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TM 9-1817

WAR DEPARTMENT TECHNICAL MANUAL

K2-14

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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and Body for 5- to 6-Ton
Ponton Tractor Truck
(Autocar Model U8144T)



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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.

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

CONTENTS

		Paragraphs	Pages
CHAPTER	1. INTRODUCTION	1- 2	6- 7
CHAPTER	2. CLUTCH	3- 15	8- 18
SECTION	I. Description and data	3- 4	8- 9
	II. Removal	5	9- 10
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	6- 10	10- 16
	IV. Installation	11	16
	V. Test and adjustment	12- 14	17- 18
	VI. Fits and tolerances	15	18
CHAPTER	3. TRANSMISSION	16- 28	19- 38
SECTION	I. Description and data	16- 17	19- 22
	II. Disassembly into subassemblies	18	22- 26
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	19- 25	26- 36
	IV. Assembly of transmission	26	36- 38
	V. Test	27	38
	VI. Fits and tolerances	28	38
CHAPTER	4. POWER TAKE-OFF	29- 34	39- 45
SECTION	I. Description and data	29- 30	39- 40
	II. Removal	31	40- 41
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	32- 33	41- 45
	IV. Installation	34	45
CHAPTER	5. TRANSFER CASE	35- 44	46- 63
SECTION	I. Description and data	35- 36	46- 50
	II. Disassembly into subassemblies	37	50- 51
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	38- 42	52- 61
	IV. Assembly of transfer case	43	61- 62
	V. Fits and tolerances	44	62- 63
CHAPTER	6. DRIVE SHAFTS	45- 50	64- 68
SECTION	I. Description and data	45	64- 65
	II. Disassembly	46- 47	65- 67
	III. Cleaning, inspection, and repair	48	67- 68
	IV. Assembly	49- 50	68

★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.

CONTENTS—Contd.

		Paragraphs	Pages
CHAPTER	7. DRIVE SHAFT HAND BRAKE	51- 53	69- 71
SECTION	I. Description	51	69
	II. Brake shoes	52- 53	69- 71
CHAPTER	8. FRONT AXLE	54- 68	72- 98
SECTION	I. Description and data	54- 55	72- 74
	II. Disassembly into subassemblies	56	74- 75
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	57- 59	76- 87
	IV. Assembly of front axle	60	87
	V. Tests and adjustments	61	87- 88
	VI. Fits and tolerances	62	88
	VII. Front end alinement	63- 68	89- 98
CHAPTER	9. REAR AXLE	69- 78	99-118
SECTION	I. Description and data	69- 70	99-101
	II. Disassembly into subassemblies	71	102-103
	III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	72- 73	104-114
	IV. Assembly of rear axle	74	114-115
	V. Test and adjustment	75- 77	115-117
	VI. Fits and tolerances	78	118
CHAPTER	10. SERVICE (AIR) BRAKE SHOES.....	79- 84	119-122
SECTION	I. Description and data	79	119-120
	II. Disassembly, cleaning, inspection, repair, and assembly.....	80- 82	121-122
	III. Test and adjustment	83- 84	122
CHAPTER	11. WHEELS, HUBS, AND TIRES.....	85- 92	123-128
SECTION	I. Description and data	85- 86	123
	II. Cleaning, inspection, and repair	87- 89	124-126
	III. Balancing wheels	90- 92	126-128
CHAPTER	12. STEERING GEAR	93-103	129-142
SECTION	I. Description and data	93- 94	129-130
	II. Removal	95	131-134
	III. Disassembly into subassemblies	96	134
	IV. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	97- 99	134-138

CONTENTS - Contd.

