

## MUNCIE 465

Chevrolet  
GMC

## DESCRIPTION

Muncie transmission model 465 is a four-speed heavy duty unit with all helical gears except reverse. First gear is a constant mesh type that engages with the second speed synchronizer sleeve. Second, third and fourth speed gears are synchronized.

## TROUBLE DIAGNOSIS

See *Manual Transmission Troubleshooting* in *MANUAL TRANSMISSION SERVICING* Section.

## SERVICE (IN VEHICLE)

## REAR BEARING RETAINER OIL SEAL

1) Drain oil from transmission and disconnect drive shaft. Remove parking brake from rear of transmission. Disconnect speedometer cable and remove speedometer driven gear from mainshaft rear bearing cap. Using flange or yoke holding tool, remove the output yoke or companion flange nut from mainshaft. Remove mainshaft rear bearing cap and gasket. Discard gasket. Remove oil seal from rear bearing cap, and discard seal.

2) Coat outer diameter of new oil seal with a suitable sealing cement. Install seal in bearing cup using a suitable seal driver. Press seal in flush with outside of bearing cap. To reassemble components, reverse removal procedure and fill transmission with suitable lubricant.

## REMOVAL &amp; INSTALLATION

See *Manual Transmission Removal* in *MANUAL TRANSMISSION SERVICING* Section.

## TRANSMISSION DISASSEMBLY

## COVER &amp; SHIFT FORK MECHANISM

Mount transmission in suitable holding fixture and remove cover screws. Move reverse shifter fork so reverse idler gear is partially engaged before removing cover. Forks must be set so rear edge of slot in reverse fork is in line with front edge of slot in forward forks as viewed through tower opening. If necessary, insert two bolts in cover flange threaded holes and turn evenly to raise cover dowel pins from case.

## OUTPUT YOKE &amp; REAR BEARING RETAINER

Set transmission in two gears at once to lock mainshaft and remove yoke flange nut. Remove output yoke, and brake drum if equipped. On models with a transfer case, use suitable tool (J-23070) to remove mainshaft rear bearing lock nut (see illustration). Remove parking brake and brake flange plate if equipped. Remove rear bearing retainer and slide speedometer drive gear off mainshaft.

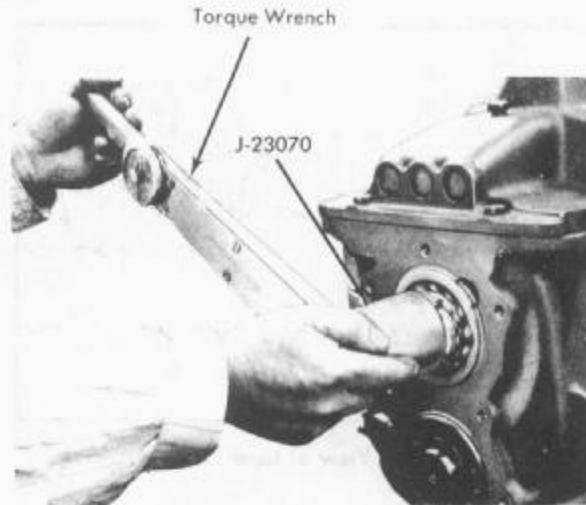


Fig. 1 Removal or Installation of Mainshaft Rear Bearing Lock Nut (4-WD)

## COUNTERGEAR

Remove drive pinion bearing retainer and counter gear front bearing cap. Pry counter gear front bearing out by inserting a screwdriver into groove at cast slots in case. Remove counter gear rear bearing snap ring from shaft. Using suitable puller tools (J-22832 and J-8433-1), remove counter gear rear bearing (see illustration). This will allow counter gear to rest on case bottom for mainshaft removal.

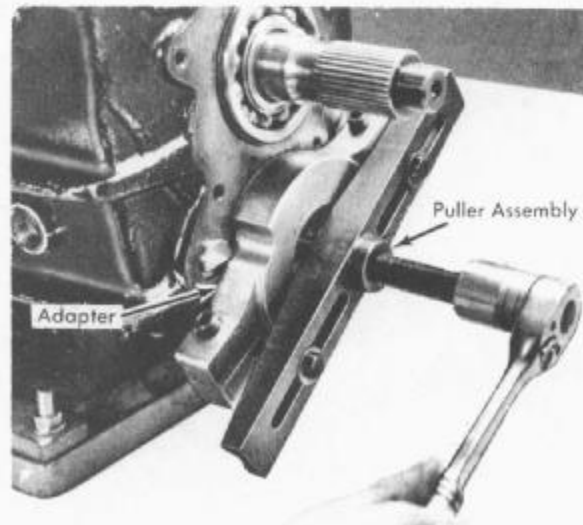


Fig. 2 Removal of Rear Counter Gear Bearing



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## DRIVE PINION

Remove drive pinion bearing outer race to case retaining ring. Remove drive pinion and bearing by tapping on bottom side of drive pinion shaft and prying out at bearing snap ring groove at same time. Remove 4th speed gear synchronizer ring when drive pinion is removed. **NOTE** — Cutout section of drive pinion gear should be down to clear countergear for pinion removal.

