

Fig. 7B-19J--Loading Countergear Bearing

CAUTION: Be sure the notches in the blocker ring align with the keys in the 3-4 synchronizer assembly.

7. Place extension to case gasket at rear of case holding in place with grease and, from the rear of the case, assemble the clutch gear, mainshaft and extension to case as an assembly.

8. Install extension to case retaining bolts. Using seal cement on bottom bolt only.

9. Install front bearing outer snap ring to bearing and position bearing over stem of drive gear and into front case bore.

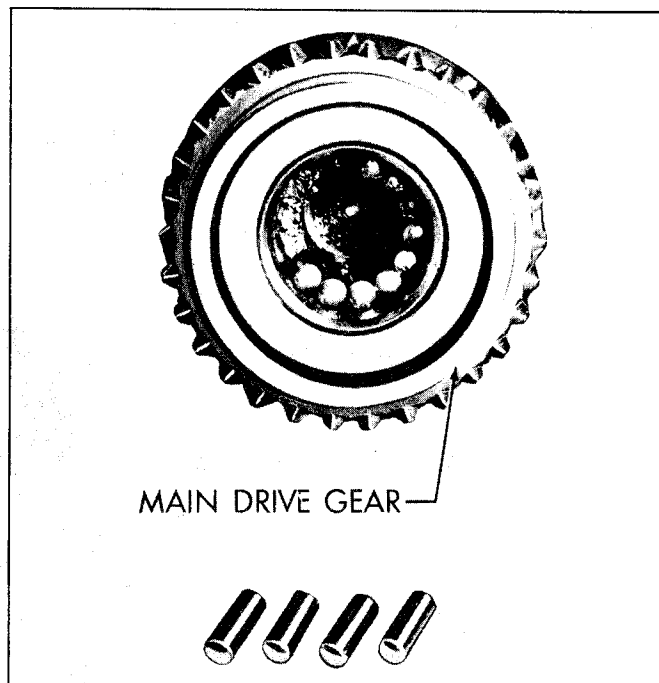


Fig. 7B-20J--Loading Mainshaft Bearings

10. Install snap ring to drive gear stem, and drive gear bearing retainer and gasket to case.

NOTE: The retainer oil return hole should be at the bottom.

11. Shift synchronizer sleeves to neutral positions and install cover, gasket and fork assembly to case. Be sure forks align with their synchronizer sleeve grooves.

12. Tighten all bolts to specified torque.

4-SPEED (WARNER) 83MM TRANSMISSION

INDEX

Disassembly of Transmission	7B-30
Disassembly of Mainshaft.....	7B-34
Cleaning and Inspection	7B-35
Transmission Case.....	7B-35
Bearing Rollers and Spacers.....	7B-35
Gears.....	7B-35
Front and Rear Bearings.....	7B-35
Repairs.....	7B-36
Clutch Keys and Springs Replacement	7B-36

Extension Oil Seal and/or Bushing Replacement ...	7B-36
Drive Gear Bearing Retainer Oil.....	7B-37
Reverse Shifter Shaft and/or Seal Replacement	7B-37
Reverse Idler Shaft Replacement	7B-37
Transmission Side Cover	7B-37
Assembly of Countergear	7B-37
Checking Countergear End Play.....	7B-37
Assembly of Mainshaft.....	7B-38
Assembly of Transmission.....	7B-38

