Part ONE
TRANSMISSIONS
Chapter I
THREE-SPEED TRANSMISSIONS

	Section
Disassembly procedure	111
Cleaning, inspection, and repair	112
Assembly procedure	113
Fits and tolerances	114

111. DISASSEMBLY PROCEDURE.

The following disassembly procedure applies to all three-speed transmissions used on Ford, Mercury, and Lincoln cars from 1932 through 1947. These transmissions are all similar in construction, however, some of the parts may be slightly different or not used on all transmissions (figure 1). Where a difference occurs in the disassembly of a particular model transmission, the difference in procedure will appear in the form of a "note" or a separate subparagraph which is added for that particular operation.

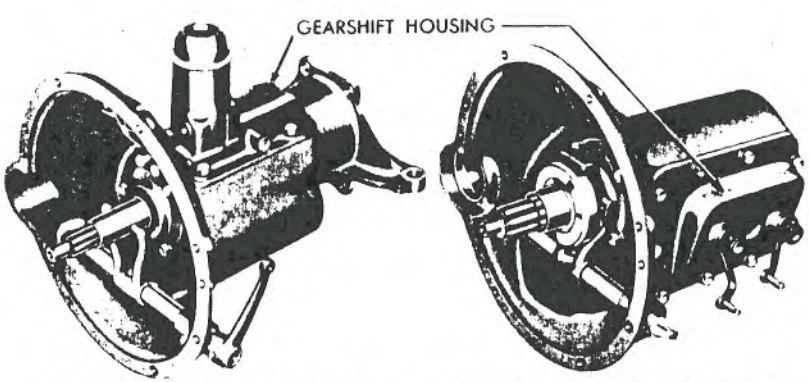


Figure 1—Transmissions Used on Ford, Mercury, and Lincoln Cars.

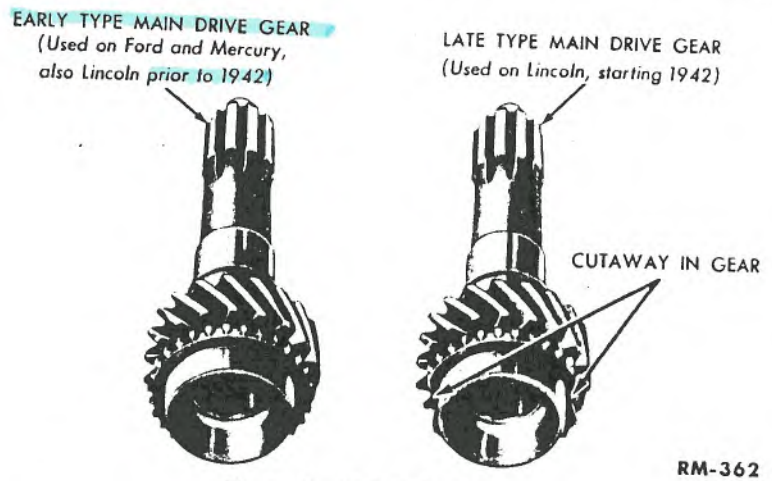


Figure 2—Main Drive Gears.

a. Remove Gearshift Housing. Drain the oil from the transmission case. Remove the cap screws that secure the gearshift housing to the transmission case (figure 1). Lift the gearshift housing off the case. Remove the gasket.

NOTE: *It is not necessary to disassemble the gearshift housing at this time unless there are damaged parts. If it is necessary to disassemble the gearshift housing, see section 127.*

b. Remove Rear Bearing Retainer. Remove the lock wire and cap screws that secure the rear bearing retainer (7085) to the transmission case. Remove the bearing retainer from the case.

c. Remove Front Bearing Retainer. Remove the clutch release bearing return spring (7562) (figure 3). Slide the clutch release bearing (7580) and hub (7561) off the front bearing retainer. Remove the cap screws that secure the front bearing retainer (7050) to the transmission case, and slide the bearing retainer off the main drive gear.

NOTE: *On the Lincoln standard transmission, it will be necessary to remove the clutch release lever (7511) from the clutch release shaft (7510) to allow sufficient clearance for removing the front bearing retainer.*

NOTE: *Two types of main drive gears (7017) are being used. Starting in 1942, the main drive gear used on the Lincoln transmissions has the cutaway provided on the gear (figure 2)*

§ III. c.

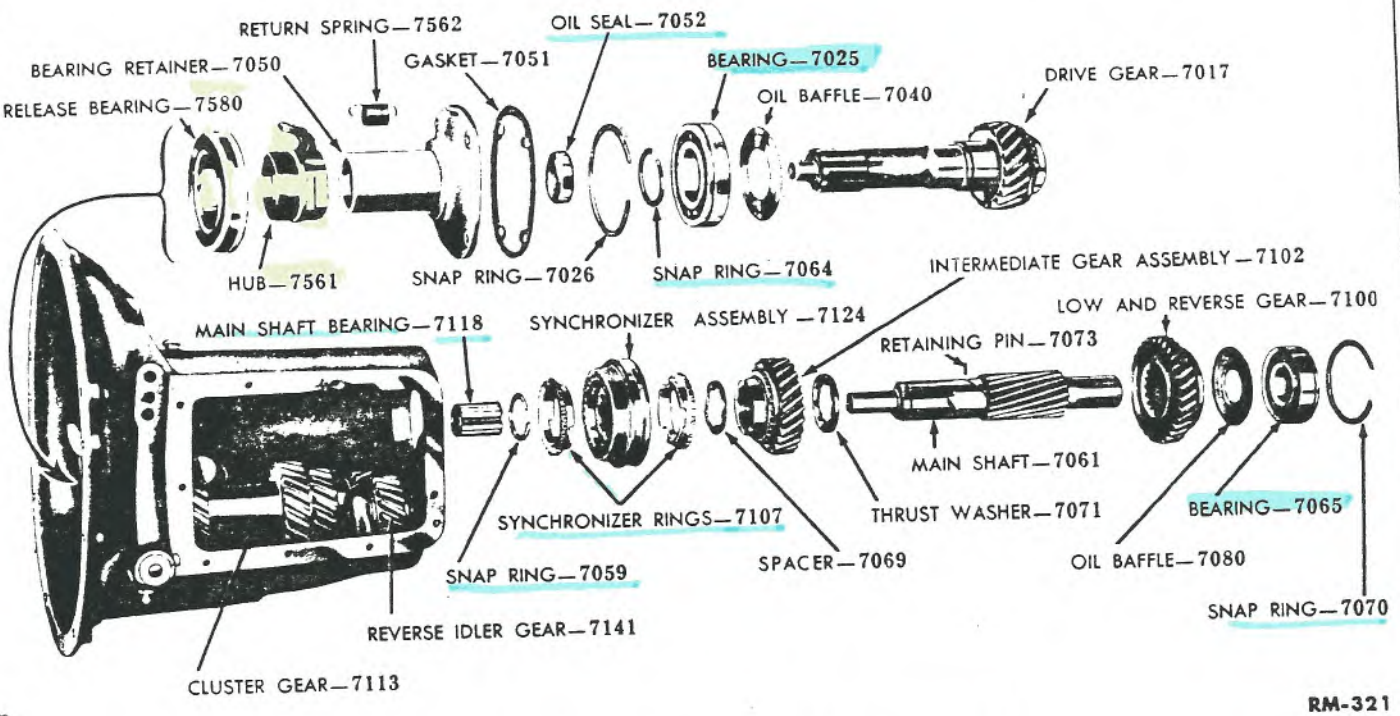


Figure 3—Main Drive Gear and Main Shaft, Disassembled.

