# TM 9-1817

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*ORDNANCE MAINTENANCE*

# Power Train, Chassis, and Body for 5- to 6-Ton Ponton Tractor Truck

## (Autocar Model U8144T)

*WAR DEPARTMENT* • *28 APRIL 1944*

**FOR ORDNANCE PERSONNEL ONLY**

*WAR DEPARTMENT TECHNICAL MANUAL*

*TM 9-1817*



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Washington 25, D. C., 28 April 1944

TM 9-1817, Ordnance Maintenance: Power Train, Chassis, and Body for 5- to 6-Ton Ponton Tractor Truck (Autocar Model U8144T), is published for the information and guidance of all concerned.

[A.G. 300.7 (25 Feb 44)
O.O.M. 461/(TM-9) Rar. Ars. (4-28-44)]

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(For explanation of symbols, see FM 21-6.)

# CONTENTS



★This manual supersedes pertinent information from TB ORD 20, dated 24 January 1944; TB 800-21, dated 30 November 1943; and TB 10-1000-27, dated 6 August 1943. This manual, together with TM 9-817 and TM 9-1832A, supersedes TM 10-1497, dated 1 July 1942.

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# ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

## CHAPTER 1

## INTRODUCTION

### 1. SCOPE.

**a.** The instructions contained in this manual are for the information and guidance of personnel charged with the maintenance and repair of the 5- to 6-ton, 4 x 4 Ponton Tractor Truck (Autocar Model U8144T). These instructions are supplementary to Field Manuals and Technical Manuals prepared for the using arms. This manual does not contain information which is intended primarily for the using arms, since such information is available to ordnance maintenance personnel in 100-series Technical Manuals or Field Manuals.

**b.** This manual contains a description of, and procedure for, disassembly, cleaning, inspection, repair, and assembly of the following vehicle components: clutch, transmission, power take-off, transfer case, drive shafts, drive shaft hand brake shoes, front axle, rear axle, service (air) brake shoes, wheels, hubs and tires, steering gear, springs and shock absorbers, frame, cab and body, winch, fifth wheel, fuel tanks, radiator, fan and hub.

**c.** TM 9-817 contains a description of the 5- to 6-ton, 4 x 4 Ponton Tractor Truck (Autocar Model U8144T) and technical information required for the identification, use and care of the materiel. Part one of TM 9-817 contains vehicle operating instructions. Part two contains vehicle maintenance instructions for using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction. Part three contains instructions for storage and shipment of the materiel, references to all Standard Nomenclature Lists, Technical Manuals, and other publications for the materiel covered by this manual, and an index of the manual arranged alphabetically.

**d.** TM 9-1832A contains a description of, and procedures for disassembly, inspection, repair, and assembly of the engine used on this vehicle.

**e.** TM 9-1825B contains a description of, and procedures for disassembly, inspection, repair, and assembly of the cranking motor and generator used on this vehicle.

**f.** TM 9-1826C contains a description of, and procedures for disassembly, inspection, repair, and assembly of the carburetor used on this vehicle.

**g.** TM 9-1828A contains a description of, and procedures for disassembly, inspection, repair, and assembly of the fuel pump used on this vehicle.

**h.** TM 9-1827A contains a description of, and procedures for

# INTRODUCTION

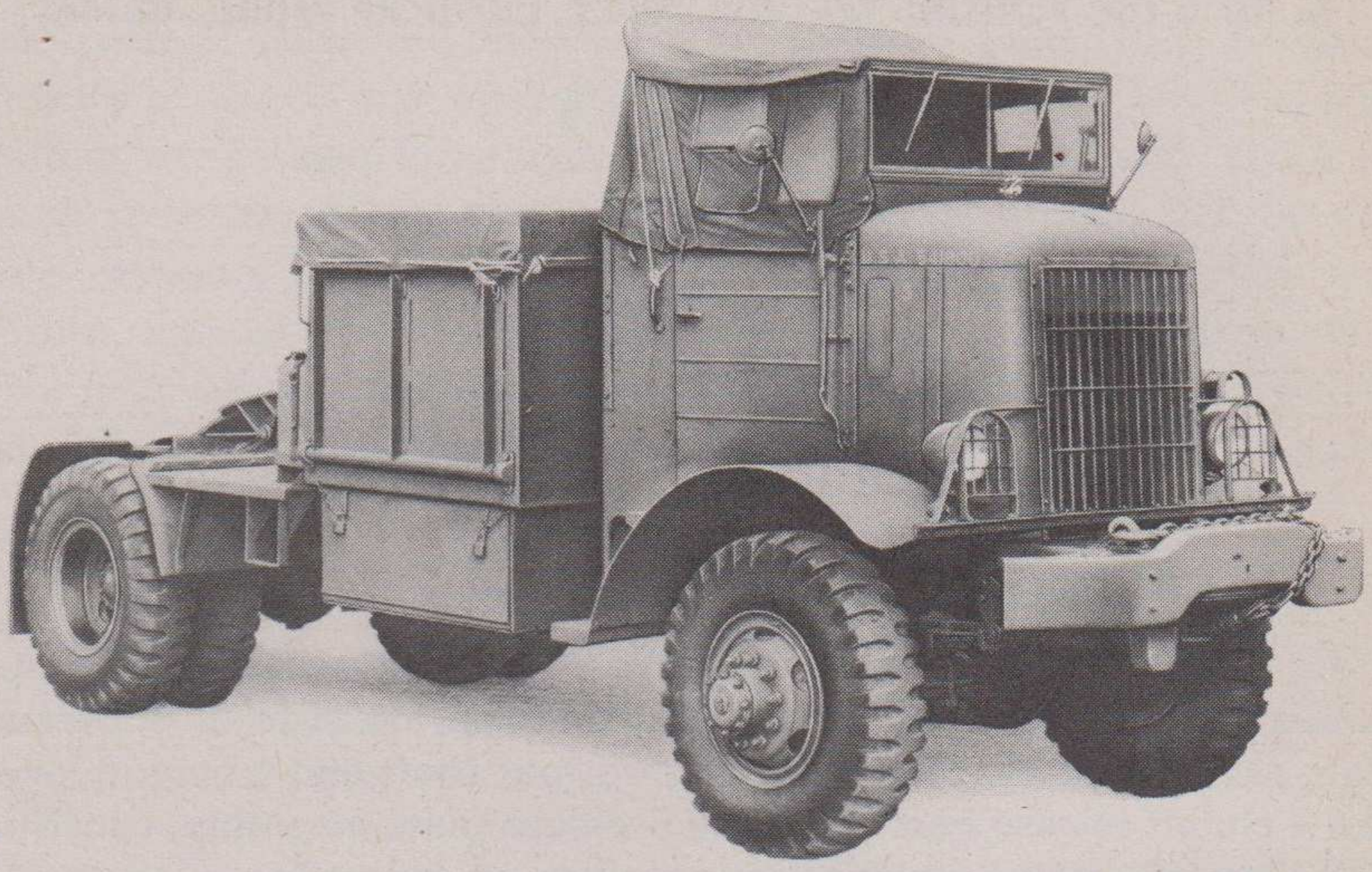

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*Figure 1 — Right Side — 5- to 6-ton 4 x 4 Ponton Tractor Truck (Open Cab) — Front Side View*

disassembly, inspection, repair, and assembly of components of the air brake system on this vehicle.

## 2. VEHICLE MODIFICATION RECORDS.

### a. MWO and Major Unit Assembly Replacement Record.

(1) DESCRIPTION. Every vehicle is supplied with a copy of A.G.O. Form No. 478 which provides a means of keeping a record of each MWO completed, or major unit assembly replaced. This form includes spacer for the vehicle name and U.S.A. registration number, instructions for use, and information pertinent to the work accomplished. It is very important that the form be used as directed, and that it remain with the vehicle until the vehicle is removed from service.

(2) INSTRUCTIONS FOR USE. Personnel performing modifications or major unit assembly replacements must record clearly on the form a description of the work completed and must initial the form in the columns provided. When each modification is completed, record the date, hours, and/or mileage, and MWO number. When major unit assemblies, such as engines, transmissions, and transfer cases, are replaced, record the date, hours, and/or mileage, and nomenclature of the unit assembly. Minor repairs, minor parts, and accessory replacements need not be recorded.

(3) EARLY MODIFICATIONS. Upon receipt by a third or fourth echelon repair facility of a vehicle for modification or repair, maintenance personnel will record the MWO numbers of modifications applied prior to the date of A.G.O. Form No. 478.

# ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

## CHAPTER 2

## CLUTCH

### Section I

## DESCRIPTION AND DATA

### 3. DESCRIPTION AND OPERATION.

**a. Description** (figs. 2 and 4). The single-disk type clutch, located between the engine and transmission, consists of a pressure plate assembly, disk, pilot bearing, throwout shaft and trunnion levers, and a clutch release bearing. The pressure plate assembly, consisting of a conical spring compressed against an adjusting plate and a clutch release sleeve, is attached to the clutch flywheel ring by six flywheel ring adjusting straps and nuts. Shims for adjusting the distance between the clutch release sleeve and the rear of the flywheel ring are placed under these adjusting straps. Twenty clutch pressure levers with a fulcrum ring ball in each lever are held in position between two fulcrum rings and secured to clutch release sleeve by a snap ring. The pressure levers rest against the clutch pressure plate with studs protruding through flywheel ring. Pressure plate retracting springs are placed over pressure plate studs and secured with retaining pins and washers. The clutch disk facings, composed of an asbestos composition reinforced with copper wire, are attached to the clutch disk with rivets. The splined bore of the disk hub rests on the main drive gear spline. A clutch pilot bearing (which is packed with a special heat-resistant grease) is pressed into the bore of the flywheel and provides a seat for the main drive gear. The clutch throwout shaft and trunnion levers are located in the clutch housing attached to the transmission. Bushings are used for seats of the throwout shaft. The clutch release bearing is pressed into a trunnion block which is seated on the main drive gear bearing cap. A return spring is attached to the trunnion block and a cap screw on the main drive gear bearing cap.

**b. Operation.** The clutch engages and disengages engine power with the transmission. When the clutch pedal is depressed, motion is transmitted by linkage to the trunnion block and clutch release bearing, which is brought forward against clutch release sleeve. This applies pressure on clutch pressure spring and, through an arrangement of interlocked pressure levers and fulcrum ring balls, creates a centrifugal force which opposes action of clutch pressure spring.

## CLUTCH

This permits backward movement of pressure plate, thus releasing pressure of clutch disk against flywheel. When clutch is in engaged position, centrifugal force acts on pressure levers to assist action of clutch pressure spring; and, since these levers form a disk or dial plate, pressure is uniformly distributed against pressure plate and, in turn, against clutch disk. The clutch disk is mounted on main drive gear splines; therefore, pressure of disk against engine flywheel transfers power from engine to transmission and eventually to axles.

### 4. DATA.

| | |
|---|---|
| Make | W. C. Lipe |
| Model | L-42-S |
| Disk: | |
| Model | L-15-2 |
| Size | 15 in. |
| Type | Single dry plate |
| Number of facings | 2 |
| Outside diameter | 15 in. |
| Inside diameter | 8 in. |
| Spring pressure at 1¼ in. height | 535 lb |

## Section II

## REMOVAL

### 5. REMOVAL.

a. **Remove Transmission.** Refer to TM 9-817.

b. **Remove Clutch Pressure Plate Assembly, Disk, and Pilot Bearing.** Refer to TM 9-817.

c. **Remove Clutch Release Bearing** (fig. 2). Free the clutch release trunnion return spring. Slide trunnion block with attached clutch release bearing off main drive gear bearing cap.

d. **Remove Clutch Housing Assembly** (fig. 2). Remove cotter pins and nuts attaching clutch housing to transmission case. Lift off clutch housing.

# ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

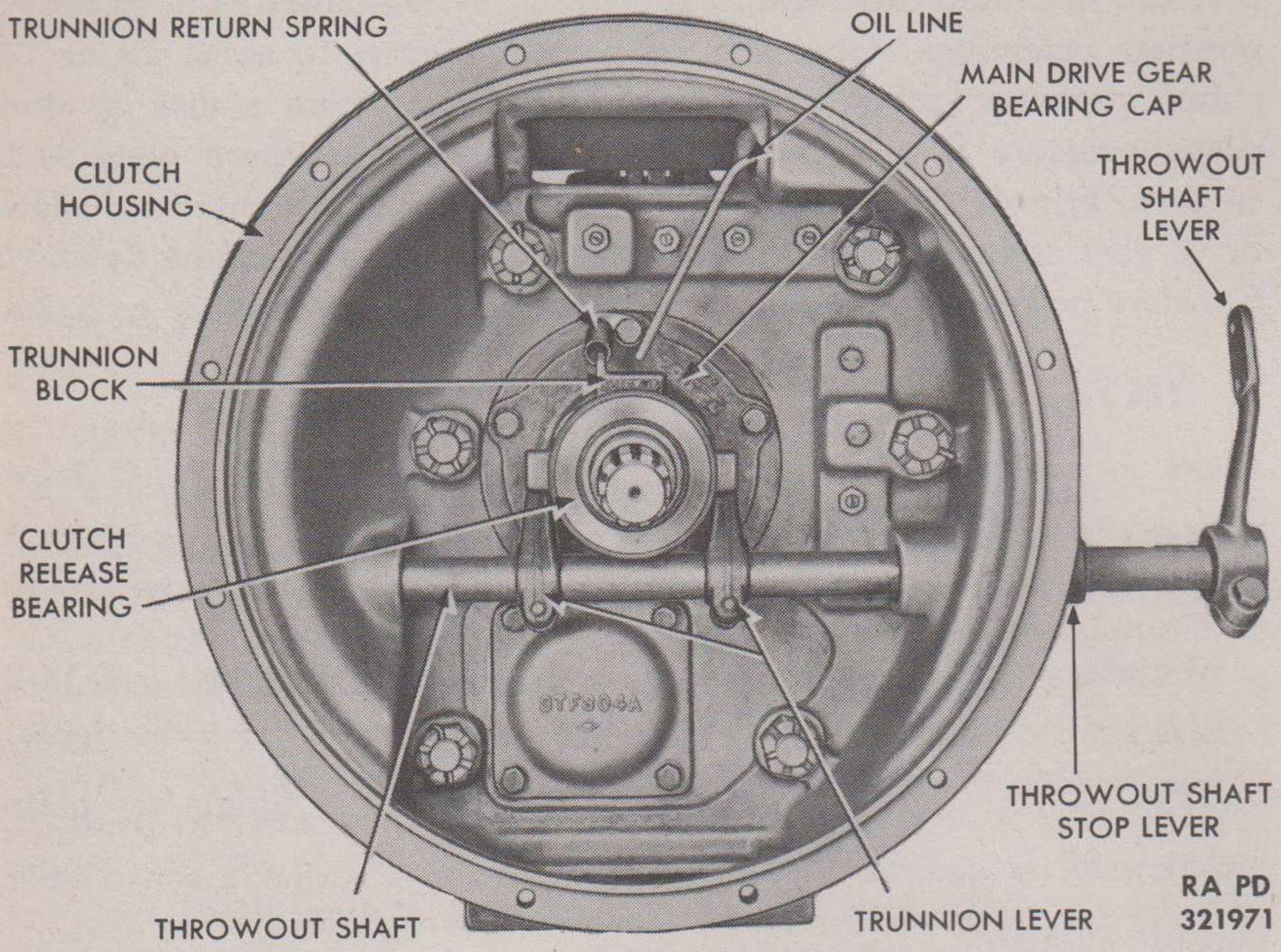



***Figure 2 — Clutch Housing Assembly***

## Section III

## DISASSEMBLY, CLEANING, INSPECTION, REPAIR, AND ASSEMBLY OF SUBASSEMBLIES

### 6. CLUTCH HOUSING.

**a. Disassembly** (fig. 3).

(1) REMOVE THROWOUT SHAFT. Remove trunnion lever cap screws and lock washers. Tap off trunnion levers and remove Woodruff keys. Slide clutch throwout shaft out of clutch housing.

(2) REMOVE THROWOUT SHAFT LEVER. Remove cap screw and lock washer securing shaft lever to throwout shaft. Tap off shaft lever and remove Woodruff key.

(3) REMOVE STOP LEVER. Remove cap screw and lock washer attaching stop lever to throwout shaft. Tap off stop lever. Remove adjusting cap screw and lock nut from stop lever.

(4) REMOVE THROWOUT SHAFT BUSHINGS. Tap bushings out of clutch housing.

(5) REMOVE COVER PLATES. Remove cap screws and lock washers attaching top and bottom cover plates to housing. Lift off cover plates.

**b. Cleaning, Inspection, and Repair.** Wash all parts in dry-cleaning solvent. Inspect clutch housing for cracks and fractures, tapping housing with a soft hammer to test for cracks. Check clutch throwout shaft and levers for cracks and fractures, replacing cracked or broken parts. Look for burs, nicks, and cross threads on all threaded parts, and repair or replace damaged parts. Inspect throwout shaft bushings for scoring or galling, replacing bushings if such conditions are found. Check lubrication passages to make sure they are open and clean.

**c. Assembly** (fig. 3).

(1) INSTALL COVER PLATES. Attach top and bottom cover plates to clutch housing with lock washers and cap screws.

(2) INSTALL THROWOUT SHAFT BUSHINGS. Tap bushings into position in clutch housing with oilholes in bushings alined with oilholes in housing.

(3) INSTALL STOP LEVER. Install adjusting cap screw and lock nut on stop lever. Tap Woodruff key into keyway and tap stop lever onto throwout shaft. Install lock washer and cap screw.

(4) INSTALL THROWOUT SHAFT LEVER. Install shaft lever key in keyway. Tap shaft lever onto throwout shaft and secure with lock washer and cap screw.

(5) INSTALL THROWOUT SHAFT. Insert shaft into left side of housing. Tap left trunnion lever key into shaft keyway and install left trunnion lever. Secure with lock washer and cap screw. Install right trunnion lever. Push throwout shaft fully into position in clutch housing.

## 7. CLUTCH RELEASE BEARING.

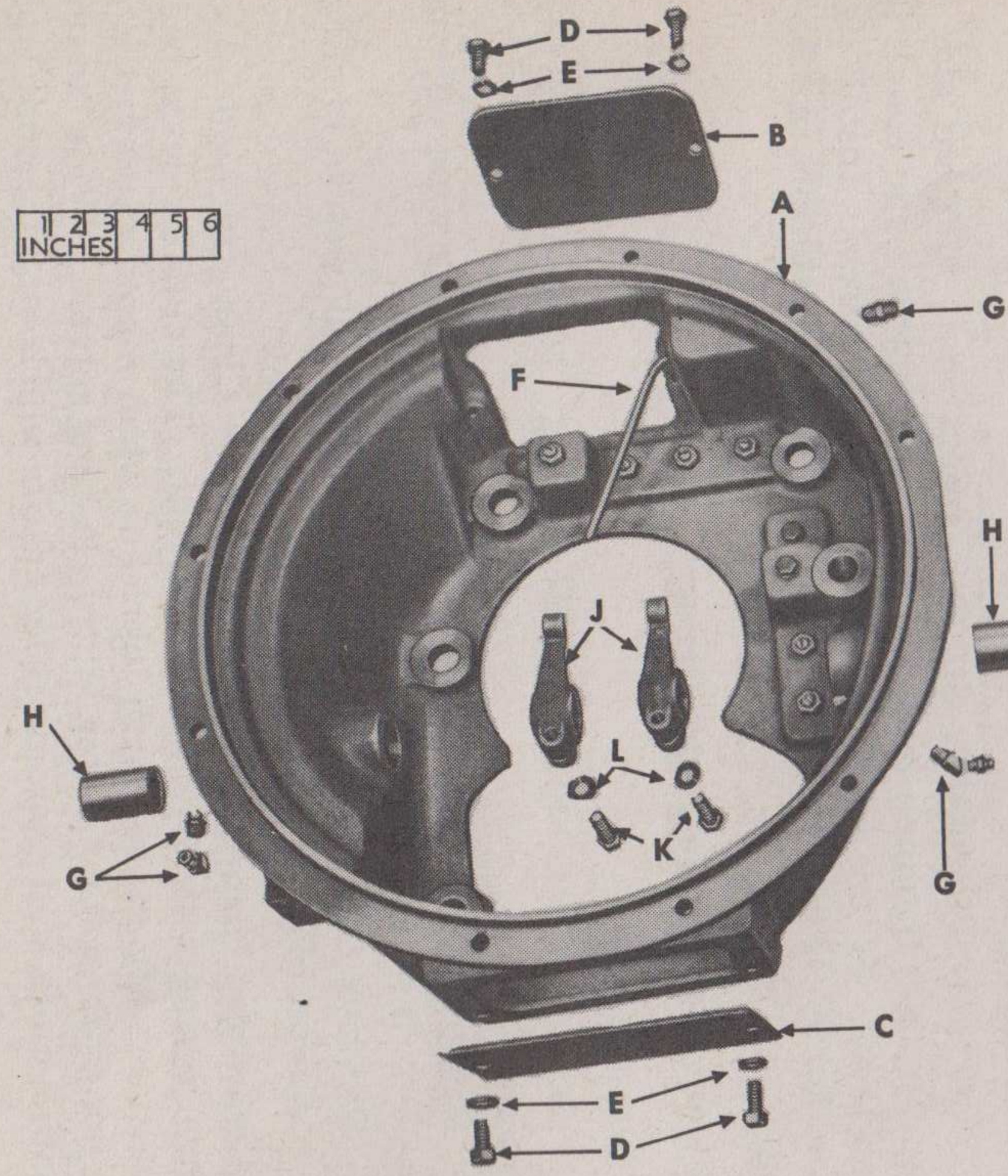
**a. Disassembly.**

(1) REMOVE TRUNNION RETURN SPRING. Remove spring from trunnion block.

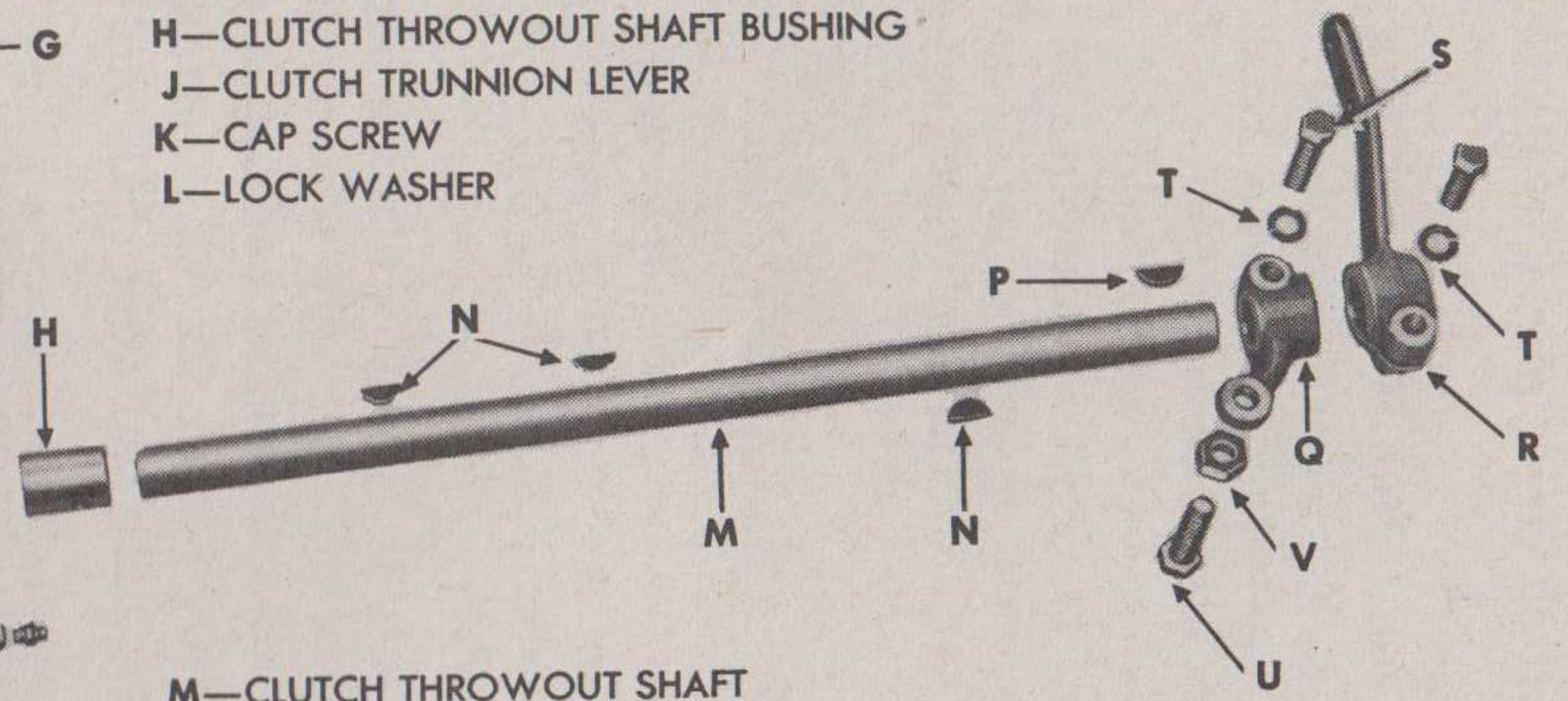
(2) REMOVE CLUTCH RELEASE BEARING. Pull bearing off trunnion block with a bearing puller.

(3) REMOVE OIL WICK. Remove wick from oil passage in clutch release trunnion block.

**b. Cleaning, Inspection, and Repair.** Clean trunnion block and return spring with dry-cleaning solvent. The clutch release bearing is permanently packed with lubricant when manufactured; therefore, do not wash or dip bearing in dry-cleaning solvent. Wipe bearing clean with a cloth, and examine it for cracks which might permit leak-




A—CLUTCH HOUSING
B—CLUTCH HOUSING TOP COVER PLATE
C—CLUTCH HOUSING BOTTOM COVER PLATE
D—CAP SCREW
E—LOCK WASHER
F—OIL LINE
G—LUBRICATION FITTING
H—CLUTCH THROWOUT SHAFT BUSHING
J—CLUTCH TRUNNION LEVER
K—CAP SCREW
L—LOCK WASHER




M—CLUTCH THROWOUT SHAFT
N—NUMBER 11 WOODRUFF KEY
P—NUMBER 15 WOODRUFF KEY
Q—THROWOUT SHAFT STOP LEVER
R—THROWOUT SHAFT LEVER
S—CAP SCREW
T—LOCK WASHER
U—STOP LEVER ADJUSTING CAP SCREW
V—STOP LEVER ADJUSTING CAP SCREW LOCK NUT

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***Figure 3 — Clutch Housing Disassembled***

age of lubricant. Check bearing for roughness, replacing bearing if these defects are found. Replace clutch release trunnion block if evidence of cracks or fractures is found. Replace trunnion return spring if it has weakened. If oil wick is gummy or flabby, install new wick.

