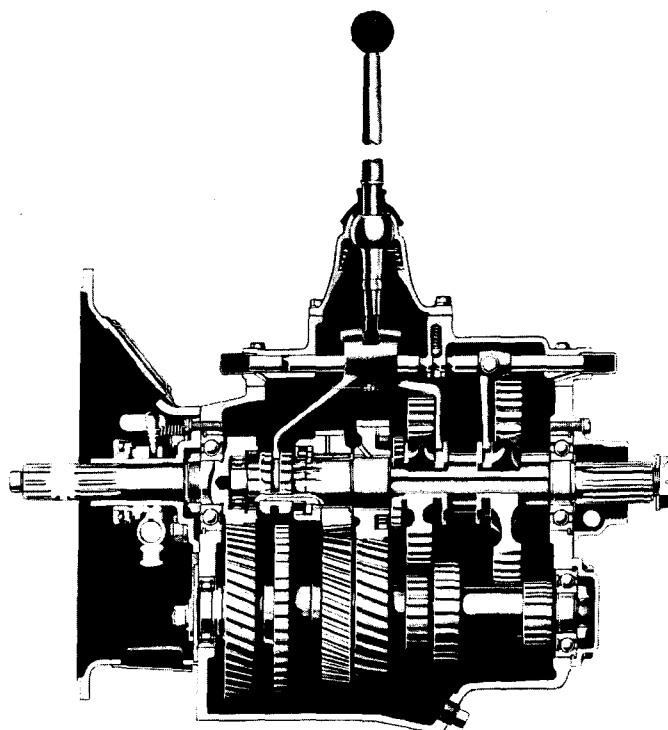


SERVICE MANUAL

SPECIFICATIONS • LUBRICATION • MAINTENANCE • REPAIR

5-A-62 and 5-A-620 TRANSMISSIONS



 **FULLER** TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY 
KALAMAZOO, MICHIGAN

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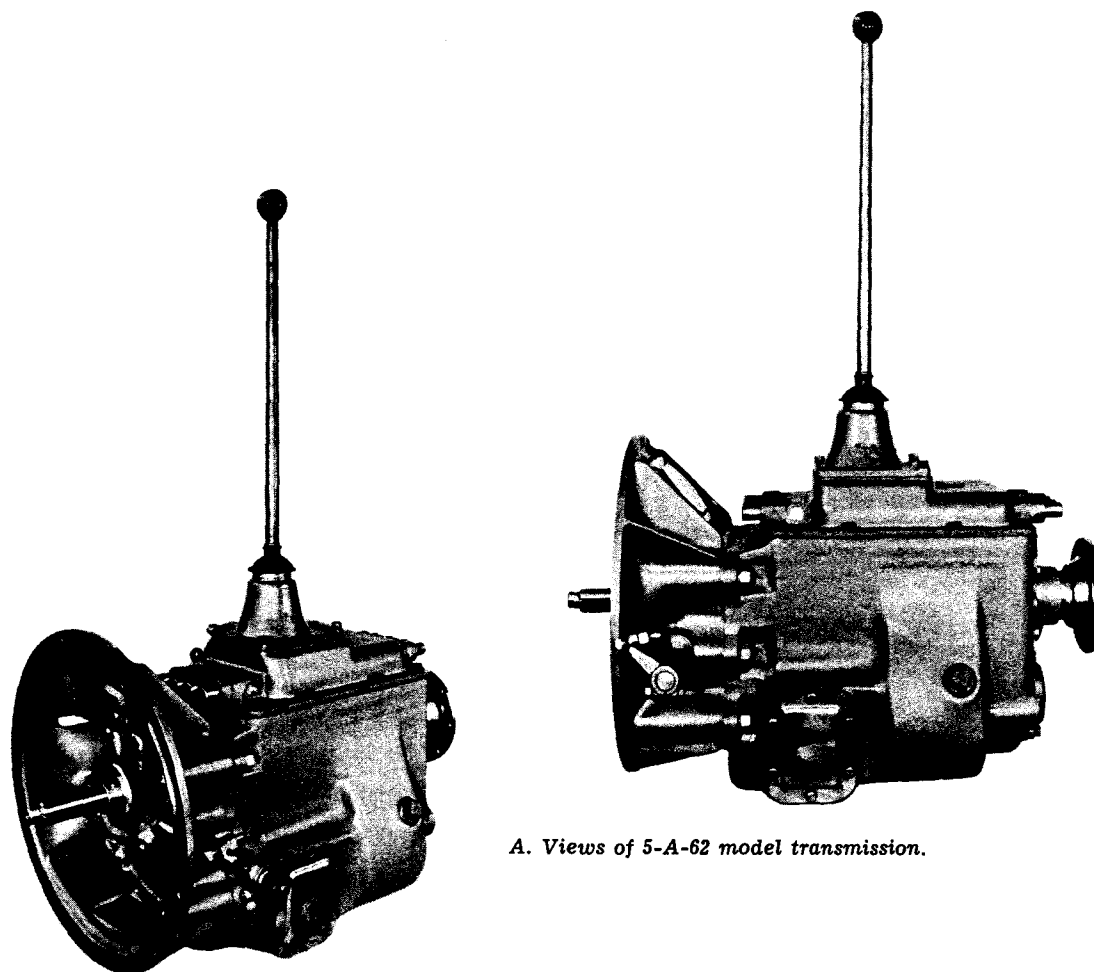
DESCRIPTION

The 5-A-62 and 5-A-620 model transmissions have five forward speeds and one reverse, high reverse speed is optional. These units are designed primarily for medium duty on-highway vehicles.

In the 5-A-62 model, direct drive is the fifth speed ratio (1 to 1). In the 5-A-620 model, direct drive is the fourth speed ratio, the fifth speed being an overdrive ratio.

First and second speed gears are engaged by moving sliding gears on the mainshaft to mesh with corresponding gears on the countershaft. Third, fourth and fifth speed gears are constant mesh gears which are engaged with internal clutching teeth.

First, second and reverse speed gears have spur teeth; third, fourth and fifth speed gears have helical teeth.



A. Views of 5-A-62 model transmission.

SPECIFICATIONS

GEAR RATIOS	5-A-62	5-A-620
Fifth	1.00	.78
Fourth	1.38	1.00
Third	2.62	1.72
Second	4.67	3.50
First	8.08	7.07
Low Reverse	8.12	7.11
High Reverse (Optional) ..	4.74	3.55

CLUTCH RELEASE MECHANISM

Clutch release bearing carrier, release bearing, extended front bearing cover, release yoke, pedal shafts and pedal adjusting arm furnished for use with single and two-plate push type clutches.

REAR SUPPORT

Six 5/8" studs with nuts and lockwashers can

be furnished in rear face of case for the attachment of support. If brake is to be used at this point, the brake bracket should be attached to the support instead of transmission case.

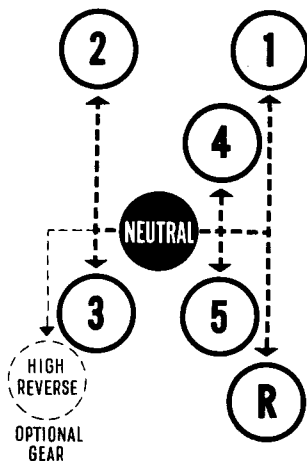
SPEEDOMETER DRIVE

Provision is made in the mainshaft rear bearing cover for the installation of speedometer gears and the attachment of cable.

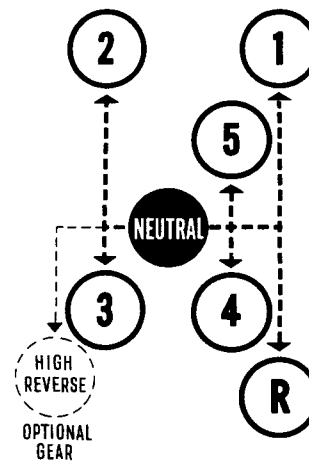
OIL CAPACITY

Approximately 28 pints, depending upon inclination of engine and transmissions.

Weight.....385 pounds
Clutch Housing Size.....SAE No. 1, 2 or 3
Installation Dimensions24-1/8 inches



B. Shifting diagram for 5-A-62 transmissions.



C. Shifting diagram for 5-A-620 transmissions.

LUBRICATION

RECOMMENDED GEAR OILS

Temperature	Grade	Type	Viscosity Range in Saybolt Universal Seconds	Minimum Viscosity Index
Above +10° F.	SAE 90	Straight Mineral Gear Oil	75/120 at 210° F.*	85
+10° F. to -10° F.	SAE 80	Straight Mineral Gear Oil	55/60 at 210° F.*	85
<i>Special Recommendation—For northern tier of states and Canada where ambient temperature is consistently below 0° F. and where parked vehicles are exposed to cold for long periods of time.</i>				
Below -10° F.	SAE 20W	Non Detergent Motor Oil	48,000 Max. at 0° F.*	

*Viscosity range must be maintained while the gear oil is in use. Check the pour characteristics of used and new oils at room temperature to determine if viscosity of used oil has changed with service.

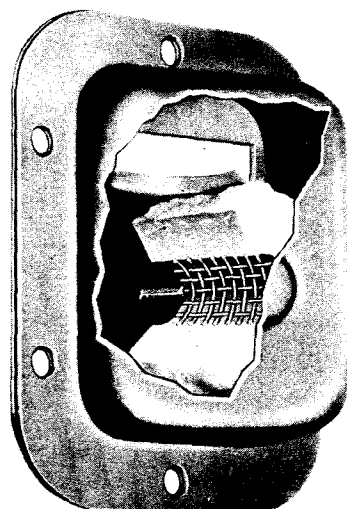
Fuller transmissions are designed and built so that all internal parts operate in a bath of oil circulated by the motion of the gears and shafts. All gears, bearings, sleeves and bushings will be amply lubricated if proper lubrication procedures are followed.

MAINTENANCE

It is obvious that gear oil costs less than replacement bearings, bushings and sleeves. Thus, to protect the transmission, it is important that the maintenance procedures below are closely followed:

1. Use the grade and type of oil recommended.
2. Change the gear oil at the recommended intervals.
3. Keep the oil at the proper level. Inspect regularly.

To keep the gear oil clean between oil changes use the Fuller Transmission Gear Oil Filter which can be attached to either or both power take-off openings. This assembly includes a replaceable filter element that removes the accumulation of metallic particles, road dirt and grit deposited in the lubricant. See Illustration D.



D. Fuller Transmission Gear Oil Filter.

DRAINING AND REFILLING

To drain the transmission remove the drain plug at bottom of case. Drain oil when transmission is warm. After the transmission has been drained, and before it is refilled, the case should be thoroughly flushed with a clean flushing oil or kerosene.

Before removing the filler plug on left side of case, all dirt should be removed from the area of the case adjacent to the filler opening. Fill the transmission to the level of the filler opening, metering approximately 28 pints of gear oil into the transmission. The exact amount will depend upon the inclination of the transmission. **In every instance, fill to the level of the filler opening.**

Do not overfill. Overfilling will cause oil to be forced out of the case through the mainshaft openings. Oil lost in this manner may impair the efficiency of clutch and parking brake.

INSPECTION

Gear oil is to be kept even with the level of the filler opening at all times. Check at the following intervals:

Highway Service	1,000 miles
Off-highway Service	40 hours

GEAR OIL CHANGE

Change the gear oil on all new equipment after the first 100 hours of use; thereafter, make oil

changes as follows:

Highway Service	10,000 miles
Off-highway Service	
Logging and associated	
operations	1,000 hours
Dirt moving, mining and	
associated operations ...	250 to 500 hours,
as indicated by operation and contamination of lubricant.	

OIL FILTER

Replace oil filter element at each oil change; clean filter element housing.

CLUTCH RELEASE BEARING

Lubricate the clutch release bearing after each 40 hours of operation with Mobilgrease No. 5 or its equivalent.

SPECIAL RECOMMENDATION

The above oil inspection and change periods are based on the average use and operating conditions for the applications listed. It is recommended that the individual owner make a periodic lab analysis of the lubricant to determine contamination based on the individual's own operating conditions. After this has been determined, the individual owner can then set his own inspection and oil change periods based on his operation.

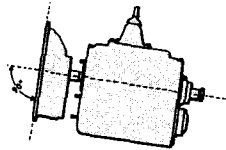
GENERAL INSTRUCTIONS FOR DISASSEMBLY

IMPORTANT: Read this section before starting the detailed disassembly procedures.

It is assumed in the detailed disassembly instructions that the transmission has been taken from the chassis, the lubricant has been drained, and the brake lever and parking brake removed. The gear shift lever housing assembly is included in the detailed instructions; however, this assembly also must be removed from transmission before removing transmission from vehicle.

Follow each procedure closely in each section, making use of both the text and pictures. Use certain precautions, as listed below, during disassembly.

- 1. CLUTCH HOUSING**—Unless absolutely necessary the clutch housing should not be removed. If disassembly is necessary to replace either the housing or case, extreme care should be taken during reassembly to maintain the 90°

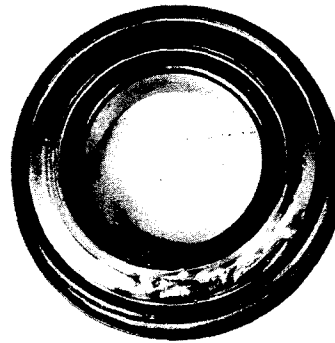


angularity between the machined face on the engine side of the housing and the centerline of the mainshaft bores in the case. Concentricity between the pilot diameter of the clutch housing and mainshaft bearing bores should also be carefully maintained within SAE tolerances.

- 2. SHIFTING BAR HOUSING**—As the shifting bar housing is disassembled, all parts should be laid on a clean bench in the same order as removed. This procedure will simplify reassembly as well as reduce the possibility of losing the small interlock parts.

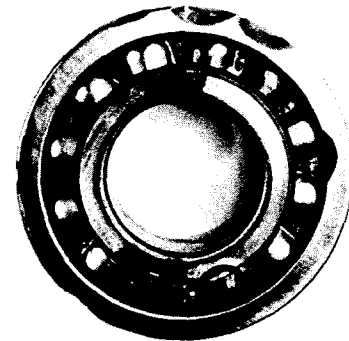
- 3. CLEANLINESS**—Provide a clean place to work. It is important that no dirt or foreign material enters the unit during repairs. The outside of the unit should be carefully cleaned before starting the disassembly. Dirt is abrasive and can damage highly polished parts such as bearings, sleeves and bushings.

- 4. BEARINGS**—Carefully wash and relubricate all bearings as removed and protectively wrap until ready for use. Remove all bearings with pullers designed for this purpose—do not remove bearings with hammer and punch.

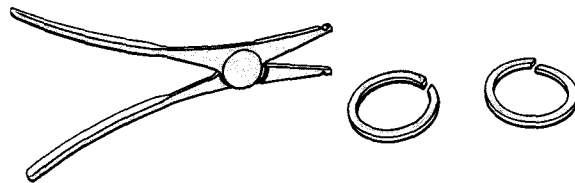


BEARING REMOVED WITH PUNCH, DAMAGED SHIELD.

BEARING REMOVED WITH CHISEL, DAMAGED OUTER RACE.



- 5. SNAP RINGS**—Remove snap rings with pliers designed for this purpose. Rings removed in this manner can be reused.



- 6. WHEN DRIVING**—Apply force to shafts, housings, etc., with restraint. Movement of some parts is restricted. Do not apply force after the part being driven stops solidly. Use soft hammers and bars for all disassembly work.

DETAILED DISASSEMBLY INSTRUCTIONS

A. To Remove the Gear Shift Lever Housing Assembly

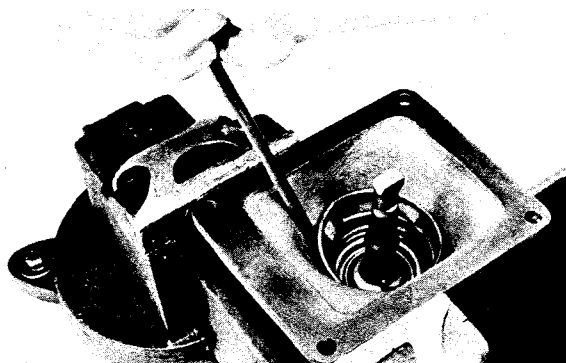
1. Shift the transmission into the neutral position.
2. Remove the attaching capscrews and lift the gear shift lever housing or remote control housing from the shifting bar housing. Illustration No. 1.



1. Removing the gear shift lever housing assembly.

B. To Disassemble the Gear Shift Lever Housing Assembly

1. Remove the ball grip at upper end of lever.
2. Pull the rubber boot upward and off lever.
3. Mount the assembly in a vise with the large opening in housing upwards.
4. With a heavy screwdriver, force the spring from under lugs cast in housing and remove the spring from housing. Illustration No. 2.
5. Withdraw the washer and gear shift lever from housing. Illustration No. 3.
6. Remove nut and lockwasher from pivot pin in right side of housing.
7. Remove the gear shift lever pivot pin by forcing it inward and through wall of housing.