	Paragraphs	Pages
V. Assembly of steering gear	100	138-139
VI. Installation	101	139-140
VII. Test and adjustment	102	140-141
VIII. Fits and tolerances	103	142
CHAPTER 13. SPRINGS AND SHOCK ABSORBERS	104-114	143-149
SECTION I. Springs	104-108	143-146
SECTION II. Shock absorbers	109-114	146-149
CHAPTER 14. FRAME, CAB, AND BODY	115-127	150-170
SECTION I. Frame	115-117	150
SECTION II. Pintle	118-119	151-152
SECTION III. Cab	120-123	153-168
SECTION IV. Body	124-127	168-170
CHAPTER 15. WINCH	128-140	171-183
SECTION I. Description and data	128-129	171-172
SECTION II. Disassembly into subassemblies	130	172-174
SECTION III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	131-136	174-181
SECTION IV. Assembly of winch	137	182
SECTION V. Test and adjustment	138-139	182-183
SECTION VI. Fits and tolerances	140	183
CHAPTER 16. FIFTH WHEEL	141-146	184-187
SECTION I. Description and data	141-142	184-185
SECTION II. Disassembly into subassemblies	143	185
SECTION III. Disassembly, cleaning, inspection, repair, and assembly of subassemblies	144-145	186-187
SECTION IV. Assembly of fifth wheel	146	187
CHAPTER 17. FUEL SYSTEM	147-150	188-192
SECTION I. Description	147	188
SECTION II. Fuel tanks	148-150	188-192
CHAPTER 18. COOLING SYSTEM	151-158	193-198
SECTION I. Description	151	193
SECTION II. Radiator	152-154	193-195
SECTION III. Fan and hub	155-158	196-198
CHAPTER 19. SPECIAL TOOLS	159-160	199
REFERENCES		200-202
INDEX		203-212

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

CHAPTER 1

INTRODUCTION

I. 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.

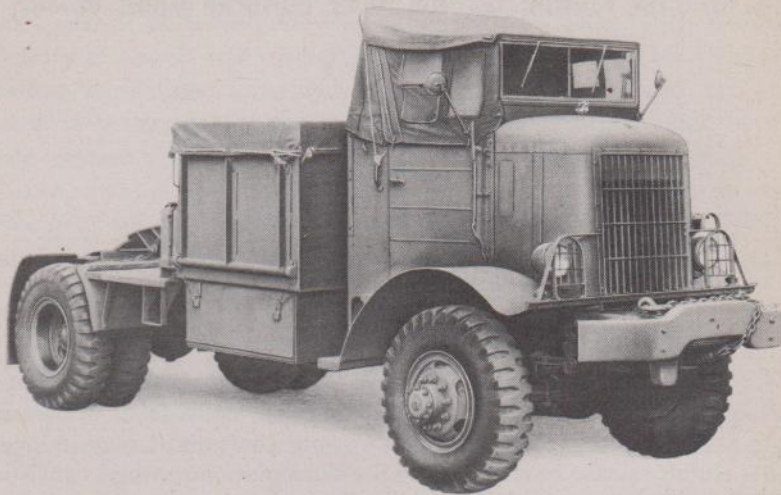
e. TM 9-1825B contains a description of, and procedures for disassembly, inspection, repair, and assembly of the cranking motor and generator used on this vehicle.

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



RA PD 321945

**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 1**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 1 $\frac{1}{4}$ 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)**

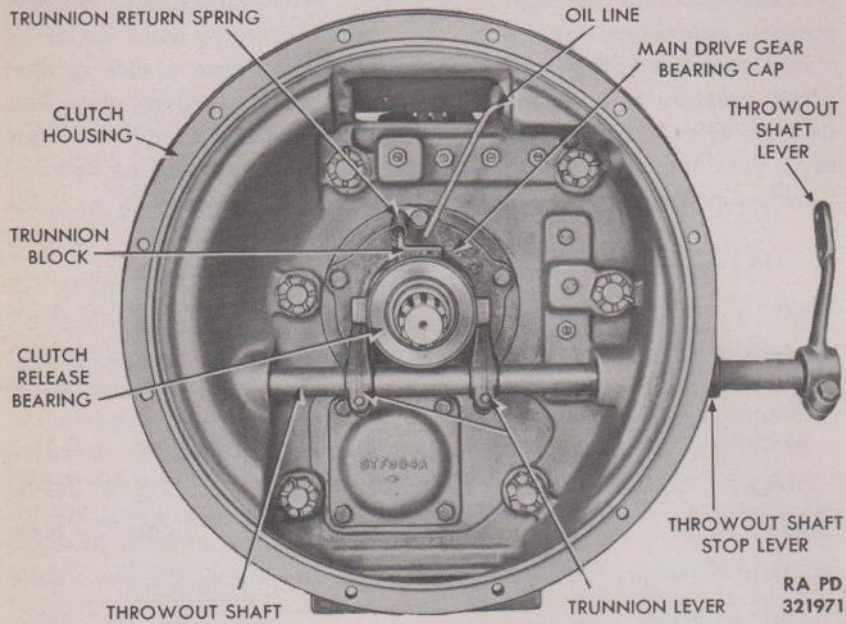


Figure 2 — Clutch Housing Assembly

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.

CLUTCH

(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 burrs, 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.