**c. Assembly.**

(1) INSTALL OIL WICK. Insert wick into oil passage in trunnion block.

(2) INSTALL CLUTCH RELEASE BEARING. Carefully press bearing into position on trunnion block.

(3) INSTALL TRUNNION RETURN SPRING. Attach spring to trunnion block.

## 8. CLUTCH PRESSURE PLATE ASSEMBLY.

**a. Disassembly** (fig. 4).

(1) REMOVE CLUTCH PRESSURE PLATE. Place assembly in arbor press and compress clutch pressure spring by pressing down on clutch release sleeve. Remove four pressure plate retracting spring retainer pins and retainer washers. Lift off four pressure plate retracting springs. Release assembly from arbor press and lift off clutch pressure plate.

(2) REMOVE CLUTCH PRESSURE LEVERS. Place assembly in arbor press and press down on clutch flywheel ring. Remove clutch release sleeve snap ring. Lift off top clutch release fulcrum ring and remove fulcrum ring balls and clutch pressure levers. Lift out lower fulcrum ring. CAUTION: *This must be done with extreme care, because the clutch pressure spring exerts a pressure of approximately 600 pounds.*

(3) REMOVE FLYWHEEL RING. Remove assembly from arbor press and lift off flywheel ring.

(4) REMOVE CLUTCH PRESSURE SPRING. Lift out clutch pressure spring.

(5) REMOVE CLUTCH RELEASE SLEEVE. Lift out clutch release sleeve.

(6) REMOVE CLUTCH ADJUSTING PLATE. Remove flywheel ring stud nuts, internal-toothed lock washers, adjusting straps, and adjusting shims. Lift adjusting plate from flywheel ring.

**b. Cleaning, Inspection, and Repair.** Clean all parts in dry-cleaning solvent. Place clutch pressure plate on a surface plate and check for distortion. If pressure plate is dished, install new plate. Inspect clutch pressure plate retracting springs. If springs are stretched so that gaps exist in coils, replace with new springs. Examine pressure plate studs and replace studs that are bent or have damaged threads. Examine clutch release sleeve fulcrum rings for worn or scored condi-

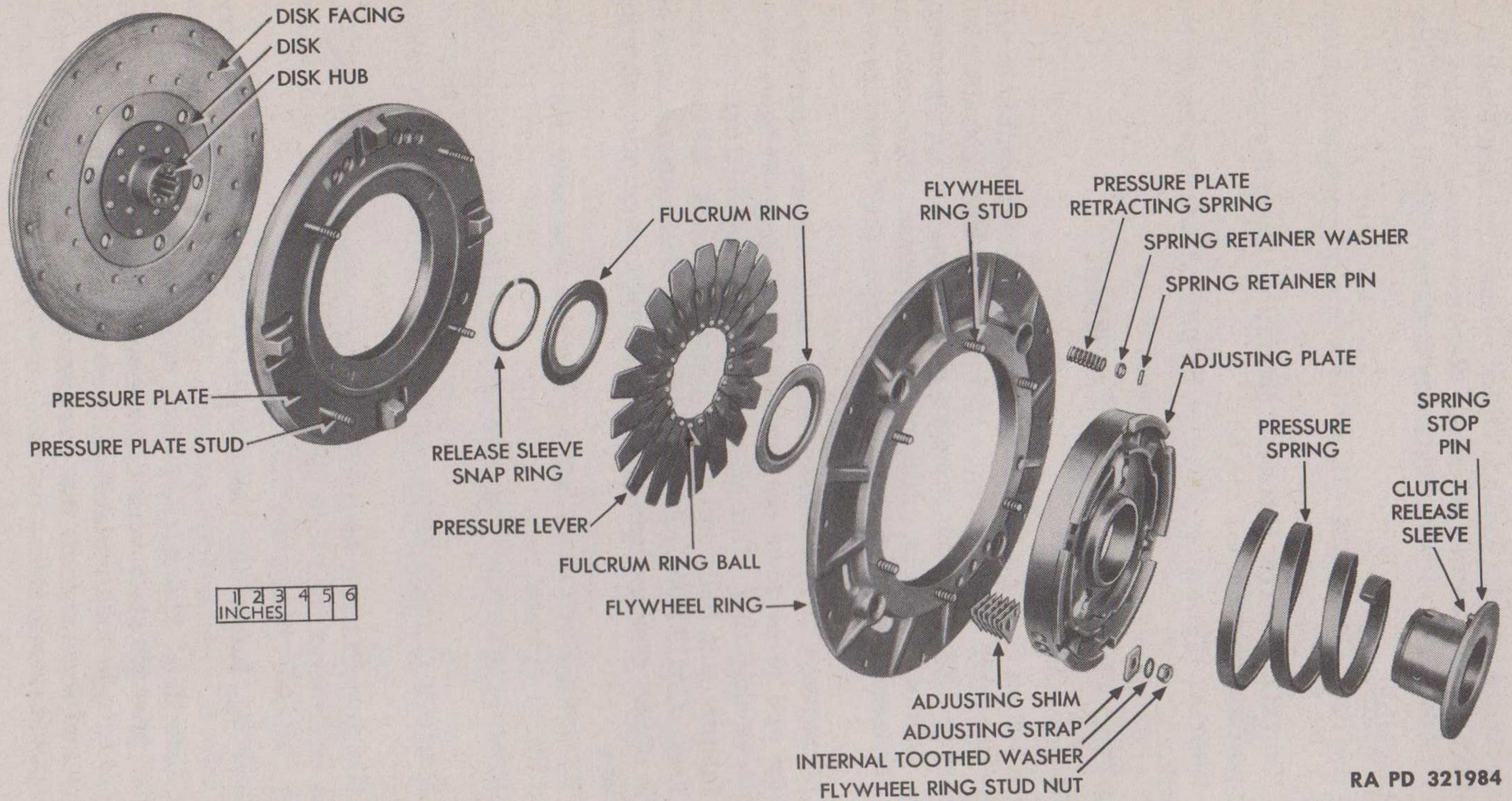


***Figure 4 — Clutch Disassembled***

tion in cup side and for warpage. If warped or badly worn, replace. Inspect all fulcrum ring balls for wear or flat spots, replacing any balls that are out-of-round. Check the 20 clutch pressure levers for wear at points of contact with adjusting plate, pressure plate, and fulcrum ring. If scored or bent, replace with new levers. Inspect clutch release sleeve snap ring for fractured or out-of-round condition. If snap ring is not in perfect condition, use a new ring in assembly. Examine flywheel ring for cracks or fractures, and for burs on machined surfaces. Replace cracked or broken parts; remove burs with handstone. Replace any studs on flywheel ring that are damaged. Examine adjusting plate and pressure spring for fractures and replace if broken. Inspect bore of clutch release sleeve for burs, removing burs with handstone. Test fit of sleeve in adjusting plate which should be an easy fit, not so tight that it must be tapped into adjusting plate. Thrust surface of sleeve must be free of any ridges or scores. Replace sleeve if worn or damaged.

**c. Assembly** (fig. 4).

(1) INSTALL CLUTCH ADJUSTING PLATE. Install six flywheel ring adjusting shims on each of six flywheel ring studs. Stagger shims so they alternately face right and left. Aline slots in adjusting plate with flywheel ring studs and place adjusting plate into seat and on top of adjusting shims. Place adjusting straps on each stud and secure adjusting plate to flywheel ring with internal-toothed lock washers and stud nuts.

(2) INSTALL CLUTCH PRESSURE SPRING. Place small end of pressure spring on clutch release sleeve, with end of spring against sleeve spring stop pin. Place flywheel ring and adjusting plate assembly on large end of spring, with end of spring against stop in adjusting plate. Using an arbor press, push down on flywheel ring and install bottom fulcrum ring over clutch sleeve. Position pressure levers around pressure plate with drilled ends in fulcrum ring. Install fulcrum ring balls, top fulcrum ring, and clutch release sleeve snap ring. Remove assembly from arbor press.

(3) INSTALL CLUTCH PRESSURE PLATE. Install clutch flywheel ring on pressure plate studs. Place pressure plate retracting springs and spring retainer washers on studs. Press down on washers and springs, and insert retainer pins through pressure plate studs.

## 9. CLUTCH DISK.

**a. Disassembly** (fig. 4).

(1) REMOVE DISK FACINGS. Drill out rivets holding disk facings to disk, drilling from smooth side of rivet. Lift facings from disk. CAUTION: *Do not use a brake relining machine to remove rivets as it is likely to spring disk.*

**b. Cleaning, Inspection, and Repair.** Inspect all rivets for tightness, replacing loose rivets. Place flywheel side of disk on a surface plate to make sure it lies flat without bend or distortion. If it does not, replace disk. Examine ends of splines in hub of disk. Dress off any burs with a file or handstone. Place disk on splines of main drive gear and note fit of splines; which should allow disk splines to slide easily on splines of main drive gear without binding and with very little side play. If side play is more than barely perceptible, replace disk.

**c. Assembly.**

(1) INSTALL DISK FACINGS (fig. 4). Place the 2 facings on clutch disk. Rivet facings to disk with 30 clutch disk facing rivets. Make certain all rivets are pressed to a uniform thickness. Rivets must be below surface of facings on both sides of disk. Examine disk to be certain it has not been bent or distorted during riveting operation. Replace disk if bent or distorted.

## 10. CLUTCH PILOT BEARING.

**a. Cleaning, Inspection, and Repair.** Clean clutch pilot bearing in dry-cleaning solvent. After drying, turn bearing by hand. If it runs roughly or if balls appear to be worn, replace bearing. This bearing is packed with heat-resistant grease when clutch is assembled and does not require further attention except when replaced, at which time it must be repacked.

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## Section IV
# INSTALLATION

## 11. INSTALL CLUTCH.

**a. Install Clutch Housing** (fig. 2). Attach clutch housing to transmission case with nuts and cotter pins.

**b. Install Clutch Release Bearing** (fig. 2). Slide trunnion block with installed clutch release bearing onto main drive gear bearing cap. Attach trunnion return spring to main drive gear bearing cap cap screw. Test clutch trunnion levers (par. 14).

**c. Install Clutch Pilot Bearing, Disk, and Pressure Plate Assembly.** Refer to TM 9-817.

**d. Install Transmission.** Refer to TM 9-817.

# CLUTCH

## Section V

# TEST AND ADJUSTMENT

## 12. GENERAL.

**a.** Original setting of the clutch provides for approximately 1½ inch of free pedal movement between pedal and toeboard or stop. Clutch readjustment is necessary when this clearance is reduced to three-fourths inch or less. Do not make pedal adjustment. Check distance between clutch release sleeve and rear face of clutch flywheel ring. When clutch is properly adjusted, this distance will measure 1⅛ to 1$^{3}/_{16}$ inches (fig. 5). It is not safe to depend on free pedal movement alone without checking this dimension. Distance between clutch release sleeve and rear face of clutch flywheel ring is controlled by flywheel ring adjusting shims. On this clutch, one shim moves the clutch release sleeve seven sixty-fourths inch. Movement of sleeve should not be less than one-half inch, and not more than nine-sixteenths inch in order to obtain proper clutch release. If less than one-half inch, add one shim; if more than nine-sixteenths inch, remove one shim.

## 13. ADJUSTMENT OF INSTALLED CLUTCH.

**a. Remove Clutch Housing Cover Plates.** Remove top and bottom clutch housing cover plates.

**b. Disconnect Linkage.** Disconnect clutch control rod clevis from clutch throwout shaft lever by removing cotter pin and clutch control rod clevis pin.

**c. Block Lever in Release Position.** Block clutch throwout shaft lever in full-release position.

**d. Turn Engine.** Use hand crank to turn engine until adjusting strap and shim pack are accessible through clutch housing opening.

**e. Loosen Adjusting Nuts.** With clutch in released position, back off the six adjusting (clutch flywheel ring stud) nuts about five full turns.

**f. Remove Blocking.** Remove blocking from clutch throwout shaft lever. This will move clutch adjusting plate away from shims.

**g. Remove Shims.** Remove shims as necessary to obtain 1⅛ to 1$^{3}/_{16}$ inches clearance between face of clutch release sleeve and rear face of clutch flywheel ring. To ensure full contact between pressure plate and disk, always remove same number of shims from each pack.

