

# 1974 Corvette: Service News: New Warner 4-Speed Released Interim 1974 Production

**Subject:** New Warner 4-Speed Released Interim 1974 Production

**Model and Year:** 1974 Camaro and Corvette Models

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A new Warner 4-speed has been introduced for Camaro and Corvette models interim 1974 production. Two gear ratios are being offered, a new low wide ratio of 2.64:1 and low close ratio of 2.43:1. The currently released Muncie 4-speed will be maintained for the remainder of the 1974 model year.

The disassembly and assembly procedure found on pages 1 thru 8 should be used when servicing the new Warner 4-speed.

## Disassembly of Transmission

**NOTE:** *An exploded view of the transmission is provided in Figure 3 found on page 2 to aid in the disassembly of the transmission.*

1. Shift transmission into second gear. Remove shift cover attaching bolts, cover assembly and gasket.
2. Remove drive gear bearing retainer bolts, retainer and gasket from front of transmission.
3. Remove lock pin from reverse shifter lever boss (Fig. 1) and pull shifter shaft partially out to disengage the reverse shifter fork from the reverse gear.
4. Remove the rear extension attaching bolts, tap extension rearward with a soft hammer to start removal. Remove extension and gasket.
5. Remove speedometer gear outer snap ring (Fig. 2). Slide or tap gear

from mainshaft then remove second snap ring.