DISASSEMBLY OF TRANSMISSION

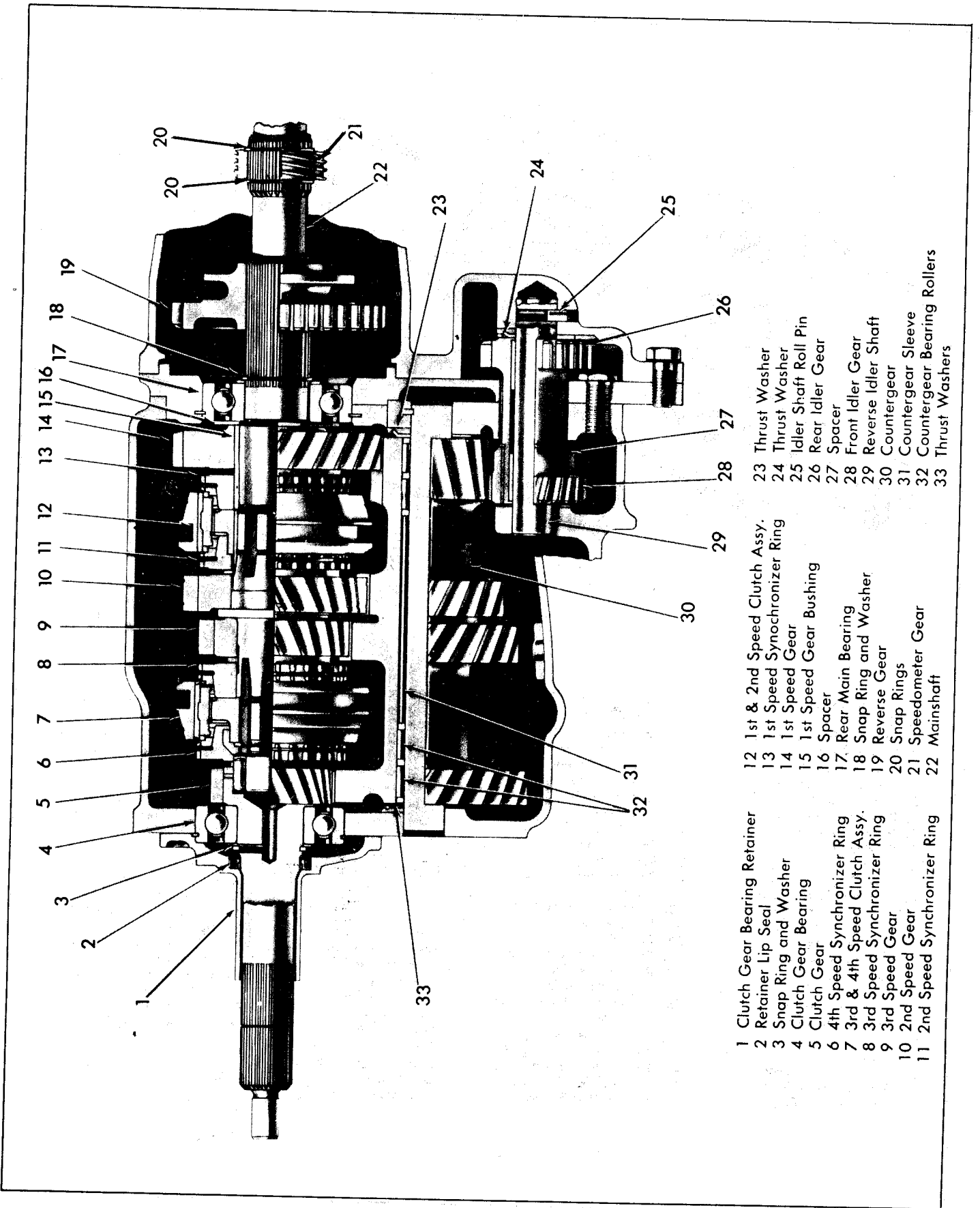
NOTE: Sectional and exploded view of the transmission are provided in Figures 7B-1K and 7B-2K to assist in the disassembly of the transmission.

1. Thoroughly clean the exterior of the transmission assembly.

2. Shift transmission into second gear, remove drain plug from lower right of case and drain lubricant from transmission.

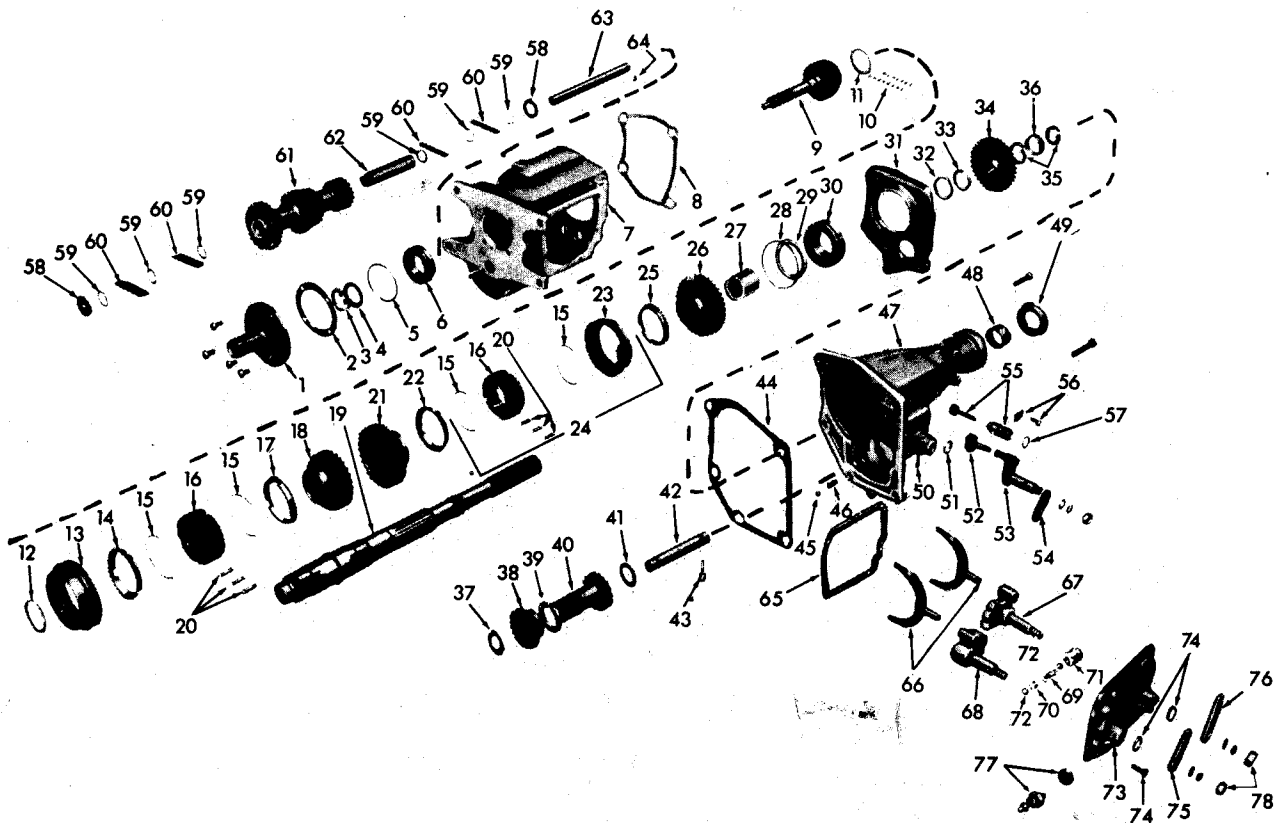
3. Remove nine (9) shift cover attaching bolts, cover assembly and gasket. Remove both shift forks.