## MAINSHAFT, COUNTERGEAR &amp; REVERSE IDLER GEAR

Remove mainshaft rear bearing retainer snap ring and, using suitable puller tools (J-22832 and J-8433-1), remove bearing from case. Slide 1st speed gear thrust washer off mainshaft. Raise rear of mainshaft and move rearward, then lift shaft front up and out of case. Remove synchronizer cone from shaft. Slide reverse idler gear rearward and move countergear back until front end is free of case and remove assembly. Drive reverse idler gear shaft out of case from front to rear, using a drift, and remove reverse idler gear.

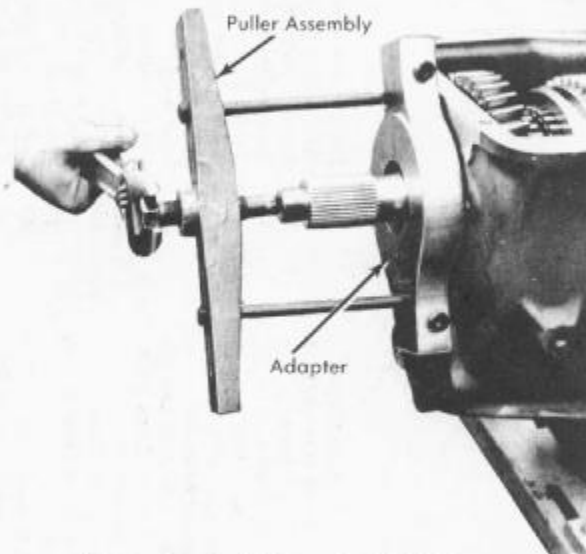


Fig. 4 Removal of Rear Mainshaft Bearing

## COMPONENT DISASSEMBLY &amp; REASSEMBLY

## COVER &amp; SHIFTER FORK MECHANISM

**Disassembly** — Drive out pins retaining 1st-2nd and 3rd-4th speed shifter forks to shifter shafts, and also remove shaft expansion plugs. **NOTE** — Pin retaining 3rd-4th speed shifter fork-to-shaft and shifter fork must be removed before removing reverse shifter head pin. With shifter shafts in neutral position, drive shafts out of cover to remove shifter forks. Ensure that detent balls, springs and interlock pins are not lost as shifter shafts are removed. Drive out pin holding reverse shifter head and drive out shaft. Ensure that detent balls are not lost as they are under spring tension in rear rail boss holes.

**Cleaning & Inspection** — Wash all parts in clean solvent and inspect forks and gates for wear at pads and lever slots.

Check forks for alignment. Check roll pin fit in forks and gates. Check neutral notches of shift shafts for wear from interlock balls. Shafts which are indented at points adjacent to neutral notches should be replaced.

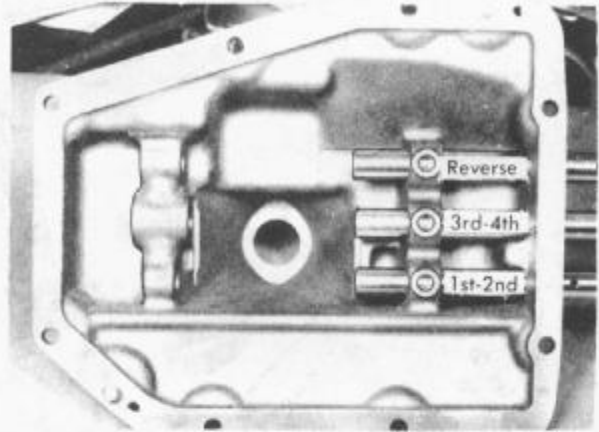


Fig. 5 Location of Shift Shafts in Shift Housing

**Reassembly** — 1) Reassemble cover installing shifter shafts in order of reverse shaft, 3rd-4th speed shaft and 1st-2nd speed shaft. Place fork detent ball springs and balls in hole positions in cover. Start shafts into cover depressing yoke detent balls with a small punch, and push shafts on over balls. Starting with reverse shifter shaft, hold fork in position and push shaft through yoke. Install cotter pin in fork and shaft, then position fork in neutral position.

