

**MC-9 MAINTENANCE MANUAL****SECTION 13**  
**TRANSMISSION**

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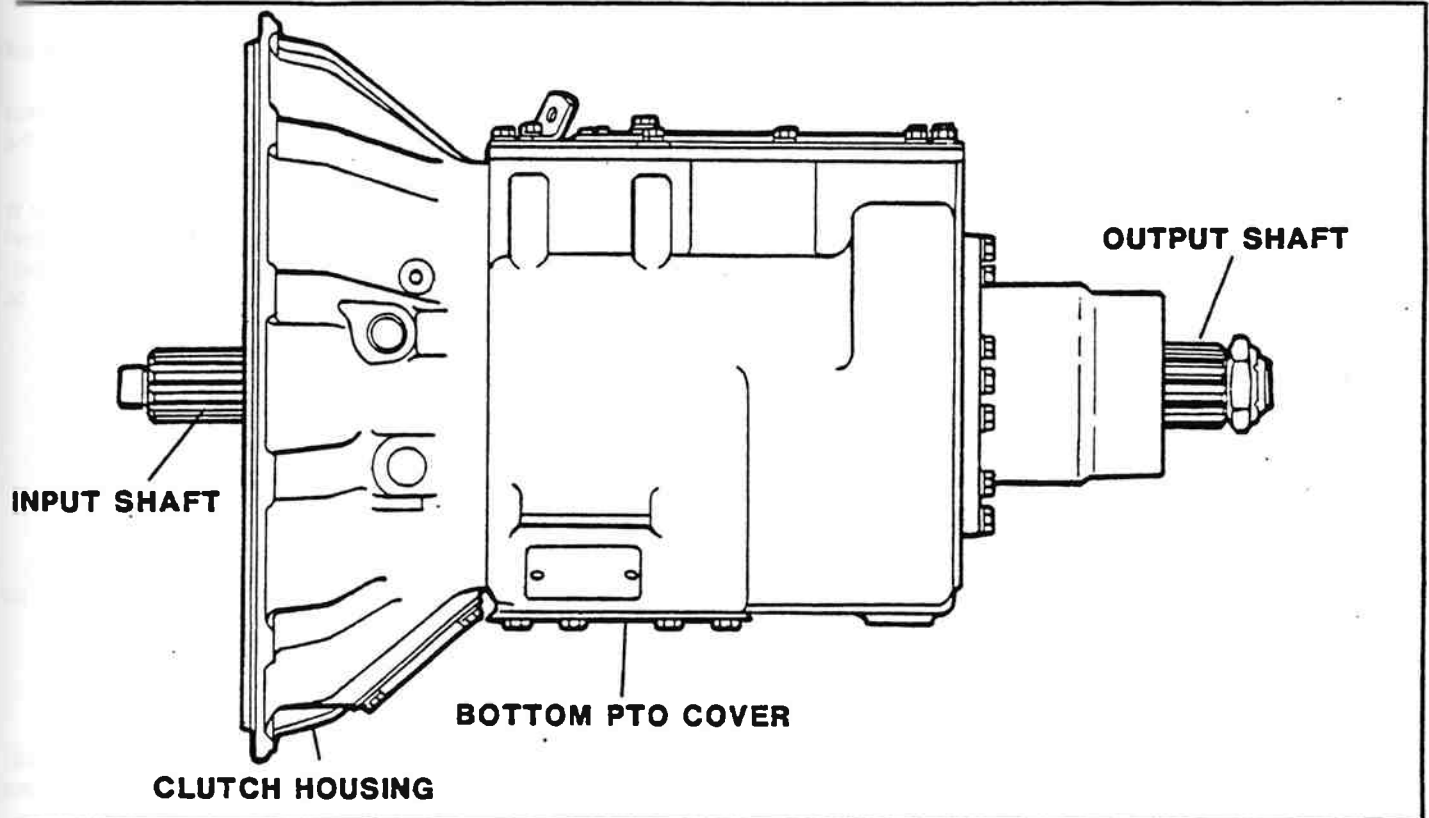


Figure 13-1. T-11605 Transmission.

## 5-SPEED MANUAL TRANSMISSION

The model 11605 transmission (figure 13-1) has five forward speeds and one reverse. Figure 13-2 shows the shift pattern. Twin countershafts divide the torque equally between shafts and gears. The countershafts are identical except for the PTO gears.

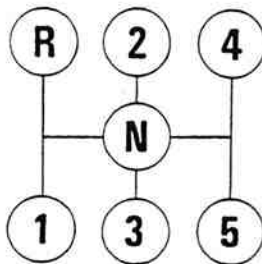


Figure 13-2. 5-Speed Shift Pattern.

The mainshaft gears are located axially by washers and held in position by the rotation of the countershaft gears. All gears have spur type teeth.

The mainshaft gears are clutched by internal splines in the hubs of gears. Sliding clutch gears with short, conical clutched teeth provide short, easy shifts.

The input shaft and drive gear are not integral and may be changed individually.

The transmission is splash lubricated by oil contained in the case. Two magnetic oil plugs are located on the bottom of the

case to collect any metallic particles that are present in the oil. The filler tube and dipstick are accessible through the left side engine compartment service door.

The Model T-11605F manual transmission, which is optional, is often installed in conjunction with drive axles having 3.33 or 3.85 gear ratios. This combination is for greater fuel economy. The transmission differs from the T-11605D in the first through fourth gear ratios; see specifications at the end of this section.

## MAINTENANCE

A proper lubrication schedule is essential to ensure maximum performance of the transmission.

On new coaches, the "factory fill" lubricant should be changed between the first 3,000 and 5,000 miles (4,827 to 8,045 km). During initial operation tiny metal particles are freed from the mating surfaces of moving parts. The lubricant carries these particles through the transmission causing wear on all parts. When draining the transmission, remove all metal particles that are picked up by the magnetic drain plug.