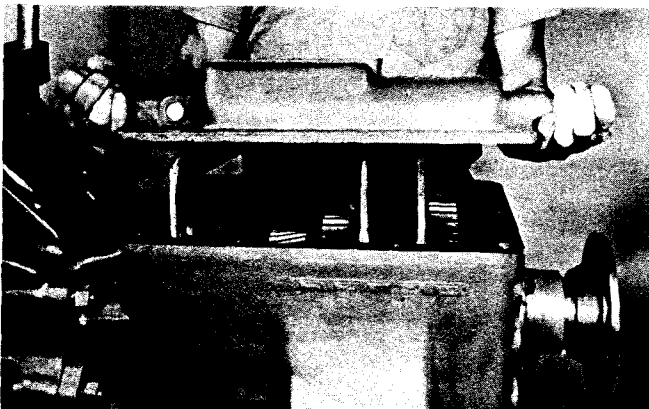
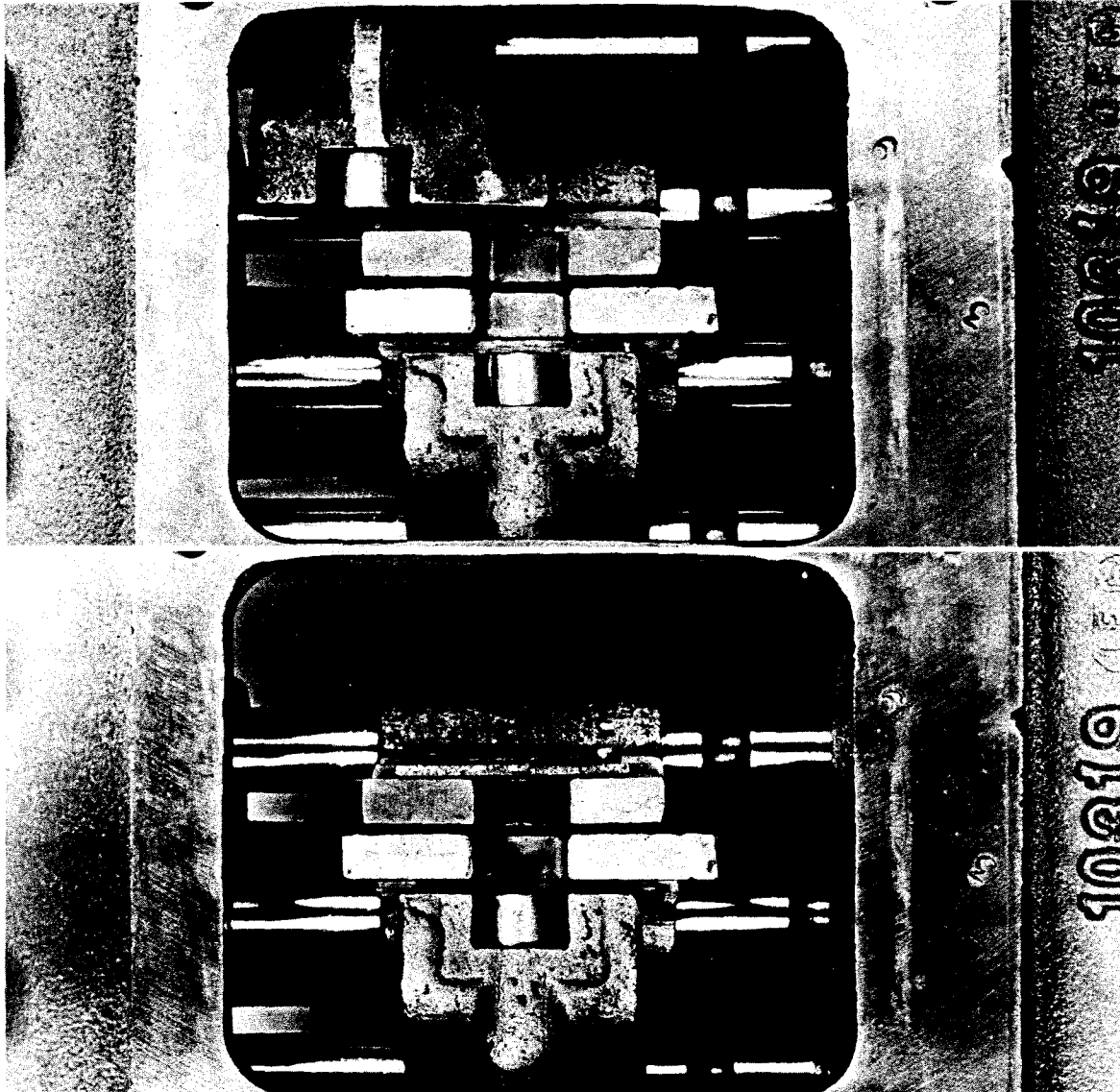
2. Removing the gear shift lever tension spring. Pry the spring from under lugs cast into housing.

C. To Remove the Shifting Bar Housing Assembly

1. On models with high reverse, shift the assembly into the high reverse position. On models with low reverse only, shift the assembly into the neutral position. Illustration No. 4.
2. Turn out the attaching capscrews and lift the shifting bar housing from the transmission case. Illustration No. 5.

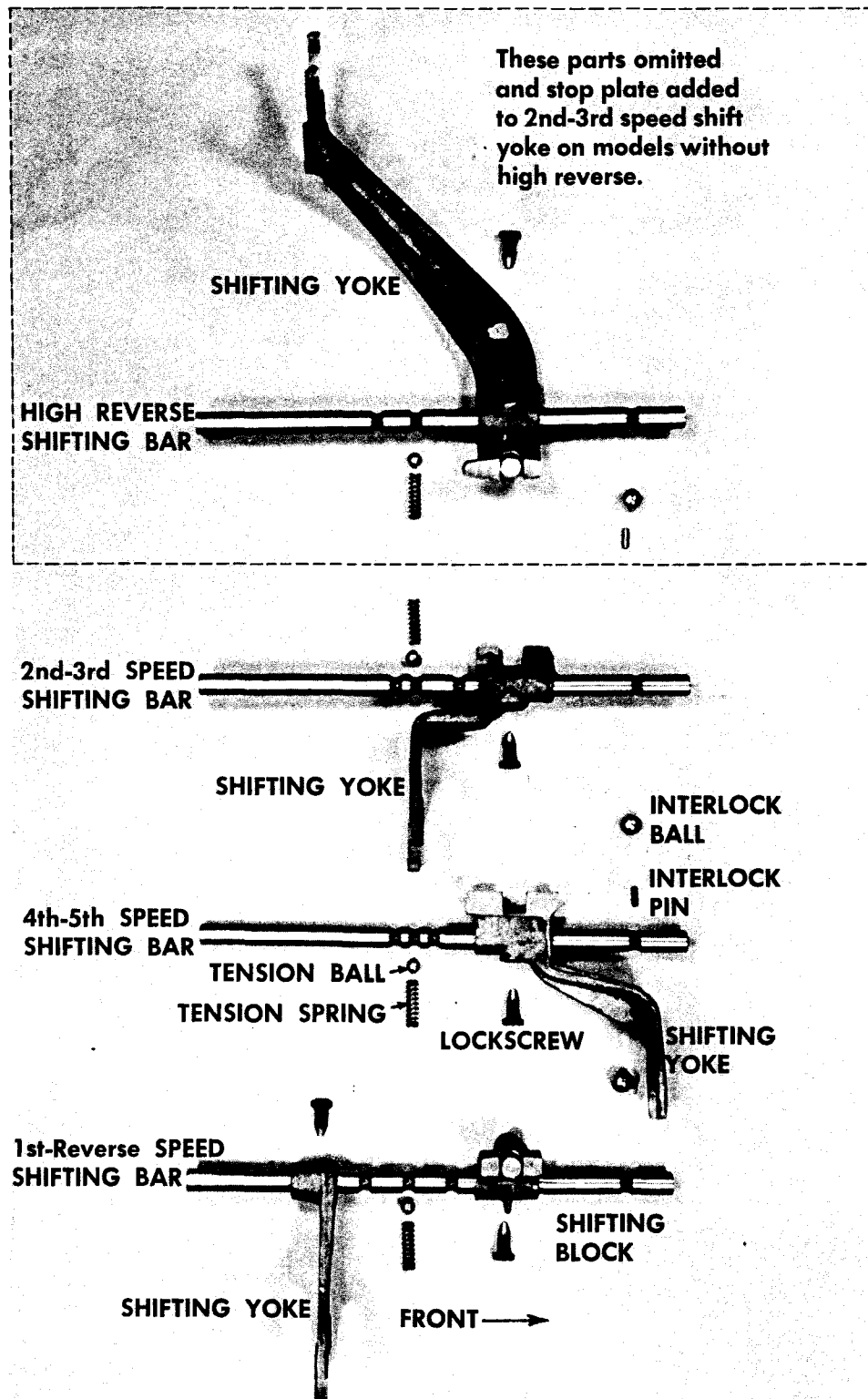


3. Removing washer and gear shift lever from housing.



4. Upper photo shows high reverse position of shifting bars. Lower photo shows neutral position on models without high reverse.

5. (Left) Removing the shifting bar housing. Jar to break gasket seal and lift.



6. Shifting bar housing parts in relative positions. Organization of parts in this manner during removal will simplify reassembly. Parts not shown are two thimbles for the interlock ball bore and the thimbles for shifting bar bores.

D. To Disassemble the Shifting Bar Housing Assembly

NOTE

Lay shifting bars with corresponding yokes and block on a clean bench in the same order as removed. This will keep parts in the same relative position and simplify reassembly. Illustration No. 6.

1. Remove the interlock ball thimble at left, front side of housing. Illustration No. 7.
2. Mount the assembly in a vise with the brake lever boss (right side) up.
3. Remove the four thimbles from shifting bar bores at rear of housing.
4. Remove lockwire from all lockscrews.

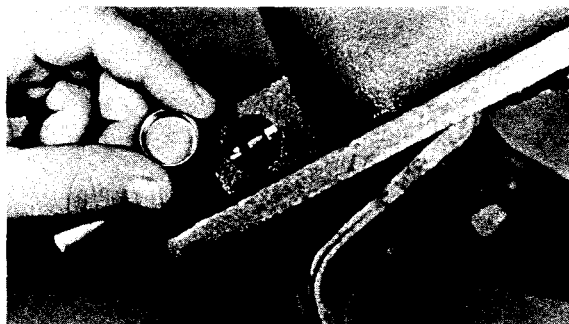
CAUTION: Extreme care should be used when removing shifting bars as a tension ball and spring are located under each bar in bore in the center web of housing. As the end of each bar clears these bores the ball and spring will be forcibly ejected from housing. Thus, hold cloth tightly over bores as each bar is removed.

5. Remove yoke lockscrew from upper bar.
6. Using soft bar or wood dowel, start the top bar forward and out front bore of housing, unseating the front thimble. (This is the high reverse shifting bar on models so equipped; it is the 2nd-3rd speed bar in three bar covers.) Illustration No. 8.

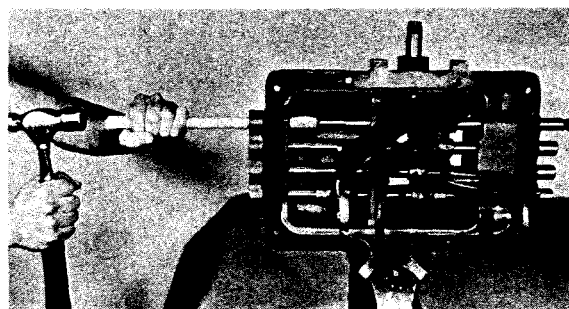
NOTE

Keep bars in the neutral position as any bar out of neutral will activate the interlock parts and lock the remaining bars. Locking can occur as long as two bars remain in the housing.

7. Pull the shifting bar partially out front bore, and as the bar is withdrawn past tension spring bore in center web, hold cloth over bore to catch ball. Illustration No. 9.
8. Remove ball and spring from bore. Illustration No. 10.
9. Pull the shifting bar out front bore, removing yoke from bar.



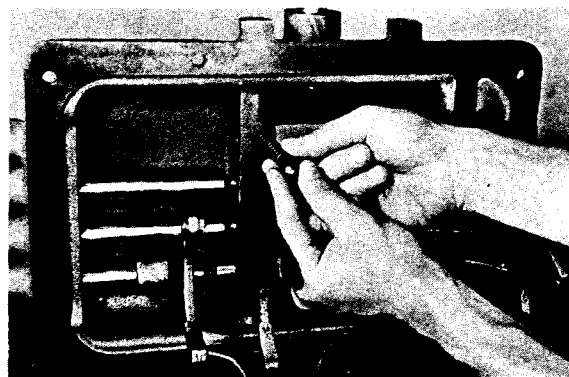
7. Removing thimble from interlock ball bore on left side of housing.



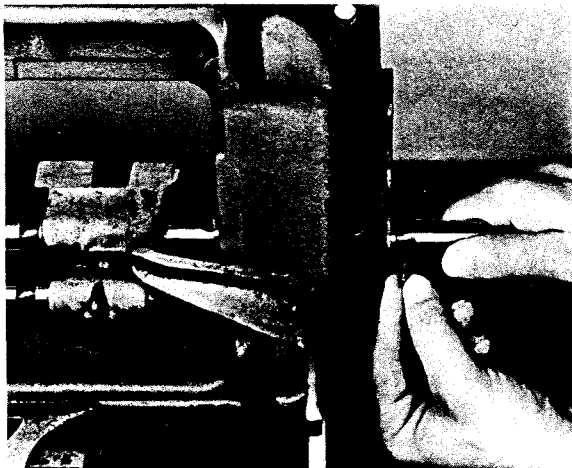
8. Starting the high reverse shifting bar out front bore of housing. This bar will not be in housing on models with low reverse only. Note thimble unseated from front bore.



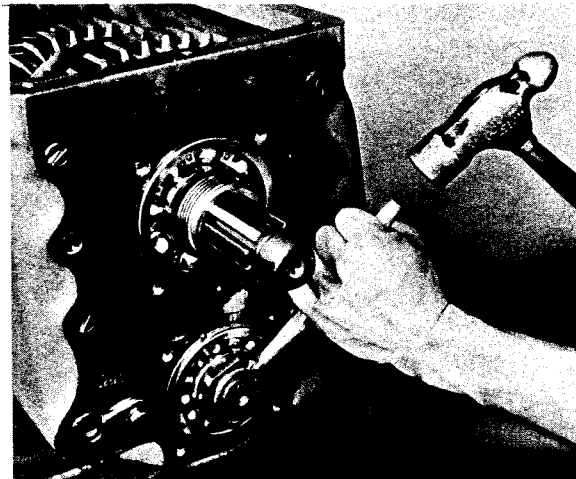
9. Catching tension ball as shifting bar is pulled past bore in housing.



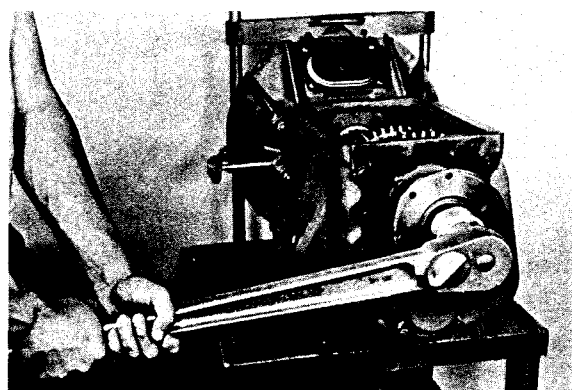
10. Removing the tension ball and spring from bore. There is a ball and spring under each bar.



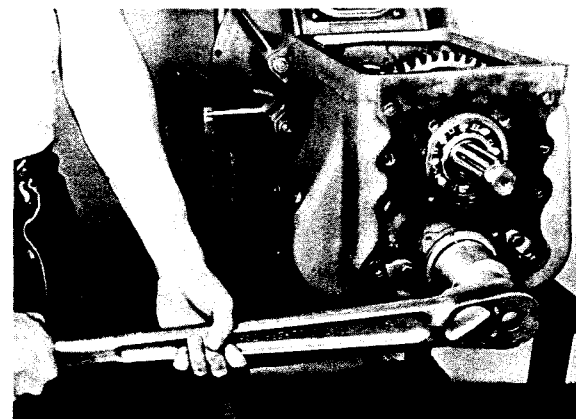
11. Removing the interlock pin from bore in neutral notch of shifting bar. There is an interlock pin in center bar of three bar housings and an interlock pin in each of the two center bars in four bar housings.