## 14. TEST OF CLUTCH TRUNNION LEVERS.

**a. Check Contact of Levers** (fig. 2). Check contact of clutch trunnion levers and lugs on clutch release trunnion block. Insert a feeler between each lug and lever at the same time. Uneven contact will not permit the block to slide freely and poor clutch engagement

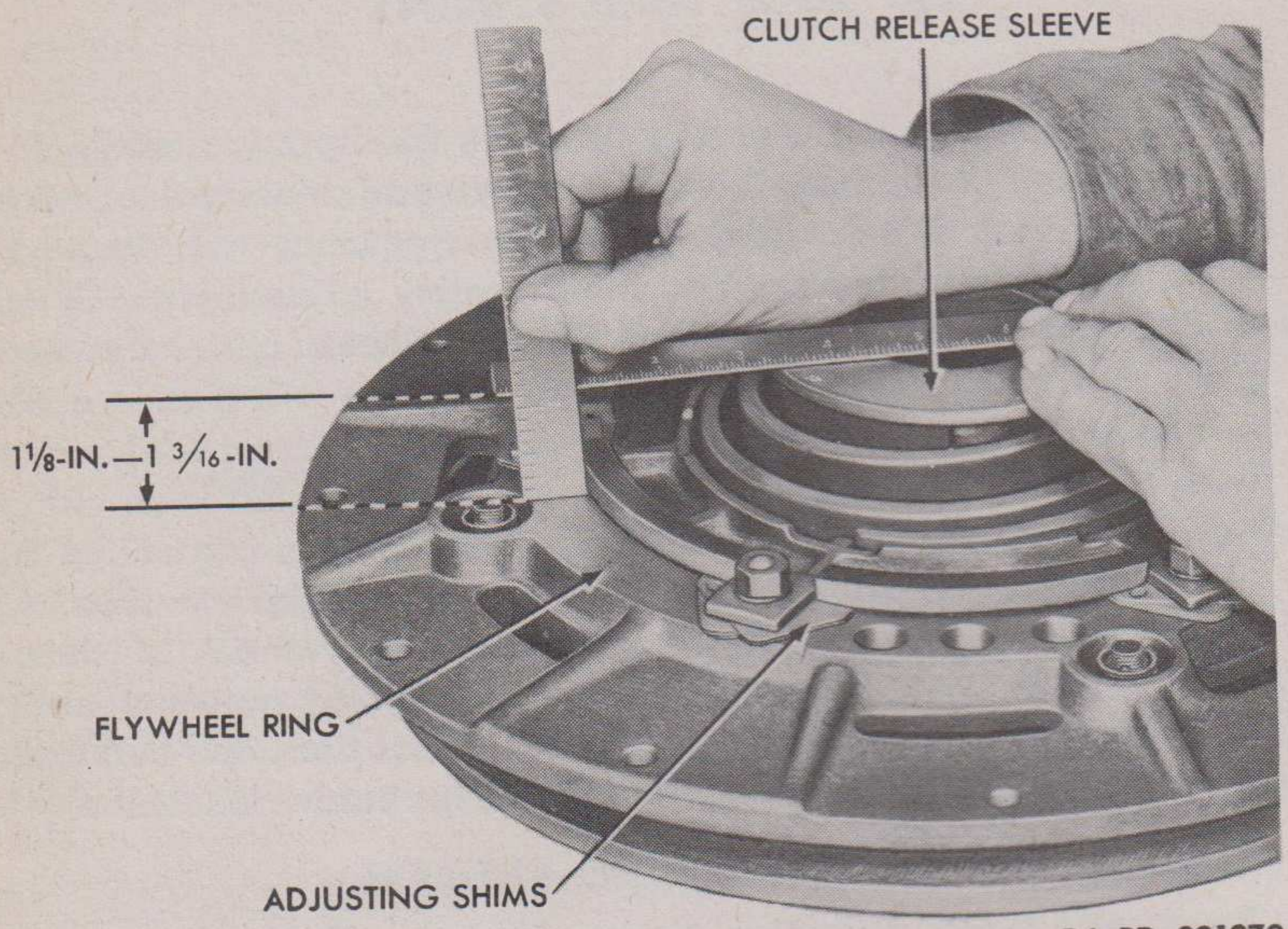


***Figure 5 — Clutch Adjustment***

will result. If necessary, file trunnion lever to provide even contact with trunnion block lugs.

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Section VI

## FITS AND TOLERANCES

### 15. FITS AND TOLERANCES.

**a. Clutch Disk.**

| | |
|---|---|
| Hub to shaft spline clearance | 0.001 to 0.005 in. |
| Out-of-true (warp) measured 1½ in. from outer edge | 0.002 to 0.003 in. |

**b. Pressure Plate.**

| | |
|---|---|
| Driving lugs to slots in flywheel ring | 0.004 to 0.006 in. |
| Out-of-true (warp) maximum | 0.015 in. |
| Adjusting shims, quantity used under each strap with new facings | 8 |
| Pressure spring pressure at 1¼-in. height | 535 lb |

**c. Clutch Pedal.**

| | |
|---|---|
| Toeboard clearance | 1 in. |

# CHAPTER 3

# TRANSMISSION

## Section I

## DESCRIPTION AND DATA

### 16. DESCRIPTION AND OPERATION.

**a. Description** (fig. 6). This transmission, a selective-gear type having five forward speeds and one reverse, is equipped with helical gears running in constant mesh in third speed and overdrive. Fourth speed is direct drive and fifth speed is overdrive. A power take-off opening is located on right-hand side of transmission case. A bell housing, containing the clutch release or throwout mechanism, is attached to the front of the transmission case. The gearshift lever is attached to a stub which is mounted in a bracket on the transmission cover and extends into slots in shifting rod arms and forks attached to gearshift rods. Four rod plungers and springs are located in the rear of transmission case underneath the gearshift rods. Three interlock plungers are placed between rods in the front of the case, and lock in place any rods that should not move when transmission is shifted into any desired speed. The main drive gear, which receives power from the engine through the clutch, has a splined shaft for engagement with splined hub in the clutch disk. It is supported in the transmission case by a ball bearing housed in a bearing retainer. This retainer is held in place by main drive gear bearing cap which serves as a pilot for the bell housing and a seat for the clutch release or throwout mechanism. A roller bearing in the recess of the main drive gear provides front support for the transmission mainshaft. A ball bearing in a bearing retainer supports the mainshaft at the rear.

**b. Operation.** Engine power is transmitted through the clutch to the main drive gear. Power flow through transmission in various gear speeds follows: NOTE: *All key letters in this subparagraph refer to figure 6.*

(1) FIRST SPEED (A). Main drive gear to countershaft drive gear, through countershaft, up to first speed slide gear on mainshaft, and out.

(2) SECOND SPEED (B). Main drive gear to countershaft drive gear, through countershaft, up to second speed slide gear on mainshaft, and out.

(3) THIRD SPEED (C). Third and fourth speed clutch ring engages with third and fourth speed clutch driver on mainshaft. Power flows from main drive gear to countershaft drive gear, to third speed

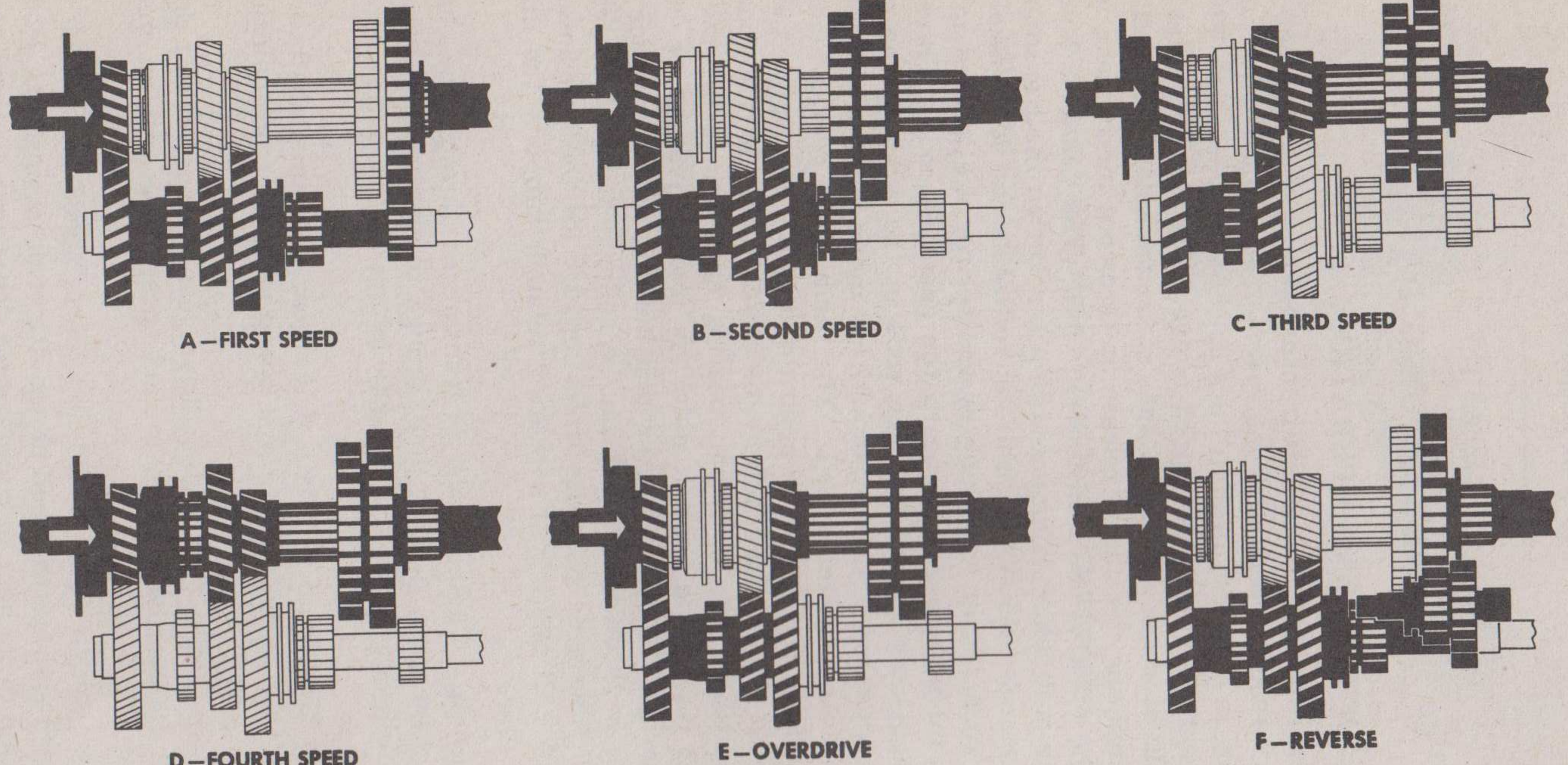


*Figure 6 — Transmission Power Flow*

A—MAIN DRIVE GEAR BEARING RETAINER
B—MAIN DRIVE GEAR
C—THIRD AND FOURTH SPEED CLUTCH RING
D—THIRD AND FOURTH SPEED CLUTCH DRIVER
E—MAIN SHAFT OVERSPEED GEAR
F—SECOND SPEED SLIDE GEAR
G—FIRST SPEED SLIDE GEAR
H—FIRST AND SECOND SPEED SLIDE GEAR SLEEVE
J—MAIN SHAFT
K—COUNTERSHAFT FRONT BEARING LOCK NUT
L—PLAIN WASHER
M—LOCK NUT WASHER
N—COUNTERSHAFT FRONT BEARING INNER RACE
P—COUNTERSHAFT DRIVE GEAR
Q—POWER TAKE-OFF DRIVING GEAR
R—THIRD SPEED COUNTERSHAFT GEAR
S—OVERDRIVE COUNTERSHAFT GEAR
T—OVERDRIVE COUNTERSHAFT GEAR CLUTCH RING
U—COUNTERSHAFT
V—REVERSE GEAR SHAFT
W—REVERSE GEAR

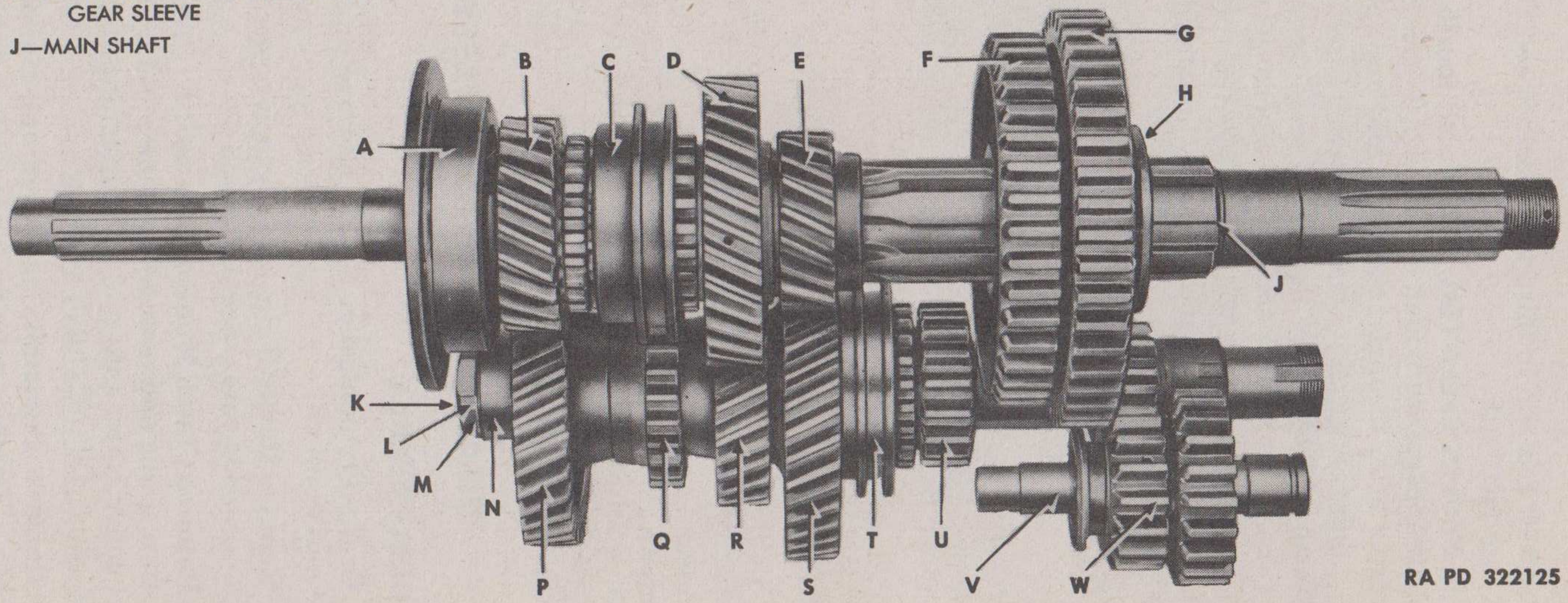


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*Figure 7 — Transmission Gears and Shafts*

countershaft gear, up to third and fourth speed clutch driver on mainshaft, and out.