§ III. c.

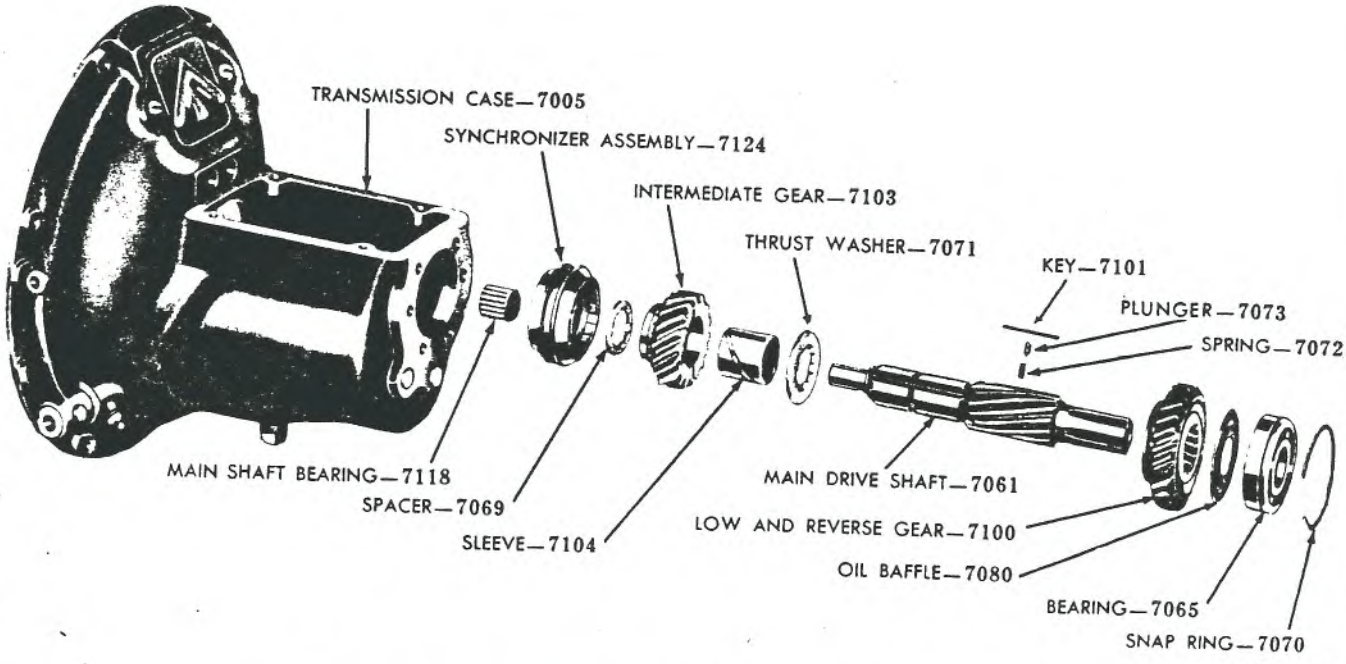


Figure 4—Main Shaft Used from 1932 Through 1937, Disassembled.

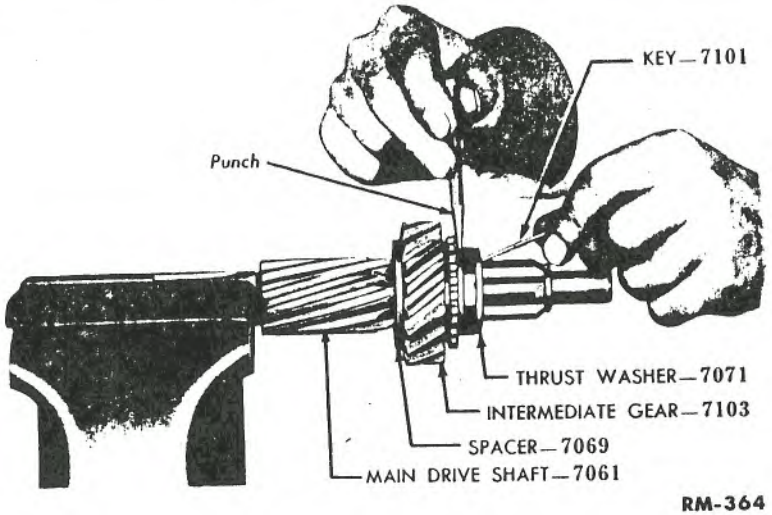


Figure 5—Removing Intermediate Gear from Main Shaft.

to allow sufficient clearance to remove the main drive gear without the necessity of dropping the cluster gear. All transmissions used on the Ford and Mercury, including the Lincoln prior to 1942, use the main drive gear without the cutaway in the gear. On these transmissions it is necessary to drop the cluster gear in order to remove the main drive gear. The following subparagraphs (1) and (2) cover the removal of both types of main drive gears. Follow whichever procedure that applies.

(1) *REMOVAL OF MAIN DRIVE GEAR WITHOUT CUTAWAY IN GEAR*. Remove the lock pin (7155) that secures the countershaft and reverse idler gear shaft in the case (figure 8). From the forward end of the transmission case, drive the countershaft out of the cluster gear and case. This will allow the cluster gear to rest on the bottom of the case. Remove the main drive gear and bearing from the transmission case. Remove the main shaft bearing (7118) and synchronizer ring (7107) from the pilot end of the main shaft (figure 3).

