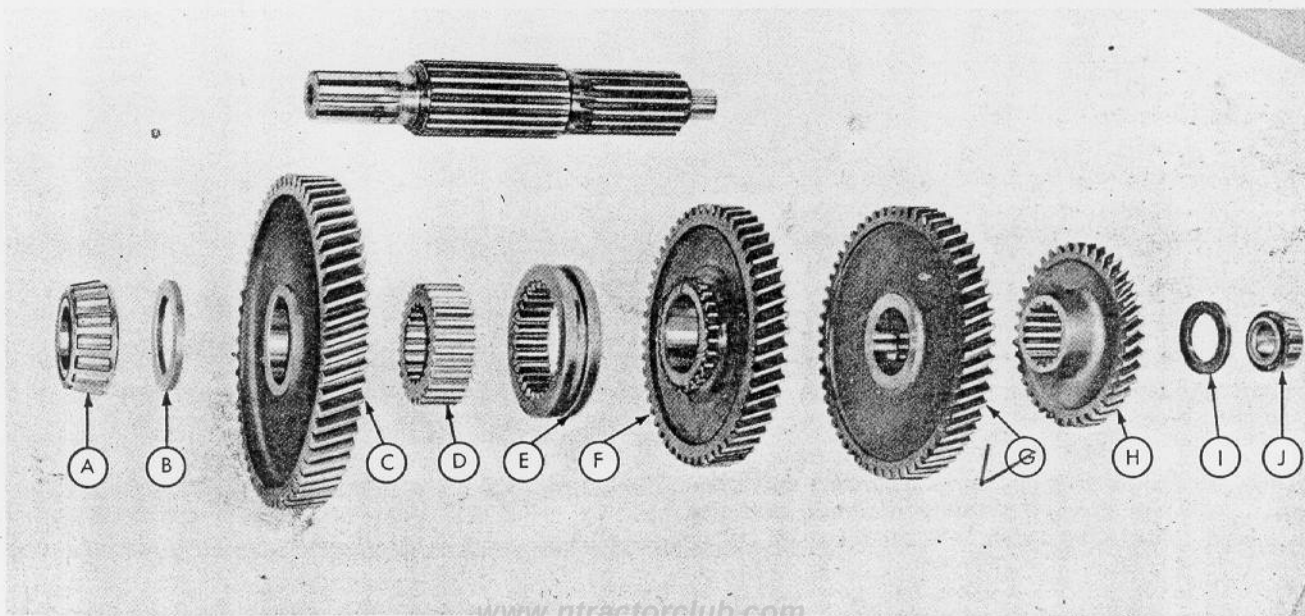


Fig. 16

Step 4—Check the countershaft bearing adjustment as shown in Figure 16. (Stub shaft inserted or the PTO shaft may be used if properly supported.)

**NOTE:** Be sure the proper number of shims are installed. The correct torque for bearing adjustment is 15 to 30 inch lbs.

**NOTE:** Install the two lower shift rails and forks. Insert the detent balls and secure with the springs and the interlock screw plugs.



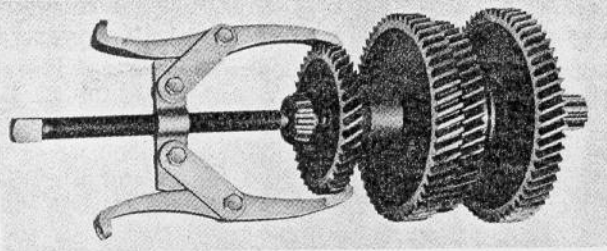


Fig. 18

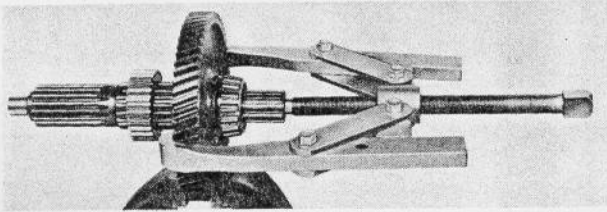


Fig. 19

## VII. SERVICING THE MAIN SHAFT ASSEMBLY

### Step 1—Disassemble the unit.

- a. Pull the front bearing (J-Figure 17), thrust washer (I-Figure 17) and the fourth gear (H-Figure 17) as a unit. See Figure 18.
- b. Remove the second gear (G-Figure 17).
- c. Remove the third gear (F-Figure 17).
- d. Remove the sliding coupling (E-Figure 17).
- e. Pull the first gear (C-Figure 17), thrust washer (B-Figure 17), and the rear bearing (A-Figure 17) as a unit. See Figure 19.
- f. Remove the connector (D-Figure 17).