2) Hold 3rd-4th fork in position and push shaft through yoke, but not through front support bore. Place two interlock balls between reverse and 3rd-4th shifter shafts in crossbore of front support boss. Install interlock pin in 3rd-4th shaft hole and grease to hold in place. Push 3rd-4th shaft through fork and cover bore, keeping both balls and pin in position between shafts until retaining holes line up in fork and shaft. Install retaining pin and move to neutral position.

3) Place two interlock balls between 1st-2nd shaft and 3rd-4th shaft in crossbore of front support boss. Hold 1st-2nd fork in position and push shaft through cover bore and fork until retainer hole and fork line up with hole in shaft. Install retainer pin and move to neutral position. Install new shaft hole expansion plugs.

## DRIVE PINION

**Disassembly** — Remove 17 mainshaft pilot bearings and roller retainer. Remove snap ring holding bearing on pinion shaft and press shaft out of bearing using an arbor press.

**Cleaning & Inspection** — Wash parts in cleaning solvent and inspect roller bearings for pits or galling. Check bearing surface in shaft recess for galling. Inspect gear teeth for wear and pinion pilot for wear. Check pinion bearing for roughness.

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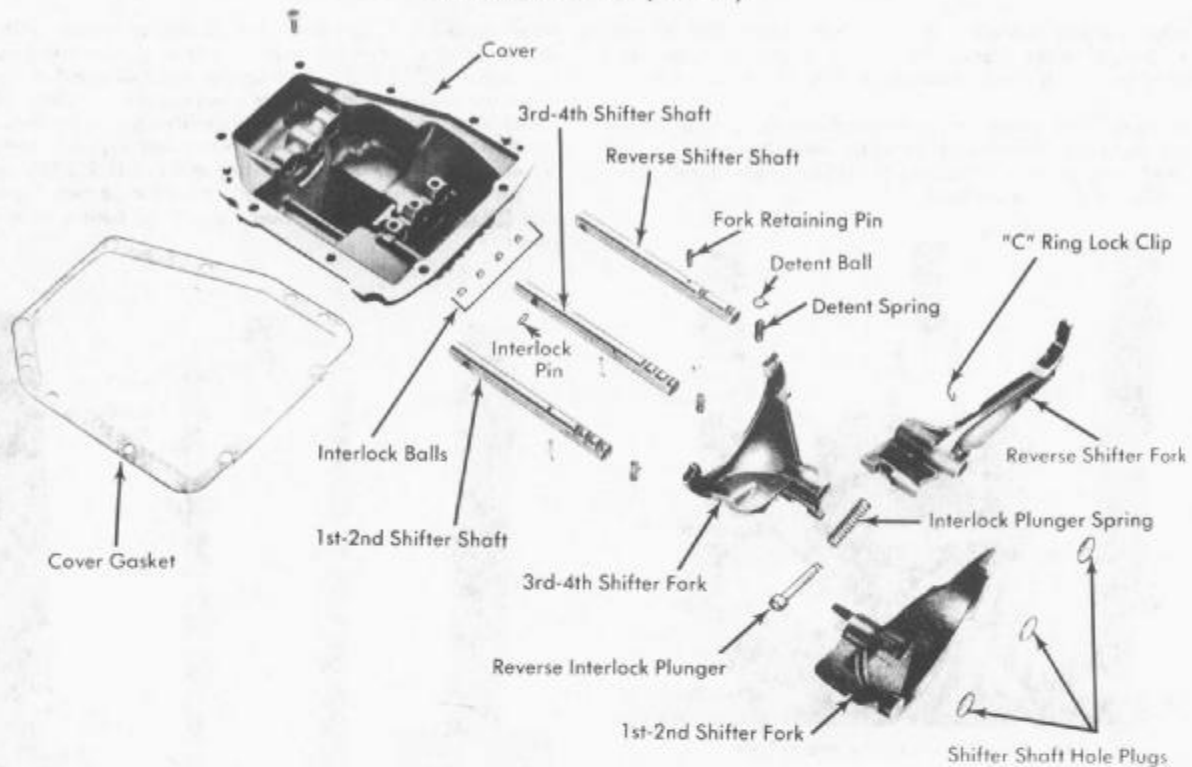


Fig. 6 Exploded View of Cover and Shift Assembly

**Reassembly** — Press bearing and new oil slinger onto drive pinion. Slinger should be located flush with bearing shoulder on drive pinion. Install snap ring on pinion to secure bearing, then install retainer ring in groove on outside diameter of bearing. Ensure bearing turns freely after installed on shaft. Install snap ring in mainshaft pilot bearing bore (if previously

removed). Apply grease to bearing surface and install roller bearings and bearing retainer. **NOTE** — Roller bearing retainer holds bearings in position and is pushed forward into recess by mainshaft pilot during final assembly.