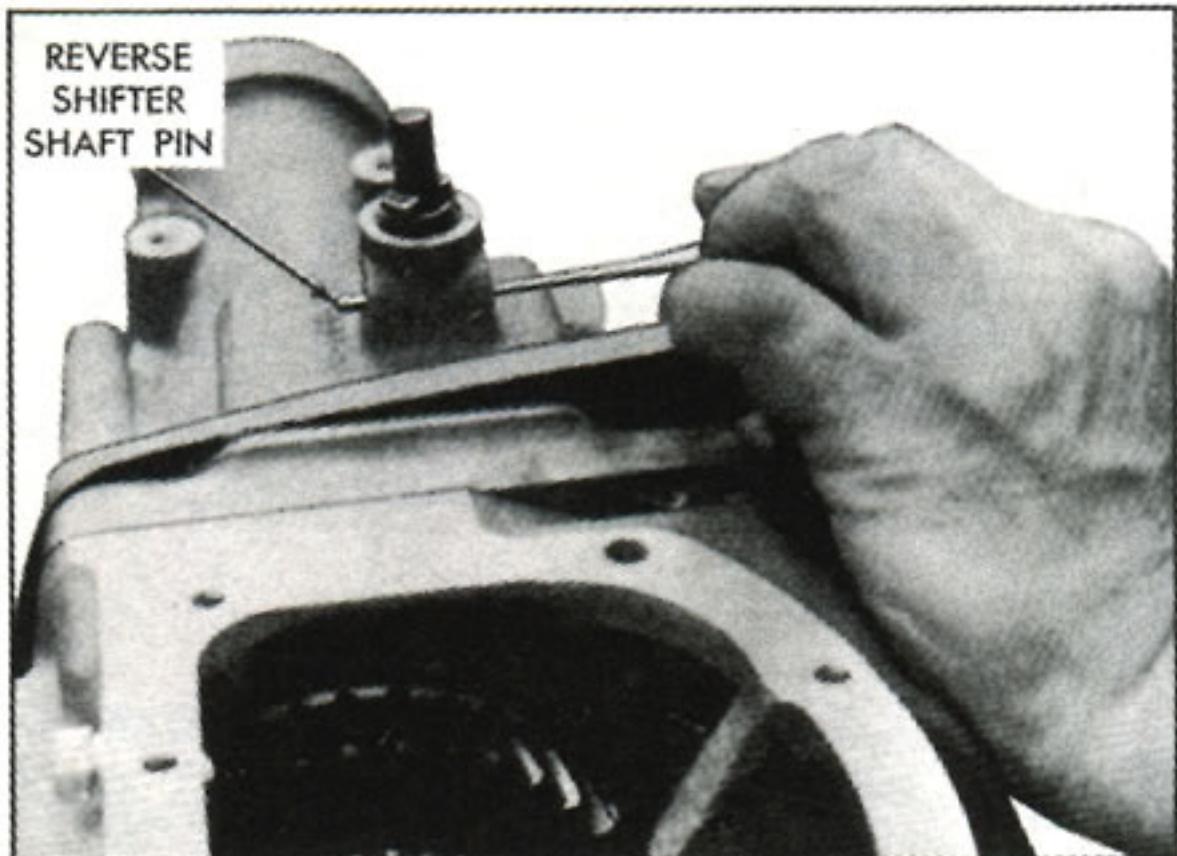


Fig. 1—Removing Reverse Shifter Shaft Lock Pin

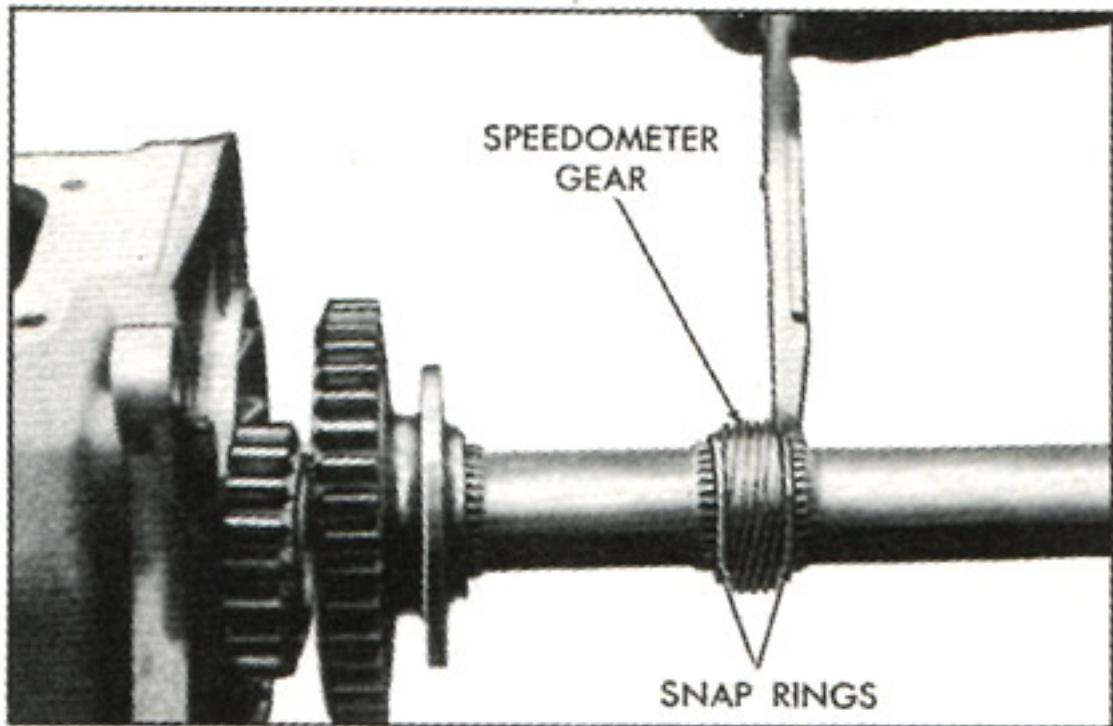
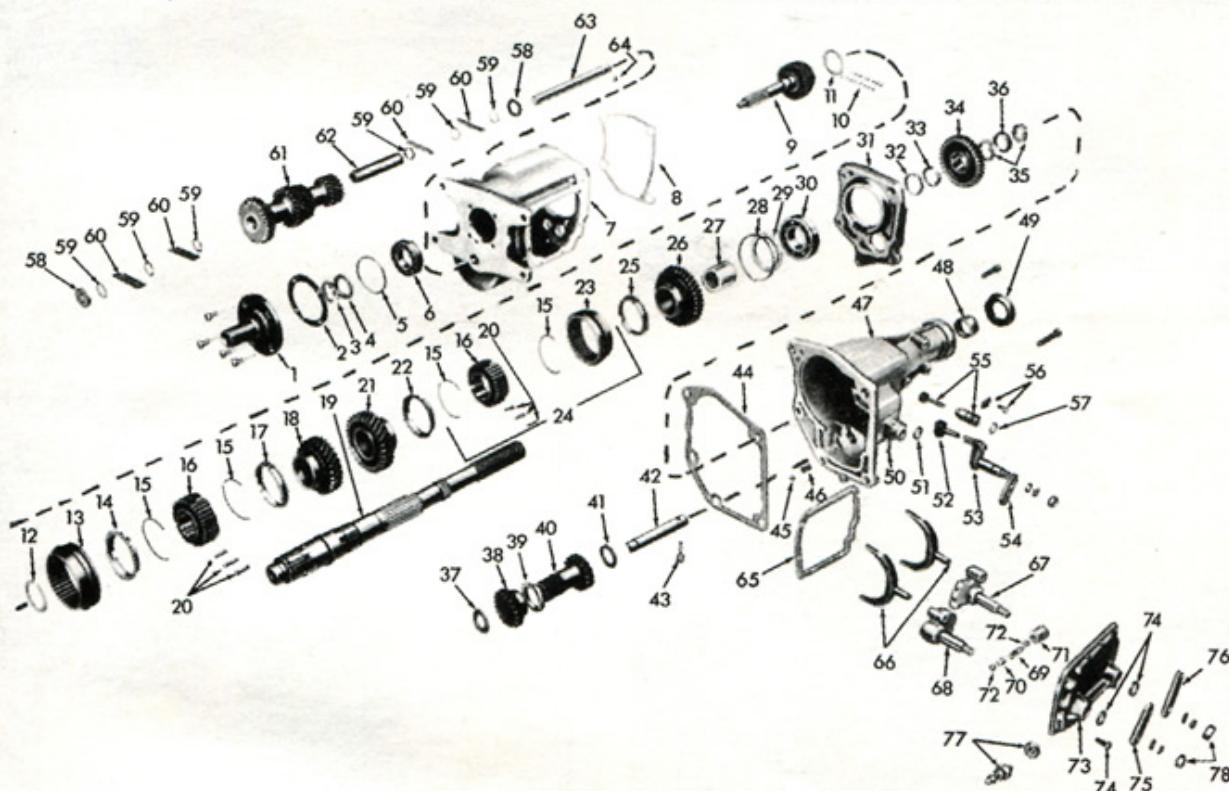