4. Remove four (4) drive gear bearing retainer bolts, retainer and gasket from front of transmission.



- | | | | |
|----|------------------------------|----|----------------------|
| 1 | Clutch Gear Bearing Retainer | 23 | Thrust Washer |
| 2 | Retainer Lip Seal | 24 | Thrust Washer |
| 3 | Snap Ring and Washer | 25 | Idler Shaft Roll Pin |
| 4 | Clutch Gear Bearing | 26 | Rear Idler Gear |
| 5 | Clutch Gear | 27 | Spacer |
| 6 | 4th Speed Synchronizer Ring | 28 | Front Idler Gear |
| 7 | 3rd & 4th Speed Clutch Assy. | 29 | Reverse Idler Shaft |
| 8 | 3rd Speed Synchronizer Ring | 30 | Countergear |
| 9 | 3rd Speed Gear | 31 | Countergear Sleeve |
| 10 | 2nd Speed Gear | 32 | Countergear Bearing |
| 11 | 2nd Speed Synchronizer Ring | 33 | Thrust Washers |
| 12 | 1st & 2nd Speed Clutch Assy. | | |
| 13 | 1st Speed Synchronizer Ring | | |
| 14 | 1st Speed Gear | | |
| 15 | 1st Speed Gear Bushing | | |
| 16 | Spacer | | |
| 17 | Rear Main Bearing | | |
| 18 | Snap Ring and Washer | | |
| 19 | Reverse Gear | | |
| 20 | Snap Rings | | |
| 21 | Speedometer Gear | | |
| 22 | Mainshaft | | |

Fig. 7B-1K--Sectional View of 4-Speed (Warner) 83mm Transmission



- | | | | |
|--|--|--|--|
| 1. Bearing Retainer | 23. First and Second Speed Clutch Sliding Sleeve | 44. Rear Bearing Retainer To Case Extension Gasket | 63. Countershaft |
| 2. Gasket | 24. First and Second Speed Clutch Assembly | 45. Reverse Shifter Shaft Detent Ball | 64. Countershaft Woodruff Key |
| 3. Selective Fit Snap Ring | 25. First Speed Gear Synchronizing Ring | 46. Reverse Shifter Shaft Ball Detent Spring | 65. Gasket |
| 4. Spacer Washer | 26. First Speed Gear | 47. Case Extension | 66. Forward Speed Shift Forks |
| 5. Bearing Snap Ring | 27. First Speed Gear Sleeve | 48. Extension Bushing | 67. First and Second Speed Gear Shifter Shaft and Detent Plate |
| 6. Main Drive Gear Bearing | 28. Rear Bearing Snap Ring | 49. Rear Oil Seal | 68. Third and Fourth Speed Gear Shifter Shaft and Detent Plate |
| 7. Transmission Case | 29. Thrust Washer | 50. Reverse Shifter Shaft Lock Pin | 69. Poppet Spring |
| 8. Rear Bearing Retainer Gasket | 30. Rear Bearing | 51. Reverse Shifter Shaft "O" Ring Seal | 70. Interlock Pin |
| 9. Main Drive Gear | 31. Rear Bearing Retainer | 52. Reverse Shift Fork | 71. Interlock Sleeve |
| 10. Bearing Rollers (16) | 32. Washer | 53. Reverse Shifter Shaft and Detent Plate | 72. Detent Balls |
| 11. Washer | 33. Selective Fit Snap Ring | 54. Reverse Shifter Lever and Fitting | 73. Transmission Side Cover |
| 12. Snap Ring | 34. Reverse Gear | 55. Speedometer Driven Gear and Fitting | 74. Lip Seals |
| 13. Third and Fourth Speed Clutch Sliding Sleeve | 35. Snap Ring | 56. Retainer and Bolt | 75. Third and Fourth Speed Shifter Lever |
| 14. Fourth Speed Gear Synchronizing Ring | 36. Speedometer Drive Gear | 57. "O" Ring Seal | 76. First and Second Speed Shifter Lever |
| 15. Clutch Key Spring | 37. Reverse Idler Front Thrust Washer (Flat) | 58. Washer (Tanged) | 77. T.C.S. Switch and Gasket |
| 16. Clutch Hub | 38. Reverse Idler Gear (Front) | 59. Spacer (.050") | 78. Lever Attaching Nuts |
| 17. Third Speed Gear Synchronizing Ring | 39. Snap Ring | 60. Bearing Rollers (28) | |
| 18. Third Speed Gear | 40. Reverse Idler Gear (Rear) | 61. Countergear | |
| 19. Mainshaft | 41. Thrust Washer (Tanged) | 62. Countergear Roller Spacer | |
| 20. Clutch Keys (3) | 42. Reverse Idler Shaft | | |
| 21. Second Speed Gear | 43. Reverse Idler Shaft Lock Pin and Welch Plug | | |
| 22. Second Speed Gear Synchronizing Ring | | | |