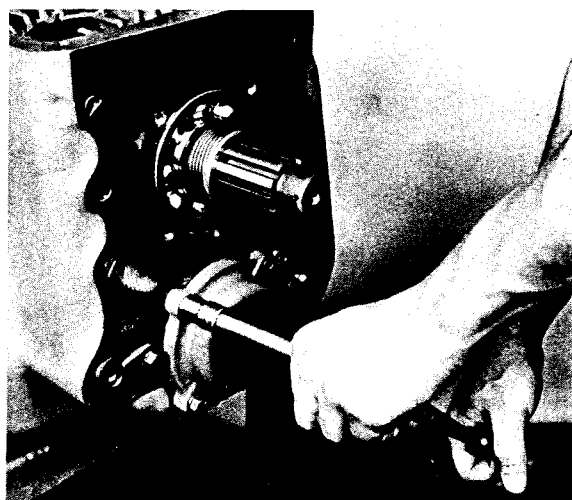
14. Relieving the countershaft rear bearing nut where peened into shaft.



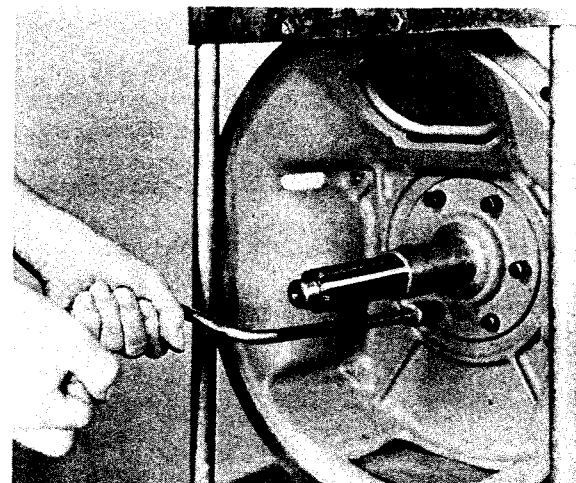
12. Removing companion flange nut from rear of shaft.



15. Turning countershaft rear bearing nut from shaft.



13. Removing the rear bearing covers.



16. Removing capscrews from front bearing cover.

10. Remove the remainder of the bars in the same manner as upper bar, moving bars to the right and out front of housing. Remember to catch tension ball as each bar is removed.

NOTE

Take care that interlock parts are not lost. There is a $\frac{3}{4}$ " interlock ball located between each bar. These will drop from interlock bore in left side of housing as last bar is removed. There is also an interlock pin in the neutral notch of the center bar or bars. These should be removed as neutral notch of each bar clears housing. Illustration No. 11.

11. Remove thimble from interlock ball bore in right side of housing. Force outward from inside.

E. To Remove the Universal Joint Companion Flange

1. Lock the mainshaft by engaging two speeds with the sliding gears.
2. Remove cotter pin and turn the companion flange nut from rear of mainshaft. Illustration No. 12.
3. Remove washer from mainshaft.
4. Pull the companion flange to the rear and off splines of mainshaft.

F. To Remove the Countershaft Rear Bearing Nut

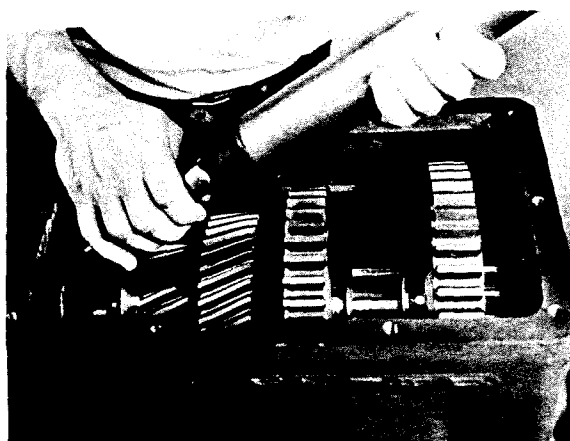
1. Turn out the attaching capscrews and remove both the mainshaft and countershaft rear bearing covers. Illustration No. 13.
2. With the mainshaft still locked in two speeds, use a small flat-bladed chisel to relieve the countershaft rear bearing nut where it is peened into shaft. Illustration No. 14.
3. Remove the speedometer drive gear and the washer from mainshaft.
4. Remove the countershaft rear bearing nut. Illustration No. 15.

G. To Remove the Drive Gear Assembly

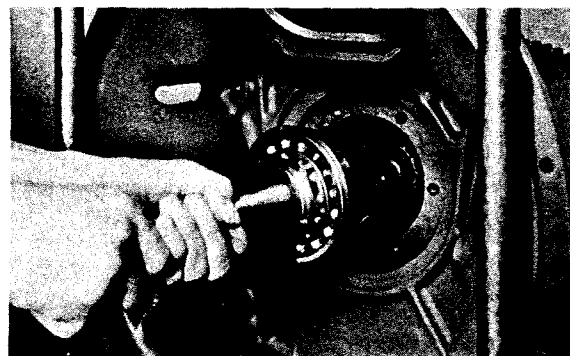
1. Remove the clutch release mechanism.
2. Turn out attaching capscrews from the front bearing cover. Illustration No. 16.
3. Tap against drive gear from inside of case with soft bar and mallet to move the assembly forward. Illustration No. 17.
4. Remove the cover from shaft as drive gear is moved forward.
5. Remove the drive gear from front bore of case. Illustration No. 18.

H. To Disassemble the Drive Gear Assembly

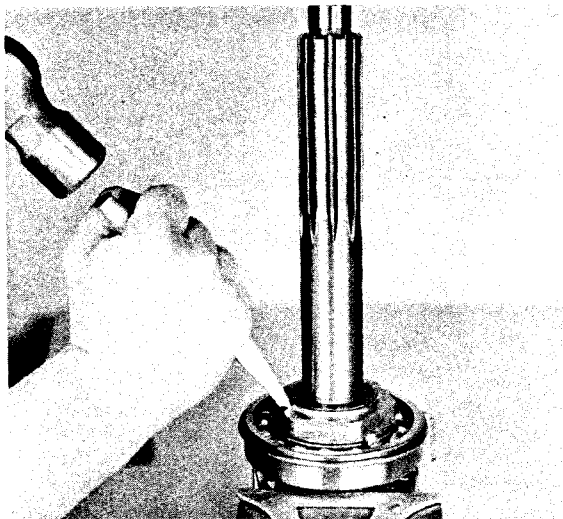
1. Mount the drive gear in a soft-jawed vise with the pilot end up.



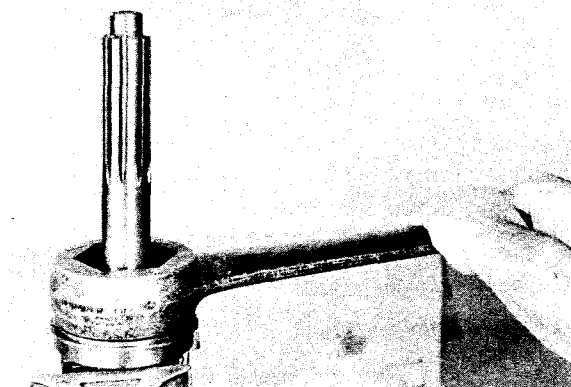
17. Moving the drive gear assembly forward from inside of case.



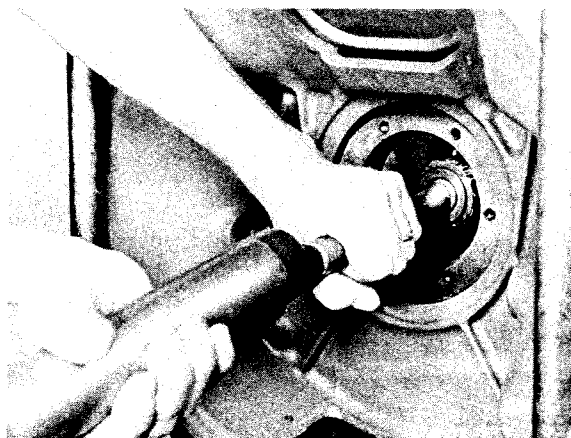
18. Removing drive gear assembly from front bore.



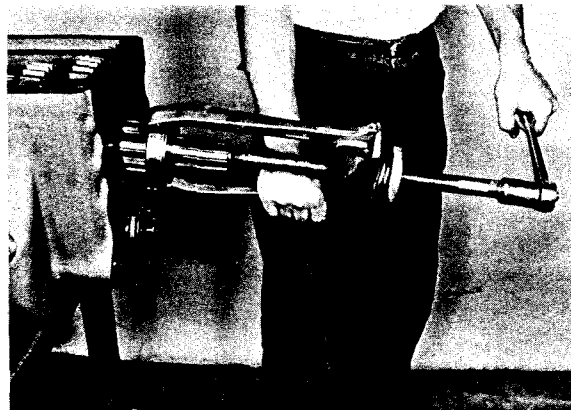
19. Relieving the drive gear bearing nut where peened into shaft.



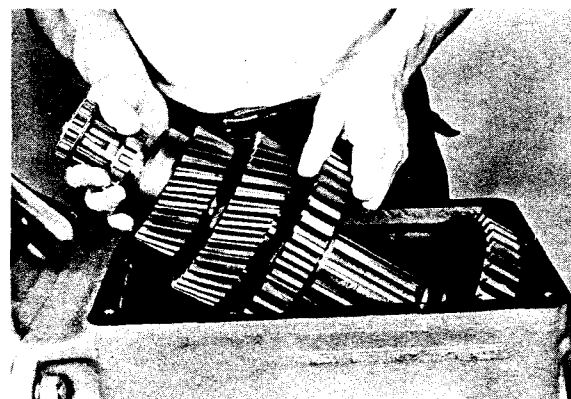
20. Removing the drive gear nut, left-hand thread.



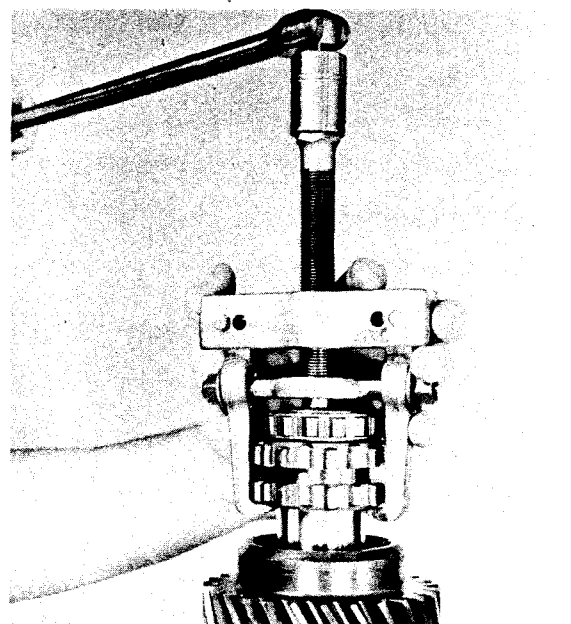
21. Driving through soft bar to move mainshaft assembly to the rear, unseating rear bearing from case bore.



22. Pulling rear bearing from mainshaft.



23. Lifting mainshaft assembly from case.



24. Removing pilot bearing from mainshaft.

2. Relieve the bearing nut at points where it is peened into shaft. Illustration No. 19.
3. Turn the bearing nut from shaft, **LEFT-HAND THREAD**. Illustration No. 20.
4. Press the bearing from shaft.

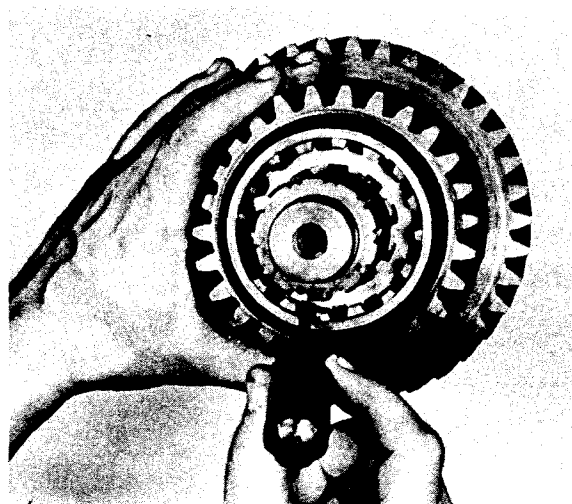
I. To Remove the Mainshaft Assembly

1. Use soft bar and mall against front of mainshaft to move the assembly to the rear, unseating mainshaft rear bearing from case bore. Illustration No. 21.
2. Remove the rear bearing from mainshaft. Illustration No. 22.
3. Tilt the mainshaft assembly and remove through top of case, leaving the large sliding gear inside. Illustration No. 23.
4. Remove the loose gear from case and sliding gear from shaft.

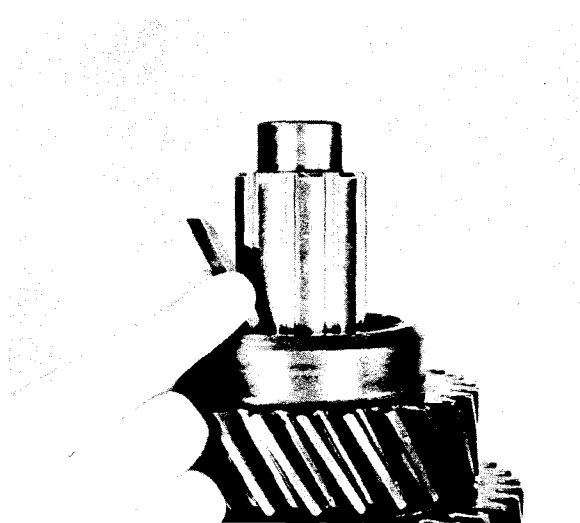
J. To Disassemble the Mainshaft Assembly

1. Mount the assembly in a soft-jawed vise, pilot end up.
2. Remove the pilot bearing, using pullers behind sliding clutch gear to apply even pressure on bearing. Illustration No. 24.

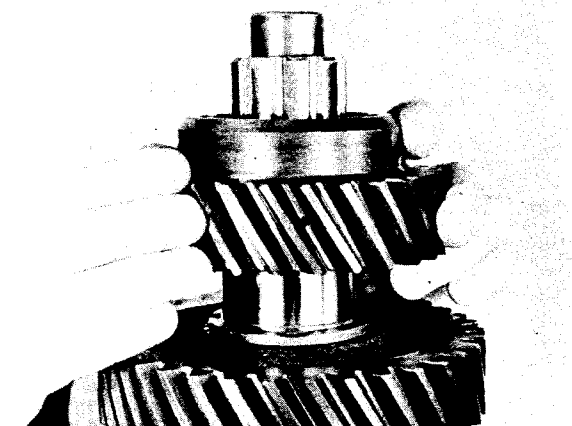
3. Remove the sliding clutch gear.
4. Pry the washer retaining key from its keyway between splines of mainshaft. Illustration No. 25.
5. Turn the gear retaining washer in its groove inside the hub of the fourth speed gear until the lugs on its inside diameter align with grooves in shaft. Illustration No. 26.
6. Move the fourth speed gear upward to remove the washer and gear from shaft. (This is the fifth speed overdrive gear on 5-A-620 models.) Illustration No. 27.



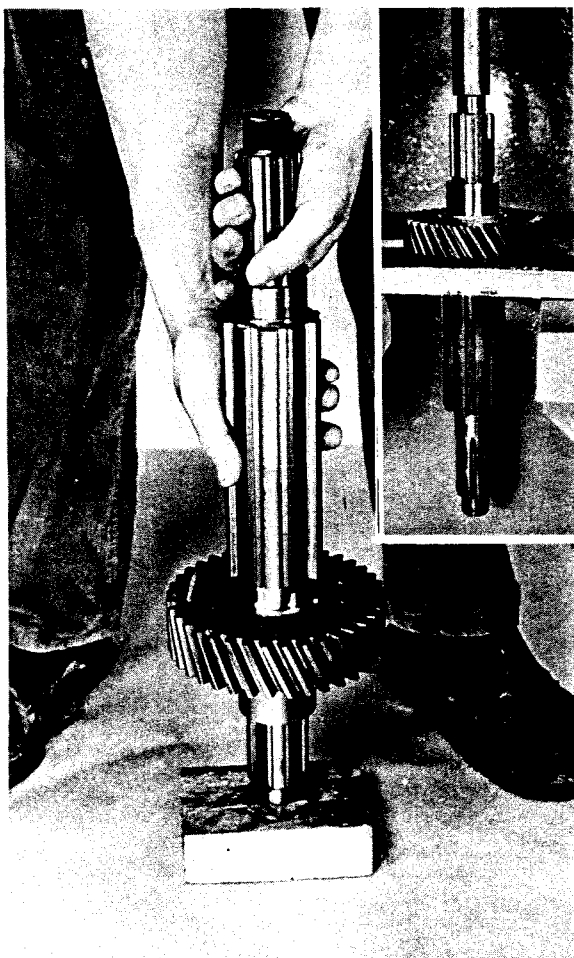
26. Turning splined washer in its groove. Insert small punch or screwdriver so that it engages teeth of gear and washer; turn washer by turning gear.