### DRIVE PINION OIL SEAL

Remove retainer, and oil seal assembly. Pry oil seal from retainer and replace with a new seal. Install new seal with suitable installer tool (J-22833). Insert seal in retainer so lip of seal is toward flange of installer tool. Install retainer with a new gasket and tighten bolts.

### MAINSHAFT

**Disassembly** — Remove first speed gear and thrust washer. Remove snap ring in front of 3rd-4th synchronizer assembly. Withdraw reverse driven gear. Press behind second speed gear to remove 3rd-4th synchronizer, third speed gear, and second speed gear with third gear bushing and thrust washer. Remove second speed synchronizer ring. Support second speed synchronizer hub on front face and press mainshaft through first gear bushing and second speed synchronizer hub. Split second gear bushing with a chisel and remove bushing from shaft. **NOTE** — Use care not to damage mainshaft.

**Cleaning & Inspection** — 1) Wash all parts in clean solvent and inspect mainshaft for scoring or wear at thrust surfaces and splines. Check synchronizer hub and sleeve for excessive wear. Sleeve should slide freely on synchronizer hub. Check fit

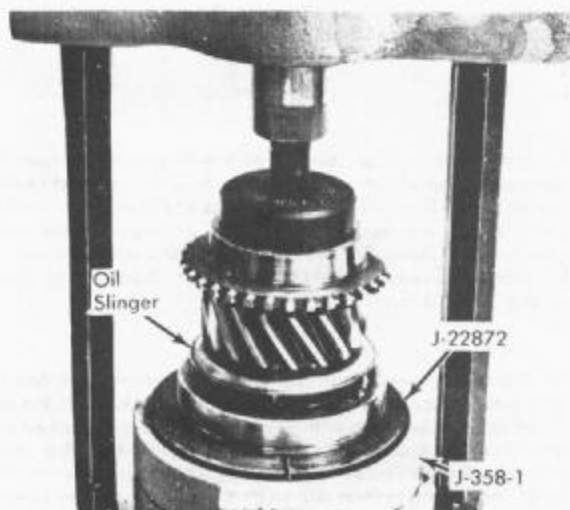


Fig. 7 Installing Drive Gear Bearing

# 4-Speed Manual Transmissions

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of synchronizer hub on mainshaft splines. Check that 3rd-4th speed synchronizer sleeve slides freely on 3rd-4th speed synchronizer hub, but hub should be a snug fit on shaft splines.

2) Inspect 3rd speed gear thrust surfaces for scoring. Check 3rd speed gear mainshaft bushing for wear. Note that the 3rd speed gear must be a running fit on mainshaft bushing and bushing, a press fit on shaft.

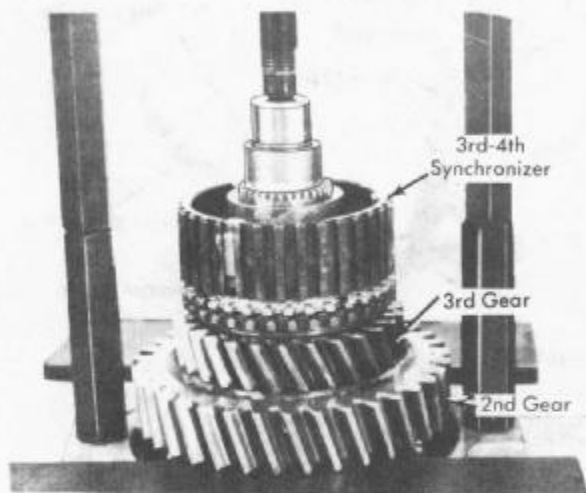


Fig. 8 Disassembling Mainshaft

3) Check 2nd speed gear and thrust washer for scoring or excessive wear. Check synchronizer springs for looseness or breakage. Inspect 2nd speed gear synchronizer blocker ring and bronze synchronizer cone on 2nd speed gear for excessive wear or damage. Also inspect 3rd speed gear synchronizer cone for wear.

4) The 1st-Reverse sliding gear must have a sliding fit on synchronizer hub and must not have excessive radial movement or rotational play. If gear is not free on hub, check for burrs on front end of half-tooth internal splines. Remove burrs by honing as necessary. Check all gears for excessive tooth wear or damage.