Draining the factory fill lubricant before the first 5,000 miles (8,045 km) also prevents oil contamination caused by the differences between factory fill lubricant and the lubricant used by the operator for topping up the level.

At intervals of 5,000 miles (8,045 km) check the dipstick to ensure the oil is at proper level. Inspect for leaks. At intervals of 50,000 miles (80,450 km) the transmission oil should be changed.

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## TRANSMISSION OIL CHANGE

While the oil is warm, remove the magnetic drain plug at the bottom of the case to drain the oil. Thoroughly clean the plug before re-installing.

When refilling the transmission, refer to the chart (figure 13-3) to determine the correct type of lubricant. Factory fill is 22 U.S. pints (10.41 liters) of SAE-50 heavy duty engine oil.

Do not overfill the transmission as this will cause fluid to be forced out of the case through the mainshaft openings. Also, types and brands of oil should not be intermixed because of possible oil component breakdown and loss of lubrication protection.

RECOMMENDED LUBRICANTS		
Type	Grade (SAE)	Ambient Temperature
Heavy Duty Engine Oil MIL-L-2104C or MIL-L-46152 or API-SF or API-CD	50 40 30	Above 10°F (12°C) Above 10°F (12°C) Below 10°F (12°C)
Mineral Gear Oil with rust and oxidation inhibitor API-GL-1	90 80W	Above 10°F (12°C) Below 10°F (12°C)
Mild EP Gear Oil* MIL-L-2105 or API-GL-4	90 80W	10°F to 100°F (12°C to 38°C) -15°F to 70°F (-26°C to 21°C)
Multipurpose Gear Oil* MIL-L-2105B or MIL-L-2105C or API-GL-5	85W144 80W140 90 80W90 80W 75W	Above 10°F (12°C) Above -15°F (-26°C) 10°F to 100°F (12°C to 38°C) -15°F to 100°F (-26°C to 38°C) -15°F to 70°F (-26°C to 21°C) -40°F to 15°F (-40°C to 26°C)

\* Mild EP gear oil or multi-purpose gear oil are not recommended when lubricant operating temperatures are above 230°F (110°C).

Figure 13-3. Lubricant Chart.

## TRANSMISSION REMOVAL

1. Drain the lubricant from the transmission.
2. Disconnect the selector rod from the shift lever and from the pivot link rod by removing cotter keys and nuts. Refer to figure 13-4. Do not disconnect the linkage at the turnbuckle

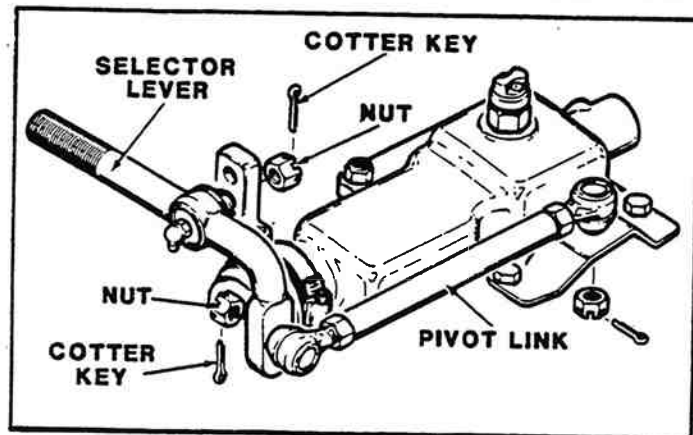


Figure 13-4. Disconnecting Shift Link.

which connects the selector lever to the linkage; doing so will result in misadjustment of the linkage.

3. Disconnect the external linkage from the clutch release arm to permit the release yoke to turn up and pull free of the bearing thrust pads.

4. A suitable sling or transmission jack should be used to properly maintain engine-transmission alignment when removing or installing the transmission. A transmission dolly is available through parts outlets or may be fabricated as shown on drawing 20-233. See Service Tools at end of this section.

**CAUTION: Do not allow the rear of the transmission to drop down and hang unsupported in the splined hubs of the clutch discs. Failure to observe this caution will result in bending or distortion of the clutch friction discs.**

5. Remove the mounting bolts and slide transmission on dolly away from engine while maintaining alignment.

## DISASSEMBLY

Listed below are several disassembly techniques and procedures which will help the process go smoothly and help the overhaul to be successful.

1. Carefully wash and relubricate all reusable bearings as removed and protectively wrap until ready for use. Remove bearings planned to be reused with pullers designed for this purpose.

2. When disassembling the various assemblies, such as the mainshaft, countershafts, and shift bar housing, lay all parts on a clean bench in the same sequence as removed. This procedure will simplify reassembly and reduce the possibility of losing parts.

3. Remove snap rings with pliers designed for this purpose. Snap rings removed in this manner can be reused.

4. The input shaft can be removed from transmission without removing the countershafts, mainshaft, or drive gear. Special procedures are required. Refer to later page in this section for those procedures.

5. Provide yourself with a clean place to work. It is important that no dirt or foreign material enters the unit during repairs. Dirt is an abrasive and can damage bearings. It is always good practice to clean the outside of the unit before starting the planned disassembly.

6. Use restraint when applying force to shafts, housings, etc. Movement of some parts is restricted. Never apply force to the part being driven after it stops solidly. The use of soft hammers, bars and mauls for all disassembly work is recommended.