Fig. 2—Speedometer Gear and Retaining Rings

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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 Lip 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	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. First and Second Speed Shifter Lever
14. Fourth Speed Gear Synchronizing Ring	36. Speedometer Drive Gear	57. "O" Ring Seal	76. Third and Fourth 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")	
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. 3—Transmission Components

6. Slide the reverse gear from the mainshaft (Fig. 4).
7. Slide the rear portion of the reverse idler gear (Fig. 4) from the transmission case.
8. Remove the rear retainer lock bolt (Fig. 4).
9. Shift transmission into 4th gear. Remove mainshaft and rear bearing retainer assembly from the transmission case.
10. Remove front reverse idler gear and thrust washer from case.

*NOTE: Reverse idler gear teeth face toward front of transmission.*

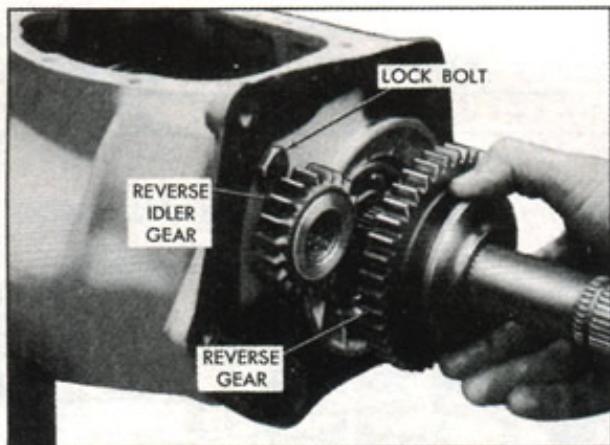


Fig. 4—Removing Reverse Gear

11. Using dummy shaft J-24658, drive countergear shaft out of countergear (Fig. 5) and allow countergear to rest on bottom of the case.

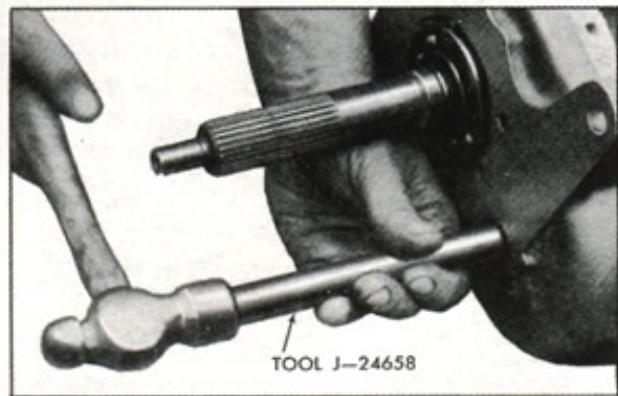


Fig. 5—Removing Countergear Shaft

12. Remove drive gear-to-bearing snap ring.
13. Press drive gear from bearing and transmission case (Fig. 6).
14. Remove countergear and tanged thrust washers from case. Check bottom of case for pilot bearings or other loose components.
15. From inside case, tap out front main bearing assembly.