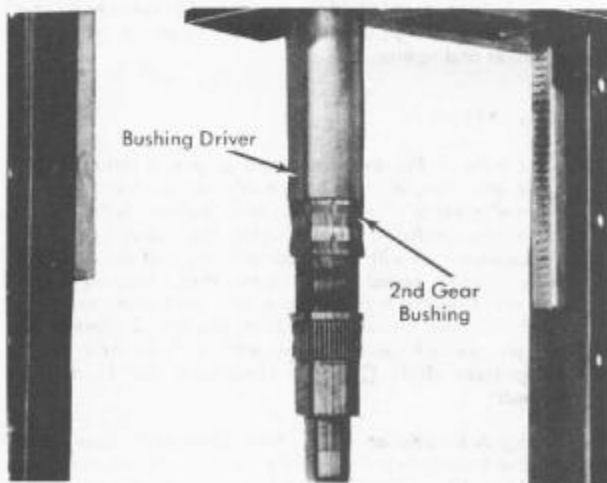


Fig. 9 Installing 2nd Gear Bushing

**Reassembly - 1)** Lubricate 2nd speed gear bushing with oil and press onto mainshaft until it bottoms on shoulder (see illustration). **CAUTION** - Bushings for 1st, 2nd and 3rd speed gears are sintered iron, use care when installing. Press 1st-2nd speed synchronizer hub onto mainshaft until it bottoms on shoulder. Install 1st-2nd speed synchronizer keys and springs (if removed). Using an arbor press, and tool (J-22873), press 1st speed gear bushing on mainshaft until it bottoms against hub. **NOTE** - Lubricate all bushings with oil before installing gears.

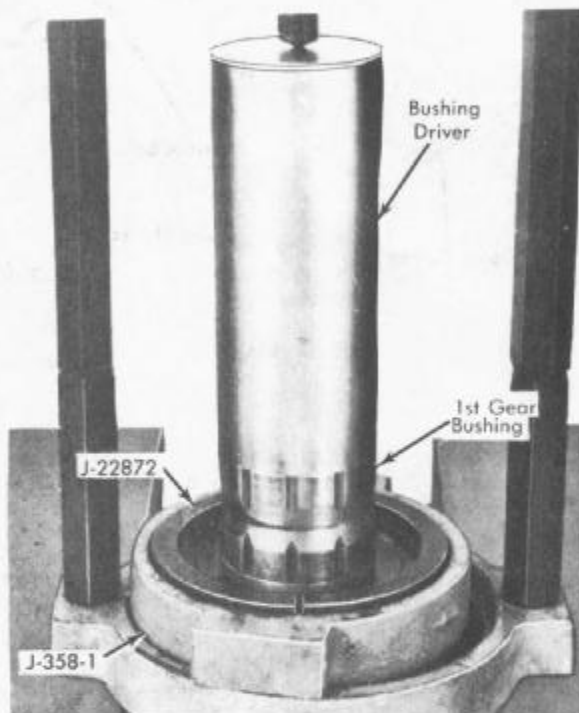


Fig. 10 Installing 1st Gear Bushing

2) Install synchronizer blocker ring and 2nd speed gear on mainshaft and against synchronizer hub. Index synchronizer key slots with keys in hub. Install 3rd speed gear thrust washer on mainshaft with tang in slot on shaft and against 2nd speed gear bushing. Press 3rd speed gear bushing on mainshaft using arbor and suitable tool (J-22875), until it bottoms on thrust washer (see illustration).

3) Install 3rd speed gear and 3rd speed synchronizer blocker on mainshaft, against 3rd speed gear thrust washer. Index synchronizer ring key slots with keys and drive 3rd-4th speed synchronizer hub assembly onto mainshaft using an arbor press and suitable tool (J-22873). Retain synchronizer assembly with snap ring. Install reverse driven gear with fork groove toward rear. Install 1st speed gear on mainshaft and against 1st-2nd speed synchronizer hub. Install 1st speed gear thrust washer.