(4) FOURTH SPEED (D). Third and fourth speed clutch ring on mainshaft engages with main drive gear. Power flows directly through main drive gear, through mainshaft, and out.

(5) OVERDRIVE (E). Overdrive countershaft clutch ring engages with countershaft. Power flows from main drive gear to countershaft drive gear, up through mainshaft overspeed gear, and out.

(6) REVERSE (F). Main drive gear to countershaft drive gear, through countershaft reverse gear, up through first speed sliding gear on mainshaft, and out.

## 17. DATA.

| | |
|---|---|
| Make | Autocar |
| Gear ratios: | |
| Reverse | 7.37 to 1 |
| First | 5.90 to 1 |
| Second | 3.60 to 1 |
| Third | 1.84 to 1 |
| Fourth (direct) | 1.00 to 1 |
| Fifth (overdrive) | 0.75 to 1 |
| Oil capacity: | |
| Summer | 8 qt |
| Winter | 10 qt |

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### Section II

# DISASSEMBLY INTO SUBASSEMBLIES

## 18. DISASSEMBLY.

**a. Drain Transmission Case.** Remove drain plug from bottom of case and drain oil.

**b. Remove Power Take-off.** Detach power take-off and adapter from transmission case. See paragraph 31.

**c. Remove Clutch Housing Assembly.** Free clutch release trunnion return spring and remove trunnion block and clutch release bearing. Remove cotter pins and nuts attaching clutch housing to transmission case. Lift off clutch housing.

**d. Remove Transmission Cover and Gearshift Lever Bracket Assembly.** Remove cap screws and lock washers attaching cover to

## TRANSMISSION

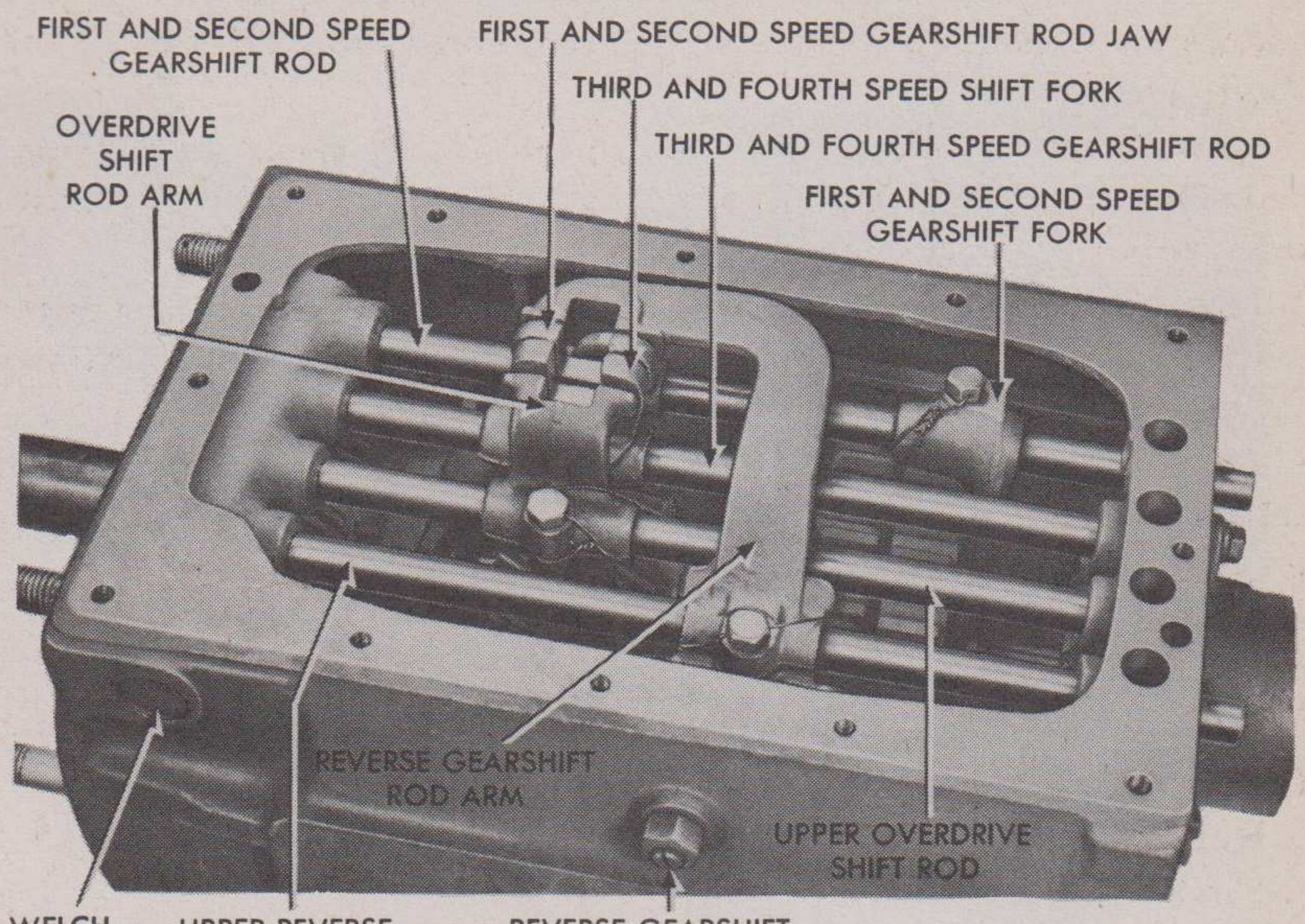


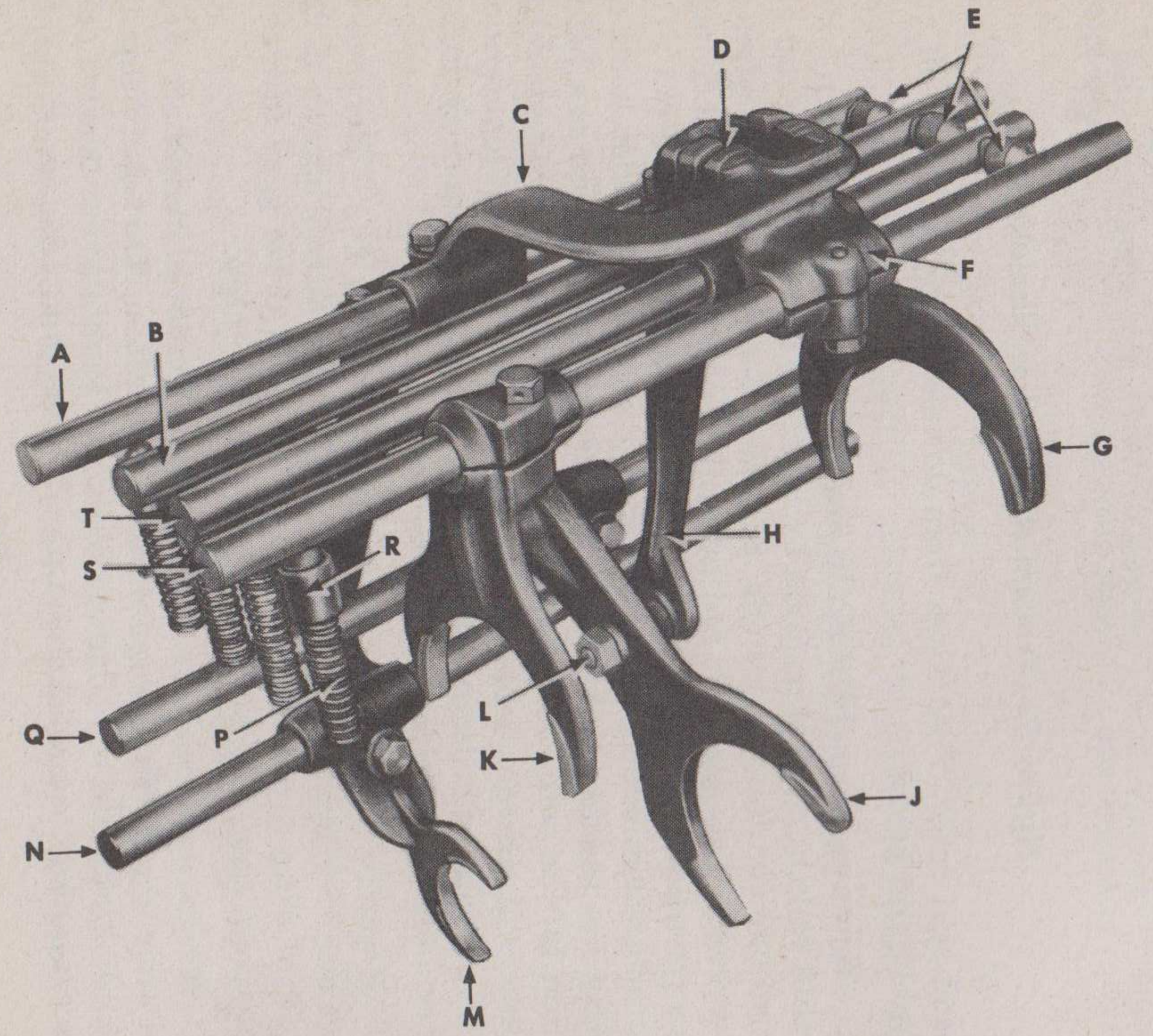

***Figure 8 — Transmission Cover Removed***

transmission case. Free cover from dowels by prying. Lift off cover assembly and gasket.

**e. Remove Gearshift Rods and Arms** (figs. 8 and 9). Place gearshift rods in neutral position by lining up slots in shifting rod arms to form one continuous slot (fig. 8). Remove rod arm lock wires and cap screws. Tap gearshift rod out either end of case about 5 inches. Grasp protruding end of rod with one hand and pull rod out of rod arm and transmission case, at the same time placing other hand over opening in case to catch rod plunger and spring, which are held in position by the rod and will pop out when rod is pulled out of case. Remove rod plunger from other end of case. Repeat operation to remove remaining rods and arms. NOTE: *No plungers or springs are used on lower overdrive and reverse rods.*

**f. Remove Main Drive Gear Assembly** (fig. 10). Remove cap screws and lock washers attaching main drive gear bearing cap to case. Lift off bearing cap and gasket. Tap on main drive gear to free assembly from case. Lift off main drive gear assembly.

**g. Remove Mainshaft Assembly.** Remove mainshaft flange cotter pin and nut. Tap flange of mainshaft spline. Do not use a puller, as it is likely to bend the edge of the flange. Remove rear bearing cover cap screws and lock washers. Lift off cover and retainer shims and




A—UPPER REVERSE GEARSHIFT ROD
B—UPPER OVERDRIVE SHIFT ROD
C—REVERSE GEARSHIFT ROD ARM
D—OVERDRIVE SHIFT ROD ARM
E—GEARSHIFT ROD INTERLOCK PLUNGERS
F—FIRST AND SECOND SPEED GEARSHIFT ROD JAW
G—THIRD AND FOURTH SPEED SHIFT FORK
H—OVERDRIVE SHIFT ROD ARM
J—OVERDRIVE SHIFT FORK
K—FIRST AND SECOND SPEED GEARSHIFT FORK
L—OVERDRIVE SHIFT ROD ARM AND FORK CONNECTING PIN
M—REVERSE GEARSHIFT FORK
N—LOWER REVERSE GEARSHIFT ROD
P—GEARSHIFT ROD SPRING
Q—LOWER OVERDRIVE SHIFT ROD
R—GEARSHIFT ROD PLUNGER
S—FIRST AND SECOND SPEED GEARSHIFT ROD
T—THIRD AND FOURTH SPEED GEARSHIFT ROD

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*Figure 9 — Transmission Gearshift Rods and Arms*