## REMOVAL OF REMOTE CONTROL HOUSING

1. Turn out the two capscrews (13) and remove nuts (12) from the two studs (figure 13-5).
2. Lift the remote control housing from the shift bar housing

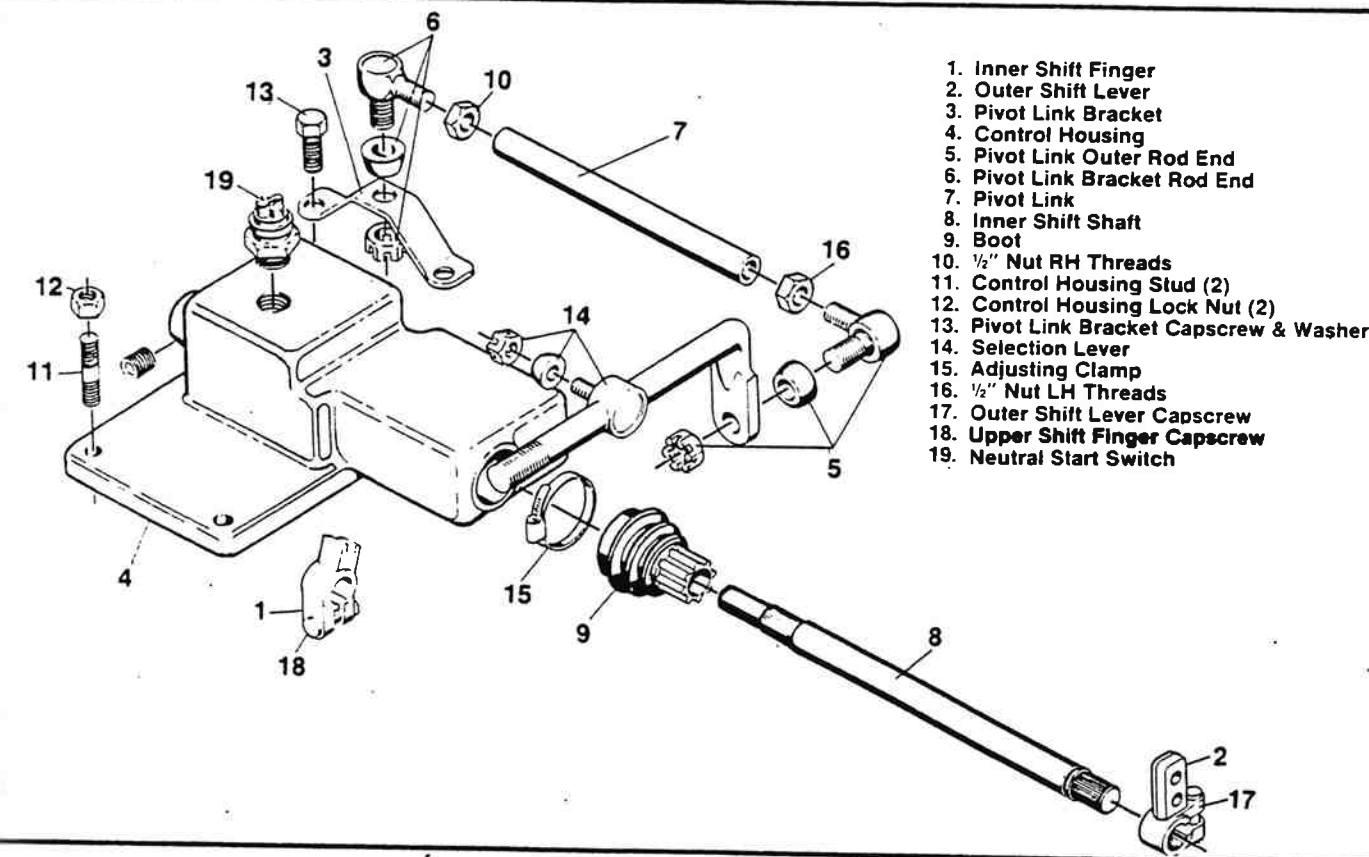


Figure 13-5. Remote Control Housing.