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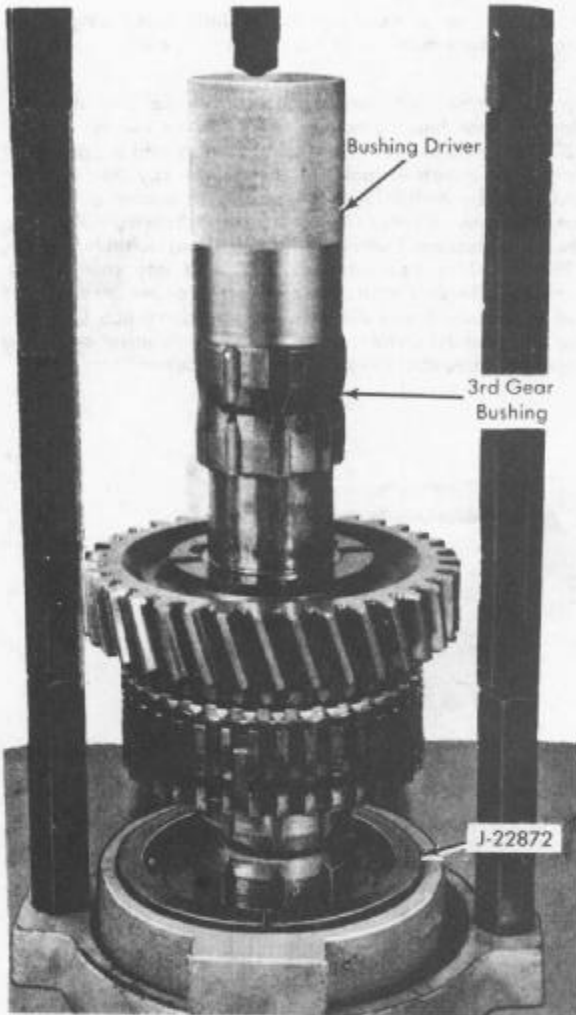


Fig. 11 Installing 3rd Gear Bushing

### COUNTERGEAR & SHAFT

**Disassembly** — Remove front counter gear shaft snap ring and thrust washer. Discard snap ring. Install suitable press plates (J-22832) on countershaft with open side to spacer (see illustration). Support assembly in an arbor press and press countershaft out of clutch counter gear assembly. **NOTE** — Counter gear is a slip fit and pressing may not be required. Remove clutch counter gear rear retaining ring and discard. Remove and discard third speed counter gear retaining ring. Position assembly on an arbor press and press shaft from third speed counter gear.

**Cleaning & Inspection** — Wash counter gear components in clean solvent and inspect gear teeth for wear and damage.

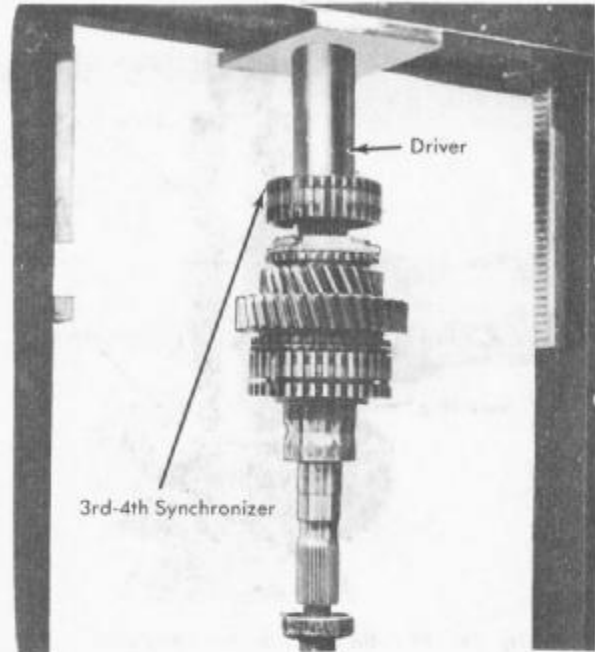


Fig. 12 Installing 3rd-4th Synchronizer

**Reassembly** — Position third speed counter gear on shaft with marked surface toward front of shaft, then press gear on shaft with arbor press. Install a new snap ring. Install a new counter gear rear snap ring using suitable sleeve tools (J-22830 & J-22873) and snap ring pliers as follows: Install inner sleeve over shaft and place snap ring over tool. Push outer tool down on snap ring until it engages groove on shaft. Using snap ring pliers, carefully expand ring until it just slides onto splines, then push ring down until it engages groove on shaft.

**CAUTION** — Do not over-stress snap ring. Position clutch counter gear and spacer on shaft using a suitable driver (J-22873). Install counter gear thrust washer and retaining ring.