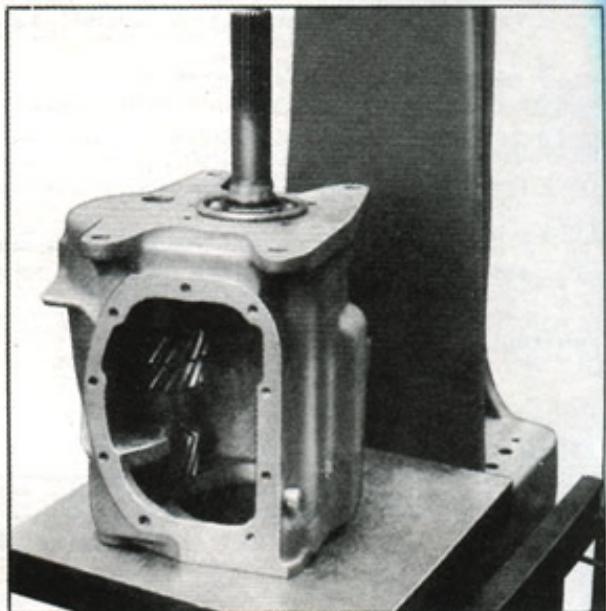


Fig. 6—Removing Drive Gear

#### Disassembly of Mainshaft

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

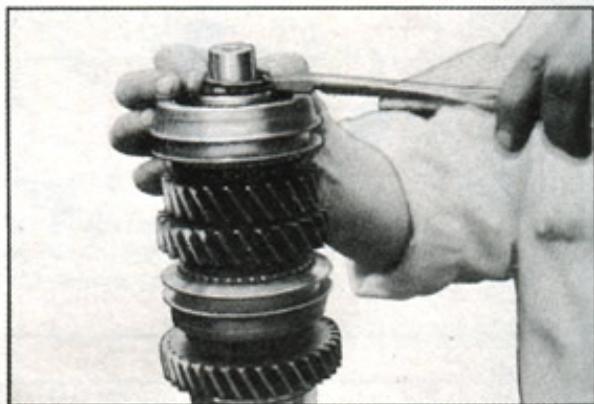


Fig. 7—Removing 3-4 Clutch Assembly Retaining Ring

2. Spread rear bearing retainer snap ring (Fig. 8) and slide retainer from mainshaft.
3. Remove rear bearing-to-mainshaft snap ring (Fig. 9).
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.

#### CLEANING AND INSPECTION

##### Transmission Case

1. Wash the transmission thoroughly inside and

outside with a suitable 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.

#### Bearings, Rollers and Spacers

The main drivegear 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 if necessary.
2. Inspect reverse gear bushing and if worn or damaged replace the entire gear (the reverse gear bushing is not serviced separately).
3. Check both clutch sleeves to see that they slide freely on their respective hubs.

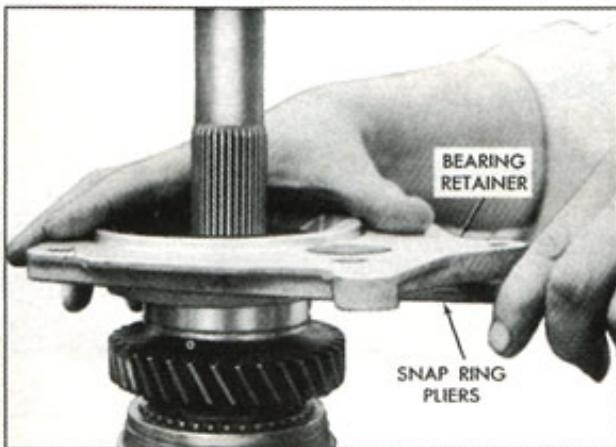


Fig. 8—Removing Rear Bearing Retainer

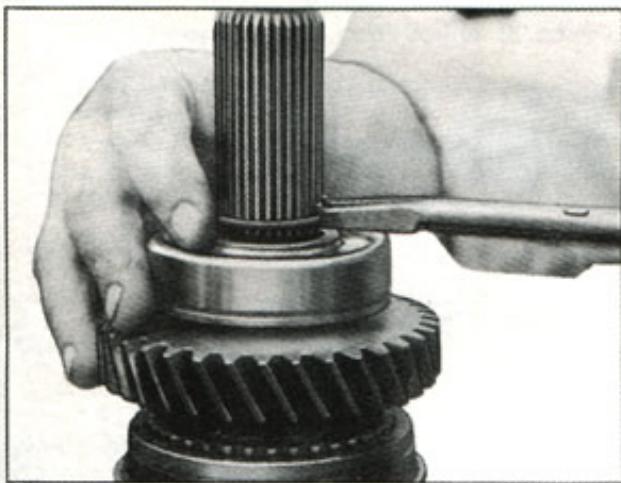


Fig. 9—Removing Rear Bearing Snap Ring

#### Front and Rear Bearings

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

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

Make sure bearings are clean, then lightly lubricate with engine oil and check for roughness. Roughness may be determined by slowly turning the outer race by hand.