Fig. 7B-2K--Exploded View of 4-Speed (Warner) 83mm Transmission

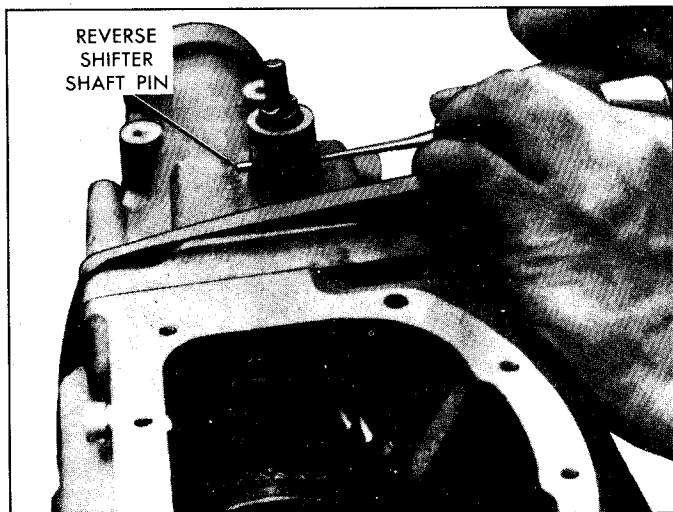


Fig. 7B-3K--Removing Reverse Shifter Shaft Lock Pin

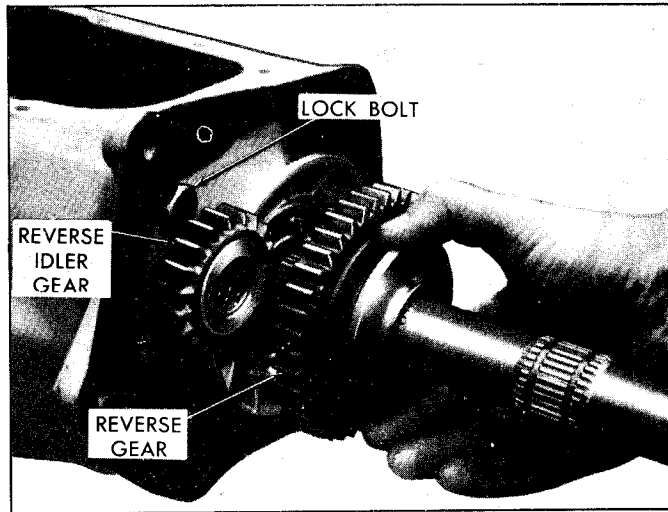


Fig. 7B-5K--Removing Reverse Gear

5. Remove lock pin from reverse shifter lever boss (Fig. 7B-3K) and pull shifter shaft partially out to disengage the reverse shifter fork from the reverse gear.

6. Remove five (5) rear extension attaching bolts, tap extension rearward with a soft hammer to start removal. Slide extension rearward until reverse idler shaft is clear of reverse idler gears. Then rotate extension to the left to free shift fork from collar of reverse gear and remove the case extension. Remove and discard gasket.

7. Remove speedometer gear outer snap ring (Fig. 7B-4K). Tap or slide speedometer gear from mainshaft, then remove second snap ring.

8. Slide the reverse gear from the mainshaft (Fig. 7B-5K), and slide the rear portion of the reverse idler gear from the transmission case.

9. Remove four (4) front bearing retainer bolts, gasket, and front bearing retainer from case.

10. Remove front bearing snap ring selective fit snap ring and spacer washer.

11. Using Tool J-6654-01, remove front main drive gear bearing from transmission case (Fig. 7B-6K).

12. Remove the rear retainer lock bolt.

13. Shift first-second and third-fourth clutch sliding sleeves forward to permit adequate clearance for mainshaft removal. Remove mainshaft and rear bearing retainer assembly from the transmission case.

14. Remove front reverse idler gear and thrust washer from case.

NOTE: Gear teeth face toward front of transmission.