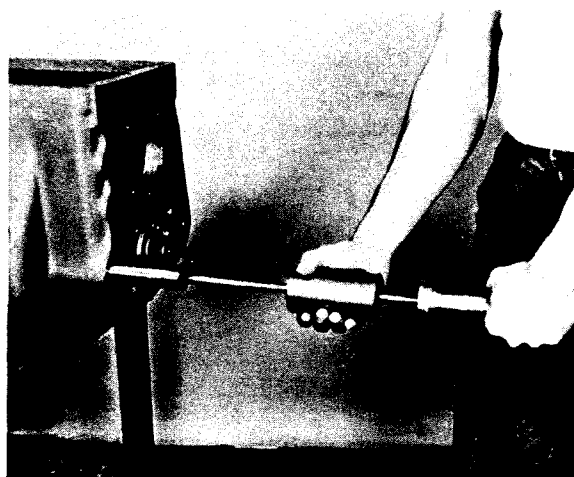
25. Removing washer retaining key from its keyway between splines of mainshaft.



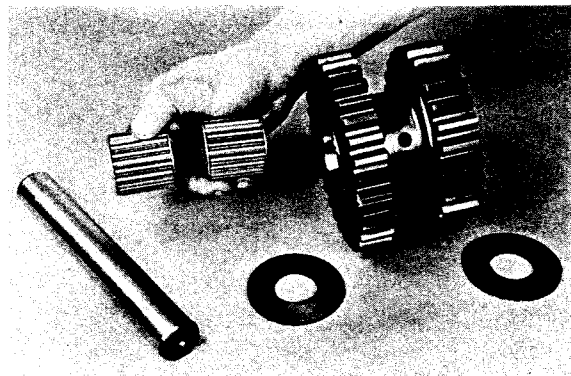
27. Removing the fourth speed gear and splined washer from shaft.



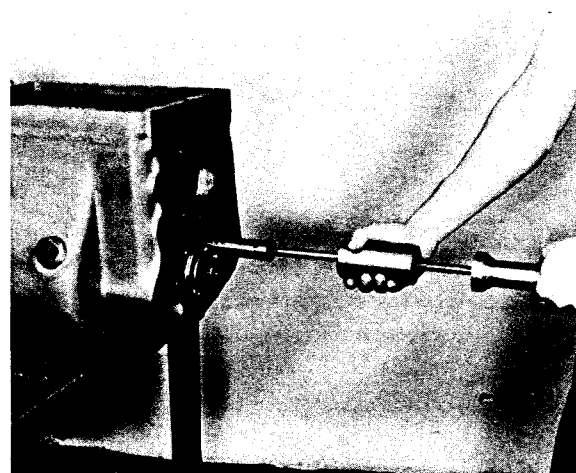
28. Jarring the third speed gear and fourth speed gear sleeve from shaft. Parts can also be pressed from shaft as shown in insert.



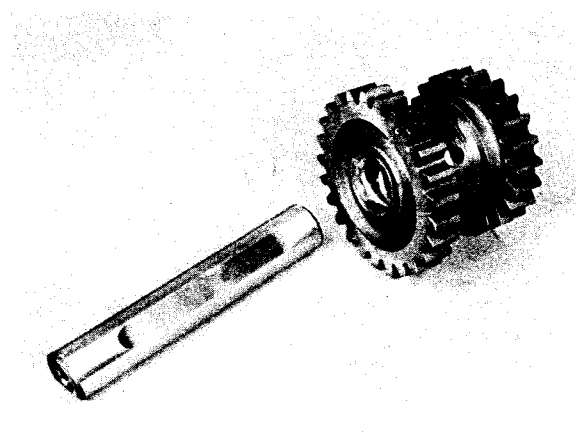
29. Removing the reverse gear shaft with impact puller.



30. Removing roller bearings from bore of low reverse gearing. Photo shows parts of low reverse gearing assembly.



31. Pulling the high reverse gear shaft from model so equipped.



32. Parts of the high reverse gearing assembly.

7. Remove assembly from vise and jar the pilot end of shaft against a wood block placed on the floor to remove the third speed gear and fourth speed gear sleeve from shaft. Illustration No. 28.

NOTE

Parts can also be removed from shaft by using the rear face of the third speed gear as a base and pressing the mainshaft through the third speed gear and the fourth speed gear sleeve.

8. Remove the Woodruff key from keyway in mainshaft.

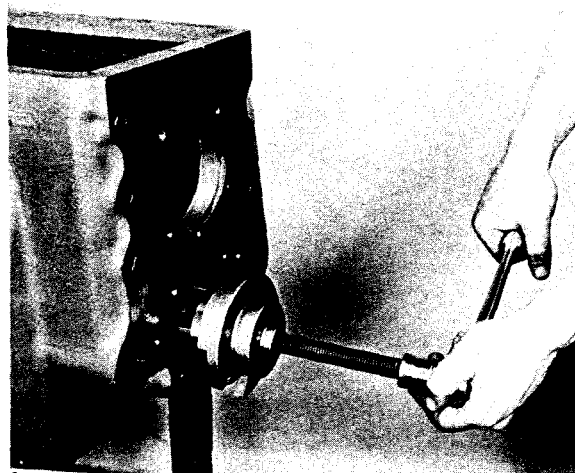
K. To Remove and Disassemble the Reverse Gearing

1. To remove the low speed reverse gearing.
 - a. At left rear face of case, remove the capscrew and reverse shaft lock plate.
 - b. Insert puller and remove the reverse shaft from case. Illustration No. 29.
 - c. Lift the low speed reverse gearing and the two thrust washers from case. (Some earlier models do not have thrust washers.)
 - d. Remove the two roller bearings from bore of reverse gearing. Illustration No. 30.
2. To remove the high speed reverse gearing, if so equipped.
 - a. At right rear face of case, remove the capscrew and reverse shaft lock plate.
 - b. Insert puller and remove the reverse shaft from case. Illustration No. 31.
 - c. Lift the high speed reverse gearing from case. Illustration No. 32.

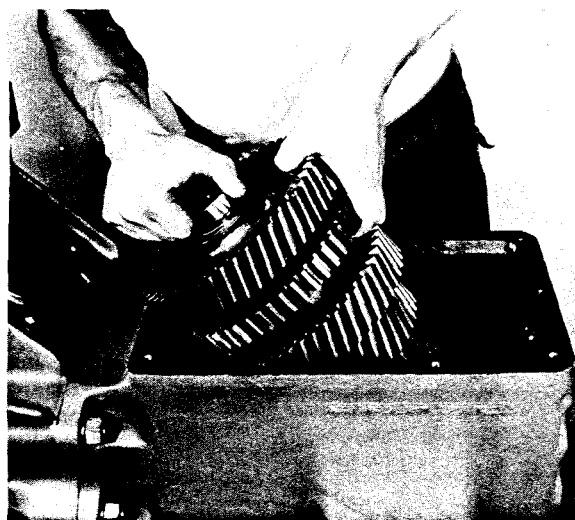
L. To Remove the Countershaft Assembly

1. Move the countershaft assembly to the rear to unseat rear bearing from case bore. Pry between drive gear and case to move shaft.
2. Remove the countershaft rear bearing. Illustration No. 33.

3. Tilt the countershaft assembly and lift through top of case. Illustration No. 34.
4. Remove the countershaft front bearing from bore in case.



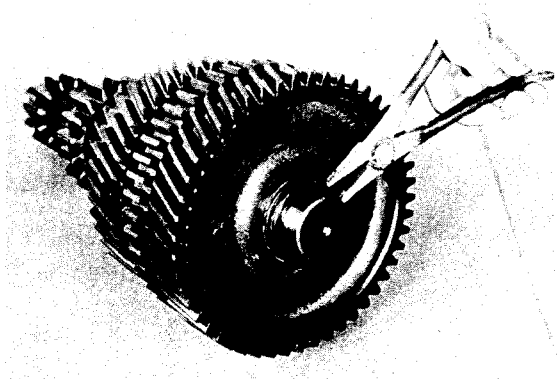
33. Pulling rear bearing from countershaft.



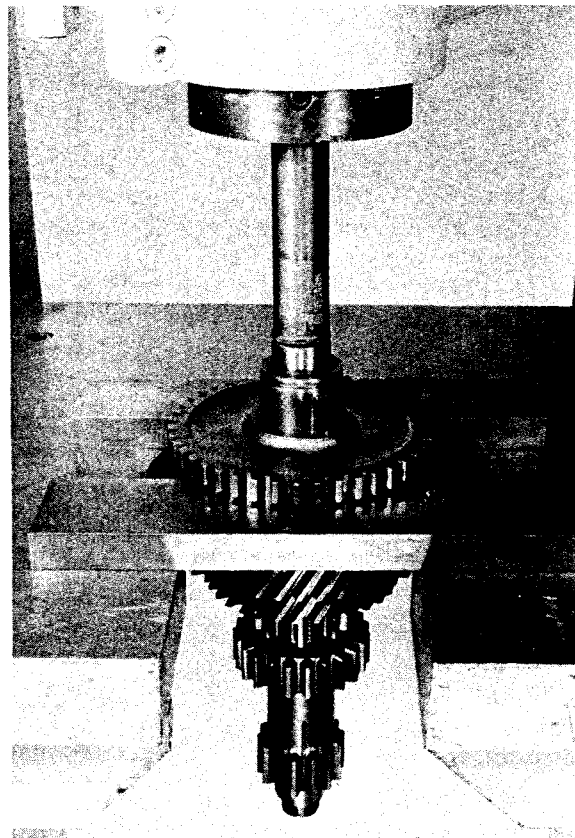
34. Lifting countershaft assembly from case.

M. To Disassemble the Countershaft Assembly

1. Remove washer from front of countershaft, if still located on shaft; otherwise, remove it from case.
2. Remove the snap ring from groove at front of countershaft. Illustration No. 35.
3. Press the gears from countershaft—ONE AT A TIME. Illustration No. 36.
4. Remove the four Woodruff keys from countershaft.



35. Removing snap ring from front of countershaft.



36. Pressing the power take-off gear from countershaft.

INSPECTION

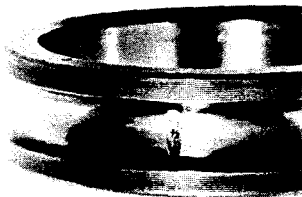
Before reassembling the transmission, the individual parts should be carefully checked to eliminate those damaged from previous service. This inspection procedure should be carefully followed to insure the maximum of wear life from the rebuilt unit.

The cost of a new part is generally a small fraction of the total cost of down time and labor, should the use of a questionable part make additional repairs necessary before the next regularly scheduled overhaul.

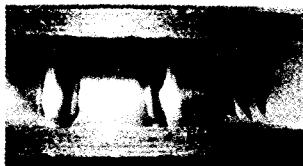
Recommended inspection procedures are set forth in the following check list:

A. Bearings

1. Wash all bearings in clean solvent. Check balls, rolls and races for pits and spalled areas. Replace bearings which are pitted or spalled.



SPALLED BEARING—
EXTREME LOAD



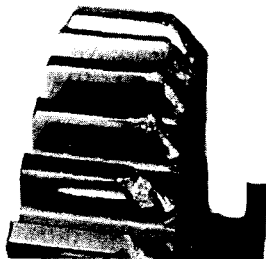
FALSE BRINNELLING—
VIBRATION WITHOUT
ROTATION

2. Lubricate bearings which are not spalled or pitted and check for axial and radial clearances. Replace bearings with excessive clearances.

3. Check fits of bearings in case bores. If outer races turn freely in the bores, the case should be replaced.

B. Gears

1. Check operating gear teeth for pitting on the tooth faces. Gears with pitted teeth should be replaced.



SNUBBED GEAR TEETH

2. Check all engaging gear teeth both internal and external. Gears with teeth worn, tapered or reduced in length from clashing in shifting should be replaced.



PITTED GEAR TEETH

3. Check radial clearances of bushed gears. Where excessive radial clearance is found, replace the bushing.

C. Splines

1. Check splines on all shafts and drive gears for wear. If sliding gears, companion flange or clutch hub have worn into the sides of the splines, the shafts or gears in this condition should be replaced.



D. Thrust Washers



1. Check surfaces of all thrust washers. Washers scored or reduced in thickness should be replaced.

E. Reverse Gear and Shaft

1. Check bore of gear and diameter of shaft for wear from action of roller bearings.

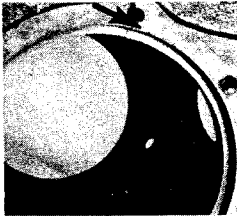
WORN
SHAFT



Replace these parts if worn. On models with high reverse, check gear bushing and wear on shaft.

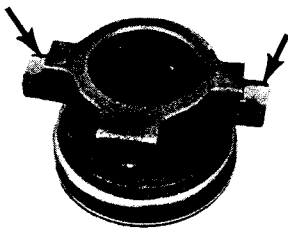
F. Gray Iron Parts

1. Check all gray iron parts for cracks and breaks. Replace or repair parts found to be damaged. Heavy castings may be welded or brazed providing the cracks do not extend into bearing bores or bolting surfaces.



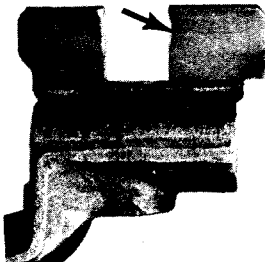
G. Clutch Release Parts

1. Check clutch release parts. Replace yokes worn at cam surfaces and bearing carrier worn at contact pads.
2. Check pedal shafts. Replace those worn at bearing surfaces.



H. Shifting Bar Housing Assembly

1. Check yokes and blocks for wear at pads and lever slot. Replace worn parts.
2. Check yokes for alignment. Straighten those which are sprung.
3. Check lockscrews in yokes and blocks. Tighten and rewire those found loose.



4. If housing has been dismantled, check neutral notches of shifting bars for wear from interlock balls. Bars indented at points adjacent to the neutral notch should be replaced.

I. Gear Shift Lever Housing Assembly

1. Check spring tension on shift lever. Replace tension spring and washer if lever moves too freely.
2. If housing is dismantled, check pivot pin and corresponding slot in lever for wear. Replace both parts if worn.

J. Bearing Covers

1. Check covers for wear from thrust of adjacent bearing. Replace covers worn and grooved from thrust of bearing outer race.
2. Check bores of covers for wear. Replace those worn oversize.

K. Oil Return Threads

1. Check oil return threads in bearing covers. If sealing action of threads has been destroyed by contact with input shaft or companion flange, replace the cover.



BUSHINGS, MAINSHAFT GEARS

Check bushed gears on sleeves to determine radial clearance. Replace bushings in mainshaft gears if there is excessive radial clearance. The following instructions apply to the installation of replacement bushings:

1. Clean bore of gear thoroughly and remove all burrs.
2. Remove sharp edge from end of bore having locking notches. Use hone or emery cloth.
3. Lubricate bushing and bore of gear.
4. Make sure that lugs on bushing line up with locking notches in gear hub. If bushing is type in which oil holes are drilled make sure oil holes are lined up

with oil holes in gear.

5. Press bushing carefully into gear hub.
6. Bushing should be 1/32" inside gear hub. Lugs must not project beyond face of gear hub when locked in place.
7. Remove all burrs and sharp edges from bushing.
8. If replacement bushing is without oil holes, drill holes working through corresponding holes in gear. Make sure all oil holes are open and remove all burrs resulting from drilling operation.
9. Check gears on lubricated sleeves and shaft seats to determine that they move freely. If additional radial clearance is required, polish ID of bushing.

TORQUE RATINGS

Recommended torque ratings, location and thread sizes of capscrews and nuts are listed below. Capscrew lengths are given for reference purposes as a guide for installation at proper locations.

Correct torque application is extremely important to assure long transmission life and dependable performance. Over-tightening or under-tightening can result in a loose installation and, in many instances, eventually cause damage to transmission gears, shafts or bearings.