### Step 2—Assemble the main shaft assembly. See Figure 17.

- a. Install the connector (D) on the main shaft.
- b. Install the first gear (C) thrust washer, and the rear bearing. Use an arbor press with the appropriate sleeve, or drive the bearing into position using a sleeve that fits the inner race of the cone.
- c. Install the sliding coupling (E).
- d. Install the third gear (F) and the second gear (G).
- e. Install the fourth gear (H).
- f. Install the thrust washer (I) and the front bearing (J). Use an arbor press with the appropriate sleeve or drive the bearing on with a sleeve that fits the inner race of the cone.
- g. Install the main shaft gear assembly in the transmission housing.
- h. Install the rear bearing retainer

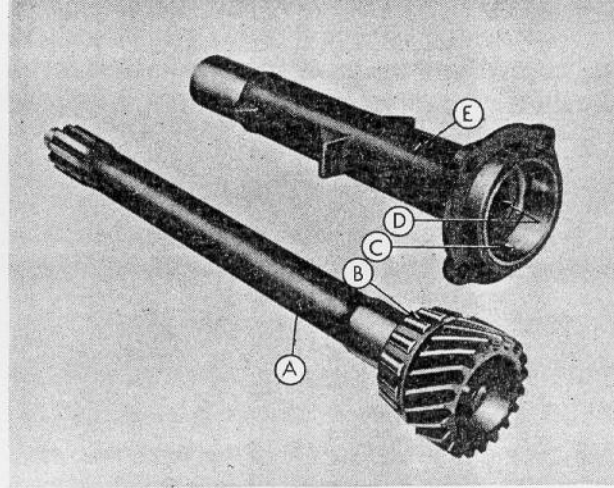


Fig. 20

**NOTE:** Be sure the metal shim pack is installed.

## VIII. SERVICING THE MAIN DRIVE GEAR AND SHAFT

### Step 1—Disassemble the unit.

- a. Remove the main drive shaft, gear, and bearing assembly (A-Figure 20) from the retainer (E-Figure 20).
- b. For training purposes, when using a tractor in which the main drive gear bearing is undamaged, *do not* remove the bearing. Remove the bearing (B-Figure 20) from the main drive shaft as shown in Figure 21.
- c. Remove the bearing cup (C-Figure 20) as shown in Figure 22.
- d. Remove the oil seal (D-Figure 20) as shown in Figure 23.

### Step 2—Assemble the main drive gear and shaft.

- a. Install the oil seal as shown in Figure 24.

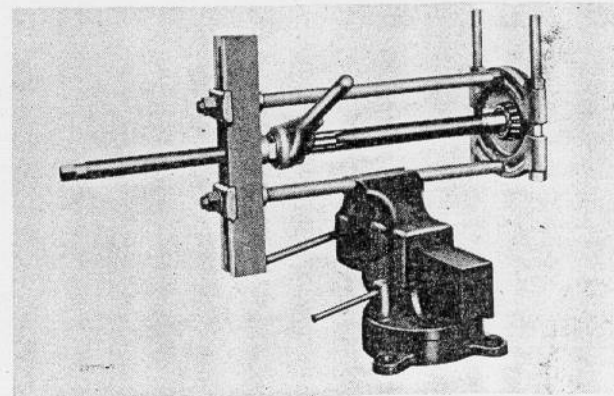


Fig. 21

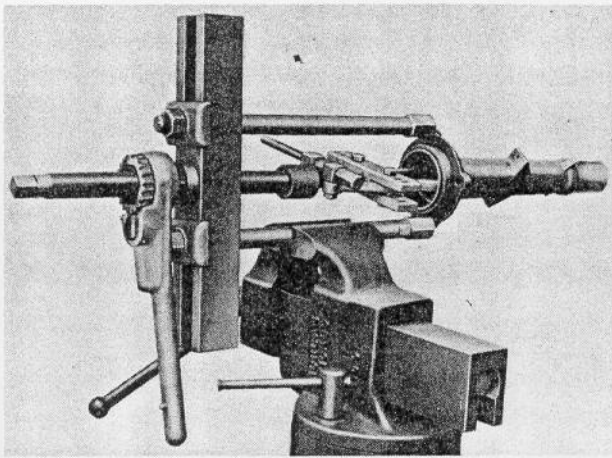


Fig. 22

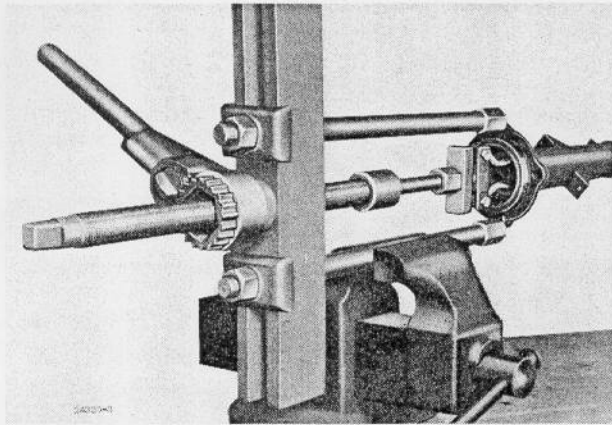


Fig. 23

- b. Install the bearing cup by pressing it into position or by driving it with a tool that applies even pressure.
- c. Install the bearing with a sleeve and arbor press.
- d. Insert the main drive shaft in the retainer.