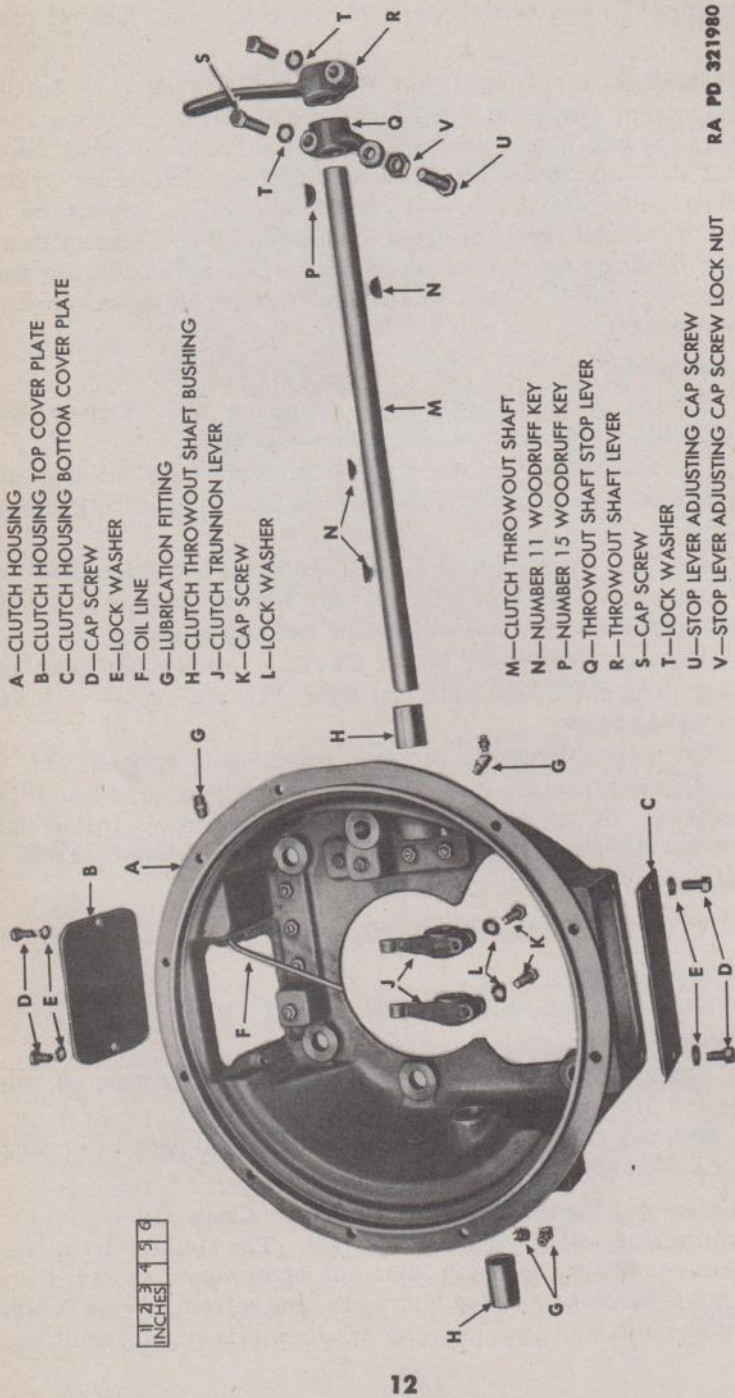
(1) **REMOVE TRUNNION RETURN SPRING.** Remove spring from trunnion block.