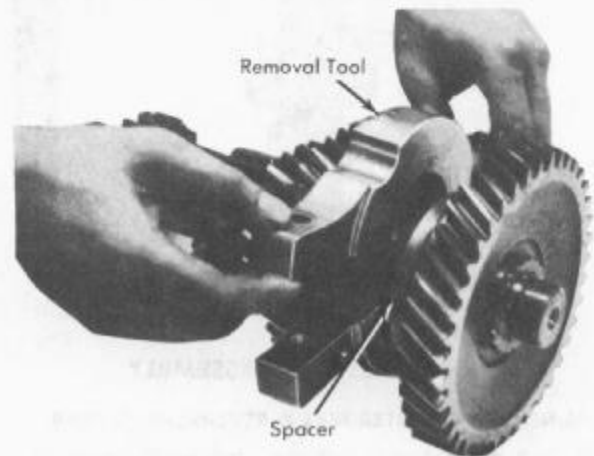


Fig. 13 Removal of Counter gear

# 4-Speed Manual Transmissions

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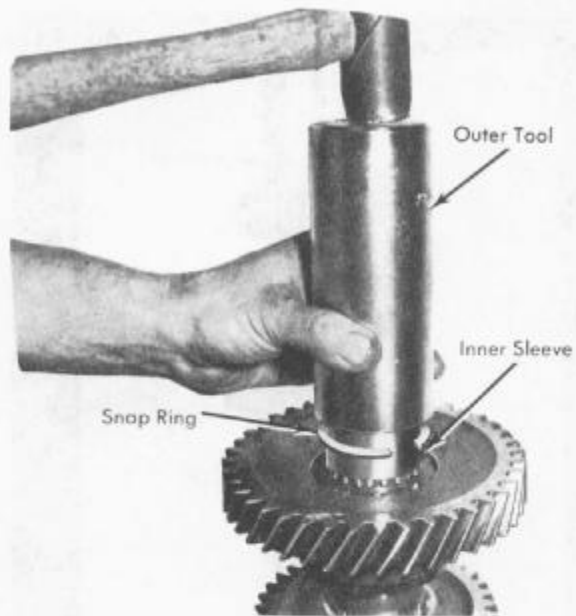


Fig. 14 Installing Countergear Snap Ring

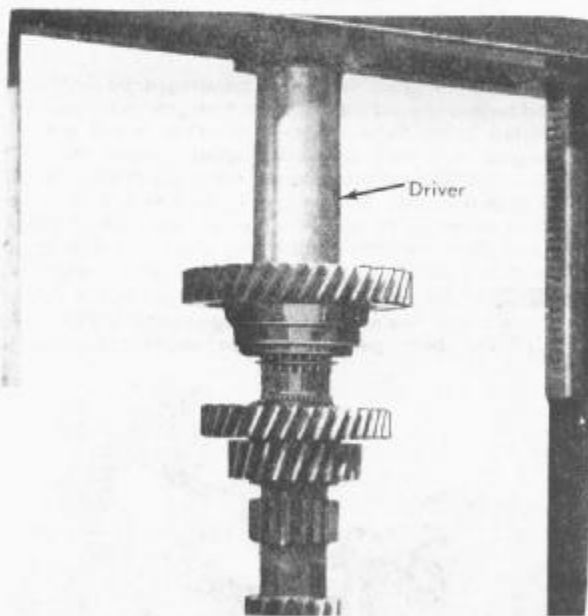


Fig. 15 Installing Countergear

### TRANSMISSION REASSEMBLY

#### MAINSHAFT, COUNTERGEAR & REVERSE IDLER GEAR

1) Place countergear in bottom of case. Install reverse idler gear in case with gear teeth toward front. Install idler gear

shaft from rear to front with slot in shaft end facing down. Shaft slot face must be at least flush with case.

2) Install mainshaft assembly in case with rear of shaft extending out rear bearing hole in case. Position suitable tool (J-22874-5) in pinion gear case front opening and engage front part of mainshaft in tool (see illustration). Lay case on front end. **NOTE** - Install 1st speed gear thrust washer on shaft, if not previously installed. Install mainshaft bearing outer snap ring and position bearing on shaft. Using suitable tool (J-22874-1), drive bearing onto shaft and into case (see illustration). Remove tools and install synchronizer cone on pilot end of mainshaft and slide rearward to clutch hub. **NOTE** - The three cut out sections of 4th speed synchronizer cone must align with three clutch keys in clutch assembly.