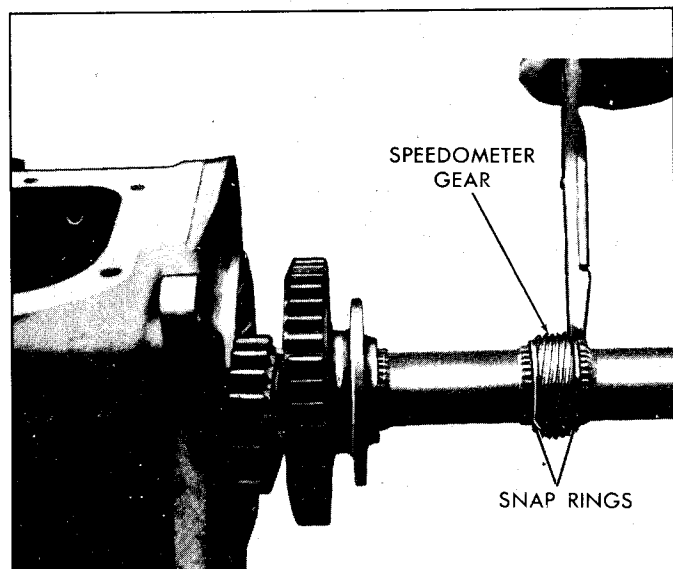


Fig. 7B-4K--Speedometer Gear and Retaining Rings

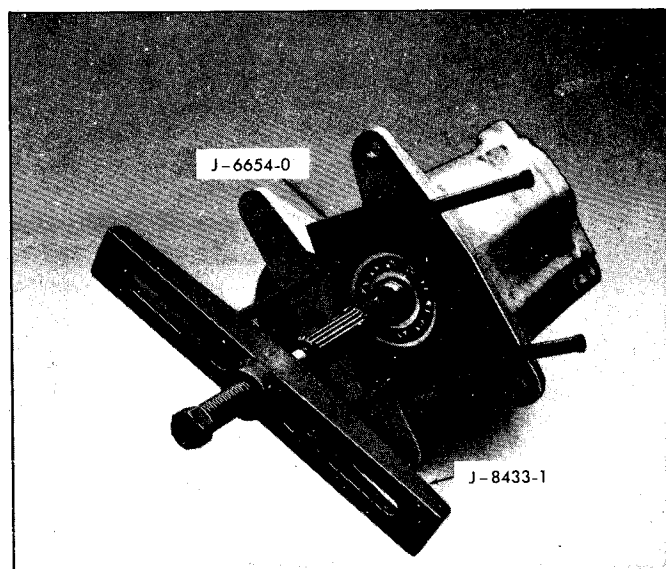


Fig. 7B-6K--Removing Main Drive Gear Bearing

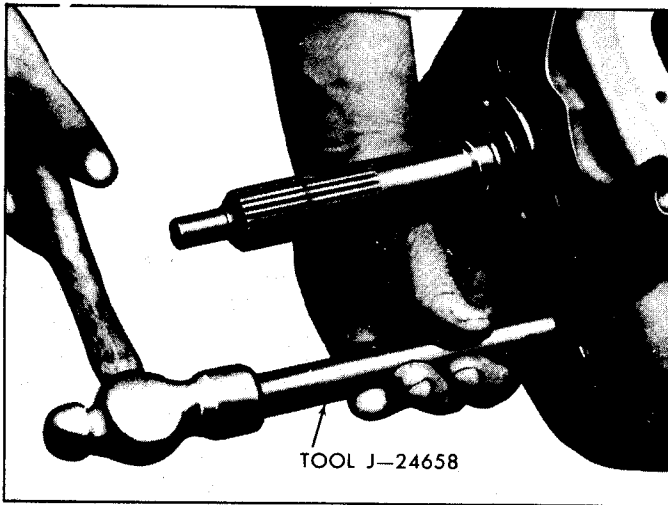


Fig. 7B-7K--Removing Countergear Shaft

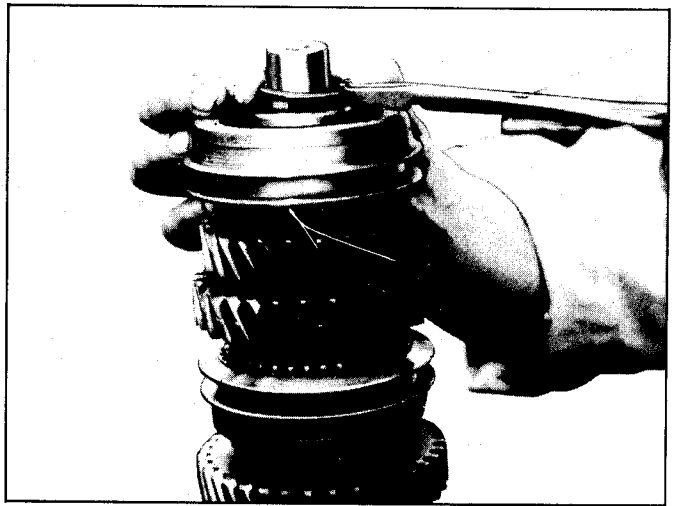


Fig. 7B-9K--Removing 3-4 Clutch Assembly Retainer

15. Using a dummy shaft J-24658 drive countergear shaft out of countergear (Fig. 7B-7K) and remove countergear and tanged thrust washers from case. Check bottom of case for pilot bearings or other loose components.

DISASSEMBLY OF MAINSHAFT (Fig. 7B-8K)

1. Using snap ring pliers, remove 3-4 clutch assembly retaining ring at front of mainshaft (Fig. 7B-9K). Slide washer, synchronizer and clutch assembly, synchronizer ring 3rd speed gear from mainshaft.

2. Spread rear bearing retainer snap ring (Fig. 7B-10K) and slide retainer from mainshaft.

3. Remove rear bearing-to-mainshaft snap ring (Fig. 7B-11K).

4. Support mainshaft under 2nd gear and press mainshaft from rear bearing, 1st gear and sleeve, 1-2 clutch and synchronizer assembly, and the second gear (Fig. 7B-12K).