# TRANSMISSION

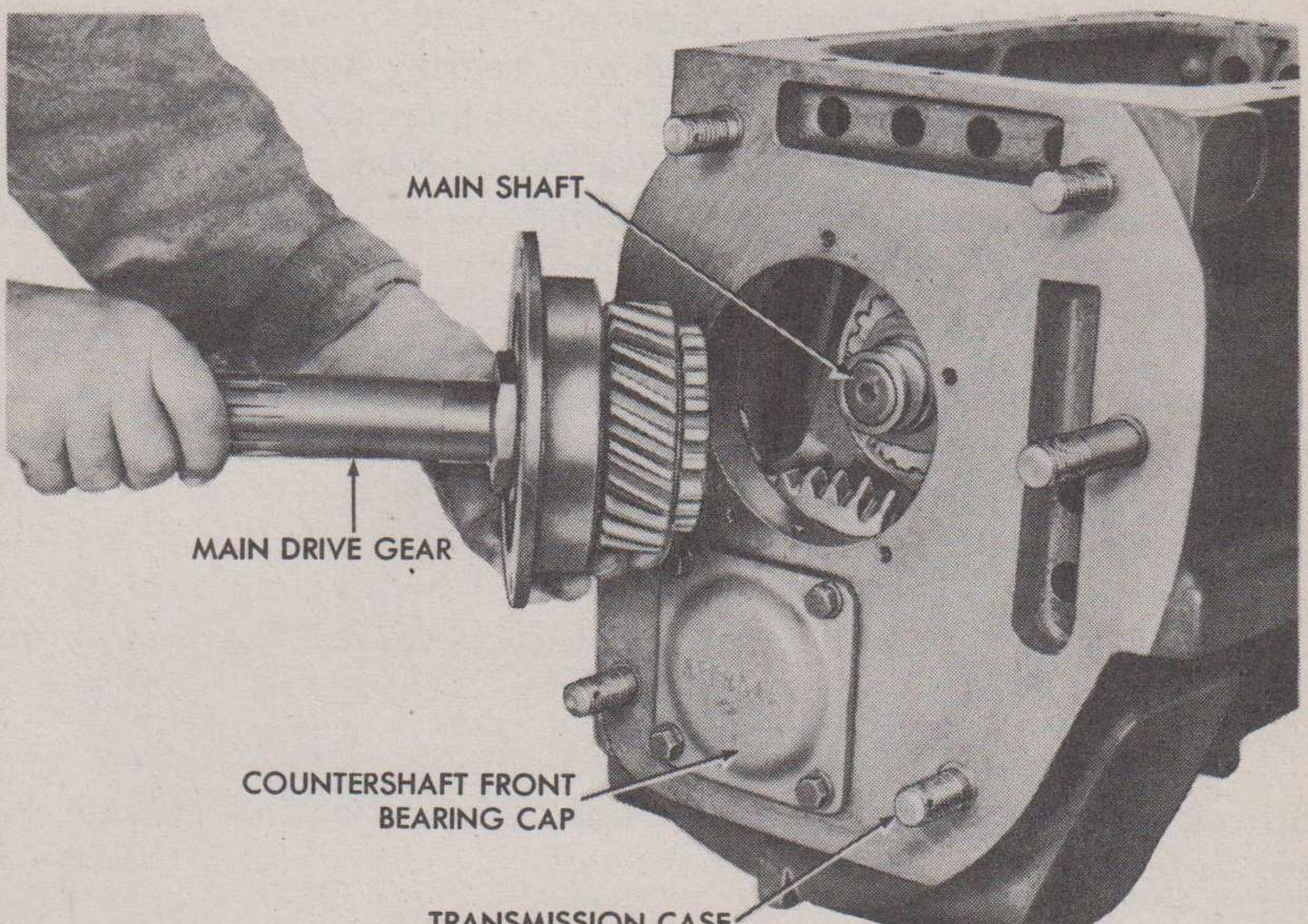


***Figure 10 — Removing Main Drive Gear***

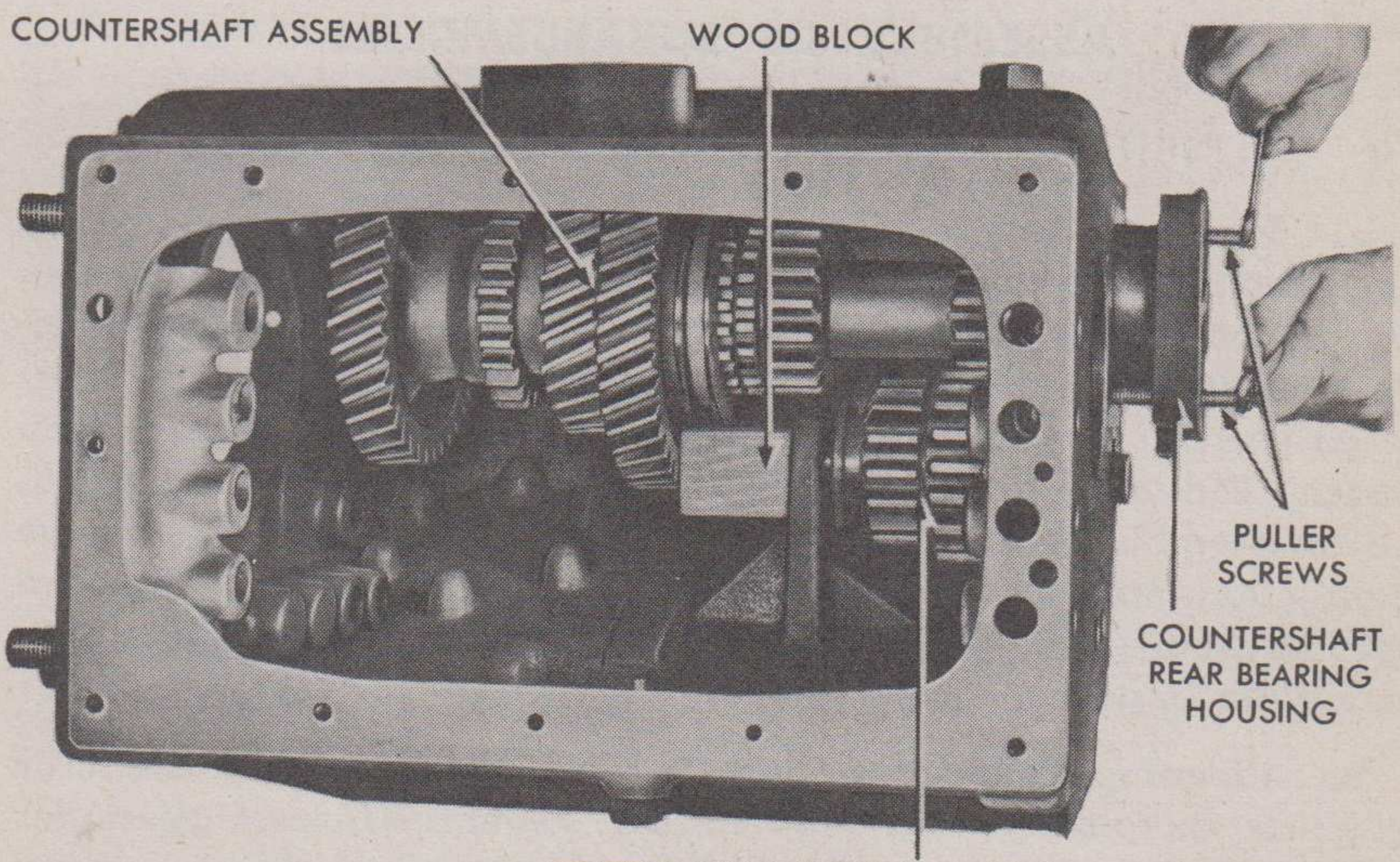


***Figure 11 — Removing Countershaft Rear Bearing Housing***

slide flange spacer off mainshaft spline. Insert puller screws into two threaded holes on face of bearing housing. Turn screws evenly against transmission case, and draw bearings and bearing housing about halfway out of case. Tap mainshaft with a soft hammer to free bearings from shaft; then finish drawing out bearings and bearing housing. Lift mainshaft assembly up and out through top opening of transmission case.

**h. Remove Countershaft Assembly** (fig. 11). Remove cap screws and lock washers attaching front and rear countershaft bearing caps to transmission case. Lift off caps and shims. Remove rear bearing nut, lock washer, and plain washer. Place a wood block between overdrive countershaft gear and reverse gear shaft support (fig. 11). Draw countershaft rear bearings and bearing housing out of transmission case with puller screws. Lift countershaft assembly out of transmission case.

**i. Remove Reverse Gear Shaft Assembly.** Tap reverse gear shaft out of its support, through bore of gear, and out of transmission case. Lift out reverse gear.

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## Section III

# DISASSEMBLY, CLEANING, INSPECTION, REPAIR, AND ASSEMBLY OF SUBASSEMBLIES

### 19. MAINSHAFT.

**a. Disassembly** (fig. 12). Slide third and fourth speed clutch ring off clutch driver. Slide first and second speed slide gear assembly off mainshaft. Remove mainshaft thrust nut and lock washer. Place assembly in an arbor press and press mainshaft through overspeed gear, third speed gear, and the third and fourth speed clutch driver. Pull main drive gear bearing inner race off end of mainshaft. To disassemble first and second speed slide gear assembly, remove eight nuts, tap out bolts, and pry gears off gear sleeve. Remove bushing from third speed gear only if damaged or worn. See subparagraph **b**, below.

**b. Cleaning, Inspection, and Repair.** Using a stiff brush, scrub all parts thoroughly with dry-cleaning solvent. Inspect gears for cracks, chipped or broken teeth, and evidence of wear. Replace gears if such defects are found. Examine shaft for chipped, scored, or twisted splines; if found, install a new shaft. Carefully examine third