**NOTE:** Caution should be used to prevent damage to the oil seal by spline end of the shaft. Rotating the shaft slowly when it is being inserted will help prevent damage to the oil seal.

- e. Install the main drive gear assembly to the transmission housing.
- f. Install the clutch throw-out bearing and spring.

## IX. COMPLETE TRANSMISSION ASSEMBLY

Step 1—Check the main shaft bearing adjustment.

- a. Securely tighten the 4 cap screws on the rear bearing retainer.
- b. Check the torque on the main shaft as shown in Figure 25.

**NOTE:** With the transmission in neutral position, 20 to 35 inch pounds of torque will be required to turn the main shaft at the rear or output end, if bearing adjustment is correct. If it has been necessary to replace any transmission gears, a careful check should be made to make sure that all gears mesh properly. This check may be made as follows:

1. Install a stub shaft or the PTO shaft, properly supported, in the PTO shift assembly.
2. Engage the power take-off with the transmission.
3. Put the transmission in neutral and measure the torque required to turn the PTO shaft. (With the shaft turning uniformly, the torque should be from 30 to 60 inch pounds. If the torque is higher than 60 inch pounds, one or more of the gears are binding at the teeth or on the hub shoulders.)

Step 2—Install the PTO clutch rail stop, lock-washer and nut.

Step 3—Install the shift plates.

Step 4—Install the top shift fork and rail.

Step 5—Install the detent ball and spring.

Step 6—Install the gear shift lever assembly.

**NOTE:** Omit Step 6 until the transmission assembly is reassembled to the tractor.

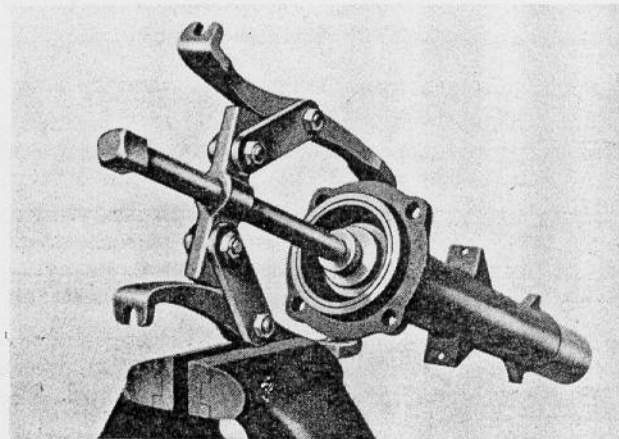
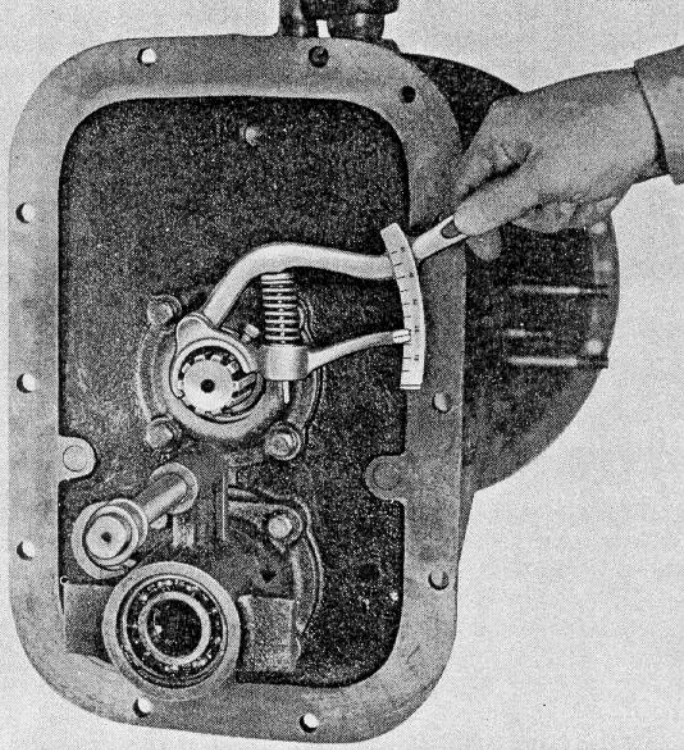


Fig. 24



**Fig. 25**