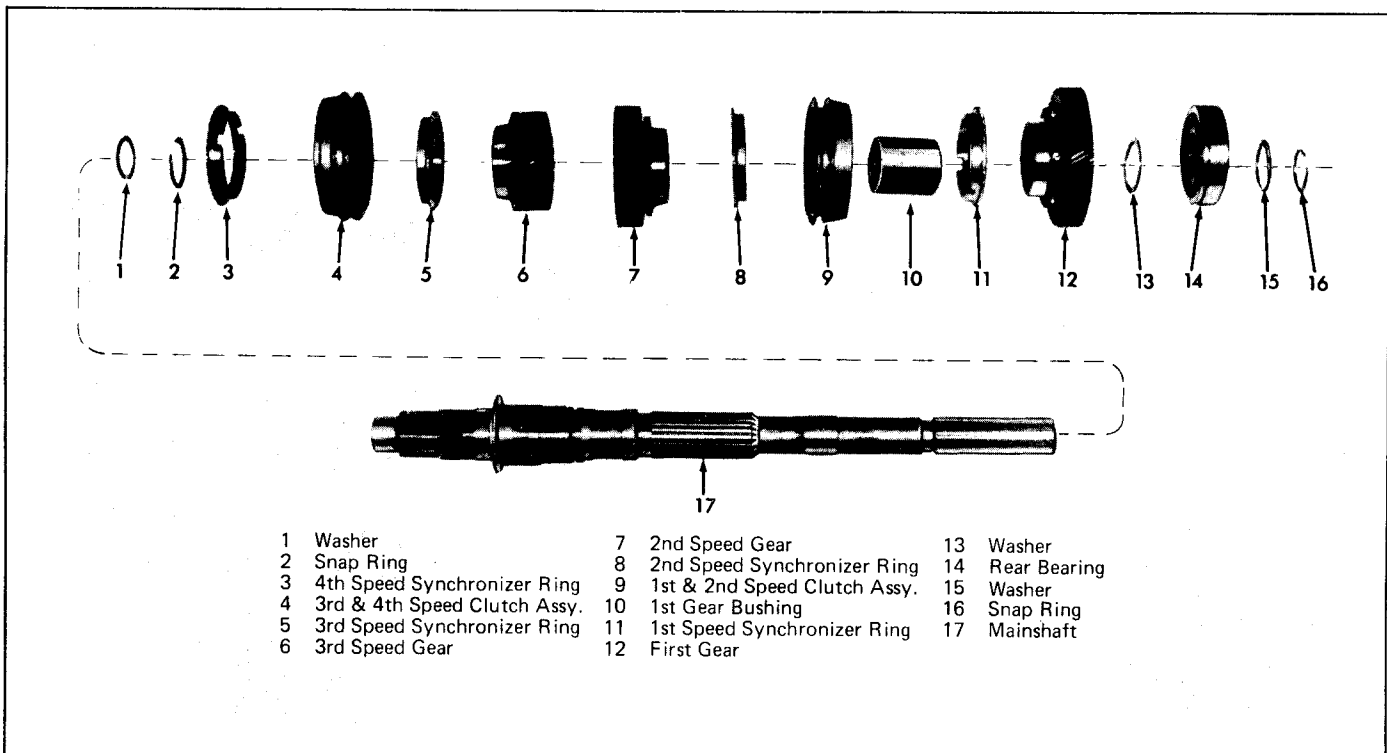


Fig. 7B-8K--Mainshaft Assembly Components

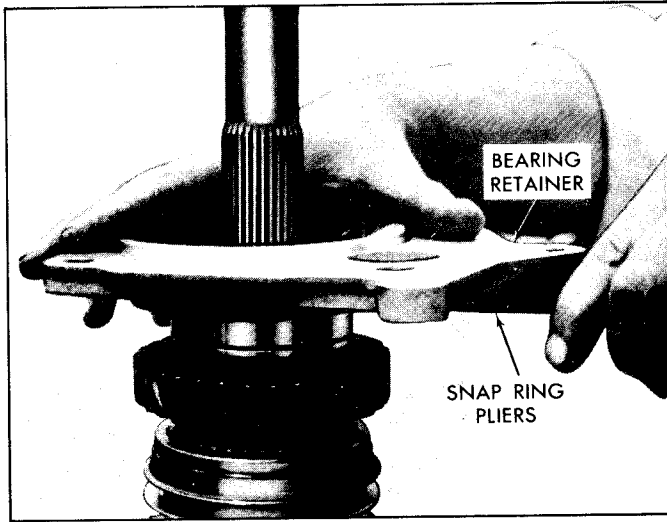


Fig. 7B-10K--Removing Rear Bearing Retainer

CLEANING AND INSPECTION

Transmission Case

1. Wash the transmission thoroughly inside and outside with cleaning solvent, then inspect the case for cracks.
2. Check the front and rear faces for burrs, and if present, dress them off with a fine mill file.
3. Make sure bearings are clean, then lubricate with light engine oil and check them for roughness by slowly turning the race by hand.

Roller Bearings and Spacers

All main drive gear and countergear bearing rollers should be inspected closely and replaced if they show wear. Inspect countershaft and reverse idler shaft at the same time, replace if necessary. Replace all worn spacers.