(2) *REMOVAL OF MAIN DRIVE GEAR WITH CUTAWAY IN GEAR*. On this type main drive gear a cutaway is provided on the synchronizing teeth of the main drive gear for removal purposes (figure 2). Turn the main drive gear until this cutaway portion is in line with the teeth on the cluster gear. Tap the main drive gear and bearing out of the transmission case. Remove the main shaft

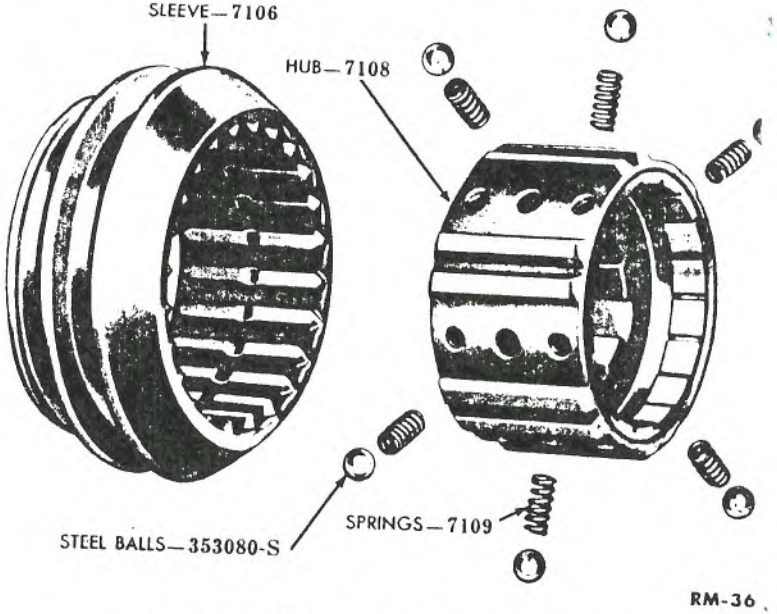


Figure 6—Plain Type Synchronizer Assembly.

bearing (7118) and synchronizer ring (7107) from the pilot end the main shaft (figure 3).

d. Remove Main Shaft. Tap on the pilot end of the main sha (7061) until the bearing (7065) on the opposite end of the main sha is about ¼ inch out of the transmission case. Remove the snap ri (7070) from the bearing (figure 3). Tap the main shaft back into t transmission case until the bearing is free on the inner side of t case. Remove the main shaft with synchronizer and gears as a assembly, lifting out the bearing end of the main shaft first.

(1) *DISASSEMBLE MAIN SHAFT*. Because of the differenc in the disassembly procedure of the main shaft, this paragraph h been divided into two subparagraphs. Subparagraph (*a*) belo applies to all transmissions used on cars from 1932 through 193 Subparagraph (*b*) below applies to all transmissions used on ca from 1938 through 1947.

(*a*) DISASSEMBLY OF MAIN SHAFT (1932 THROUGH 1937). Remov the synchronizer assembly (7124) from the main shaft (figure 4) Insert a small punch into the hole provided in the intermediate gea (figure 5). Press the plunger (7073) down to release the key (7101 and remove the key. Remove the spacer (7069), intermediate gea

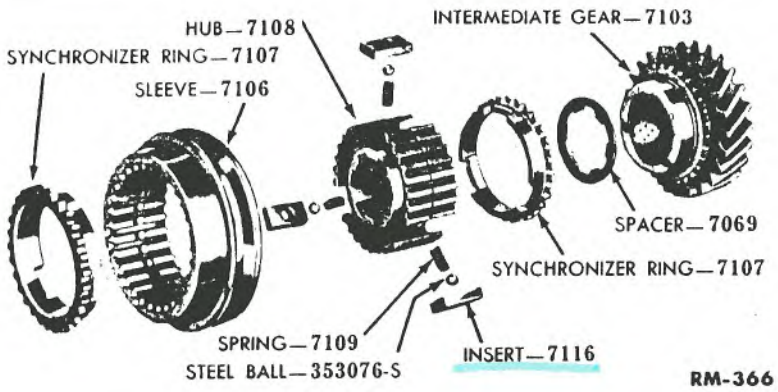


Figure 7—Blocker Type Synchronizer Assembly.

(7103), sleeve (7104), thrust washer (7071), and low and reverse gear (7100) from the main shaft (7061).

(*b*) DISASSEMBLY OF MAIN SHAFT (1938 THROUGH 1947). Remove the snap ring (7059) from the pilot end of the main shaft (figure 3). Remove the synchronizer assembly (7124), synchronizer ring (7107), spacer (7069), intermediate gear (7102), and thrust washer (7071) from the main shaft. Remove the retaining pin (7073) from the main shaft and slide the low and reverse gear (7100) off the shaft.

(c) DISASSEMBLE SYNCHRONIZER (FIGURES 6 AND 7).

NOTE: ***Two types of synchronizers are used. The plain type synchronizer (figure 6) is used in all transmissions prior to 1939. The blocker type synchronizer (figure 7) is used from 1939 through 1947. By referring to figures 6 and 7, it will be noted that the plain type synchronizer has no insert (7116). The same disassembly procedure applies to both type synchronizer assemblies.***

To prevent losing the steel balls when disassembling the synchronizer, it is advisable to hold the assembly in a small box. Push the hub (7105) out of the sleeve (7106). This will release the steel balls, springs (7109), and inserts (7116).

e. Remove Reverse Idler Gear. If the lock pin (7155) was not removed from the reverse idler shaft and countershaft in the previous paragraph **d** (1), remove the lock pin (figure 8). From the rear of the transmission case, tap the reverse idler shaft (7140) out of the case. Remove the reverse idler gear (7141) from the case.

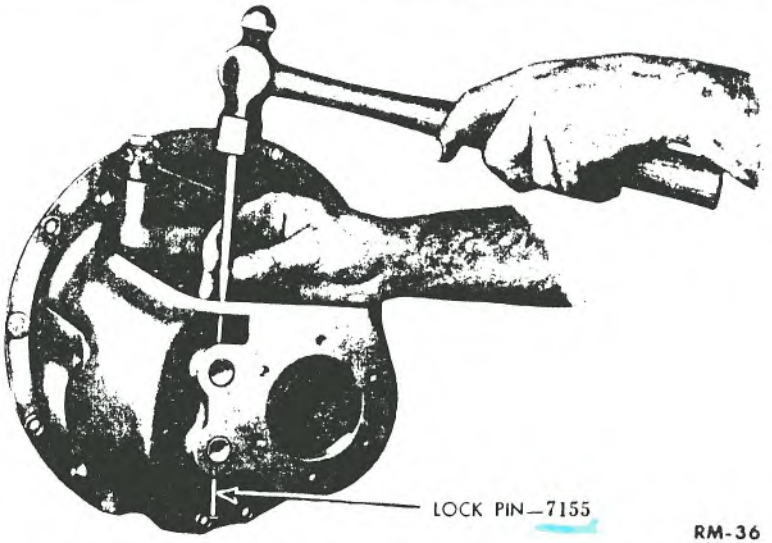


Figure 8—Removing Lock Pin from Countershaft and Reverse Idler Shaft from Case.

f. Remove Cluster Gear. If the countershaft was not remov from the cluster gear (7113) in the previous paragraph **d** (proceed as follows. From the forward end of the transmission ca tap the countershaft out of the cluster gear and case. Remove t cluster gear (7113), thrust washers (7119 and 7129) from the ca (figure 9). Remove the roller bearings (or if equipped with bushin remove the bushings) and spacer from the cluster gear.