(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-

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



RA PD 321980

Figure 3 — Clutch Housing Disassembled

CLUTCH

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-

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

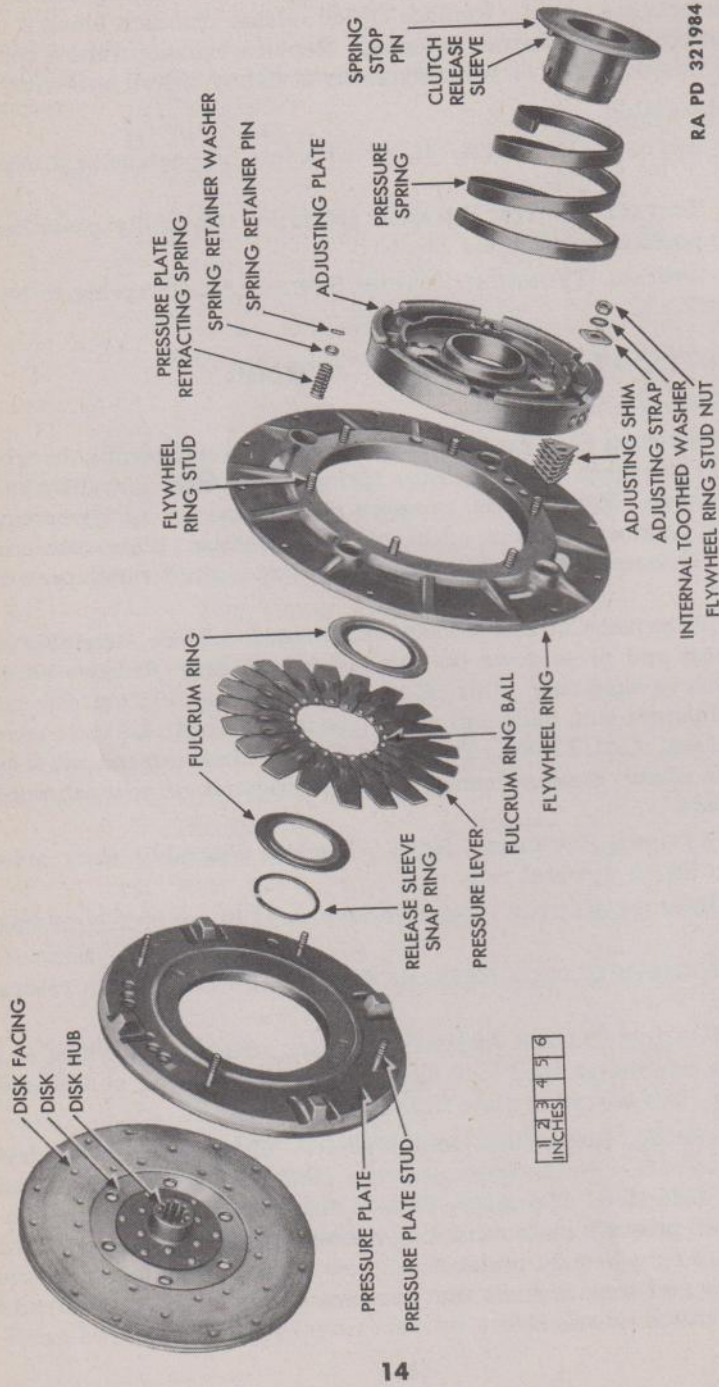


Figure 4 — Clutch Disassembled

CLUTCH

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 burrs on machined surfaces. Replace cracked or broken parts; remove burrs 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 burrs, removing burrs 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.

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

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 burrs 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.

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 $1\frac{1}{2}$ 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 $1\frac{1}{8}$ to $1\frac{3}{16}$ 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 $1\frac{1}{8}$ to $1\frac{3}{16}$ 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

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

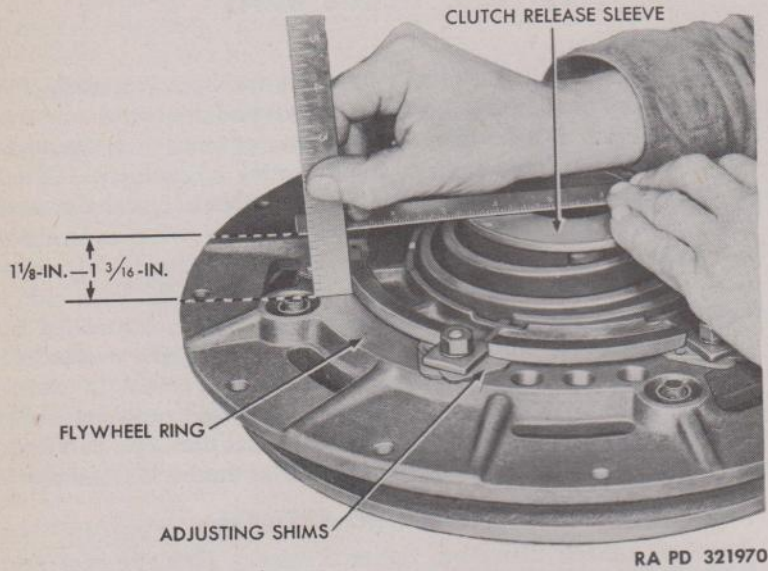


Figure 5 — Clutch Adjustment

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

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.
--------------------------	-------