Gears

1. Inspect all gears for excessive wear, chips or cracks and replace any that are worn or damaged.

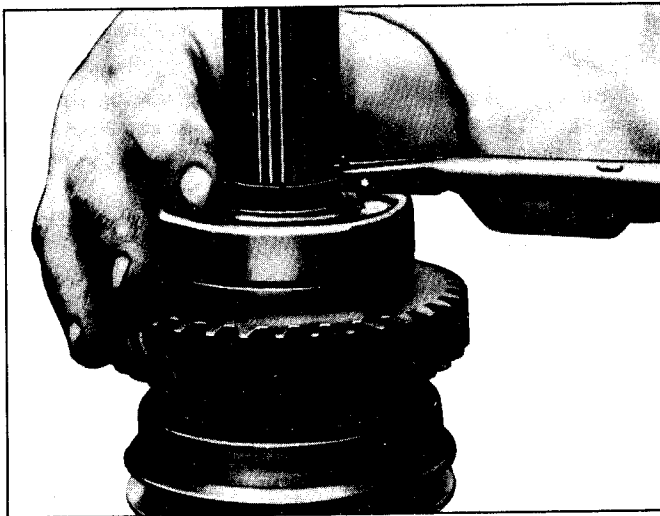


Fig. 7B-11K--Removing Rear Bearing Snap Ring

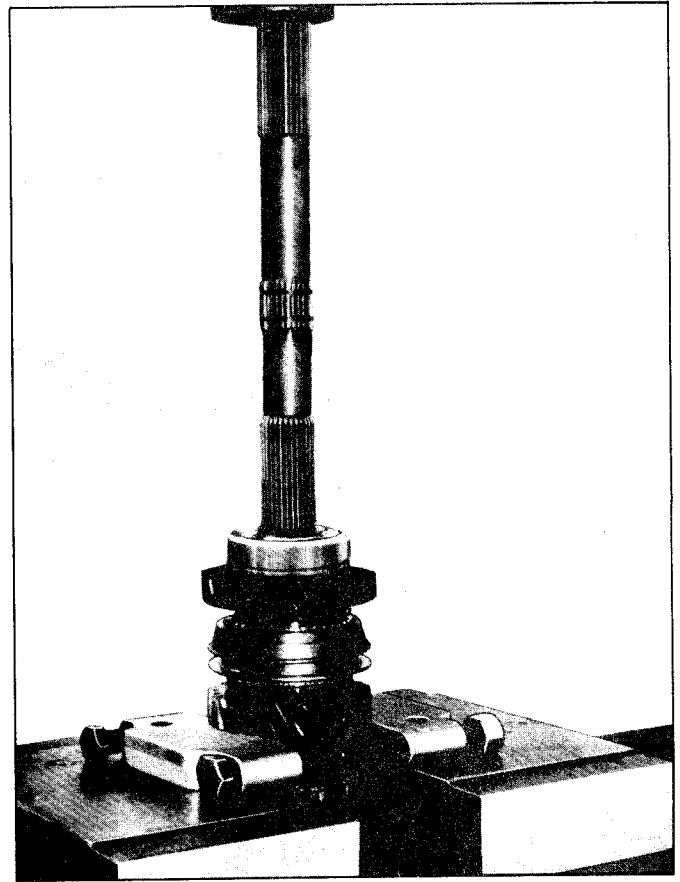


Fig. 7B-12K--Pressing Rear Bearing From Mainshaft

2. Inspect reverse gear bushing and if worn or damaged replace the entire gear (reverse gear bushing is not serviced separately).