NOTE: ***The bushings used with the cluster gear on some horsepower transmissions are a press-fit in the cluster gea These bushings should not be removed unless they are exce sively worn (see section 123).***

112. CLEANING, INSPECTION AND REPAIR.

Although the same parts are used in most transmissions and car the same basic part number, these parts vary in size. To avoid co fusion when replacing parts, the prefix along with the basic pa number should be used to identify the particular year or model t part is used.

a. Cleaning. Clean all parts thoroughly. To clean bearings tho oughly, rotate them while immersed in a cleaning fluid until a trace of lubricant has been removed. Unless the bearings are to b used immediately, they should be coated with oil to prevent rustin Discard all old gaskets.

b. Transmission Case. Replace the transmission case if it is cracked. Pull the clutch release shaft part way out of the case and check the condition of the clutch release shaft bushings (7508). If the bushings are scored or there is excessive clearance between the clutch release shaft and bushing, replace the bushings (subpar. (1) below). Replace the grease fittings if they are plugged.

(1) *CLUTCH RELEASE SHAFT BUSHING REPLACEMENT.* Drive the pin out of the fork and clutch release shaft, as shown in figure 20. Pull the clutch release shaft out of the fork and case. Using a chisel, tap the bushings out from each side of the case (figure 21).

To install new bushings, place a bushing in position at each side of the case being sure that the lubricating hole in each bushing is in line with the grease fitting on the case. Carefully tap the bushings into the case until they are flush with the outer edge of the case. Line-ream the bushings to size.

c. Cluster Gear Assembly. Replace roller bearings (7118 and 7121) that are discolored due to overheating, or if the rollers have flat spots (figure 9). Replace the countershaft (7111) if it is bent or if there is evidence of a groove worn in the shaft. Replace the cluster gear (7113) if it has chipped teeth or is excessively worn. On cluster gears using a pressed-in type bushing, check the condition of these bushings. If these bushings are scored or excessively worn, they must be replaced.

NOTE: ***When replacing the pressed-in type bushing, it is not necessary to use the original press fit bushing. A floating type bushing is available for replacement.***

d. Reverse Idler Gear and Shaft Assembly. Replace the reverse idler shaft (7140) (figure 9) if there is evidence of a groove worn in the shaft. Replace the reverse idler gear (7141) if it has chipped or excessively worn teeth. If the bushing in the reverse idler gear is excessively worn, the gear must be replaced.

NOTE: ***Do not attempt to remove the bushing from the reverse idler gear as this bushing is not serviced separately.***

e. Main Shaft and Gears. See figures 3 and 4. Rotate the bearing (7065) on the main shaft by hand. If it binds or has excessively loose races, replace the bearing (paragraph (1) below). Replace the main shaft if the pilot end of the main shaft or splines are excessively worn or scored. Replace the low and reverse gear (7100) or the intermediate gear (7103) if they have chipped or missing teeth. If the

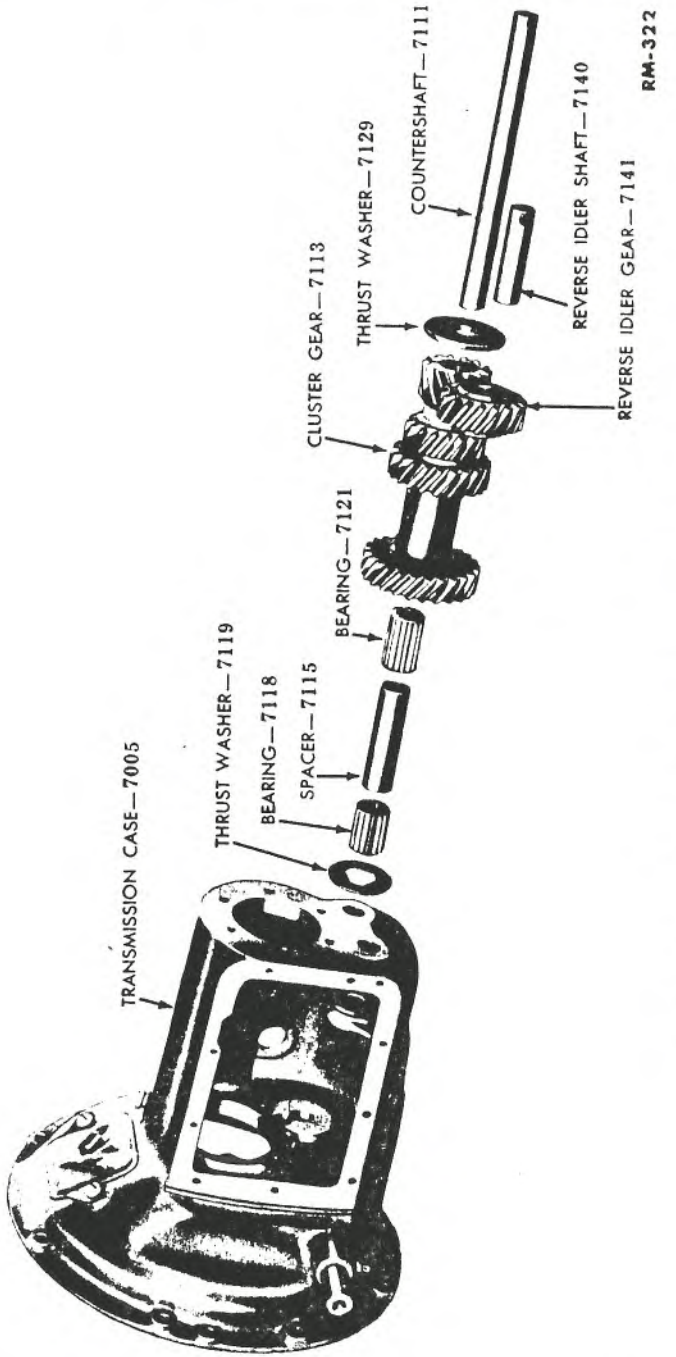


Figure 9—Cluster Gear and Reverse Idler Gear, Disassembled

intermediate gear is equipped with a sleeve (7104), slide the sleeve on the main shaft. If there is excessive backlash between the two parts replace the sleeve. Replace the thrust washer (7071) if it is scored or is excessively worn. Replace the synchronizer rings (7107) if they have chipped or missing teeth. Insert the synchronizer hub (7108) into the sleeve (7106) (figures 6 and 7). If the hub is excessively loose in the sleeve replace the sleeve or hub. Replace any broken springs (7109).

(1) *MAIN SHAFT BEARING REPLACEMENT.* Press the bearing (7065) off the shaft. To install the bearing, first place the oil baffle (7080) on the main shaft with the outer edge of the oil baffle away from the bearing. Press the bearing on the shaft being sure it is seated against the shoulder on the main shaft.

f. Main Drive Gear Assembly. Replace the oil seal (7052) located in the bearing retainer (7050) (paragraph (1) below). Replace the main drive gear (7017) if it is excessively worn or has chipped or missing teeth (figure 3). Replace the bearing (7025) on the main drive gear if it is discolored due to overheating or if the bearing binds or has loose races, when rotated by hand (paragraph (2) below).