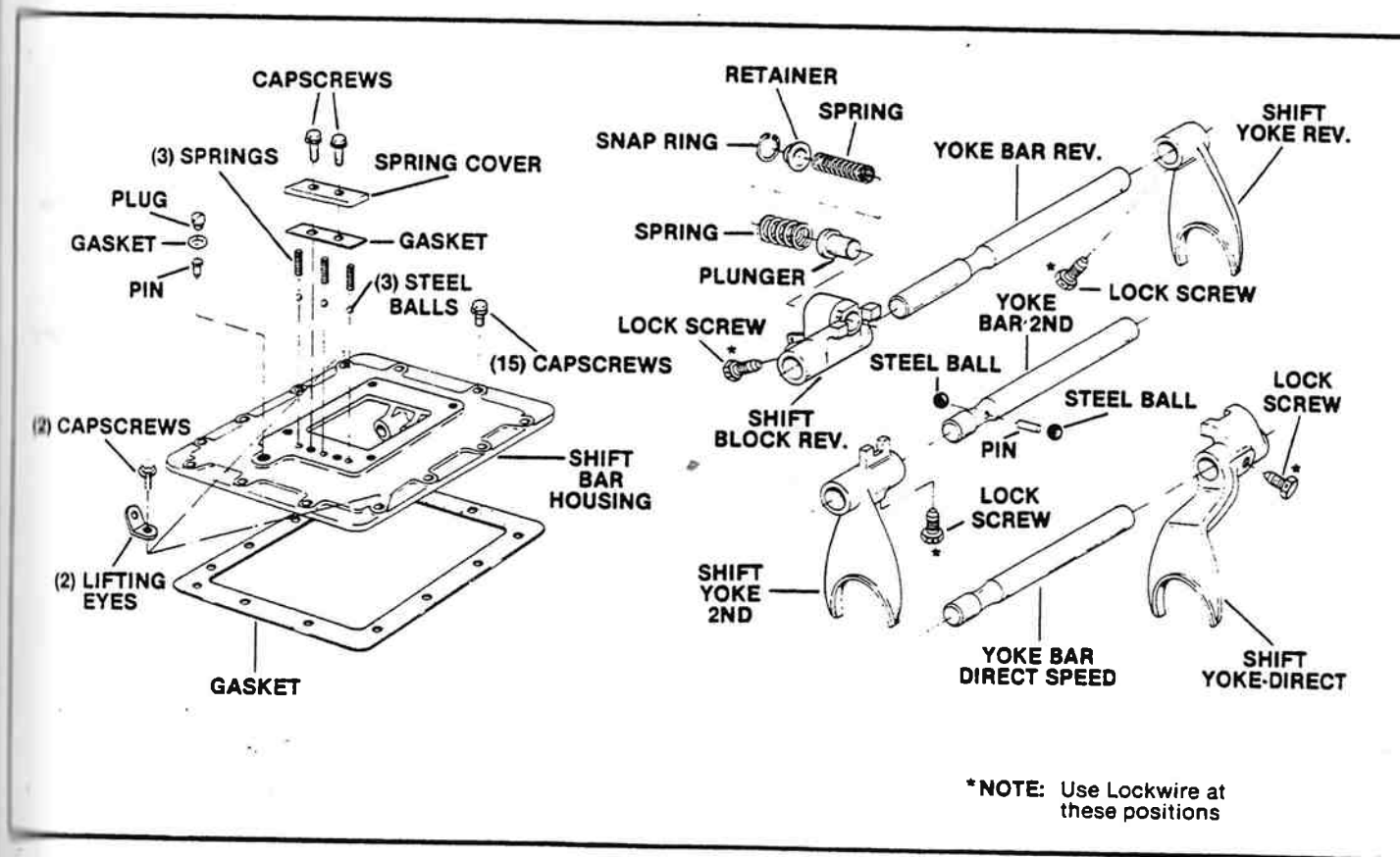


Figure 13-6. Shift Bar Housing.

\*NOTE: Use Lockwire at these positions

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## SHIFT BAR HOUSING REMOVAL AND DISASSEMBLY

1. Turn out the attaching capscrews (figure 13-7). Jar to break the gasket seal and lift the shift bar housing from the transmission (figure 13-8).

**NOTE:** Lay all parts on a clean bench in the order in which they are removed to facilitate reassembly. Keep bars not being removed in the neutral position or interlock parts will lock bars.

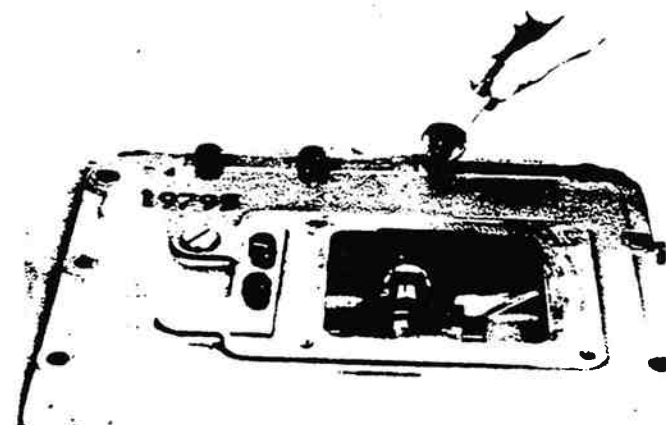


Figure 13-7. Removing Capscrews.

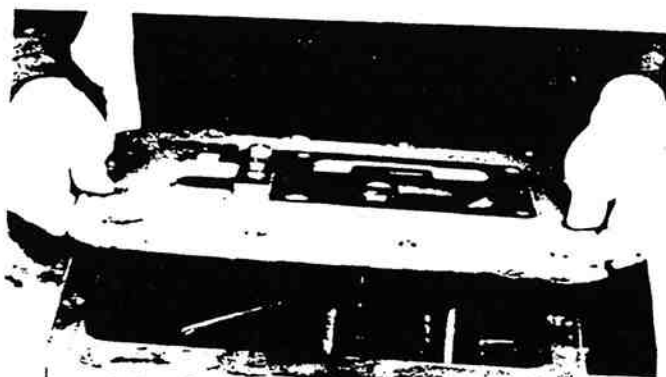


Figure 13-8. Removing Shift Bar Housing.

2. Turn out the two capscrews and remove the tension spring cover from top of housing.

3. Remove the three tension springs from bores in housing (figure 13-9) and the gasket for tension spring cover.



Figure 13-9. Tension Spring Removal.

4. Tilt housing and remove the tension balls installed under springs (figure 13-10).



Figure 13-10. Removing Tension Balls.

5. Place the housing in a vise with the left side up; the long bar will be at the bottom (figure 13-11).

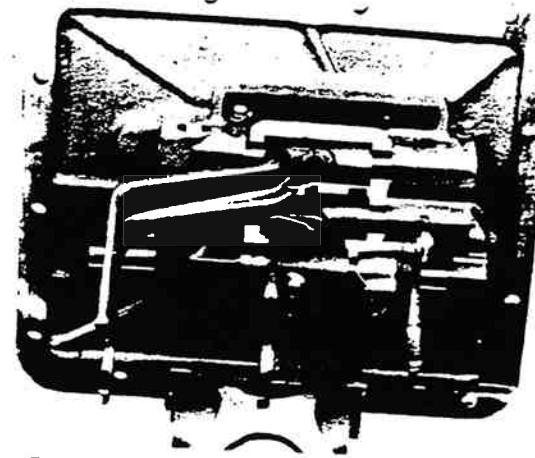


Figure 13-11. Positioning Housing In Vise.