3. Check both clutch sleeves to see that they slide freely on their hubs.

Front and Rear Bearings

1. Wash the front and rear ball bearings thoroughly in a cleaning solvent.
2. Blow out bearings with compressed air.

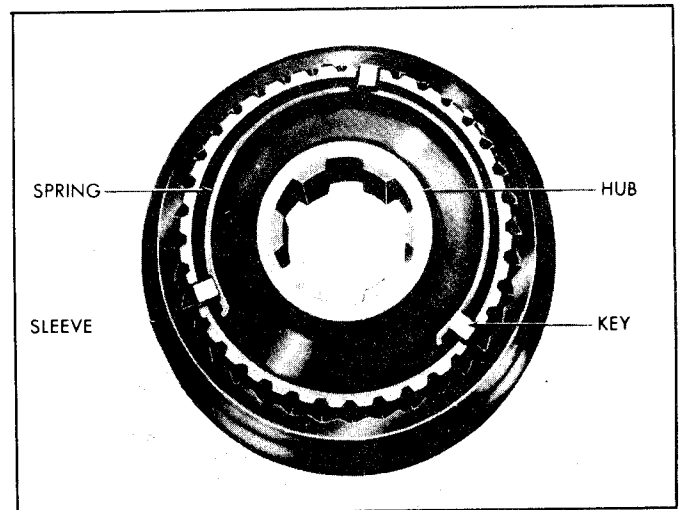


Fig. 7B-13K--Synchronizer Assembly

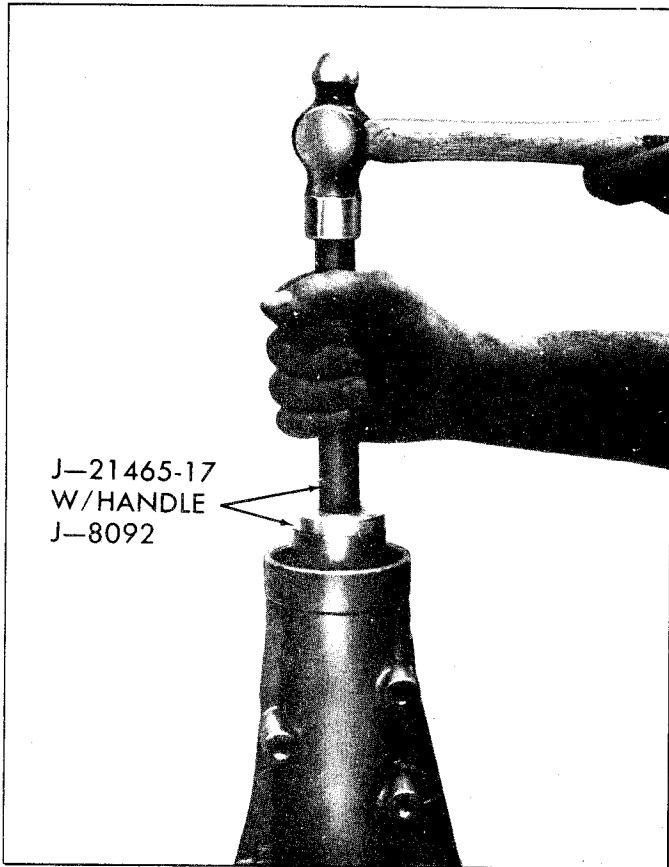


Fig. 7B-14K--Removing Rear Extension Bushing

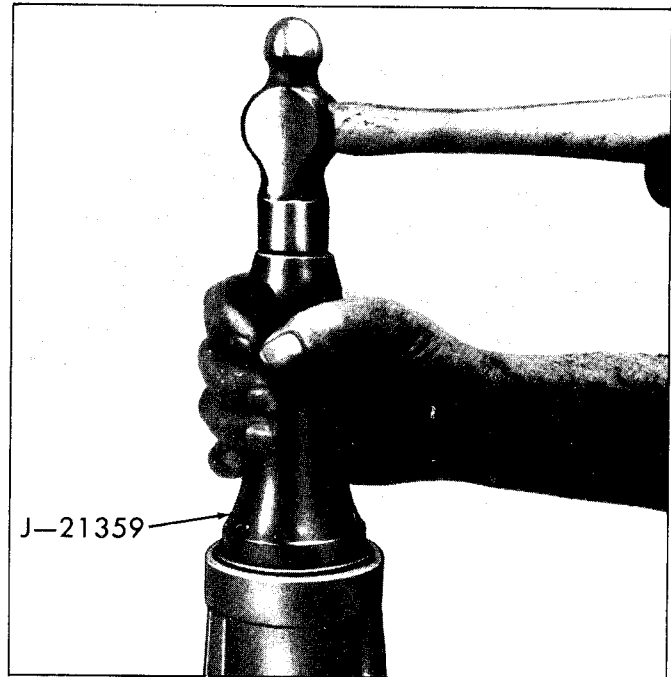


Fig. 7B-16K--Installing Drive Gear Bearing Retainer Seal

CAUTION: Do not allow the bearings to spin. Turn them slowly by hand. Spinning bearings may damage the race and balls.

REPAIRS

Synchronizer Keys and Springs

Replacement

The synchronizer hubs and sliding sleeves are a selected assembly and should be kept together as originally assembled, but the keys and two springs may be replaced if worn or broken.

1. If relation of hub and sleeve are not already marked, mark for assembly purposes.
2. Push the hub from the sliding sleeve; the keys will fall free and the springs may be easily removed.
3. Place the two springs in position (one on each side of hub), so all three keys are engaged by both springs (Fig. 7B-13K).

Place the keys in position and while holding them in place, slide the sleeve onto the hub, aligning the marks made before disassembly.

Extension Oil Seal and/or

Bushing Replacement

1. Pry seal from rear of extension.
2. Remove bushing using Tool J-21465-17 with Handle J-8092. Drive bushing from rear of extension housing (Fig. 7B-14K).
3. Using a new bushing and Tool J-21465-17 with Handle J-8092, press bushing into extension from rear of extension.
4. Coat I.D. of bushing and seal with transmission lubricant. Install new seal using Tool J-21359 (Fig. 7B-15K).

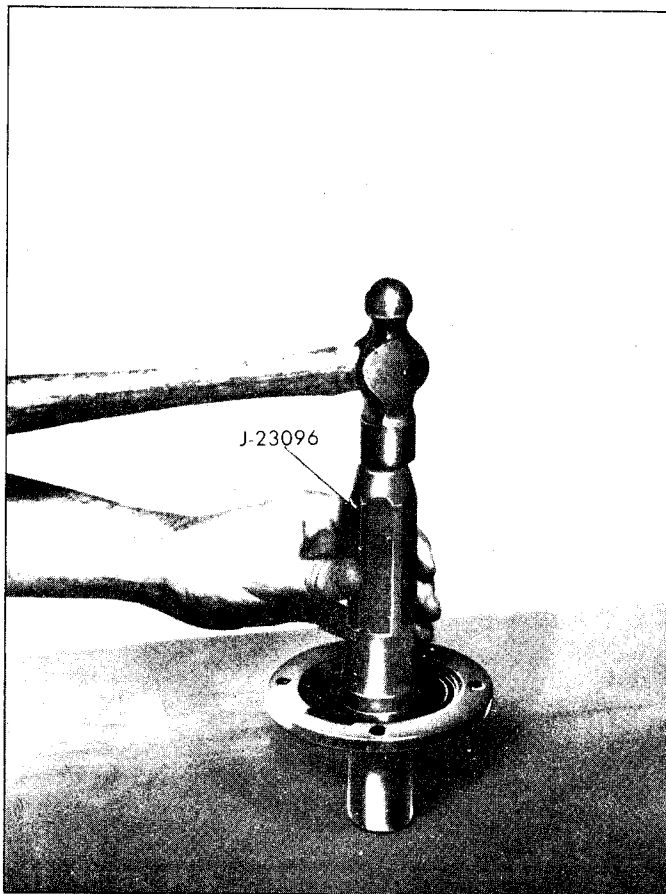


Fig. 7B-15K--Installing Rear Extension Seal