(1) *OIL SEAL REPLACEMENT.* Use a screw driver and pry the oil seal (7052) out of the bearing retainer. To install a new oil seal, place the oil seal in position on the bearing retainer with the sharp end of the leather facing up. Use a suitable tool that will fit the outer edge of the oil seal and tap the seal into the bearing retainer.

(2) *MAIN DRIVE GEAR BEARING REPLACEMENT.* Remove the snap ring (7064) from the main drive gear (figure 3). Tap the outer race of the bearing evenly around the entire circumference until the bearing is removed from the main drive gear. To install a new bearing, first place the oil baffle (7040) on the main drive gear with the outer edge of the oil baffle away from the bearing. Press the bearing on the main drive gear by pressing on the inner race of the bearing. Install the snap ring.

g. Gearshift Housing Assembly. See figures 10 and 11. It is not necessary to disassemble the gearshift housing assembly to determine if parts are worn. This can be done by a visual inspection of the assembly. Note the condition of the shift levers and forks. If there is evidence of binding when shifted into the various positions, the gearshift housing must be disassembled and the faulty parts replaced. If there was evidence of oil leaks at the shift lever (on remote type gearshift housing), the oil seals (7288) must be replaced. If any of the above parts are damaged or worn they must be replaced.

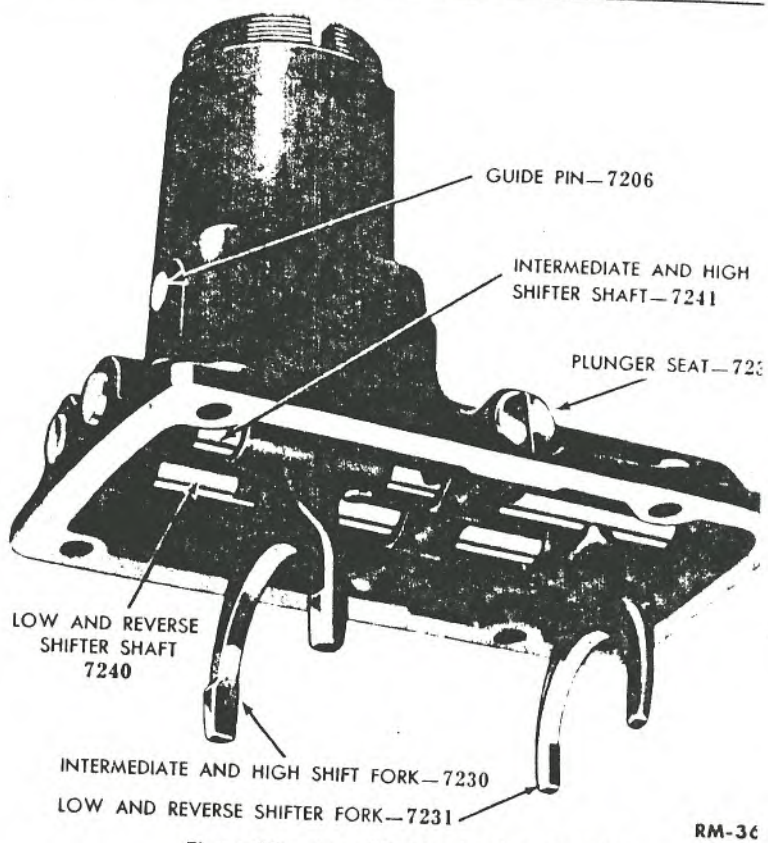


Figure 10—Gearshift Housing (Direct Shift).

To disassemble gearshift housings used on transmissions with direct shift, see paragraph (1) below. All others see paragraph below.

(1) *DISASSEMBLY OF GEARSHIFT HOUSING (DIRE SHIFT) (FIGURE 10).* Remove the plunger seat (7238) at e side of the gearshift housing. Remove the plunger spring (7234) a steel ball. Remove the pin that secures each shifter fork to e shifter shaft. Remove the shifter shafts from the forks and gearsh housing. Remove the interlock (7233) from the gearshift housi Cut the peened end of the guide pin (7206), and tap the guide p out of the gearshift housing.

To assemble the gearshift housing, tap a new guide pin (7206) position in the gearshift housing (figure 10). Peen the guide pin prevent it from loosening. Install the low and reverse shifter sha

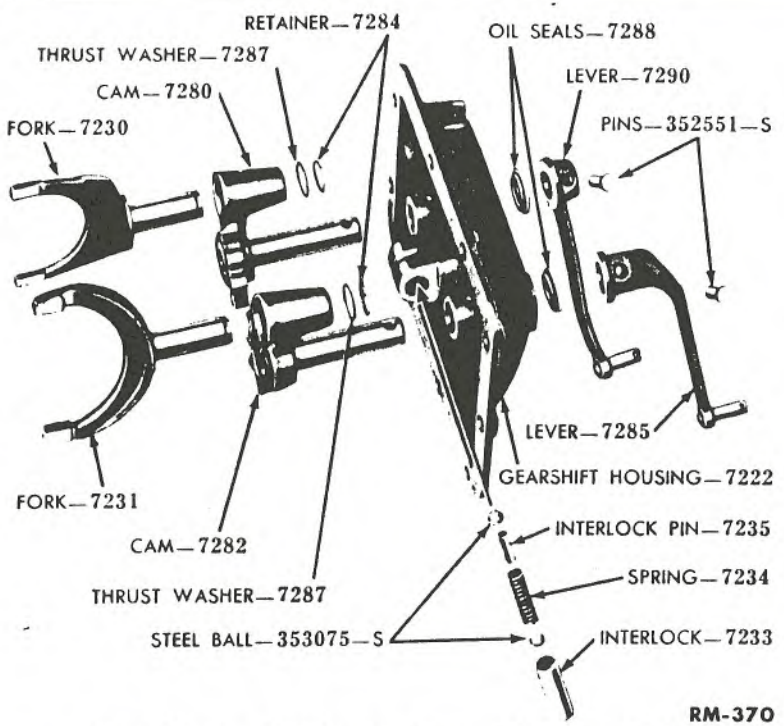


Figure 11—Gearshift Housing, Disassembled (Remote Shift).

(7240). Place the shifter fork (7231) on the shifter shaft and install the pin securing the fork to the shaft. Peen the pin to prevent it from loosening. Install the interlock (7233) in the hole provided between the two shifter shafts. Start the other shifter shaft (7241) in the gearshift housing. Place the shifter fork (7230) on the shifter shaft being sure the fork is properly located in the guide pin. Install the pin securing the fork to the shaft. Peen the pin to prevent it from loosening. Install a steel ball, plunger spring (7234) and plunger seat (7238) on each side of the gearshift housing.