**CAUTION:** Bearings must be lubricated with light oil before checking for roughness.

#### Clutch Keys and Springs Replacement

The clutch 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. 10). Place the keys in position and while holding them in place, slide the sleeve onto the hub, aligning the marks made prior to disassembly.

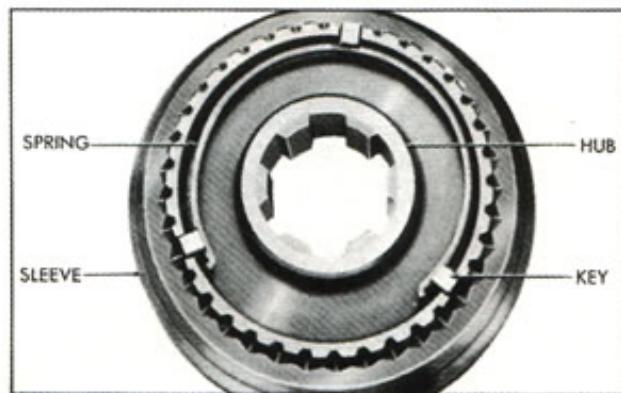


Fig. 10—Clutch Assembly

#### 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. 11).
3. Using a new bushing and Tool J-21465-17 with J-8092, from rear, press bushing into extension.
4. Coat I.D. of bushing and seal with transmission lubricant. Install new seal using Tool J-21359 (Fig. 12).



Fig. 11—Removing and Installing Rear Extension Bushing

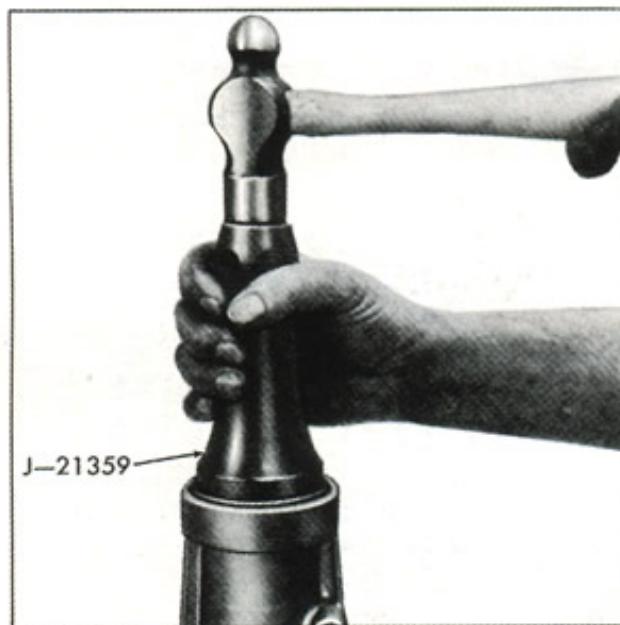


Fig. 12—Installing Rear Extension Seal

**Drive Gear Bearing Retainer Oil Seal Replacement**

1. Pry out old seal.
2. Using a new seal, install new seal into retainer using Tool J-21359 until it bottoms in bore (Fig. 13). Lubricate I.D. of seal with transmission lubricant.

**Reverse Shifter Shaft and/or Seal Replacement**

1. With case extension removed from transmission, the reverse shifter shaft lock pin will already be

removed. (See Step 3 under Transmission Disassembly).

2. Remove shift fork.
3. Carefully drive shifter shaft into case extension, allowing ball detent to drop into case. Remove shaft and ball detent spring. Remove "O" ring seal from shaft.
4. Place ball detent spring into detent spring hole and start reverse shifter shaft into hole in boss.
5. Place detent ball on spring and while holding ball down, push the shifter shaft into place and turn until the ball drops into place in detent on the shaft detent plate.
6. Install "O" ring seal on shaft.
7. Install shift fork.

*NOTE: Do not drive the shifter shaft lock pin into place until the extension has been installed on the transmission case.*

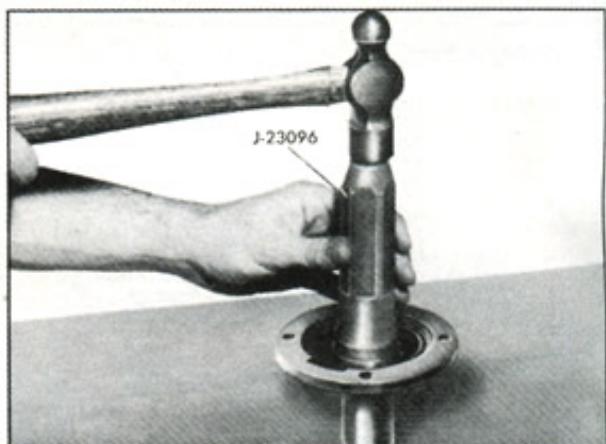


Fig. 13—Installing Drive Gear Retainer Seal

**Reverse Idler Shaft Replacement**

1. Place a small punch into hole in the extension reverse idler shaft boss and drive the welch plug and pin into the shaft (Fig. 14) until the shaft can be pulled from rear extension.