CAPSCREWS		
Location	Thread Size and Length	Torque Rating Foot-Pounds
PTO covers Reverse shaft lock	3/8-16 x 5/8 3/8-16 x 1	15-20
Shifting bar housing Drive gear bearing cover Mainshaft rear bearing cover Countershaft rear bearing cover Gear shift lever housing Countershaft rear bearing cover Gear shift lever housing	3/8-16 x 1 3/8-16 x 1-3/4 3/8-16 x 2-1/4 3/8-16 x 1-1/4 3/8-16 x 1 3/8-16 x 1-1/4 3/8-16 x 1-1/4 3/8-16 x 1-1/4	35-45
Clutch release yoke	3/8-24 x 1	40-50

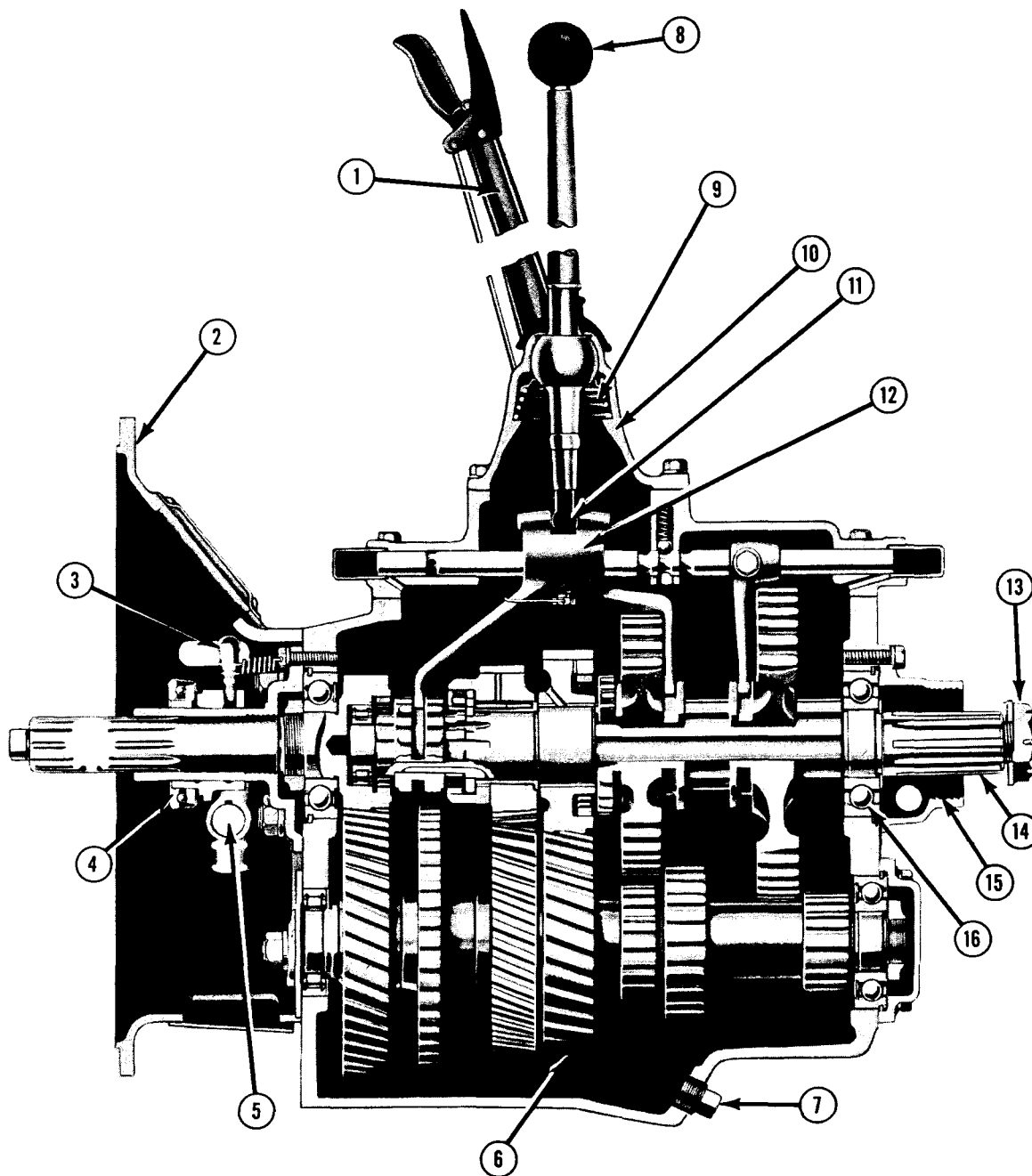
NUTS

Countershaft rear bearing	1-1/2-18	250-300
Companion flange	1-1/4-18	225-275
Drive gear bearing	1-7/8-16	250-300

LOCATION OF GASKETS

Seat gasket with shellac on part to be installed.
Gaskets are located between the following parts:

1. Gear shift lever housing and shift bar housing.
2. Shift bar housing and case.
3. Front bearing cover and case.
4. Mainshaft rear bearing cover and case.
5. Countershaft rear bearing cover and case.
6. Left-side power take-off cover and case.
7. Right-side power take-off cover and case.



MODEL 5-A-620

PREVENTIVE MAINTENANCE CHECK CHART

CHECKS WITHOUT PARTIAL DISASSEMBLY OF CHASSIS OR CAB

- 1. Hand brake lever assembly**
 - a. Rivets or screws in hand grip for looseness and wear.
 - b. Spring in hand grip for fracture and set.
 - c. Mounting shaft for lubrication and wear.
 - d. Axial clearance of lever assembly on mounting shaft. Increase or decrease by tightening or loosening nut.
 - e. Wear on latch rod at joint with latch.
 - f. Wear on latch from contact with segment and at latch rod hole.
 - g. Wear on segment from drag of latch.
- 2. Capscrews in bolt circle of clutch housing.**

Check for looseness.
- 3. Clutch release bearing carrier oil pipe or flexible tube**

Check for wear from drag in slot of housing.
- 4. Clutch release bearing**

Remove hand hole cover and check radial and axial clearance in release bearing. Also check relative position of thrust surface of release bearing with thrust sleeve on push type clutches. (See maintenance manual—single plate type clutches.)
- 5. Clutch pedal shaft**

Pry upward to check wear at bearing surface in clutch housing.
- 6. Gear lubricant**

Change at specified service intervals; use only gear oils as recommended. See Lubrication section, page 5.
- 7. Filler and drain plugs**

Remove filler plug and check level of lubricant. Tighten filler and drain plug securely.
- 8. Gear shift lever**

Check for looseness and free play in housing. If lever is loose and sloppy in housing, proceed with Check No. 9.

CHECKS WITH FLOOR BOARDS REMOVED

- 9. Shift lever tension spring and washer**

Remove gear shift lever housing and check tension spring and washer for set and wear respectively.
- 10. Gear shift lever housing**

Remove tension spring and washer and check gear shift lever pivot pin for wear.
- 11. Gear shift lever**

Check bottom end of gear shift lever for wear from contact with shifting yokes and blocks, and check slot in pivot ball for wear from pivot pin.
- 12. Shifting yokes and blocks**

With gear shift lever housing removed, check lever slots, yokes and blocks, as well as latchout plungers for wear from contact with shift lever.

CHECKS WITH DRIVE LINE DROPPED

- 13. Universal joint companion flange retaining nut**

Check for tightness. Tighten to recommended torque.

CHECKS WITH DRIVE LINE DROPPED AND WITH UNIVERSAL JOINT COMPANION FLANGE REMOVED

- 14. Splines on output shaft**

Check for wear from movement and chucking action of universal joint companion flange.
- 15. Mainshaft rear bearing cover**

Check oil return threads or oil seal for wear.
- 16. Output shaft**

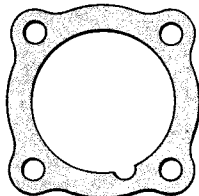
Pry upward against output shaft to check radial clearance in mainshaft rear bearing.

GENERAL INSTRUCTIONS FOR REASSEMBLY

IMPORTANT: Read this section before starting the detailed reassembly procedures.

Make sure that interiors of case and housings are clean. It is important that dirt be kept out of transmission during reassembly. Dirt is abrasive and can damage polished surfaces of sleeves, bushings, bearings and washers. Use certain precautions, as listed below, during reassembly.

- 1. GASKETS**—Use new gaskets throughout the transmission as it is being rebuilt. Make sure



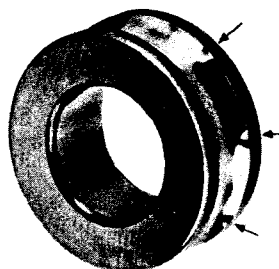
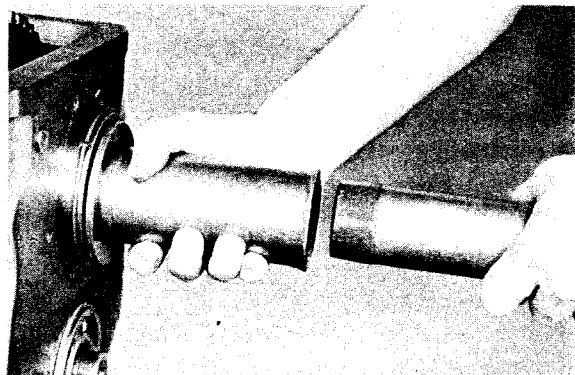
all gaskets are installed, as omission of gasket can result in oil leakage or misalignment of bearing covers. See "Location of Gaskets" heading.

- 2. CAPSCREWS**—To prevent oil leakage, use shellac on all capscrews. See torque rating chart for recommended torque.

- 3. INITIAL LUBRICATION**—Coat all bushings, gear seats, thrust washers and splines of shafts with Lubriplate during installation to provide initial lubrication, preventing scoring and galling.

- 4. AXIAL CLEARANCES**—Maintain original axial clearances of bushed gears of .006" minimum and .012" maximum.

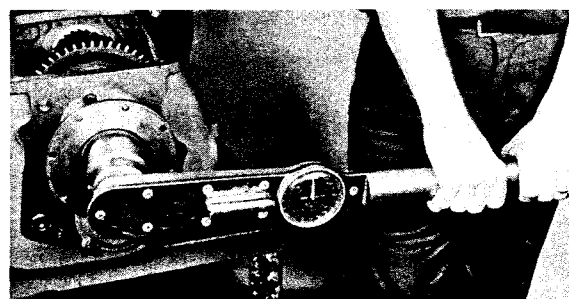
- 5. BEARINGS**—Use of flanged-end bearing drivers is recommended for the installation of



BALL DEPRESSIONS, CAUSED BY OFF-CENTER BLOW

bearings. These drivers apply equal force to both races of bearing, preventing damage to balls and races and maintaining correct bearing alignment with shaft and bore. If tubular or sleeve type driver is used, apply force only to inner race.

- 6. UNIVERSAL JOINT COMPANION FLANGE**—Pull the companion flange tightly into place with the mainshaft nut, using 225-275 foot-pounds of torque. Make sure the speedometer



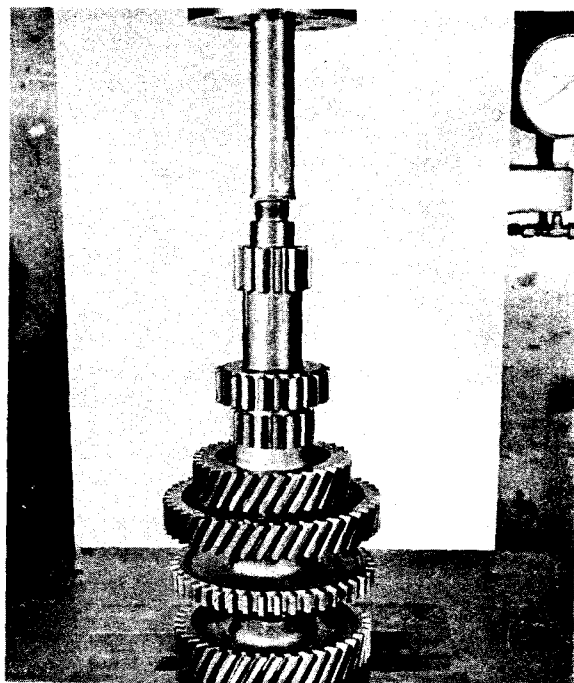
gear washer and the speedometer gear have been installed between the flange and mainshaft rear bearing. If a speedometer gear is not used, a replacement spacer of the same width must be used. Omission of parts between the flange and rear bearing, or failure to pull the flange tightly into place, will permit the shaft to move axially with resultant damage to pilot bearing, mainshaft and drive gear.

- 7. OIL FILLING**—Remember to fill transmission with the correct amount of straight mineral gear oil as recommended in the lubrication section.

DETAILED REASSEMBLY INSTRUCTIONS

A. To Reassemble the Countershaft Assembly

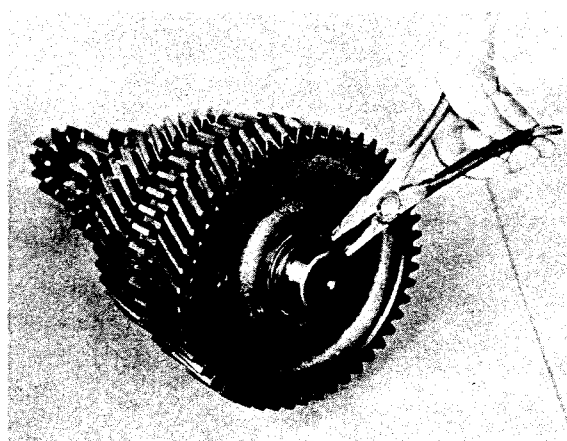
1. Install the four Woodruff keys in keyways in countershaft.
2. Align keyway in gear with keys in shaft, and press the third speed gear on countershaft, chamfered ID up (towards rear of shaft).
3. Align keyway in gear with keys in shaft, and press the fourth speed gear (fifth speed gear on 5-A-620 models) on countershaft, long hub up (towards rear of shaft).
4. Align keyway in gear with keys in shaft, and press the power take-off gear on countershaft, long hub up (towards rear of shaft).
5. Align keyway in gear with key in shaft, and press the drive gear on countershaft, long hub up (towards rear of shaft). Illustration No. 37.
6. Install the snap ring in groove at front of countershaft. Illustration No. 38.



37. Pressing drive gear on countershaft.

B. To Install the Countershaft Assembly

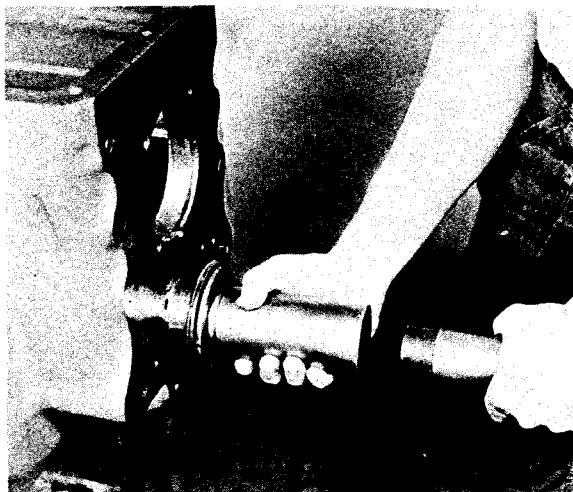
1. Install the countershaft front bearing in case bore.
2. Set the countershaft assembly vertically in case, drive gear upwards, and install washer on front of shaft. Illustration No. 39.



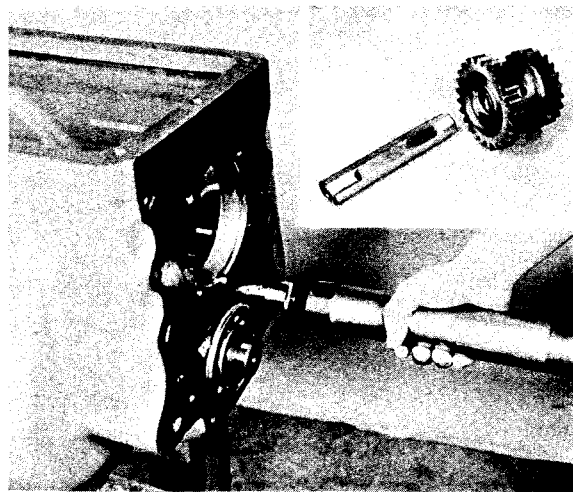
38. Installing snap ring in groove at front of countershaft.



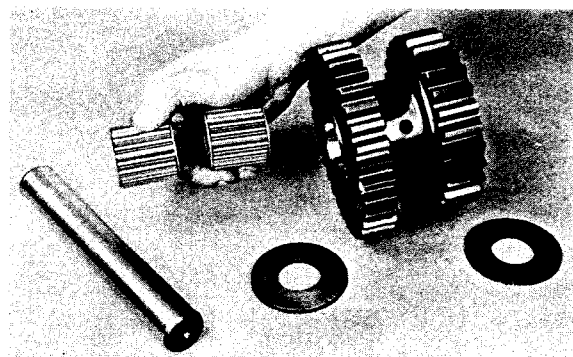
39. Installing washer on front of countershaft.



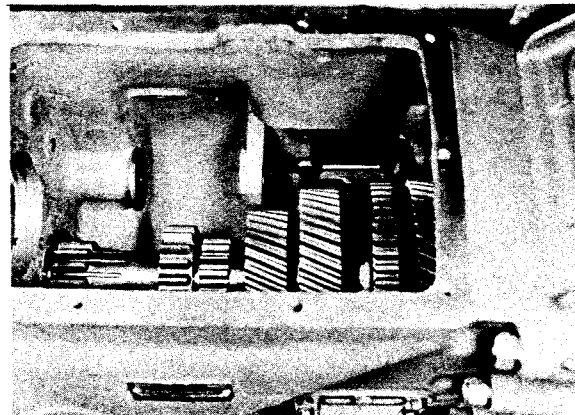
40. Installing rear bearing on countershaft and into case bore.