(2) *DISASSEMBLY OF GEARSHIFT HOUSING (REMOTE SHIFT) (FIGURE 11).* Remove the pin (352551-S) that secures the shift levers (7290 and 7285) to the cams. Remove the shift levers from the cams. Pull the shifter forks and cams out of the gearshift housing. The steel ball, interlock pin, lock pin, and spring will fall out of the gearshift housing when the cams are pulled out. Remove the retainers and thrust washer that secure the shifter forks (7230 and 7231) to the cams and remove the shifter forks from the cams. Pry the oil seals (7288) out of the gearshift housing with a screwdriver.

To assemble the gearshift housing, install new oil seals (7288) the gearshift housing. Assemble the fork (7230) on the cam (728 and install the thrust washer (7287) and retainer (7284). Repe this operation to assemble fork (7231) to the cam (7282). Place o of the forks and cam assemblies in position in the gearshift housi and install the proper lever to the cam. Secure the lever to the ca with pin (352551-S). Place the two steel balls (353075-S), interlo pin (7235), spring (7234), and interlock in position in the gearshi housing. Repeat the above procedure to install the other fork a cam assembly to the gearshift housing.

113. ASSEMBLY PROCEDURE.

Where a difference occurs in the assembly of a particular mod transmission, this procedure will appear in a form of a "note," or separate subparagraph will be added for that particular operatio Coat all parts with oil before assembling them in the transmissio case.

a. Install Cluster Gear. See figure 9. Coat the steel side of th thrust washer (7119) with grease. Place the thrust washer in th case being sure the tongue on the thrust washer is entered in th groove provided in the case. Install the two roller bearings (7118 and (7121) and spacer (7115) in the cluster gear, being sure th smaller roller bearing (7118) is at the forward end of the cluster gear If the cluster gear is equipped with bushings (74-7121), install bushing at each end of the cluster gear. Place the thrust washe (7129) in position on the end of the cluster gear. Note if the lugs o the thrust washer are in position with the grooves on the cluster gear Place the cluster gear in the case with the larger gear toward th front of the case. Make sure the thrust washers remain in their posi tions. Allow the cluster gear to rest on the bottom of the case.

NOTE: ***Do not install the countershaft (7111) at this time unless the main drive gear (7017) being used is provided with the cutaway in the teeth, as shown in figure 2. Allow the gear to rest on the bottom of the case and proceed with paragraph b below.***

Start the countershaft in the hole provided at the rear of the case (figure 9). Lift the cluster gear from the bottom of the case in line with the countershaft. Push the countershaft part way through the cluster gear. At this point recheck the position of the thrust washer at the forward end of the case by looking through the countershaft hole. The hole in the thrust washer must line up with the hole in the case. Line up the lock pin hole in the countershaft with the hole at the rear of the case and drive the countershaft in place.

b. Install Reverse Idler Gear. See figure 9. Place the reverse idler gear (7141) in position in the case being sure the shoulder on the gear is facing toward the rear of the case. Line up the lock pin hole in the reverse idler shaft with the hole in the case, and install the reverse idler shaft (7140) through the reverse idler gear.

c. Assemble Synchronizer. See figures 6 and 7. Place one of the synchronizer rings (7107) on a bench with a thrust washer on top. Place the sleeve (7106) and hub (7108) over these parts with the shank side of the hub down. Push down on the sleeve so that the inner hub will be raised above the sleeve. Install one insert (7116) and one spring (7109) at a time, (or if working on the plain type synchronizer (figure 6), install just the spring, raising the inner hub slightly for each installation.

NOTE: ***The plain type synchronizer as shown in (figure 6), does not have the inserts as the blocker type synchronizer shown in (figure 7).***

Place a steel ball at each spring, and press the spring down to force the steel ball between the sleeve and the hub. After all steel balls have been installed, pick up the assembly and press the hub in place in the sleeve.

d. Install Main Shaft. Because of the difference in the assembly of the main shafts, this paragraph has been divided into two subparagraphs. Subparagraph (1) below applies to all main shafts that were used in cars from 1932 up to 1937. Subparagraph (2) below applies to all main shafts that were used in cars from 1937 through 1947.

(1) *ASSEMBLY OF MAIN SHAFT (1932 THROUGH 1937).* See figure 4. Install the low and reverse gear (7100) on the main shaft with the shift channel on the gear facing toward the rear of the main shaft (figure 4). Install the thrust washer (7071) and sleeve (7104) on the main shaft. Drop the spring (7072) and plunger (7073) in the hole provided in the sleeve. Slide the intermediate gear (7103) on the sleeve with the coned end of the gear toward the forward end of the main shaft. Line up the hole in the intermediate gear with plunger. Insert a small punch in this hole and press down on the plunger. Place the key (7101) between the sleeve and main shaft splines. Push on the key until it is over the plunger, then remove the punch. Again push the key until the plunger has entered into the hole in the key. Check the end play between the intermediate gear and thrust washer (figure 12). The end play should be from 0.004 inch to 0.008 inch. If the clearance is more than 0.008 inch, use an oversize thrust washer. These thrust washers are available in various thicknesses. Install the plain blocker type synchronizer assembly

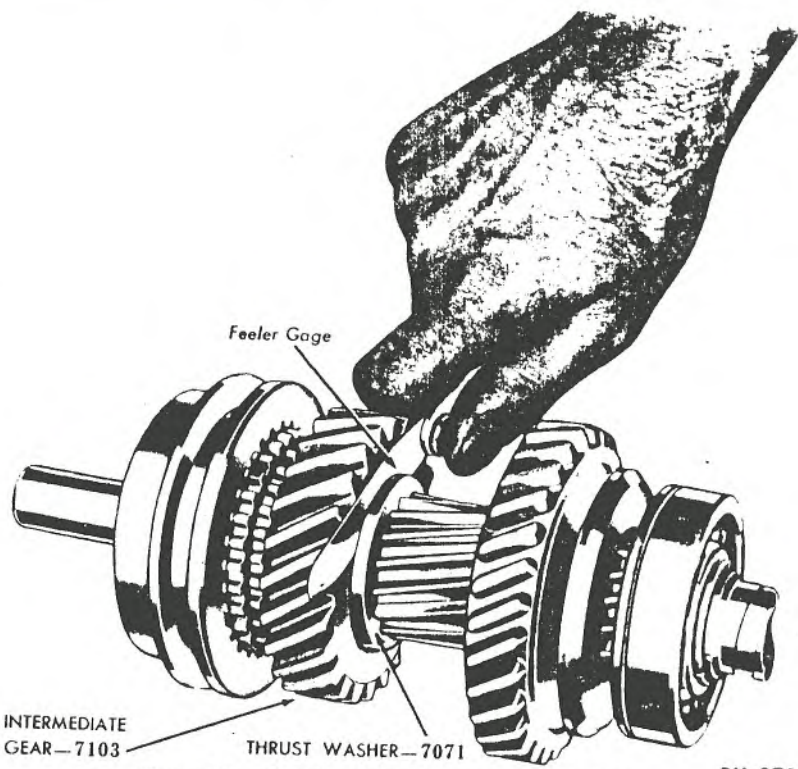


Figure 12—Checking Intermediate Gear End Play.