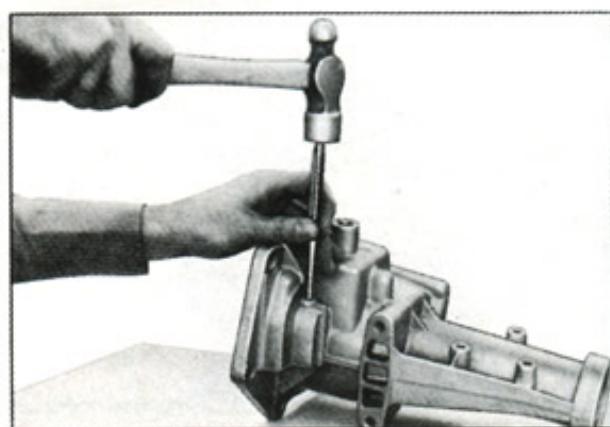


Fig. 14—Removing Reverse Idler Shaft Roll Pin

2. Insert new idler shaft into extension until hole in shaft lines up with hole in boss.
3. Insert roll pin in transmission boss opening and drive the pin into the extension until the shaft is securely locked in place. Install new Welch plug, with sealer, in boss opening.

#### Transmission Side Cover

Although service of the side cover is covered here, the transmission does not have to be removed to perform these operations. To remove the side cover on-the-vehicle, simply drain the transmission, Shift transmission into 2nd gear, disconnect the 1st/2nd cross shaft and 3rd/4th linkage and remove the attaching bolts.

1. Remove the outer shifter lever nuts and lock-washer and pull levers from shafts.
2. Carefully push the shifter shafts into cover, allowing the detent balls to fall free, then remove both shifter shafts.
3. Remove interlock sleeve, interlock pin and poppet spring.
4. Replace necessary parts (Fig. 15) and assemble by reversing steps 1-3.

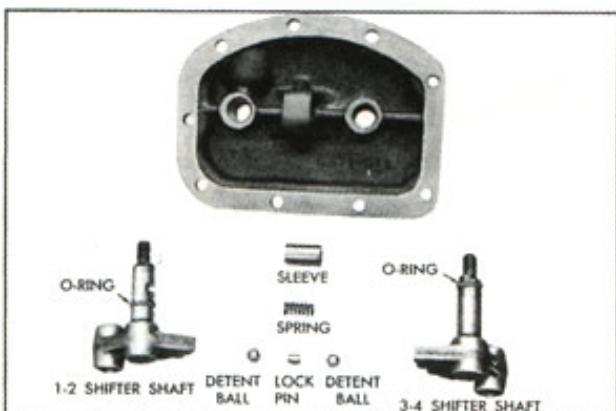


Fig. 15—Shift (Side) Cover Assembly

#### Assembly of Countergear

1. Install spacer (tubular insert) in countergear (if removed).
2. Using heavy grease to retain rollers, install spacer, rollers, another spacer, and rollers, then a spacer. Repeat in other end of countergear (Fig. 16).
3. Insert a dummy shaft or loading Tool J-24658 into countergear.

#### Checking Countergear End Play

1. Rest the transmission case on its side with the side cover opening toward the assembler. Install countergear tanged thrust washers in place, retaining them with heavy grease, making sure the tangs are resting in the notches provided in the case.

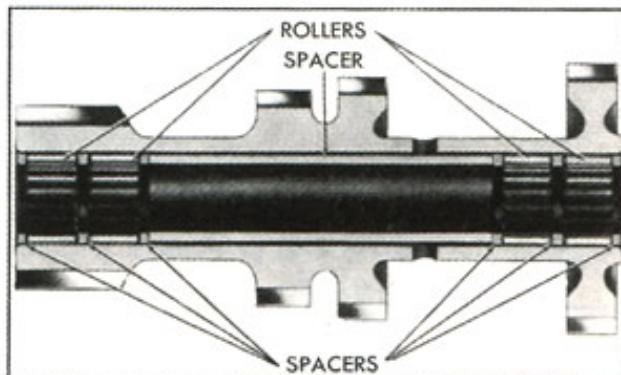


Fig. 16—Countergear Cross Section

2. Set countergear in place in bottom of transmission case. Be sure that tanged thrust washers have not moved out of position.
3. Position the transmission case, resting on its front face.
4. Lubricate and insert countershaft in rear of case. Push shaft through countergear (pushing loading Tool J-24658 out front of case) until woodruff key slot is in its relative installed position (do not install key).
5. Attach a dial indicator as shown in Figure 17 and check end play of the countergear. If end play is greater than .025" new thrust washers must be installed.