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6. Cut lockwire and remove lock screws from each bar just prior to its removal.

7. Move the top, 4th-5th speed shifting bar to the front and out of housing, removing shifting yoke from bar (figure 13-12).

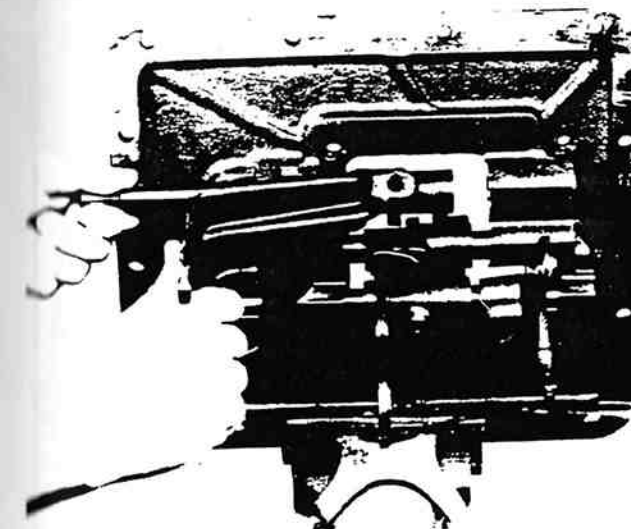


Figure 13-12. Top Shift Bar Removal.

8. Move the center, 2nd-3rd speed shifting bar to the front and out of housing, removing the shifting yoke from bar. As the neutral notch in bar clears housing boss, remove the small interlock pin from bore in neutral notch (figure 13-13).

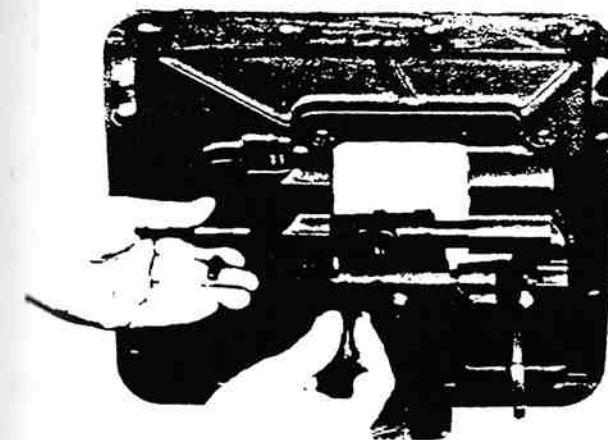


Figure 13-13. Removing Interlock Pin.

9. Move the bottom, 1st-reverse speed shifting bar to the front and out of housing, removing the shift yoke and block from the bar.

10. Two interlock balls will fall from interlock ball opening in front boss as the last bar is removed (figure 13-14).

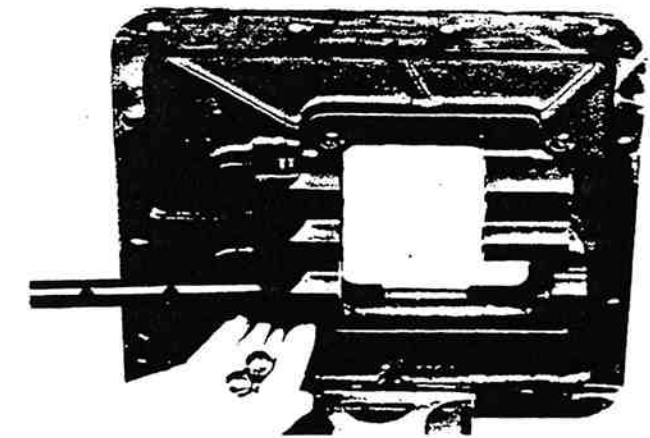


Figure 13-14. Released Interlock Balls.