(MEASURED .008") 4-1-90

(figure 6) on the main shaft with the long end of the hub toward the pilot end of the main shaft.

(2) *ASSEMBLY OF MAIN SHAFT (1937 THROUGH 1947).* Install the low and reverse gear (7100) on the main shaft with the shifter fork groove toward the rear of the main shaft (figure 3). Install the thrust washer retaining pin (7073) and thrust washer (7071) on the main shaft. Install the intermediate gear (7103) on the main shaft with the coned side toward the front of the shaft. Install the spacer (7069) and one of the synchronizer rings (7107). Install the blocker type synchronizer assembly (figure 7), with the shifter groove toward the rear of the shaft. Install the snap ring (7059) on the main shaft. Check the end play between the intermediate gear (7103) and thrust washer (7071) with a feeler gauge (figure 12). The end play should be from 0.004 inch to 0.008 inch. If the clearance is more than 0.008 inch, use an oversize spacer (7069). These spacers are available in various thicknesses.

(3) *INSTALL MAIN SHAFT IN TRANSMISSION.* Enter the pilot end of the main shaft into the case, and then lower the rear of the main shaft into the case. Enter the bearing on the main shaft into the bearing hole at the rear of the case. Install the snap ring (7070) on the bearing at the outer side of the case.

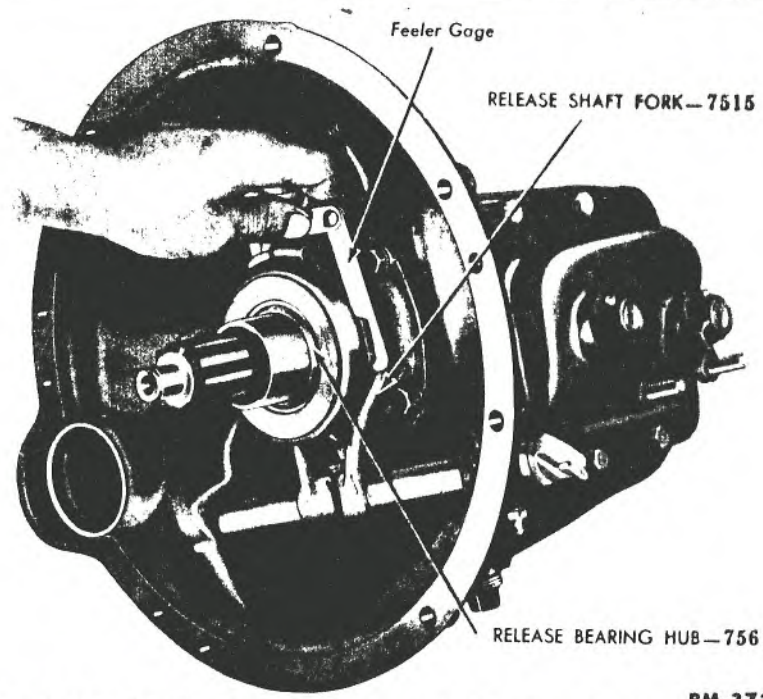
e. Install Main Drive Gear. Install the bearing (7118) on the pilot end of the main shaft (figure 3). Place the synchronizer ring (7107) in position on the main shaft. Start the main drive gear (with bearing (7025) and oil baffle (7040) assembled on the main drive gear) into the forward end of the case. If using a main drive gear with a cutaway in the gear (figure 2) it will be necessary to line up this cutaway in the gear with the cluster gear. Using a soft hammer, tap the end of the main drive gear until the snap ring on the bearing is seated against the transmission case. Using a new gasket, install the bearing retainer (7050) on the main drive gear (with the eye for the clutch release bearing at the top) being careful not to damage the oil seal (7052) in the bearing retainer. Install the cap screws that secure the bearing retainer to the case.

NOTE: ***If the countershaft was not previously installed in the transmission case, it should now be installed (paragraph b above), and the countershaft and reverse idler shaft secured with the lock pin.***

f. Install Clutch Release Bearing. Install the clutch release bearing (7580) and hub (7561) on the bearing retainer (figure 3). Install the clutch release bearing return spring (7562). If working on a Lincoln transmission, install the clutch release lever on the clutch release shaft. Using a feeler gauge, check the alignment of the clutch release shaft fork (figure 13). Both sides of the release shaft fork should contact the release bearing at the same time. If the clearance between one side of the fork and bearing is more than 0.003 inch, the misalignment must be corrected. This can be done by grinding off the tight-fitting side of the fork or replacing the fork.

g. Install Gearshift Housing. Place a new gasket in position on the transmission case. Position the shift forks in neutral position. Place the gearshift housing on the transmission being sure the shift forks are entered in their proper channels on the intermediate gear and the low and reverse gear. Install the cap screws that secure the gearshift housing to the case.

Install the drain plug, and fill to proper level with specified lubricant. Move the shift levers to the various positions, and turn the main drive gear by hand to make sure the gears do not bind and that the shift forks are in their proper location.



RM-372

Figure 13—Checking Clearance Between Clutch Release Bearing and Fork.

114. FITS AND TOLERANCES.

This section covers all manufacturer's dimensions of the various parts used on the Ford, Mercury, and Lincoln three-speed transmissions. The various parts that are subject to wear are listed by the part number and carry a prefix to identify the particular model transmission the part is used on.

a. Cluster Gear and Countershaft.

(1) *CLUSTER GEAR.*

Part Number	End Play (Inches) Manufacturer	Inside Diameter (Inches) Manufacturer
B-7113	0.004 to 0.012	1.125 to 1.126
48-7113	0.005 to 0.017	1.125 to 1.126
67-7113-A	0.005 to 0.017	1.125 to 1.126
68-7113-A	0.005 to 0.017	1.125 to 1.126
74-7113-A	0.005 to 0.017	0.760 to 0.761
74-7113-D	0.005 to 0.017	0.760 to 0.761
022A-7113-A	0.005 to 0.017	1.125 to 1.126
21C-7113	0.005 to 0.017	1.125 to 1.126

(2) *COUNTERSHAFT.*

Part Number	Diameter (Inches) Manufacturer
B-7111	0.7495 to 0.7500
74-7111	0.6245 to 0.6250

b. Reverse Idler Gear and Shaft.