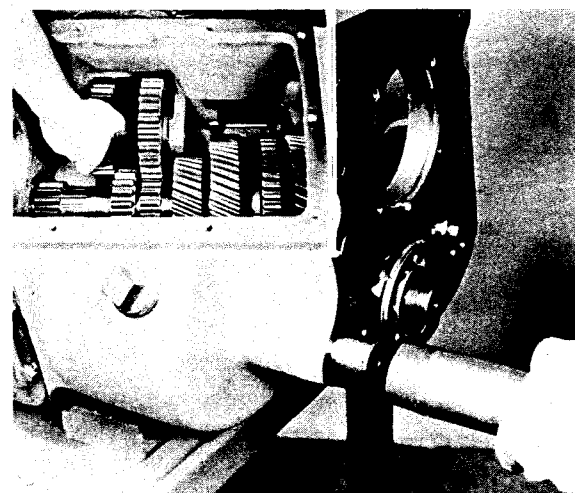
41. Installing the high reverse gear shaft in model so equipped. Insert shows parts of high reverse gearing assembly.



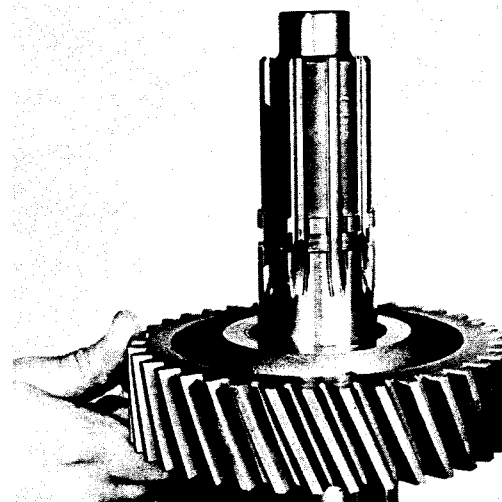
42. Placing roller bearings in bore of low reverse gearing. Photo shows parts of the low reverse gearing assembly.



43. Low reverse gear shaft inserted into case so that rear thrust washer is held in position.



44. Installing the low reverse gear shaft. Insert shows placement of gear and front thrust washer in case.



45. Installing the third speed gear on mainshaft.

3. Set the countershaft into horizontal position in case, then move forward to insert front of shaft into front bearing. Make sure washer remains in place on shaft.
4. Install the rear bearing on countershaft and into case bore, seating bearing tightly against shoulder of shaft with shield to the inside. Illustration No. 40.

C. To Reassemble and Install the Reverse Gearing

1. To install the high speed reverse gearing, if so equipped.

- a. Install the high reverse gearing into position in right side of case between the two bosses, large gear to the rear.
- b. Install the high speed reverse gear shaft in case and through the gear. Align milled flat on end of shaft with cap-screw hole in case. Illustration No. 41.
- c. Install the reverse shaft lock plate, tighten capscrew securely.

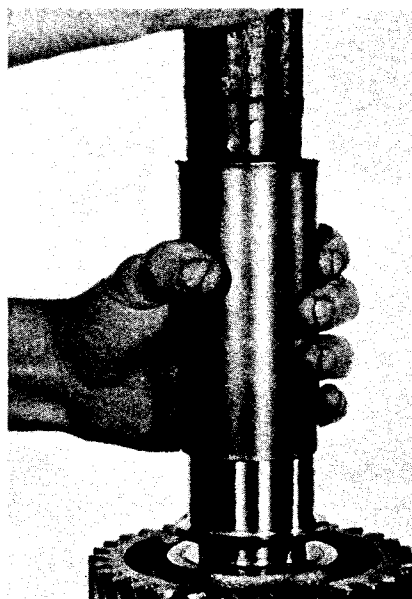
2. To install the low speed reverse gearing.

- a. Place the two roller bearings inside the bore of the low speed reverse gearing. Illustration No. 42.
- b. Insert the reverse gear shaft through bore in case so that it protrudes inside the case just far enough to hold the rear thrust washer in position, and place the rear thrust washer on protruding shaft. Illustration No. 43.
- c. Set the reverse gearing and front thrust washer into position between the two bosses in left side of case, large gear to the front.
- d. Install the reverse gear shaft through the washers and the reverse gearing, making sure milled flat on end of shaft aligns with capscrew hole in case. Illustration No. 44.
- e. Install the reverse shaft lock plate, tighten capscrew securely.

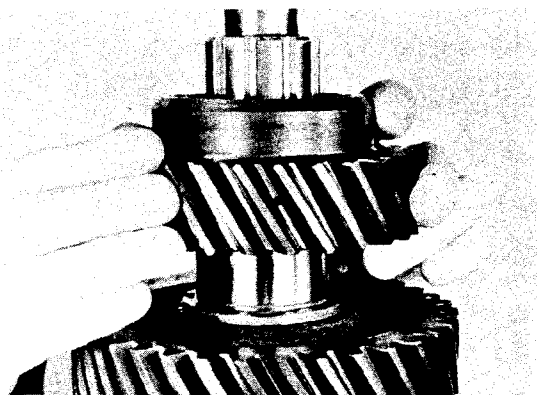
D. To Reassemble the Mainshaft Assembly

1. Mount the mainshaft in a soft-jawed vise, pilot end up.

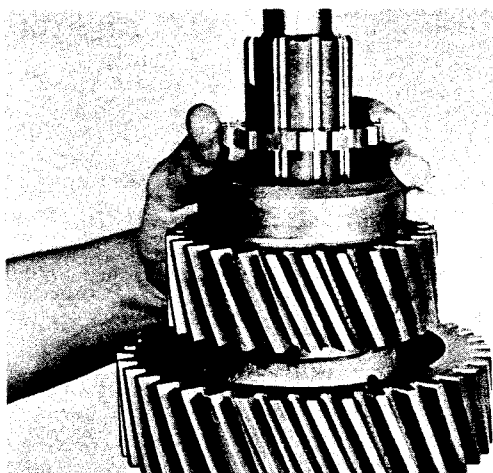
2. Install the third speed gear on mainshaft, clutching teeth to the rear. Illustration No. 45.
3. Install the Woodruff key in keyway in mainshaft.
4. Align keyway in sleeve with key in shaft and install the fourth speed gear sleeve on mainshaft, fitting tightly against shoulder of shaft. (This is the fifth speed overdrive gear sleeve on 5-A-620 models.) Illustration No. 46.
5. Install the fourth speed gear on sleeve, clutching teeth to the front. Illustration No. 47.



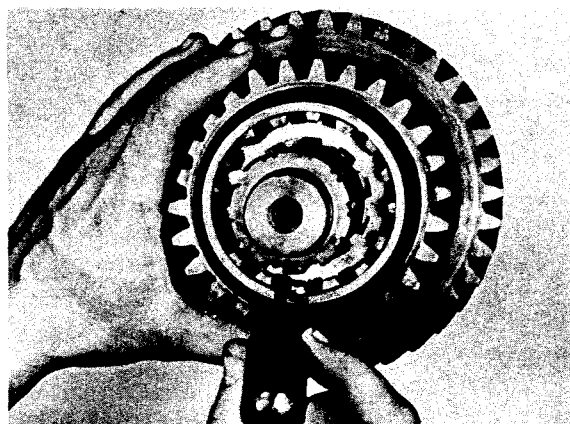
46. Installing the fourth speed gear sleeve on mainshaft.



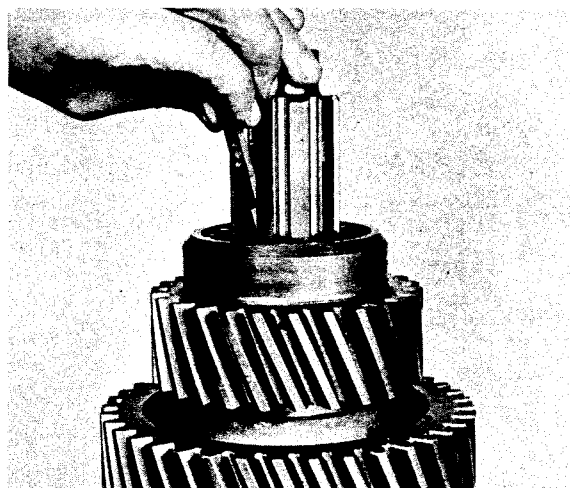
47. Installing the fourth speed gear on sleeve.



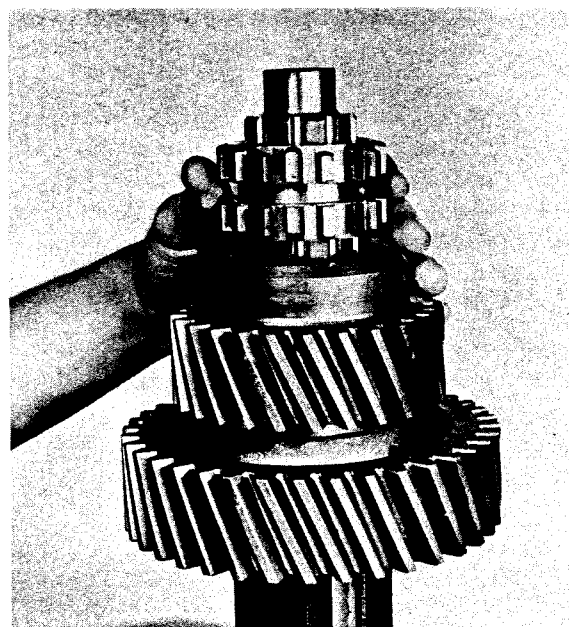
48. Installing the splined washer on mainshaft.



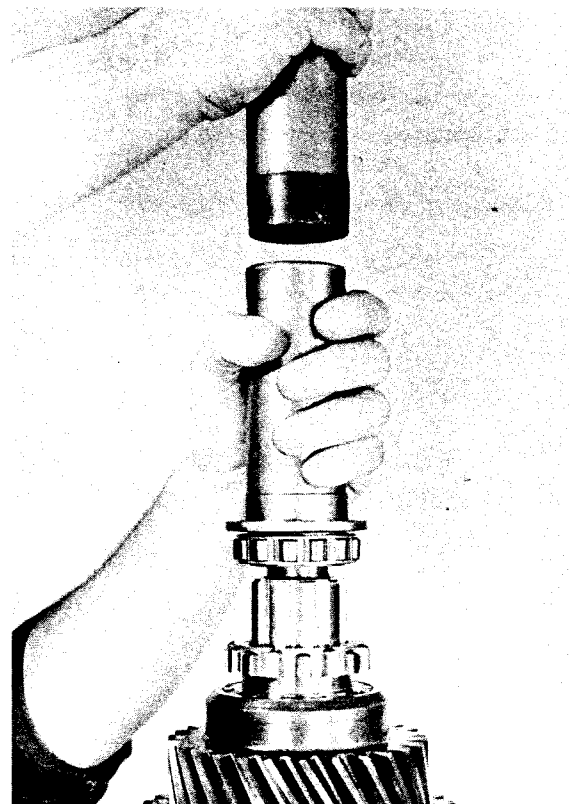
49. Turning splined washer in its groove. Insert small punch or screwdriver to engage gear teeth with teeth of washer; turn washer by turning gear.



50. Installing the washer retaining key in keyway, inserting thick end of key between splines of washer.



51. Installing the 4th-5th speed sliding clutch gear.

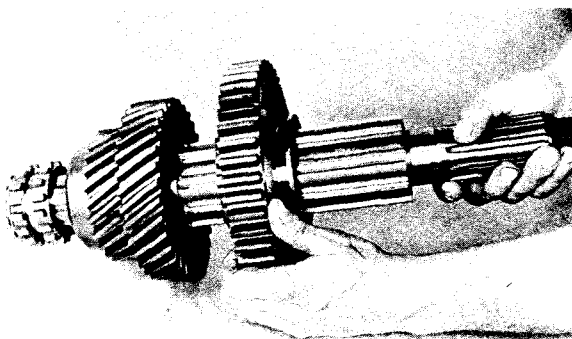


52. Installing the pilot bearing on mainshaft.

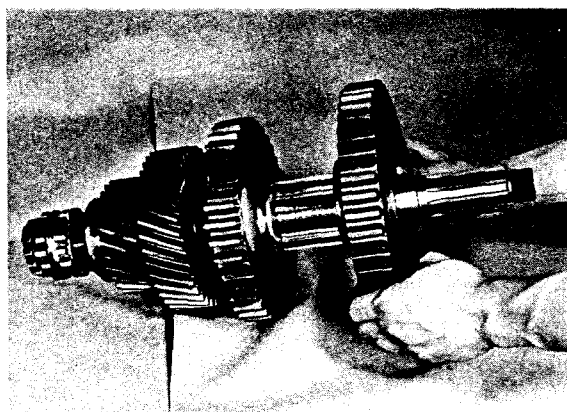
6. Install the splined washer in hub of fourth speed gear and in its groove on mainshaft, chamfered edge of lugs to the rear. Illustration No. 48.
7. Turn the washer in its groove until the lugs on its inside diameter align with raised splines of mainshaft. Illustration No. 49.
8. Install the washer retaining key in keyway between splines of mainshaft, inserting thick end between splines of washer. Illustration No. 50.
9. Install the fourth-fifth speed sliding clutch gear on mainshaft with recessed bore to the rear. Illustration No. 51.
10. Install the pilot bearing on mainshaft, midway between end of shaft and shoulder. Illustration No. 52.

E. To Install the Mainshaft Assembly

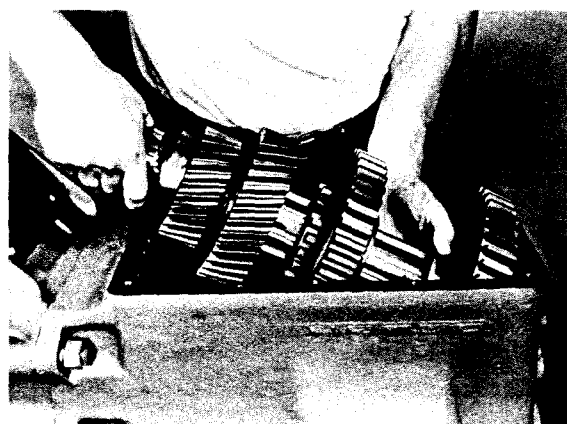
1. Remove the mainshaft assembly from vise and install the second-third speed sliding gear over rear of shaft, yoke slot to the rear. Illustration No. 53.
2. Install the first-reverse speed sliding gear on shaft, yoke slot to the front. Illustration No. 54.
3. Tilt the mainshaft assembly and install in case, engaging mainshaft gears with corresponding gears on countershaft. Illustration No. 55.
4. Install rear bearing on mainshaft and into case bore. Illustration No. 56.



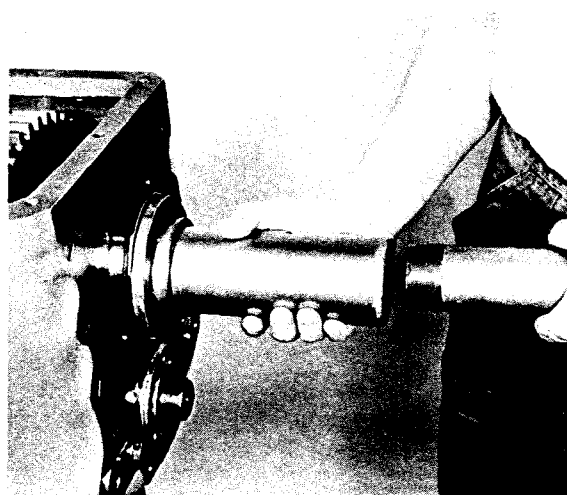
53. Installing the 2nd-3rd speed sliding gear on mainshaft.



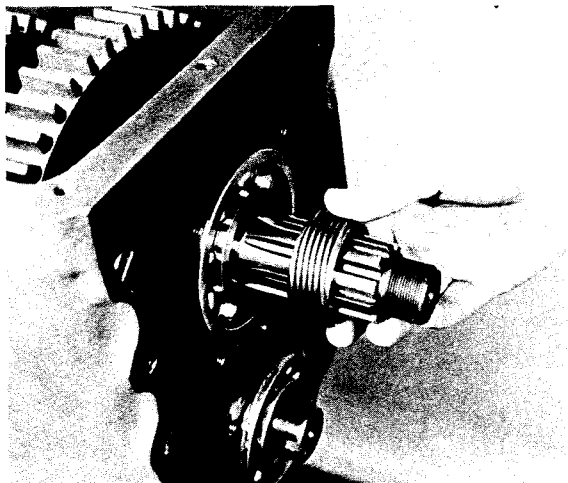
54. Installing the 1st-reverse speed gear on shaft.