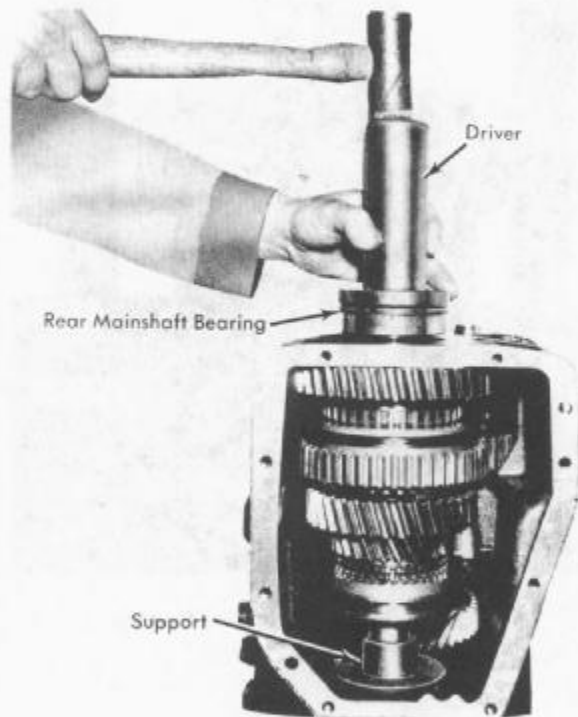


Fig. 16 Installing Rear Mainshaft Bearing

#### DRIVE PINION

Install drive pinion bearing outer snap ring. Position cutout portion of pinion gear teeth for mainshaft clearance when installing drive pinion. Raise mainshaft to engage drive pinion and 4th speed synchronizer, and tap bearing outer race with a plastic head hammer to install pinion. Install drive pinion bearing retainer using a new gasket and tighten bolts.

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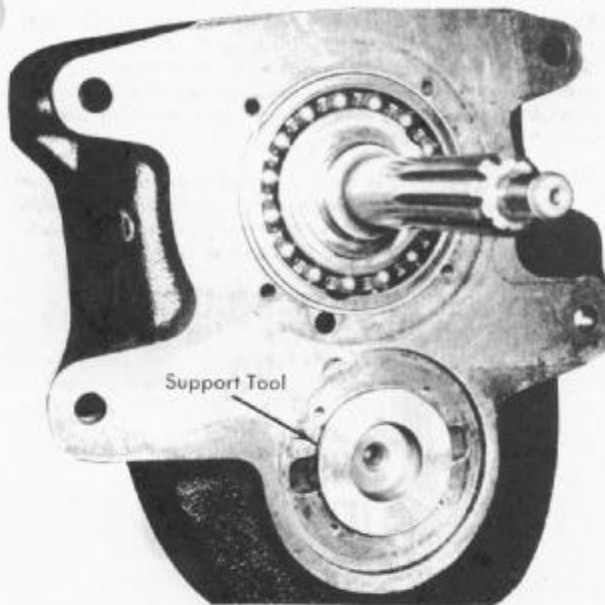


Fig. 17 Counter gear front support tool



Fig. 18 Installing rear counter gear bearing

### COUNTERSHAFT

Install suitable tool (J-22874-2) in counter gear front bearing opening in case to support counter gear (see illustration). Lay transmission case on front end and install outer snap ring on counter gear rear bearing. Then position bearing on counter gear and using suitable tool (J-22874-2), drive bearing into place (see illustration). Install snap ring on countershaft at rear bearing and remove tool. Tap counter gear front bearing assembly into case and install front bearing cap with new gasket. Tighten cap screws.

### OUTPUT YOKE & REAR BEARING RETAINER

Slide speedometer drive gear over mainshaft to bearing. Install rear bearing retainer with new gasket and ensure that snap ring ends are in lube slot and cutout in bearing retainer. Install bolts and tighten as specified. Install brake backing plate assembly if equipped. On models with a transfer case, install rear bearing lock nut and washer using suitable tool (J-23070), tighten nut and bend washer tangs to fit slots in nut. Install parking brake drum and/or universal output yoke. Apply a light coat of oil to seal surface. Lock transmission in two gears at once, install universal joint output yoke lock nut and tighten.

### COVER & SHIFT FORK MECHANISM

Move transmission gears to neutral except reverse idler gear which should be engaged about  $\frac{1}{8}$ ". Install cover with new gasket, shifting forks must slide into their proper positions on clutch sleeves and reverse idler gear. Forks must be positioned as in removal. Install cover bolts and tighten.

### TIGHTENING SPECIFICATIONS

Application	Fr. Lbs.
Cover-to-Case Bolts .....	23
Counter gear Front Cover Bolts .....	25
Drive Pinion Bearing Retainer .....	14
Drain & Filler Plugs .....	33
Output Yoke .....	95
Power Take-Off Cover .....	17
Parking Brake .....	22
Rear Bearing Retainer .....	23
Rear Mainshaft Bearing Lock Nut (4-WD) .....	100
Transmission-to-Clutch Housing .....	75