(1) *REVERSE IDLER GEAR.*

Part Number	Inside Diameter (Inches) Manufacturer
B-7141	0.7515 to 0.7525
68-7141	0.7515 to 0.7525
74-7141-B	0.6270 to 0.6280

(2) *REVERSE IDLER SHAFT.*

Part Number	Diameter (Inches) Manufacturer
B-7140-A	0.7490 to 0.7495
74-7140-A	0.6245 to 0.6255

c. Transmission Main Shaft.

Part Number	Pilot Diameter (Inches) Manufacturer
B-7061	0.749 to 0.750
68-7061-B	0.749 to 0.750
74-7061-B	0.624 to 0.625
81A-7061-B	0.7500 to 0.7505
21-C-7061	0.7500 to 0.7505

d. Intermediate Gear and Thrust Washers.

(1) *INTERMEDIATE GEAR.*

Part Number	End Play (Inches) Manufacturer	Inside Diameter (Inches) Manufacturer
B-7103	0.004 to 0.008	1.5575 to 1.5585
74-7103-B	0.004 to 0.008	1.3760 to 1.3765

(2) *INTERMEDIATE GEAR THRUST WASHERS.*

(a) FRONT.

Part Number	Thickness (Inches) Manufacturer
B-7069	0.183 to 0.184
74-7069	0.140 to 0.141
81A-7069-A	0.630 to 0.655
81A-7069-B	0.068 to 0.071

(b) REAR.

78-7071	0.1875 to 0.1885
74-7071-B	0.140 to 0.141
81A-7071	0.185 to 0.187

e. Main Drive Gear

Part Number	Pilot End Inside Diameter (Inches) Manufacturer
48-7017	1.126 to 1.127
67-7017	1.126 to 1.127
74-7017	0.938 to 0.939
81A-7017	1.126 to 1.127
022A-7017	1.126 to 1.127
11Y-7017	1.126 to 1.127

f. Remove Cluster Gear. Working from the forward end of the transmission case just below the clutch release shaft, drive the countershaft (7111) out of the case. Remove the cluster gear (7113). Remove the two roller bearings (7118) and spacer (7115) from the cluster gear (figure 19).

122. CLEANING, INSPECTION, AND REPAIR.

This section covers the inspection and repair of the various parts that are subject to wear in the transmission. Repairs in this section consist of disassembling any assemblies which have not been completely disassembled in the preceding section.

a. Cleaning. Clean all parts thoroughly. To clean bearings thoroughly, rotate them while immersed in a cleaning fluid until all trace of lubricant has been removed. Unless the bearings are to be used immediately, they should be coated with oil to prevent rusting.

b. Transmission Case. Replace the transmission case (7005), if it is cracked or damaged (figure 19). Pull the clutch release shaft (7510) part way out of the transmission case on the left side. Check the condition of the clutch release shaft bushings (7508). If they are scored or there is excessive clearance between the clutch release shaft and bushing, replace the bushings (subparagraph (1) below).

NOTE: ***On the two-piece transmission (figure 16) it is not necessary to remove the clutch housing from the transmission case unless either the transmission case or clutch housing is found damaged.***

(1) *CLUTCH RELEASE SHAFT BUSHING REPLACEMENT.* To remove the clutch release shaft bushings (7508), cut the head of the pin that secures the clutch release fork to the shaft with a chisel. Insert a long nosed drift through the inspection plate opening, and drive the pin out of the fork (figure 20). Slide the clutch release shaft out of the transmission case. Drive the two split bushings out from each side of the case (figure 21).

To install new bushings, line up the lubricating hole in the bushing with the grease fitting hole in the case, and with a suitable driver, tap the bushing into the case until it is flush with the outside edge. Ream the bushings to size, using a 7/8-inch reamer.

c. Cluster Gear Assembly. Replace the cluster gear (7113) if it is excessively worn, or has chipped or missing teeth (figure 19). Place the cluster gear in the transmission case. Measure the end play between the cluster gear and the case with a feeler gauge. If the end play is more than 0.025 inch, replace the cluster gear. Replace the

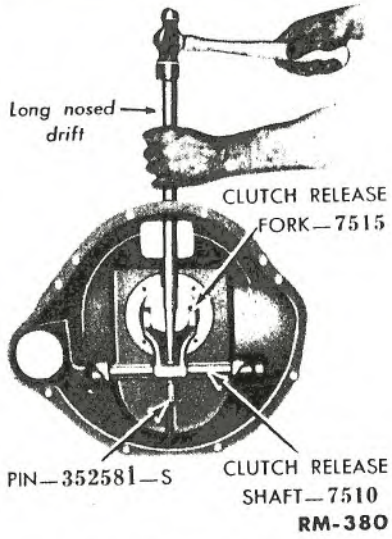


Figure 20—Removing Pin from Clutch Release Fork.

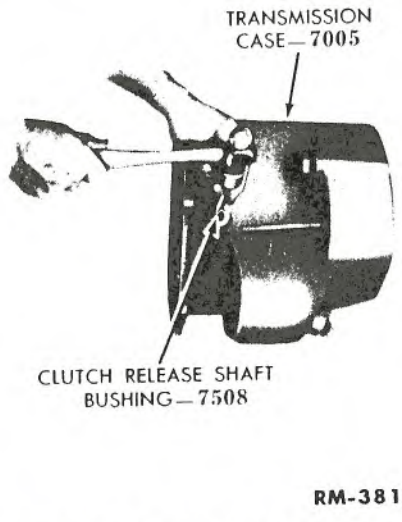


Figure 21—Removing Clutch Release Shaft Bushing from Transmission Case.

countershaft (7111) if the diameter is excessively worn. Do not measure the diameter at the slotted end of the countershaft. This end is 0.003 inch larger than the balance of the shaft in order to establish a press fit when it is installed in the case. Small nicks or scratches can be removed with a fine stone. Replace roller bearings (7118) if they have missing rollers, flat spots, or are discolored due to overheating.

d. Reverse Idler Gear and Shifter Fork Assembly. Replace the reverse idler gear (7141) if it is excessively worn, or has chipped or missing teeth (figure 19). If the bushing in the reverse idler gear is scored or excessively worn, the reverse idler gear must be replaced.

NOTE: ***Do not attempt to remove the bushing from the reverse idler gear, as this bushing is not serviced separately.***

Replace the reverse idler shaft (7140) if it is excessively worn. Replace the reverse idler shifter fork (7243) if it is excessively worn or bent. Replace the reverse idler shifter shaft (7244) if it is excessively worn or bent.

e. Main Shaft Assembly. Replace the third and high gear (7101) if it is excessively worn, or if the teeth are chipped or missing (figure 18). Slide the third and high gear on the main shaft. The gear should fit tightly enough so as not to slide down the main shaft splines on

29 24 19 14

CLUSTER GEAR
(BOTTOM SET IN CASE)

32 13/16 order

39-41 32.85"

II
81A-4235

32-34 32.18"



ALL HELICAL

18 T
(REAR)
GEAR