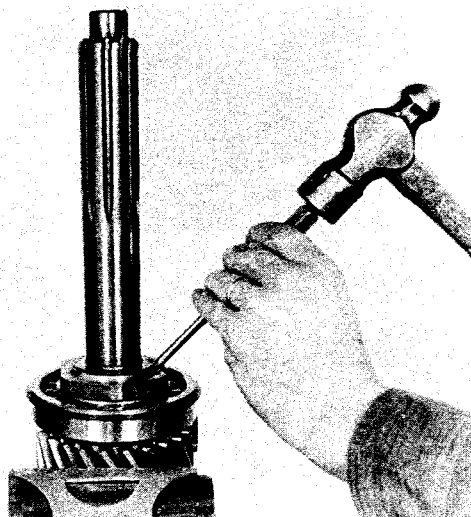
55. Installing mainshaft into case.



56. Installing rear bearing on mainshaft and into case bore. Seat bearing against shaft shoulder.



57. Installing speedometer drive gear on mainshaft. Note speedometer gear washer already installed.



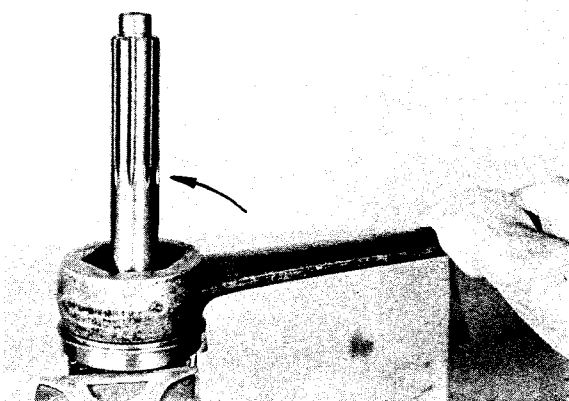
60. Peening nut into the two milled slots in shaft.



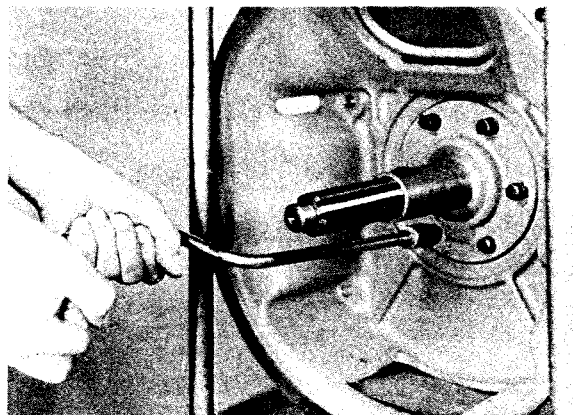
58. Applying Loctite to threads of drive gear bearing nut.



61. Installing drive gear assembly into case bore. Make sure pilot bearing on mainshaft seats properly in pocket of drive gear.



59. Installing bearing nut on shaft, left-hand thread.



62. Installing the drive gear bearing cover.

5. Install the speedometer gear washer on mainshaft.
6. Install the speedometer gear or replacement spacer on mainshaft. Illustration No. 57.

F. To Reassemble the Drive Gear Assembly

1. Press the drive gear bearing on shaft, shield to the rear.
2. Mount the drive gear in a soft-jawed vise, pilot end up.
3. Apply ample amount of Grade AV Loctite to threads of shaft and nut. Illustration No. 58.
4. Install the bearing nut on shaft, LEFT-HAND THREAD, with 250-300 ft. lbs. of torque. Wipe off excess Loctite. Illustration No. 59.

NOTE

If torque wrench is not available, torque can be closely approximated by multiplying the pounds of pull times the length of wrench handle. For example: If there is 150 pounds of pull on a wrench with a two-foot handle, multiply 150×2 which equals 300 ft. lbs. of torque. Ordinary pull scales can be used to measure pounds of pull.

5. Lock the bearing nut by peening it into slots milled into threads of gear. Illustration No. 60.
6. To hasten the hardening of Loctite, place the drive gear assembly under heat lamps 10 to 15 minutes. This procedure will set-up the Loctite rapidly and drive gear assembly will be ready for immediate use. Otherwise, at room temperature, Loctite takes from 4 to 6 hours to set-up properly.

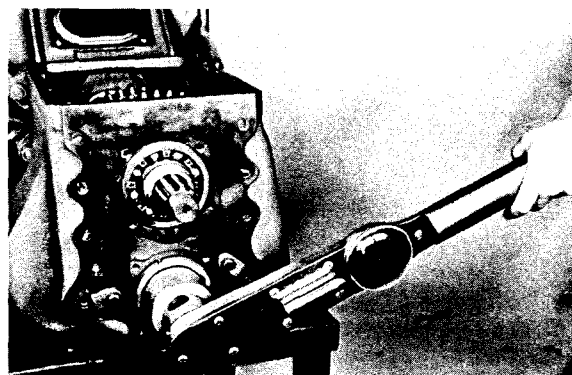
G. To Install the Drive Gear Assembly

1. Install the drive gear assembly into the case bore. Turn the mainshaft during installation to make sure the pilot bearing seats correctly in pocket of drive gear. Illustration No. 61.

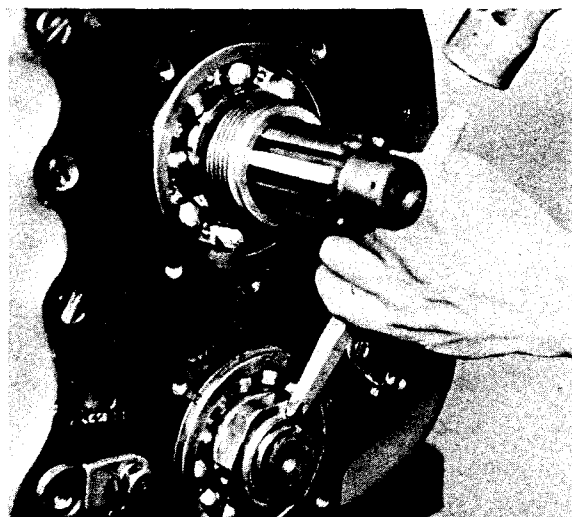
2. Install the drive gear bearing cover on case, aligning oil channel in cover with oil return hole in case. Tighten capscrews securely. Illustration No. 62.
3. Install the clutch release mechanism.

H. To Install the Countershaft Rear Bearing Nut

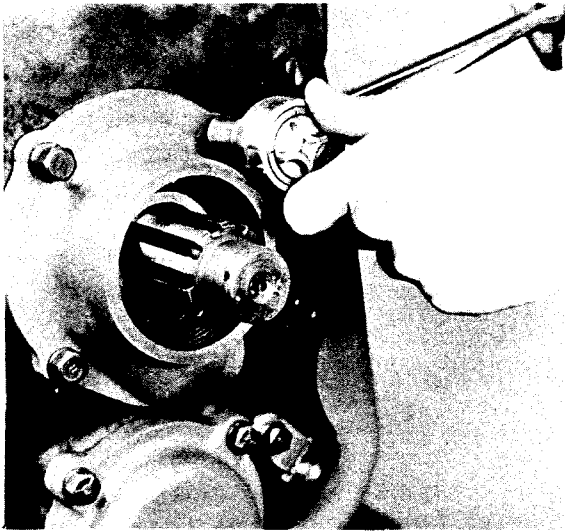
1. Lock the shafts by engaging two speeds with the mainshaft sliding gears.
2. Install the countershaft rear bearing nut, RIGHT-HAND THREAD, with 250-300 ft. lbs. of torque. (If torque wrench is not available, see Section F, paragraph No. 4.) Illustration No. 63.
3. Lock the nut by peening it into slot milled in shaft. Illustration No. 64.



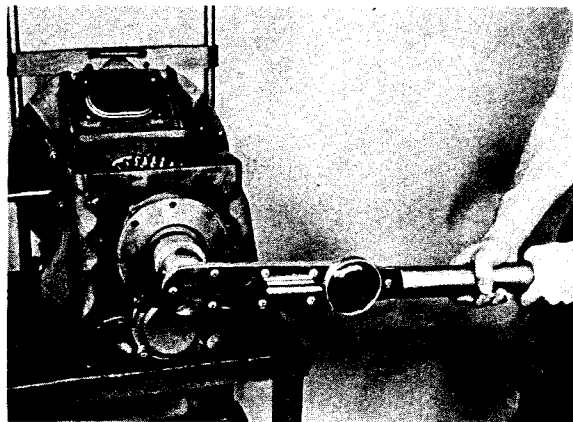
63. Installing the countershaft rear bearing nut, using 250-300 ft. lbs. of torque.



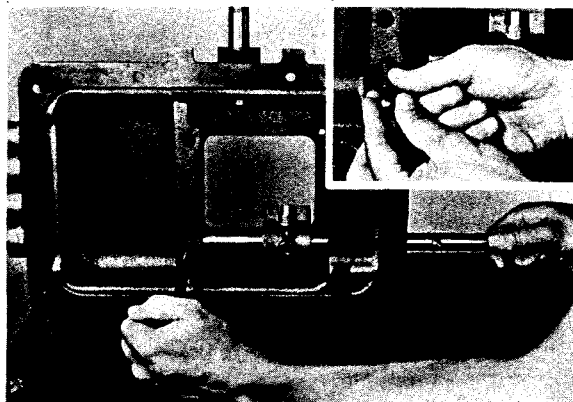
64. Peening the countershaft rear bearing nut.



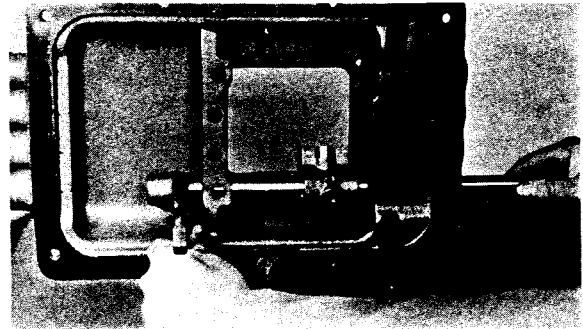
65. Securing the mainshaft rear bearing cover, installing capscrews in a staggered sequence.



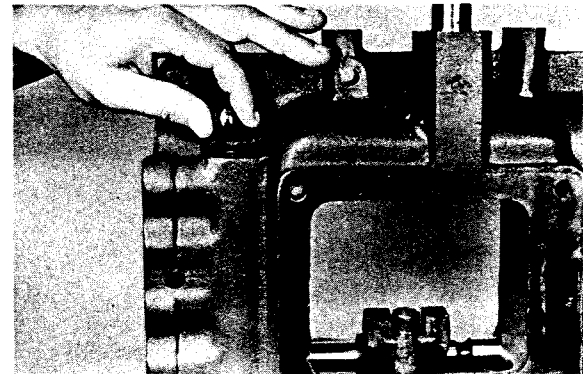
66. Installing the companion flange nut on rear of mainshaft, using 225-275 ft. lbs. of torque.



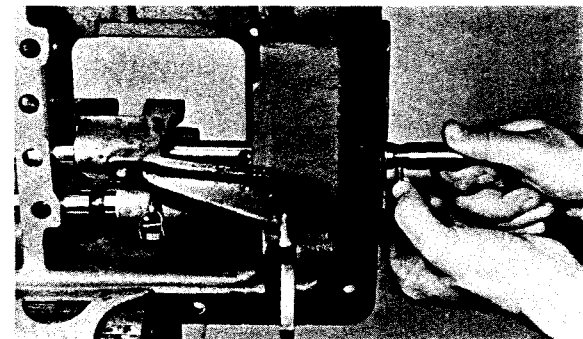
67. Depressing tension spring and ball in bore as shifting bar is pushed into housing. Insert shows the installation of spring and ball. There is a tension spring and ball for each bar.



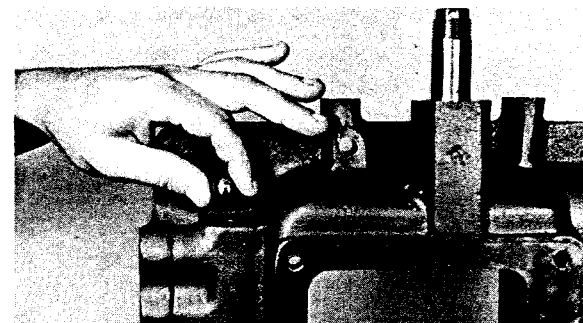
68. Installing shifting yoke on the 1st-reverse shifting bar.



69. Installing interlock ball in bore in side of housing.



70. Installing interlock pin in neutral notch of 4th-5th speed shifting bar as it is being pushed into housing.



71. Installing interlock ball in bore in side of housing.

4. Install the countershaft rear bearing cover, tighten capscrews securely.
5. Install the mainshaft rear bearing cover, tighten capscrews evenly and in a staggered sequence, make sure oil return channel in cover is aligned with channel in case. Illustration No. 65.

I. To Install the Universal Joint Companion Flange

1. Make sure the speedometer gear washer and the speedometer gear or replacement spacer are installed on mainshaft.
2. Install the companion flange on splines of mainshaft.

NOTE

Bearing cover must be perfectly aligned. Use the companion flange as a gauge to see if cover binds or rubs against companion flange when shaft is turned. If bind or rub does occur, loosen capscrews in cover, reposition cover and retighten capscrews.

3. Lock the mainshaft by engaging two speeds with the sliding clutch gears.
4. Install washer on mainshaft.
5. Install the companion flange nut on mainshaft with 225-275 ft. lbs. of torque. (If torque wrench is not available, see Section F, paragraph 4.) Illustration No. 66.
6. Install cotter pin.

J. To Reassemble the Shifting Bar Housing Assembly

NOTE

Transmissions equipped with a high reverse have four shifting bars. Those with a low reverse only have three shifting bars, the extreme right shifting bar being omitted.

1. Install thimble in interlock ball opening in left side of housing.
2. Mount the housing in a vise with the brake lever boss (right side) up.

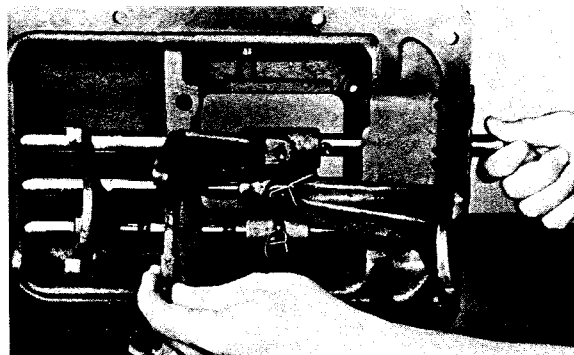
NOTE

Shifting bars are to be installed through the front of housing, with neutral notches of bars to the front. Assemble bars in the reverse of order removed and keep them in neutral position when installed. Refer to Illustration No. 6, page 10, as a guide for reassembly.

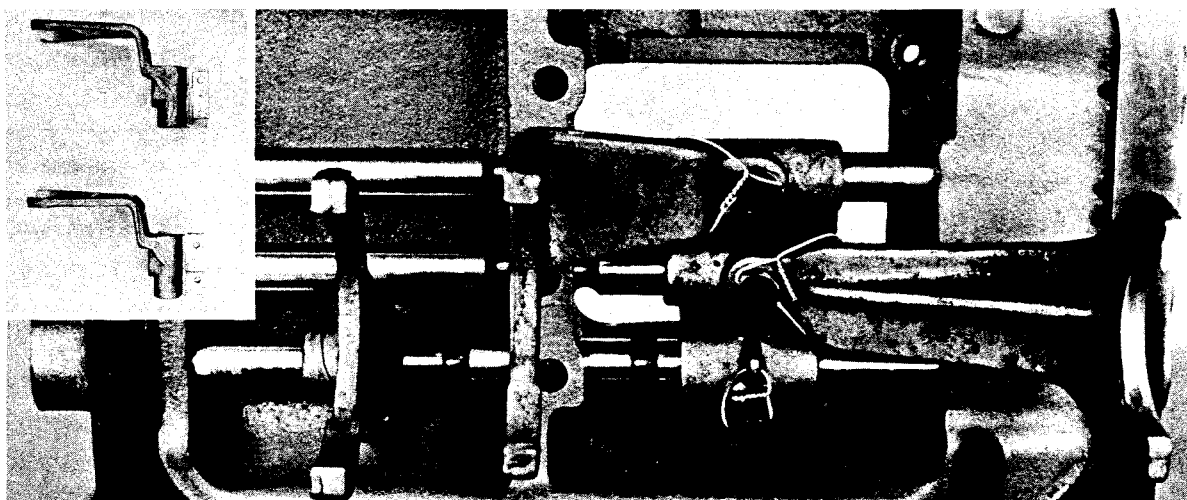
3. Start the first-reverse shifting bar through the front, lowest bore in housing, and through the first-reverse shifting block.
4. As the shifting bar reaches the tension spring hole in center web, insert spring and ball in hole. Push spring and ball inward and move bar into housing past ball. Illustration No. 67.
5. Continue to move bar into housing, installing the shifting yoke on bar, long hub towards rear. Illustration No. 68.
6. Install lockscrew in yoke and in block, tighten and wire securely.
7. Install the 3/4" interlock ball in opening in right side of housing. Illustration No. 69.
8. Start the fourth-fifth speed shifting bar through the front, lowest open bore in housing, installing the fourth-fifth speed shifting yoke, fork to the front.
9. As the shifting bar reaches the tension spring hole in center web, insert spring and ball in hole. Push spring and ball inward and move bar into housing past ball.
10. Continue to move bar into housing. As the bar is moved into housing, insert interlock pin in bore in neutral notch as notch enters housing. Illustration No. 70.
11. Install yoke lockscrew, tighten and wire securely.
12. Install the 3/4" interlock ball in opening in right side of housing. Illustration No. 71.
13. Start the second-third speed shifting bar through the front, lowest open bore in housing and install yoke, fork to the rear.
14. As the shifting bar reaches the tension spring hole in center web, insert spring

and ball into hole. Push spring and ball inward and move bar into housing past ball.