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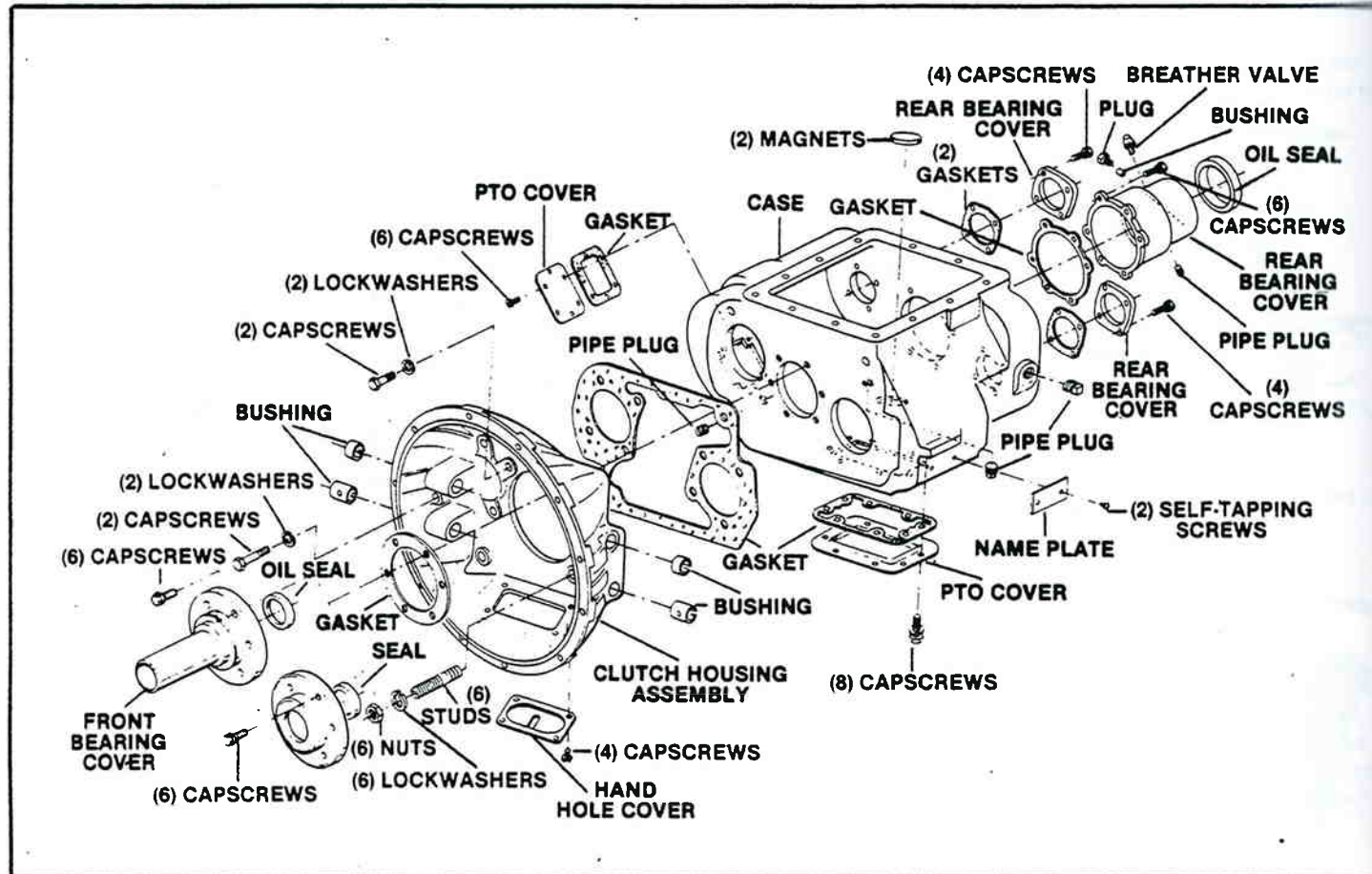


Figure 13-15. Speed Transmission Housing Assembly.

### REMOVAL OF COMPANION FLANGE (OR END YOKE) AND REAR BEARING COVER

- 1 Lock the mainshaft by engaging two speeds with the mainshaft sliding clutch gears.
- 2 Remove the elastic stop nut from the output shaft (figure 13-16).

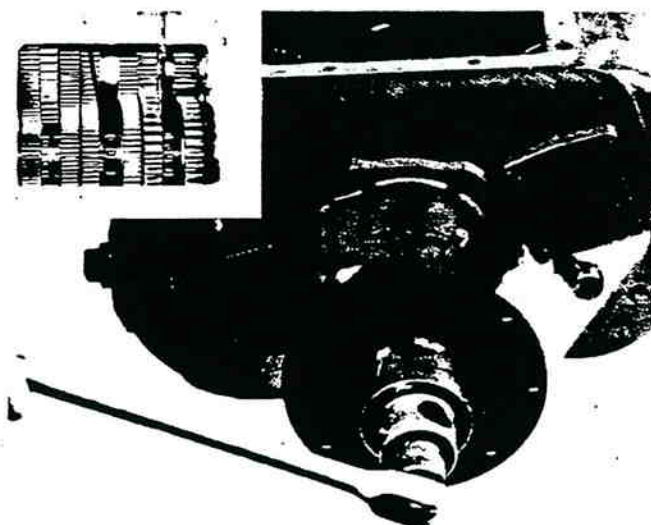


Figure 13-16. Stop Nut Removal.

- 3 Pull the flange or yoke from splines of the output shaft.
- 4 Turn out the attaching capscrews from the rear bearing cover.
- 5 Pry the bearing cover evenly to the rear to unseat from output shaft bearing (figure 13-17).

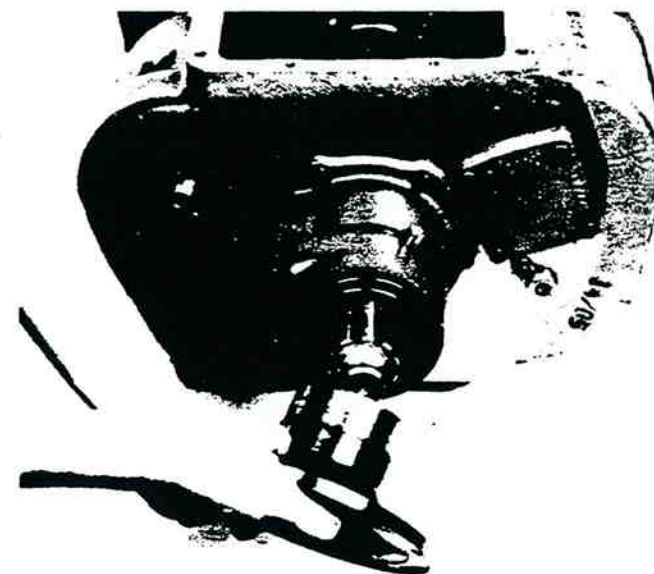


Figure 13-17. Pry Bearing Cover Evenly.

- 1 Remove the bearing cover from output shaft (figure 13-18).