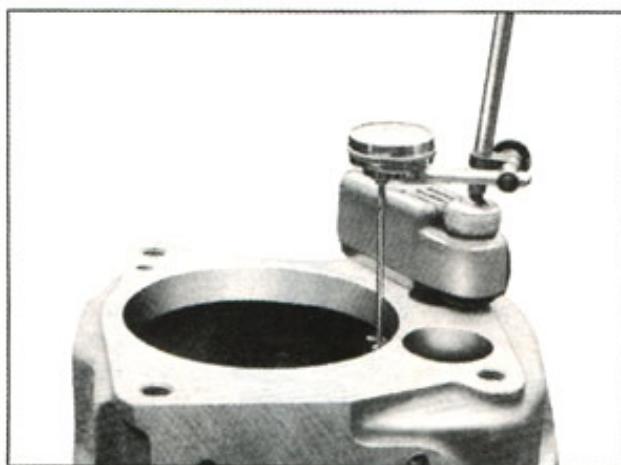


Fig. 17—Checking Countergear End Play

6. Using Tool J-24658, or dummy shaft remove countergear shaft. The countergear cannot remain installed at this point because it will interfere with the assembly of the mainshaft and clutch gear to the case. Leave thrust washers installed and countergear in bottom of transmission.

#### Assembly of Mainshaft

1. From rear of mainshaft, assemble the 2nd speed gear (with hub of gear toward rear of shaft).

2. Install 1st-2nd synchronizer clutch assembly (sliding clutch sleeve chamfer toward rear, hub to front) on the mainshaft together with a synchronizer ring on both sides of the clutch assembly.
3. Position the 1st gear sleeve on the shaft and press the sleeve onto the mainshaft until the 2nd gear, clutch assembly and sleeve bottom against the shoulder of the mainshaft (Fig. 18).

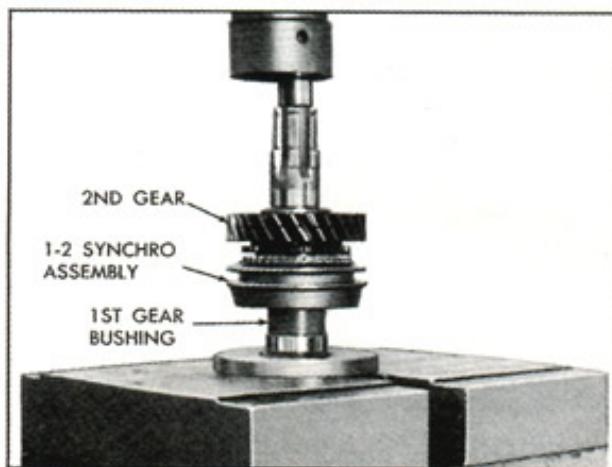


Fig. 18—Installing 2nd Gear, 1-2 Synchro and 1st Gear Sleeve

4. Install 1st speed gear (with hub toward front) and supporting inner race, press the rear bearing onto the mainshaft with the snap ring groove toward front of the transmission (Fig. 19).

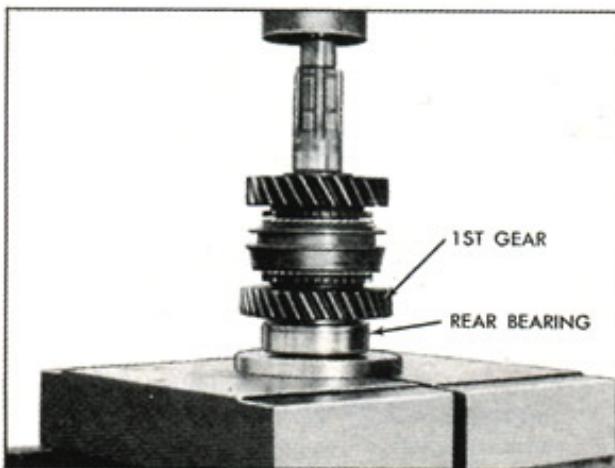


Fig. 19—Installing 1st Gear and Rear Bearing

5. Install spacer and new selective fit (thickest that will assemble) snap ring in mainshaft behind rear bearing.
6. Install the 3rd gear (hub to front of transmission) and the 3rd speed gear synchronizing ring.