# TRANSMISSION

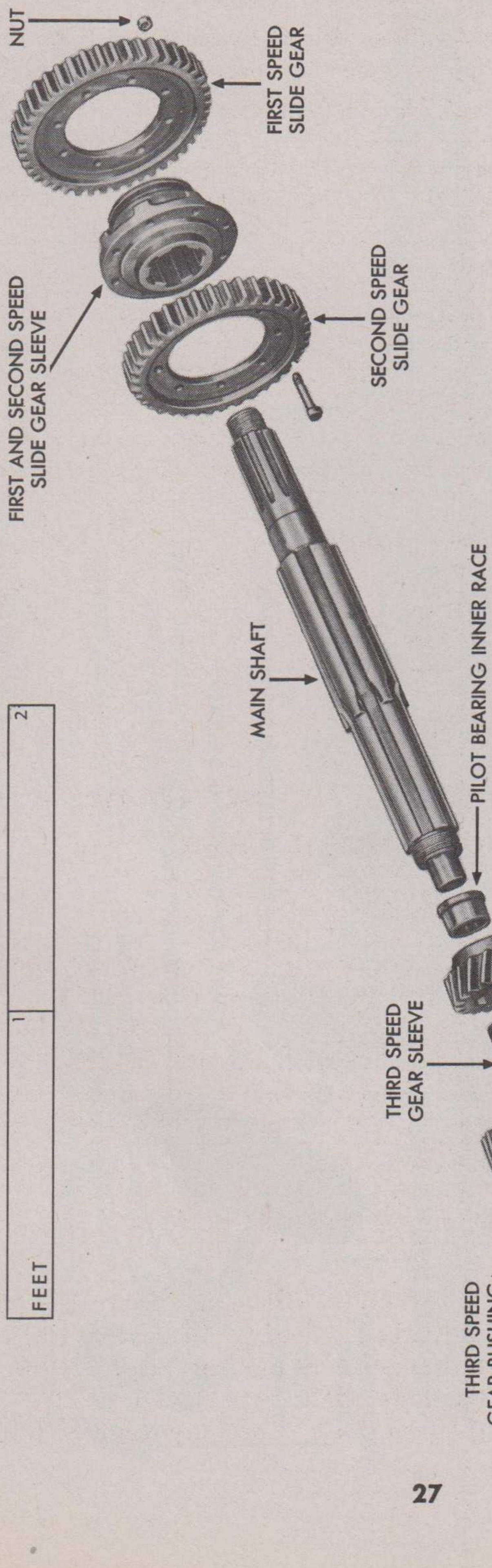



***Figure 12 — Mainshaft Disassembled***

# ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

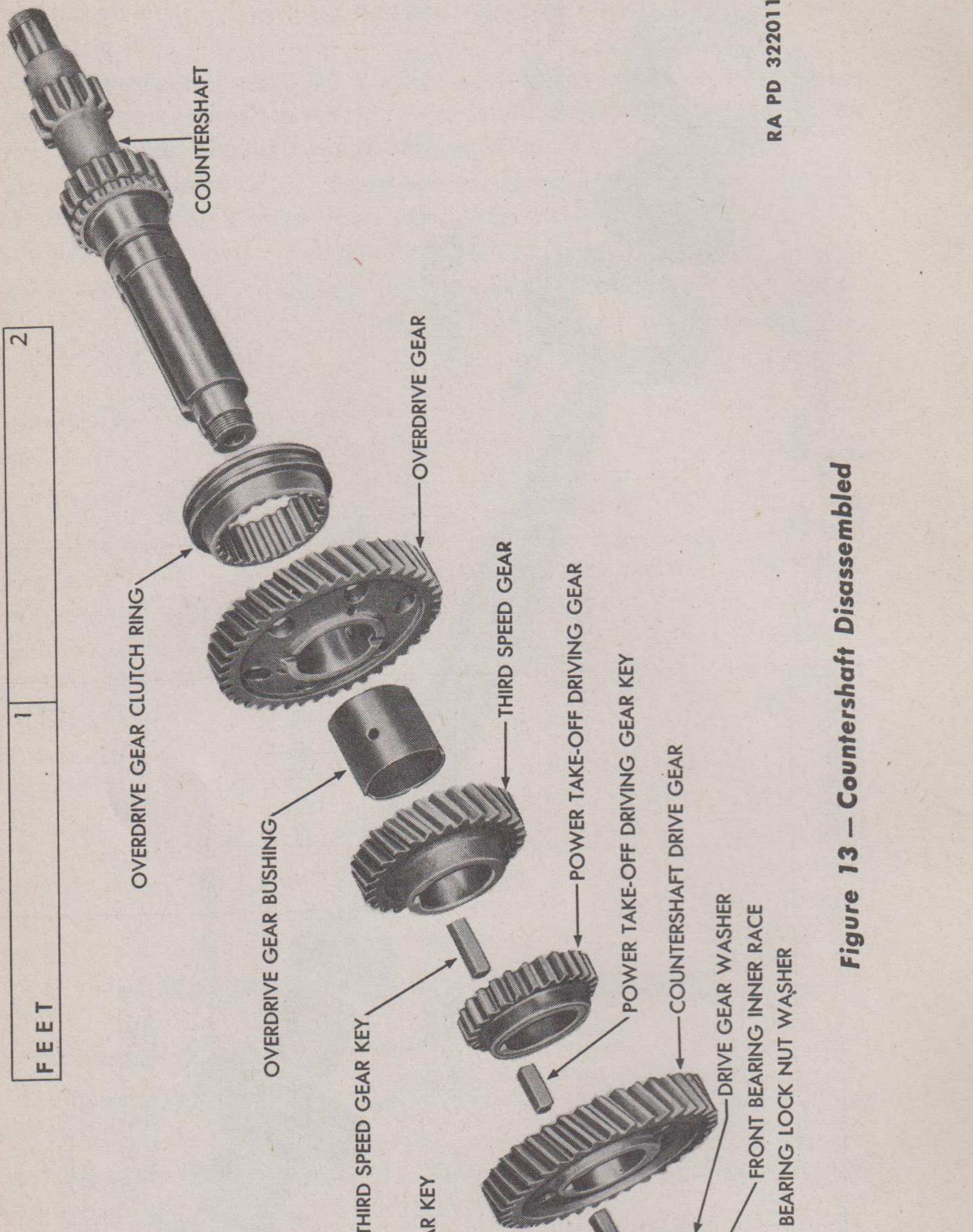



***Figure 13 — Countershaft Disassembled***

speed gear bushing and sleeve for clearance, scoring, and galling. Replace sleeve if end clearance of 0.004 inch to 0.006 inch is not obtained. Remove burs or ridges from edge of bushing with handstone. If bushing is scored or worn to a point where a feeler gage evidences a radial clearance in excess of 0.010 inch, replace it. To replace worn bushing, first remove old bushing, using an arbor press. Clean bore of gear and remove all burs with a handstone. Lubricate outside diameter of bushing and inside diameter of gear. Press new bushing fully into gear and bend over one edge into slot on gear to lock bushing in position. Drill oilholes in bushing through holes in gear. If necessary to increase the diameter of the bushing to fit it properly to the sleeve, do so with a reamer or a honing tool. Remove all burs and sharp edges resulting from pressing, drilling, or fitting operations.

**c. Assembly** (fig. 12). Press overspeed gear on shaft with an arbor press. Slide third speed gear sleeve in position on shaft. Slide third speed gear with installed bushing onto sleeve. Press third and fourth speed clutch driver on shaft. Install thrust nut lock washer and nut, tighten nut, and bend edge of lock washer over nut. Press main drive bearing inner race on end of shaft. Slide clutch ring over clutch driver. Assemble first and second speed slide gears by lining up both gears with bolt holes in gear sleeve, inserting bolts, and threading on nuts. Tighten nuts and peen over ends of bolts. Slide this assembly into position on shaft.

## 20. COUNTERSHAFT.

**a. Disassembly** (fig. 13). Remove front bearing lock nut and lock washer. Using an arbor press, press countershaft drive gear, drive gear washer, and front bearing inner race off shaft. Press off power take-off driving gear. Press off third-speed gear. Tap drive gear, power take-off, and third-speed gear keys out of countershaft keyway. Slide overdrive gear and clutch ring off shaft. Remove bushing from overdrive gear only if damaged or worn (subpar. **b**, below).

**b. Cleaning, Inspection, and Repair.** Follow cleaning, inspection, and repair procedure outlined for mainshaft assembly (par. 19 **b**). Fit, clearance, and replacement of countershaft overdrive gear bushing is the same as for mainshaft third speed gear (par. 19 **b**).

**c. Assembly** (fig. 13). Place overdrive gear clutch ring on overdrive gear, and slide this assembly on countershaft. Install third speed gear key in shaft keyway and press third-speed gear on shaft. Install power take-off gear key and press on power take-off driving gear. Install drive gear key and press drive gear on shaft. Position drive gear washer and press on front bearing inner race. Install front bearing lock nut washer and lock nut. Tighten nut and bend edge of washer over nut.

## ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

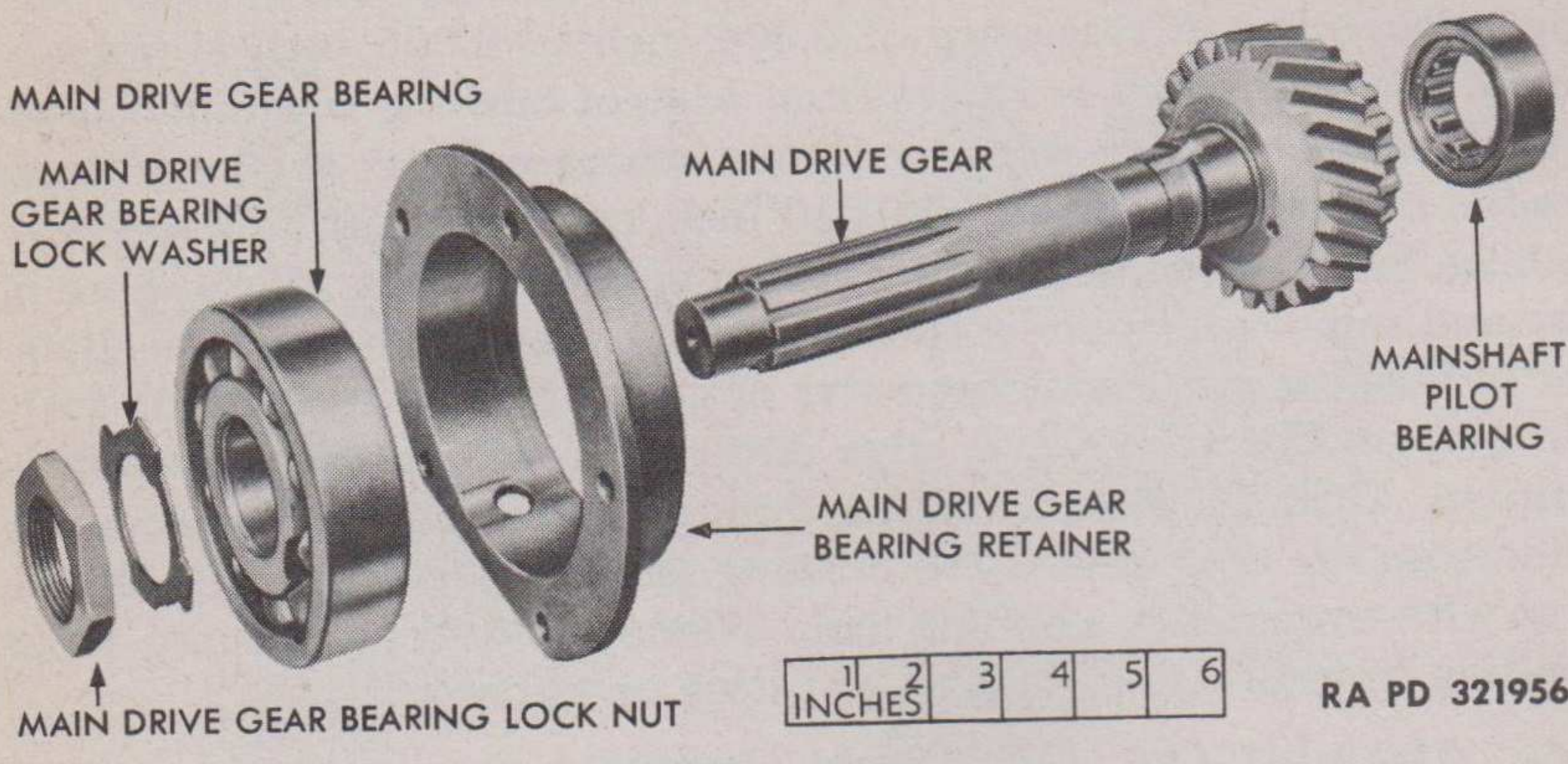



***Figure 14 — Main Drive Gear Disassembled***

### 21. MAIN DRIVE GEAR.

**a. Disassembly** (fig. 14). Remove main drive gear bearing lock nut and washer. Using an arbor press, press off main drive gear bearing and bearing retainer. Press bearing out of retainer. Using a brass drift through opening on back of main drive gear, tap out mainshaft pilot bearing.

**b. Cleaning, Inspection, and Repair.** Wash all parts in dry-cleaning solvent. Immerse bearings in dry-cleaning solvent in which no other parts have been previously cleaned, keeping them in dry-cleaning solvent long enough to dissolve heavy particles of coagulated lubricant. Rotate bearings while holding them in dry-cleaning solvent. Check bearings for out-of-round condition and for discoloration of balls or rollers caused by overheating. Except for stoning to remove light scores or gall marks, do not attempt to repair a bearing. After inspection, dip bearings in lubricant and set aside in a clean container, or wrap in paper. Inspect main drive gear for cracks, chipped or broken teeth, and scored or twisted spline. Replace gear if such conditions are found. Examine bearing retainer for cracks or fractures, and replace if such defects are found.

**c. Assembly** (fig. 14). Press mainshaft pilot bearing into recess in main drive gear. Press main drive gear bearing into bearing retainer, then press this assembly on main drive gear shaft. Install bearing lock washer and nut, tighten nut, and bend edge of washer over nut.

### 22. REVERSE GEAR.

**a. Disassembly** (fig. 15). Place assembly in a vise and remove rear needle bearing snap ring. Force out rear needle bearing washer