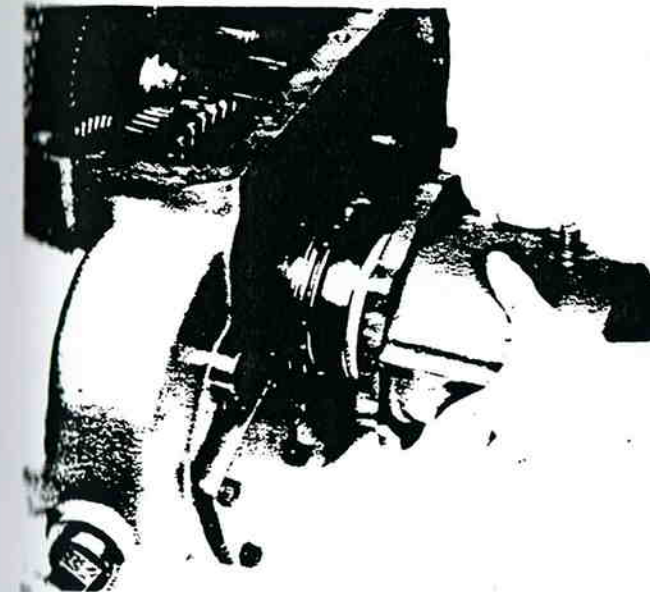


Figure 13-18. Bearing Cover Removal.

### OUTPUT SHAFT REMOVAL - refer to figure 13-20

- 1 Remove the spacer and the bearing washer from output shaft or from bearing cover (figure 13-19).



Figure 13-19. Spacer and Washer Removal.

2. Remove the oil seal from cover if necessary (figure 13-21).

**NOTE:** This bearing may remain in cover; in this case, move the bearing evenly forward and from cover.

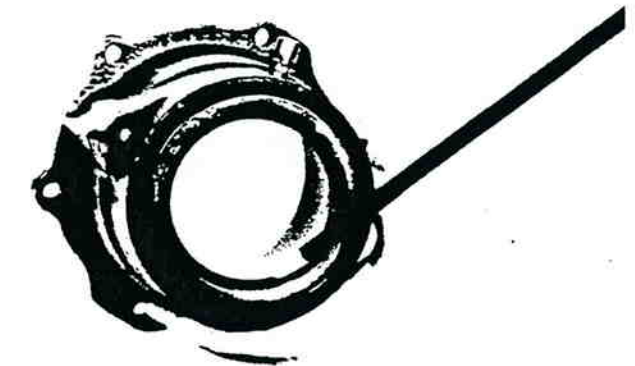
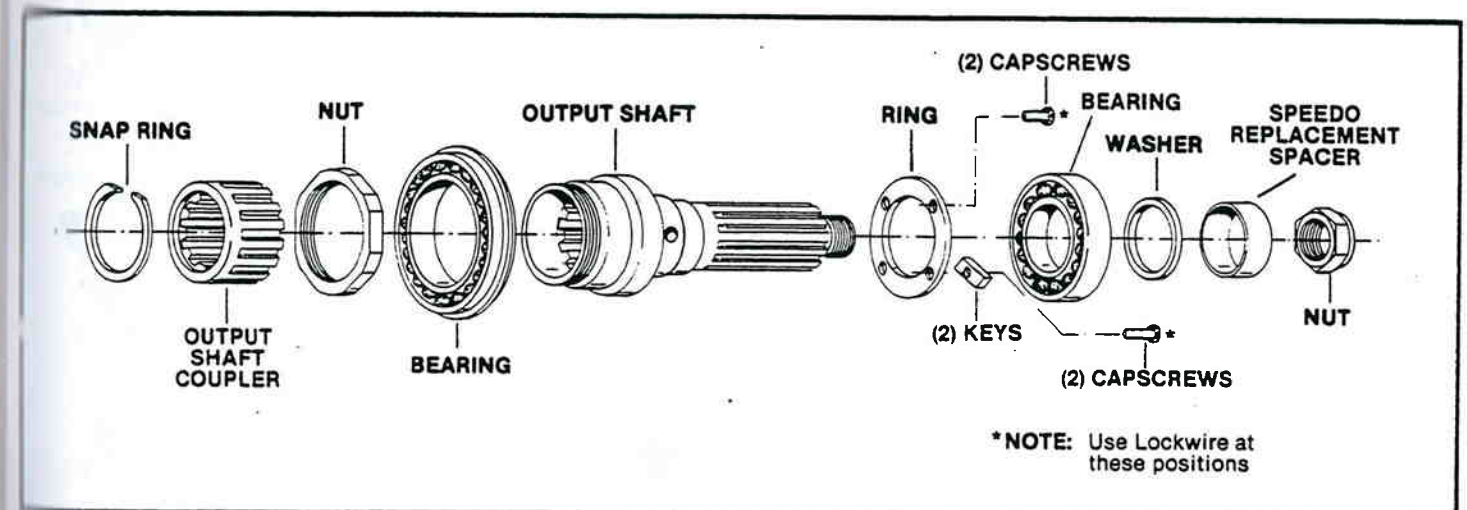


Figure 13-21. Removing Oil Seal From Cover.

3. Pull the outer bearing from output shaft (figure 13-22).



Figure 13-22. Pulling Outer Bearing.



**\*NOTE:** Use Lockwire at these positions

Figure 13-20. Output Shaft Assembly.

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4. Cut lockwire and remove the two 5/16" capscrews from the two flat keys (figure 13-23).



Figure 13-23. Removing Capscrews.

5. Remove the two flat keys from bores in output shaft. These keys maintain the position of the mainshaft in relation to output shaft (figure 13-24).

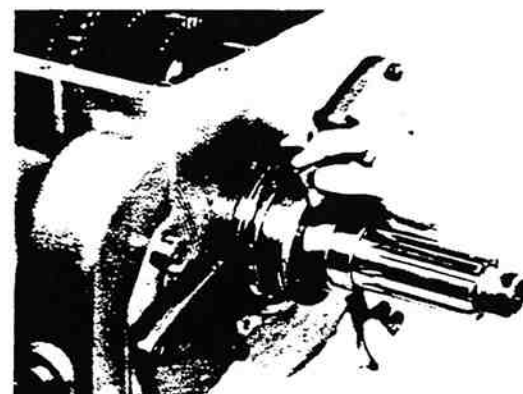


Figure 13-24. Removing Keys.