7. Install the 3rd and 4th speed gear clutch assembly (hub and sliding sleeve) with sleeve chamfer toward the front making sure that the keys in the hub correspond to the notches in the 3rd speed gear synchronizing ring.
8. Install new selective fit snap ring (thickest that will install) in the groove in mainshaft in front of the 3rd and 4th speed clutch assembly.
9. Install the rear bearing retainer over end of mainshaft. Spread the snap ring to drop around the rear bearing. Release snap ring when it aligns with groove in rear bearing.
10. Install the reverse gear (shift collar to rear).
11. Install a snap ring, the speedometer drive gear and a second snap ring, into the mainshaft.

#### Assembly of Transmission

1. Rest the transmission case on its side, with the shift cover opening toward the assembler. Position the countergear tanged washers in place, using a heavy grease to retain them. Make sure tangs are in notches of the case thrust face. Set countergear in bottom of case but do not install countergear shaft.
2. Position front main bearing, with snap ring installed) to case opening and tap or press into bore.
3. Using a heavy grease, install drive gear pilot roller bearings into gear.
4. Support inner race of main bearing, press drive gear into bearing from inside of case (Fig. 20).

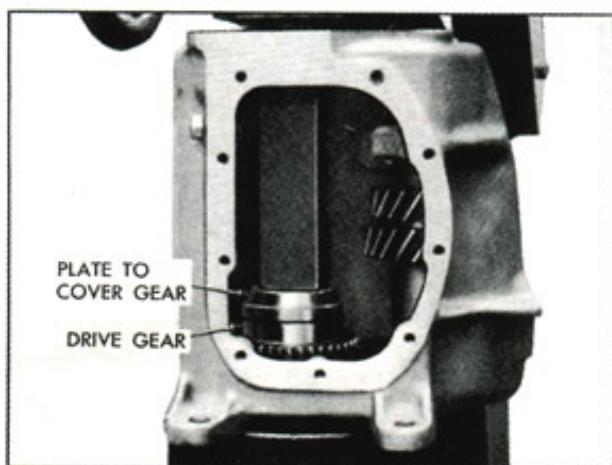


Fig. 20—Installing Drive Gear in Case

5. Raise countergear from bottom of case, with thrust washers in place, butt the countergear shaft (in rear of case) to loading tool (previously installed to load countergear bearings) and push loading tool through front of case. Install woodruff key and tap shaft into case until flush with rear face of case.
6. Install front reverse idler gear (teeth forward) and thrust washer in case.

7. Position new gasket on rear of case. Install mainshaft assembly into case. Make sure 4th speed synchronizer ring and washer are installed on front of mainshaft and that notches on synchronizer ring correspond to keys in clutch assembly.
8. Align rear bearing retainer with transmission case. Install retainer to case locating pin and retainer locking bolt. Torque to 25 ft-lbs.
9. Install rear reverse idler gear, engaging the splines with the portion of the gear within the case.
10. Place new gasket into position on rear face of bearing retainer.
11. Install reverse idler gear thrust washer into position on thrust face of the extension housing.
12. Place the two synchronizer sleeves in neutral position. Pull reverse shift shaft partially out of extension and rotate shaft to bring reverse shift fork as far forward in extension as possible. Start the extension onto the mainshaft while pushing in on the shifter shaft to engage the shift fork onto the reverse gear shift collar. When the fork engages, rotate the shifter shaft to move the reverse gear rearward permitting the extension to mate against the transmission case.
13. Install rear extension housing-to-case bolts. Install rear extension to rear bearing retainer bolts (short bolts). Use sealer on bolts. Torque all bolts to specifications.
14. Install reverse shaft lock pin and cup plug. Use sealer on plug.
15. Shift transmission into 2nd gear. Position shift cover and gasket to the transmission engaging the shift forks in the shift collars. Install attaching bolts and torque to specifications.
16. Install front bearing retainer and gasket. Apply sealer to bolts, and torque to specifications.
17. Check operation of transmission.

#### TORQUE SPECIFICATIONS

Main Drive Gear Bearing Retainer to Case Bolts	18 ft.-lbs.
Shift Cover to Case Bolts	18 ft.-lbs.
Extension to Case Bolts	40 ft.-lbs.
Shift Lever to Shifter Shaft Bolts	20 ft.-lbs.
Lubrication Filler Plug	30 ft.-lbs.
Transmission Case to Clutch Housing Bolts	52 ft.-lbs.
Crossmember to Mount and Mount to Extension Bolts	25 ft.-lbs.
Rear Bearing Retainer to Case Bolts	25 ft.-lbs.
Extension to Rear Bearing Retainer Bolts (Short)	25 ft.-lbs.
Retainer to Case Bolt	35 ft.-lbs.
Drain Plug	20 ft.-lbs.

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