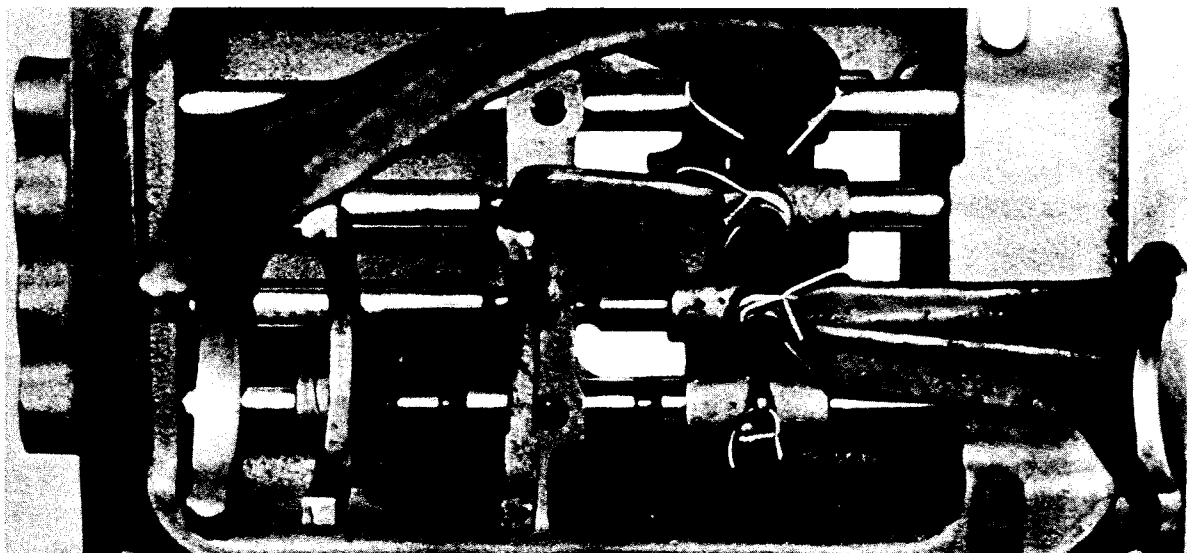
15. Continue to move bar into housing. (If model has high reverse, insert interlock pin in neutral notch as notch enters housing. Omit pin if model does not have high reverse.) Illustration No. 72.
16. Install the yoke lockscrew, tighten and wire securely. Illustration No. 73.
17. If model has high reverse, install 3/4" interlock ball in opening in right side of housing. Omit ball if model does not have high reverse.



72. Installing yoke on 2nd-3rd speed shifting bar as it is being pushed into housing.



73. Shifting bars, yokes and block correctly assembled on models with low reverse only. Insert shows stop plate installed on yoke when high reverse is not used.

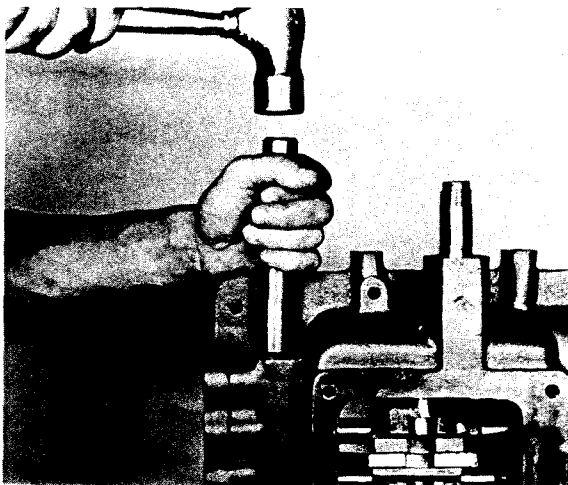


74. Shifting bars, yokes and block correctly assembled on models with high reverse.

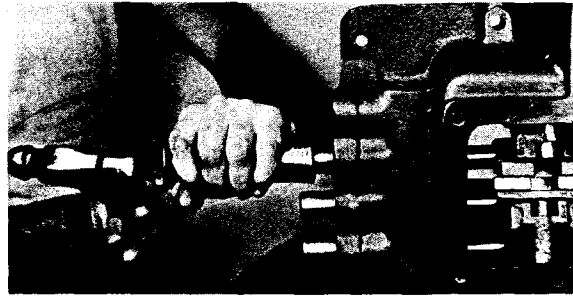
18. If so equipped, install the high reverse shifting bar through the front, upper bore in housing. Install the yoke, spring and ball in same manner as previous bars. Install yoke lockscrew, tighten and wire securely. Illustration No. 74.
19. Install thimble in interlock ball bore in right side of housing. Illustration No. 75.
20. Install the thimbles in front shifting bar bores in housing. Illustration No. 76.
21. Install the thimbles in rear shifting bar bores in housing.

K. To Install the Shifting Bar Housing Assembly

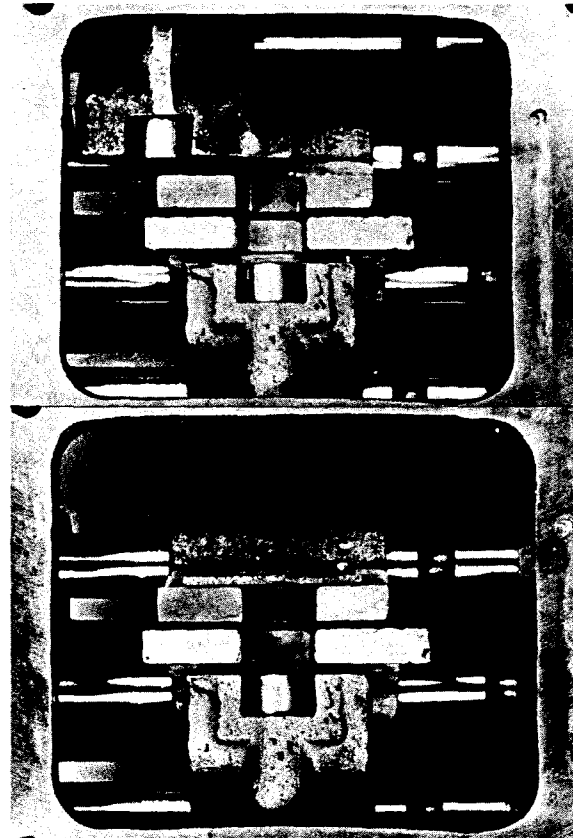
1. On models with high reverse, shift both the transmission and the shifting bar housing assembly into the high reverse speed position. On models with low reverse only, shift both units into the neutral position. Illustration No. 77.
2. Install the shifting bar housing on transmission case, inserting yokes into yoke slots of corresponding gears. Illustration No. 78.
3. Install attaching capscrews and tighten securely.



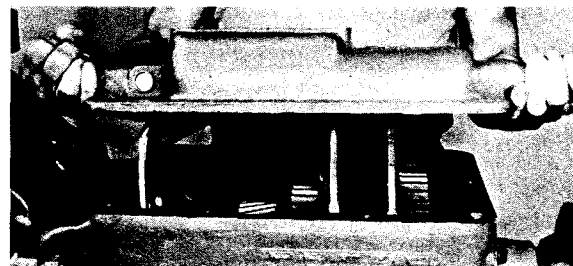
75. Installing thimble in interlock ball opening.



76. Installing thimbles in front shifting bar bores.



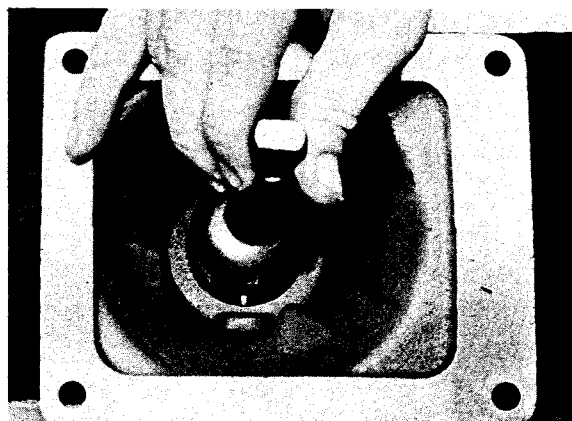
77. Upper photo shows high reverse position of shifting bars. Lower photo shows neutral position on models without high reverse.



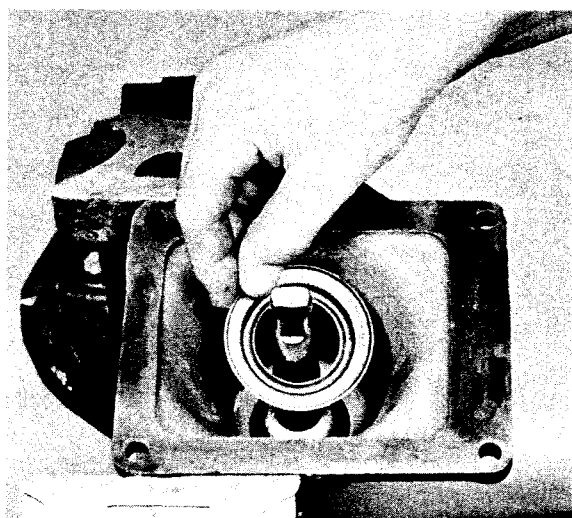
78. Installing the shifting bar housing assembly, fitting yokes into yoke slots of corresponding gears.



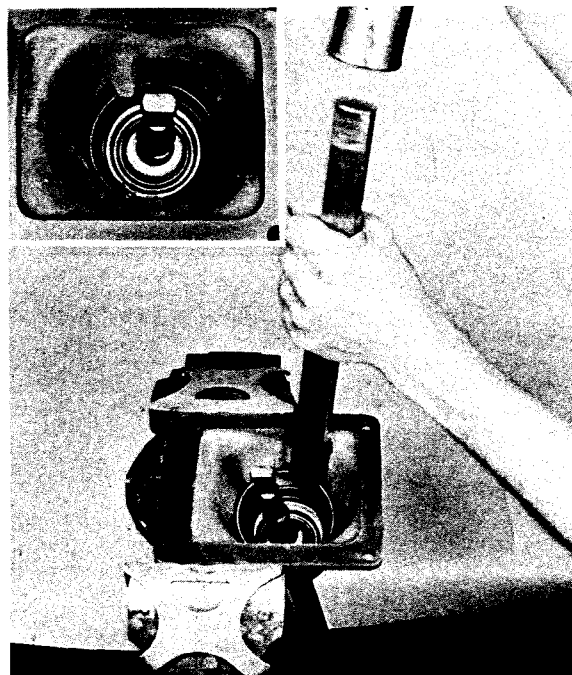
79. Installing lockwasher and nut on gear shift lever pivot pin.



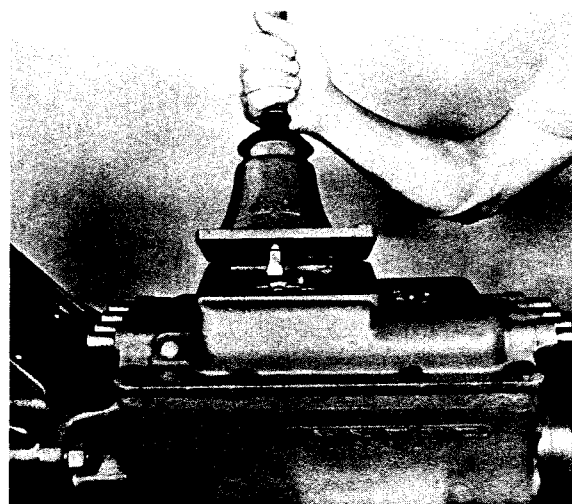
80. Installing gear shift lever in housing, inserting pivot pin in slot in pivot ball of lever.



81. Placing the tension spring washer in housing.



82. Seating the tension spring under lugs cast in housing. Insert shows spring correctly seated.



83. Installing the gear shift lever housing assembly on shifting bar housing. Make sure shift lever fits into notches of yokes and block.

L. To Reassemble the Gear Shift Lever Housing Assembly

1. Install the gear shift lever pivot pin in housing.
2. Install the lockwasher and nut on pivot pin, tighten nut securely. Illustration No. 79.
3. Mount the housing in a vise with the large bottom opening upwards.
4. Install the gear shift lever in housing, fitting slot in pivot ball over pivot pin in housing. Illustration No. 80.
5. Install the tension spring washer in housing. Illustration No. 81.
6. Install the tension spring in housing. Depress spring until upper coil is secured under lugs cast inside the housing. Illustration No. 82.

7. Remove the assembly from vise and install the rubber boot on lever and against top of housing. Thick section of boot is installed over nut on pivot pin.
8. Install the ball grip on lever.

M. To Install the Gear Shift Lever Housing Assembly

1. Make sure the shifting bar housing assembly is in the neutral position.
2. Install the gear shift lever housing or the remote control housing on the shifting bar housing, entering lever in notches of yokes and block. Illustration No. 83.
3. Install attaching capscrews and tighten securely.

TOOL REFERENCE

Some illustrations in this manual show the use of specialized tools. These tools are recommended for transmission repair as they make repair easier, faster and prevent costly damage to such critical parts as bearings and sleeves.

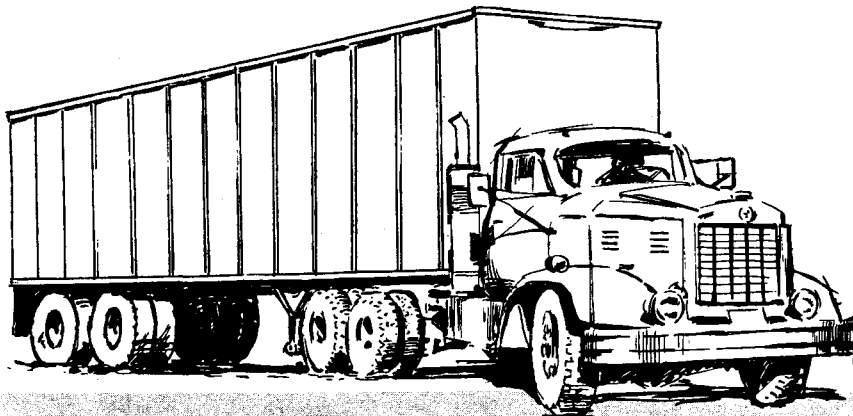
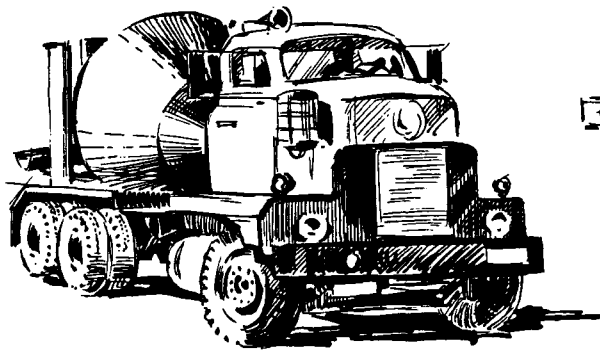
Some of these tools can be obtained from a regular tool supplier, while others can be made either from prints or from dimensions as required by the individual user.

Listed below are illustrations which show these specialized tools, the tool name and how it can be obtained. Prints are available for tools which have a Fuller tool number; send requests to the Service Department, Fuller Transmission Division, Eaton Mfg. Co., Kalamazoo, Michigan.

Also available upon request is a tool booklet which gives in detail the use and description of suggested specialized tools for rebuilding Fuller transmissions.

Illustration	Tool	How Obtained
22	Jaw pullers, medium	Tool supplier
24	Jaw pullers, small	Tool supplier
29-31	Impact puller	Make from 18" steel rod, threaded 1/2-13 one end, attach end block and sliding block
33	Ring puller	Make from Fuller tool print No. T-9824
35-38	Snap ring pliers	Tool supplier
40	Flanged-end bearing driver	Make from Fuller tool print No. T-10064
46	Tubular driver	Make from 1/4" thick tubular steel, app. 6" long with ID slightly larger than ID of sleeve.
52	Flanged-end bearing driver	Make from Fuller tool print No. T-7551
56	Flanged-end bearing driver	Make from Fuller tool print No. T-10324
63-66	Torque wrench	Tool supplier
76	Thimble driver	Make from Fuller tool print No. T-9499-2
82	Tension spring driver	Make from Fuller tool print No. T-11938

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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