6. Move the output shaft evenly to the rear and from case bore. Moving the mainshaft assembly to the rear will start moving output shaft from bore (figure 13-25).



Figure 13-25. Output Shaft Removal.

7. Remove the splined coupling gear from mainshaft, or from pocket in output shaft (figure 13-26).



Figure 13-26. Removing Splined Coupling Gear.

8. Turn out the two 5/16" capscrews and remove the key spacer ring from output shaft (figure 13-27).



Figure 13-27. Removing Spacer Ring.

9. Remove the bearing nut from the output shaft, left hand thread (figure 13-28).

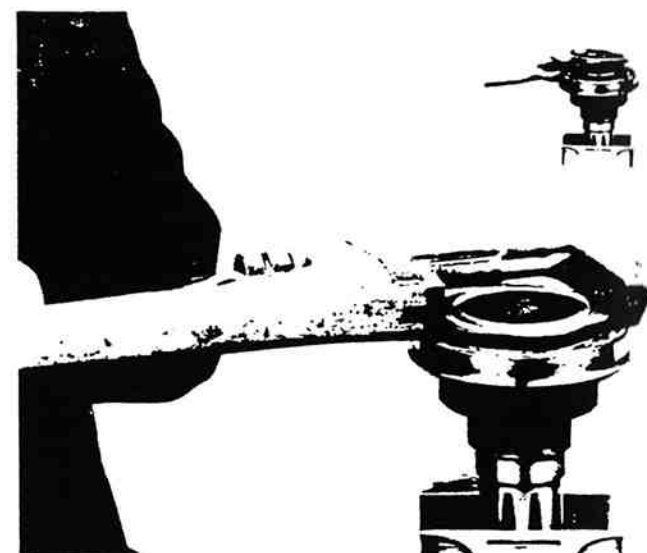


Figure 13-28. Bearing Nut Removal.

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10. Press the front bearing from output shaft (figure 13-29).

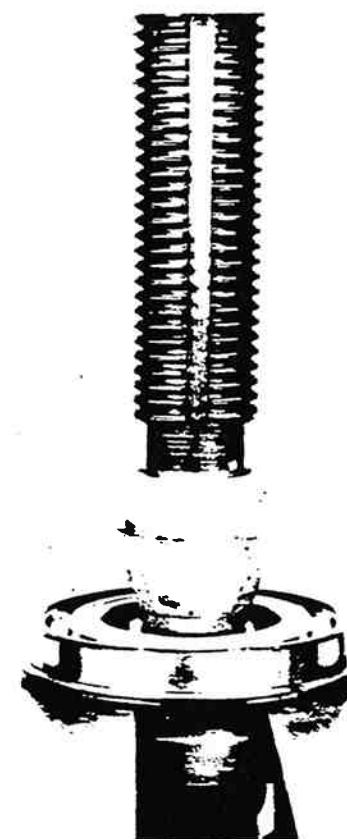


Figure 13-29. Pressing Out Bearing.

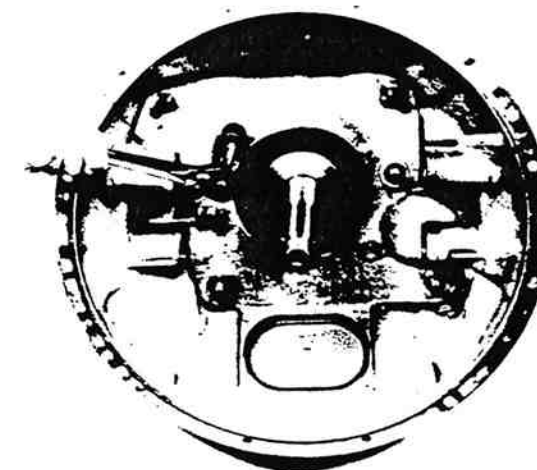


Figure 13-30. Removing Nuts from Studs.

## CLUTCH HOUSING REMOVAL

**NOTE:** The clutch housing can be removed at any time during transmission disassembly. However, it must be removed before the two countershafts can be removed.

1. Remove the clutch release mechanism.
2. Remove the four bolts and remove the six nuts and lock washers from studs at front of case (figure 13-30).
3. Break gasket seal and pull clutch housing from case (figure 13-31).

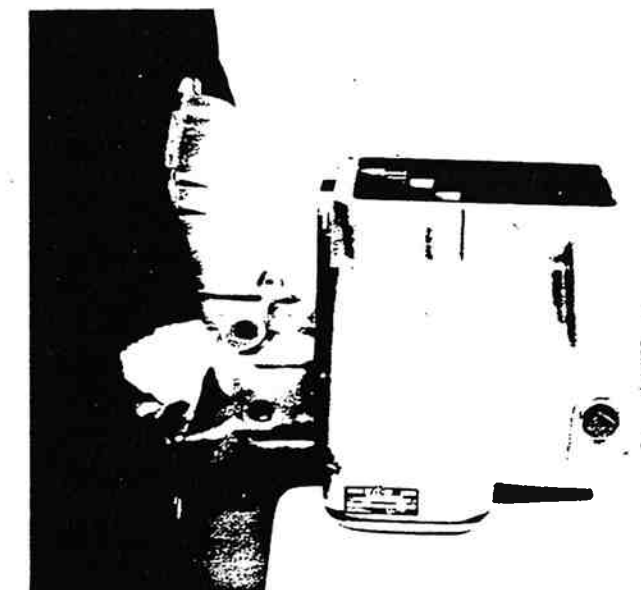


Figure 13-31. Pulling Clutch Housing from Transmission Case.