## TRANSMISSION

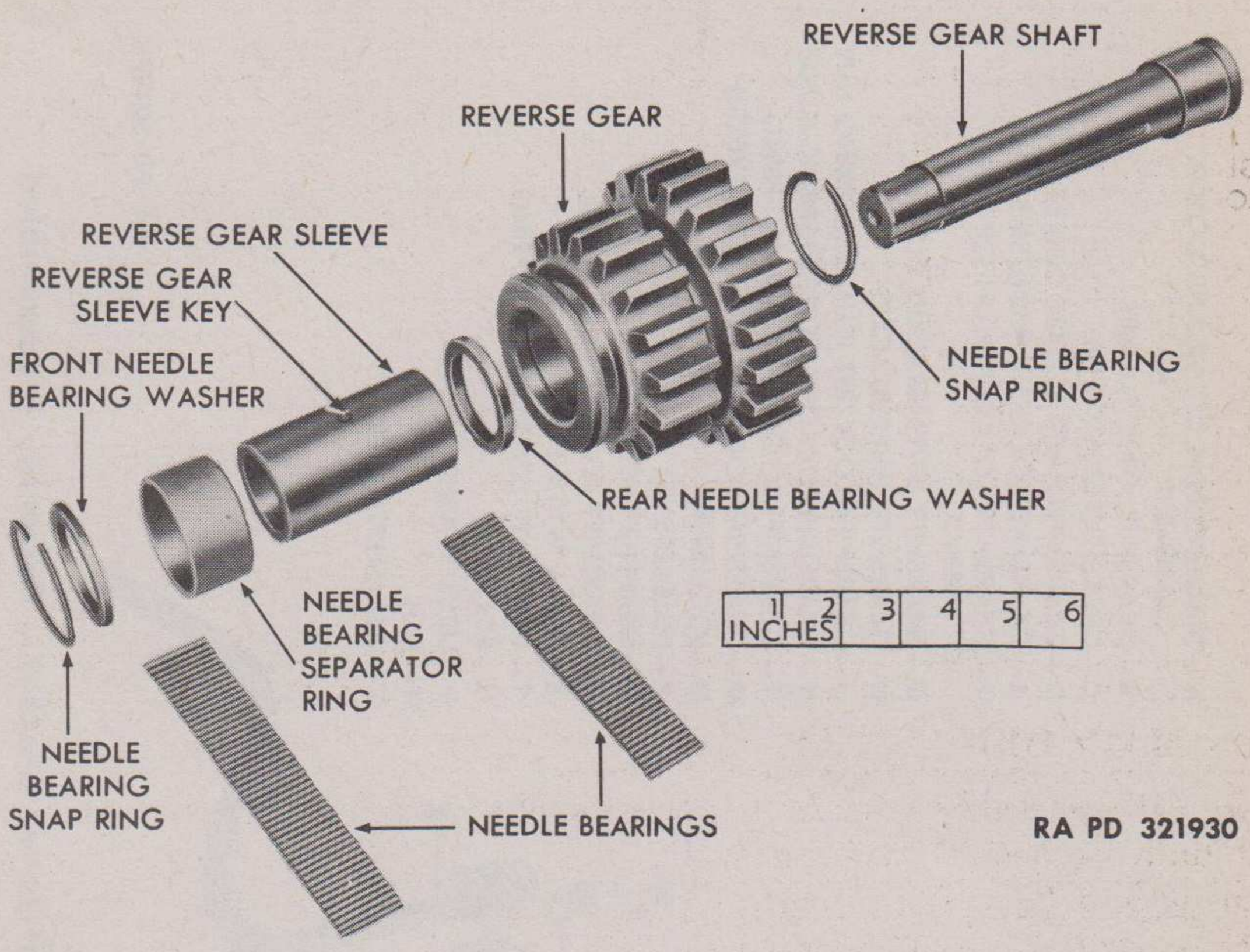
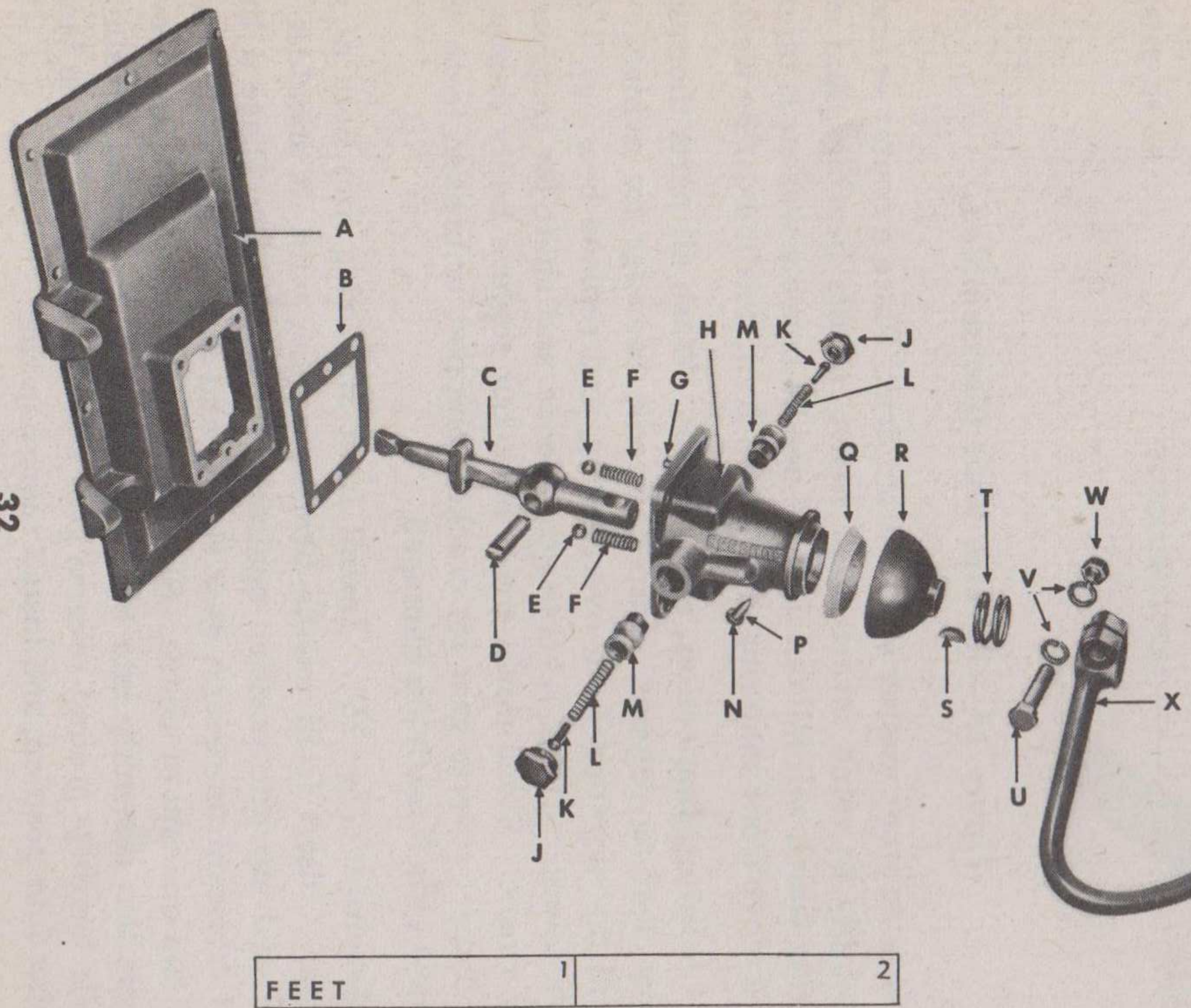



***Figure 15 — Reverse Gear Disassembled***

by tapping on front washer with a brass drift. Place a container under the assembly to catch reverse gear sleeve, needle bearings, and separator ring which will fall out as front needle bearing washer is tapped free. Remove front snap ring, and tap off front needle bearing washer.

**b. Cleaning, Inspection, and Repair.** Wash all parts thoroughly in dry-cleaning solvent. Inspect needle bearings for evidence of wear and discoloration from overheating, and replace bearings if defects are found. Check reverse gear sleeve and shaft for roughness, burs, or ridges. Stone down small burs, but replace badly damaged parts. Inspect reverse gear for cracked, chipped, or broken teeth and install new gear if teeth are damaged.

**c. Assembly** (fig. 15). Install front snap ring into bore of reverse gear. Insert front needle bearing washer with its shoulder to the rear and tap into position against front snap ring. Place a thin layer of lubricant on reverse gear sleeve, and arrange 53 needle bearings around one end of sleeve. Slide bearing separator ring on sleeve, and insert this assembly into bore of reverse gear. Install remaining 53 needle bearings around reverse gear sleeve. Tap rear needle bearing washer into position, and install rear snap ring.




A—TRANSMISSION COVER AND DOWEL ASSEMBLY
B—GEARSHIFT GATE GASKET
C—GEARSHIFT LEVER STUB
D—GEARSHIFT LEVER SOCKET CENTER PIN
E—GEARSHIFT LOCKOUT PLUNGER BALL
F—GEARSHIFT LOCKOUT PLUNGER BALL SPRING
G—GEARSHIFT LEVER BRACKET DOWEL
H—GEARSHIFT LEVER BRACKET
J—GEARSHIFT LOCKOUT PLUNGER SPRING NUT
K—GEARSHIFT LOCKOUT PLUNGER SPRING GUIDE
L—GEARSHIFT LOCKOUT PLUNGER SPRING
M—GEARSHIFT LOCKOUT PLUNGER (REVERSE)
N—LOCK NUT
P—HEADLESS SET SCREW
Q—GEARSHIFT LEVER SOCKET OIL SEAL
R—GEARSHIFT LEVER SOCKET COVER
S—NO. A WHITNEY KEY
T—GEARSHIFT LEVER SOCKET SPRING
U—BOLT
V—LOCK WASHER
W—NUT
X—GEARSHIFT LEVER

***Figure 16 — Transmission Cover and Gearshift Lever Bracket — Assembly Disassembled***

## 23 TRANSMISSION COVER AND GEARSHIFT LEVER BRACKET.

**a. Disassembly.**

(1) REMOVE GEARSHIFT LEVER (fig. 16). Remove nut, bolt, and lock washers attaching gearshift lever socket spring.

(2) REMOVE SOCKET COVER (fig. 16). Remove key from gearshift lever stub, and lift off socket cover and oil seal.

(3) REMOVE REVERSE LOCK-OUT PLUNGERS (fig. 16). Back off two lock-out plunger spring nuts, and remove springs and spring guides. From inside of bracket, tap out two reverse gearshift lock-out plungers. At the same time reverse two plunger balls which will drop out.

(4) REMOVE GEARSHIFT LEVER STUB (fig. 16). Loosen lock nut and back off set screw from side of gearshift lever bracket. Slightly turn gearshift lever stub; then pull stub out through bottom of bracket. Remove center pin from stub.

(5) REMOVE GEARSHIFT LEVER BRACKET (fig. 16). Remove four cap screws and lock washers attaching bracket to transmission cover. Pry bracket free of dowels, and lift off bracket and gasket.

(6) REMOVE LOCK-OUT PLUNGER BALL SPRINGS (fig. 16). Remove two lock-out plunger ball springs from seats in gearshift lever bracket.

**b. Cleaning, Inspection, and Repair.** Wash all parts thoroughly in dry-cleaning solvent. Remove all traces of old lubricant and dirt. Examine gearshift lever bracket and transmission cover for cracks, tapping with hammer to test for breaks which might not otherwise be evident. Replace bracket or cover if cracks are found. Inspect all plunger springs, replacing those weakened. If socket oil seal is worn or damaged, install a new seal. Examine the gearshift lever for cracks, and replace if found.

**c. Assembly.**

(1) INSTALL LOCK-OUT PLUNGER BALLS AND SPRINGS (fig. 16). Hold gearshift lever bracket in a vise, and install lock-out plunger ball springs and balls.

(2) INSTALL GEARSHIFT LEVER STUB (fig. 16). Insert socket center pin into gearshift lever stub. Insert stub into bracket with stub keyway facing toward front (set screw side) of bracket. Install and tighten set screw and lock nut.

(3) INSTALL REVERSE LOCK-OUT PLUNGERS (fig. 16). Through openings in bracket, press down on lock-out plunger balls and install reverse lock-out plungers, plunger springs, spring guides, and spring nuts.

(4) INSTALL GEARSHIFT LEVER BRACKET (fig. 16). Place a new gasket and the gearshift lever bracket in position on transmission

# ORDNANCE MAINTENANCE — POWER TRAIN, CHASSIS, AND BODY FOR 5- TO 6-TON PONTON TRACTOR TRUCK (AUTOCAR MODEL U8144T)

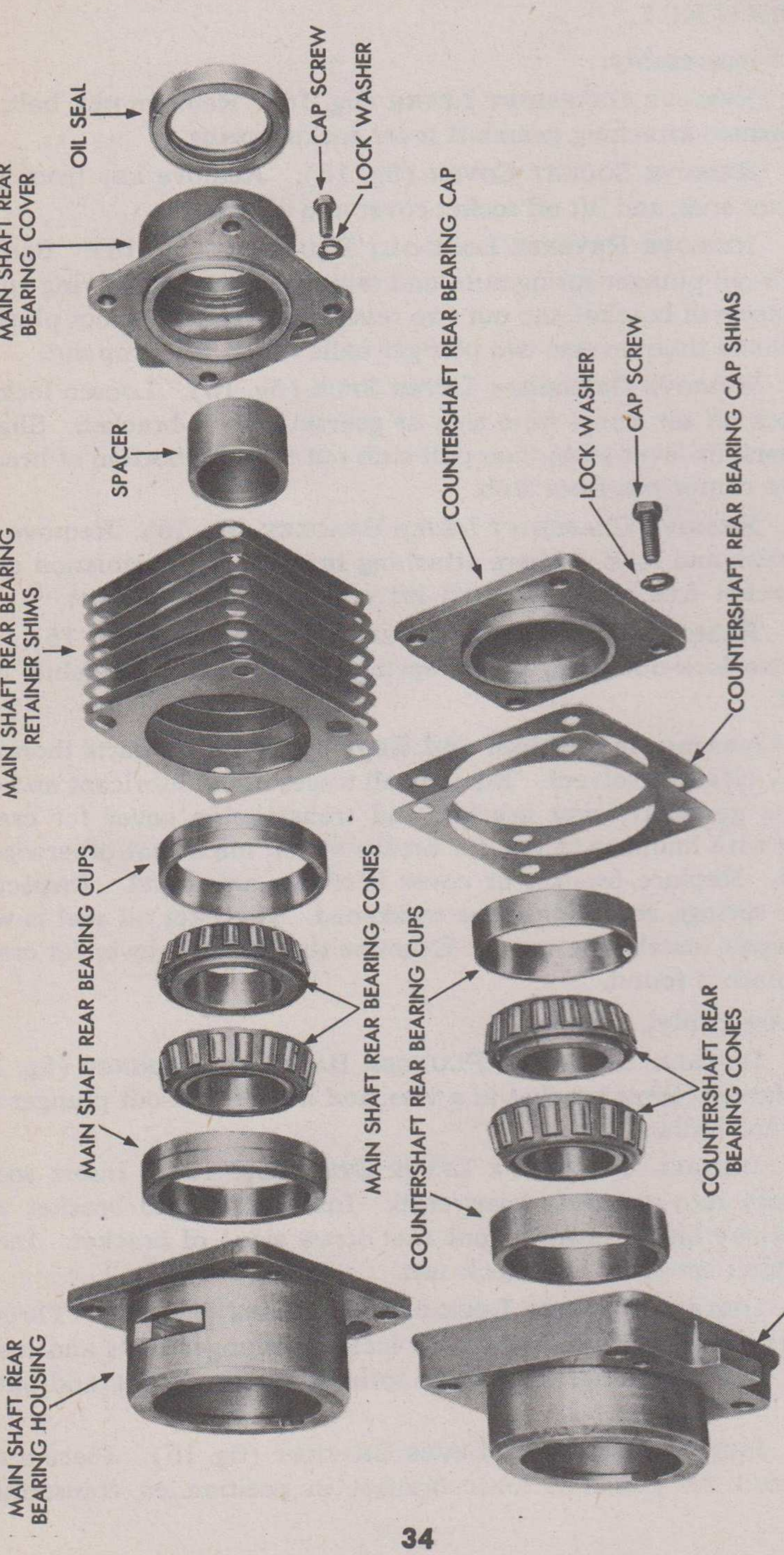



***Figure 17 — Mainshaft and Countershaft Rear Bearing Disassembled***