

TM 9-2520-232-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORDNANCE FIELD AND DEPOT MAINTENANCE

TRANSMISSION, MECHANICAL

ASSEMBLY (2520-627-8308)

(NEW PROCESS MODEL NO. 420)

END ITEM APPLICATION:

3/4 TON 4 X 4 CHASSIS M56, M56B1
AND M56C; 3/4 -TON 4 X 4 TRUCKS M37
M37B1, M43, M43B1, M152 AND M201.

TM 9-8030



HEADQUARTERS, DEPARTMENT OF THE ARMY

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TECHNICAL MANUAL }
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 DEPARTMENT OF THE ARMY
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(2520-627-8308)
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CHAPTER 1

INTRODUCTION

1. Scope

a. This manual contains instructions for field and depot maintenance of the mechanical transmission assembly 2520-627-8308 (New Process model No. 420). It contains descriptions of, and procedures for disassembly, inspection, repair, rebuild, and assembly of the transmission.

b. Appendix I contains a list of current references, including supply manuals, forms, technical manuals, and other available publications applicable to the transmission.

c. This first edition is being published in ad-

vance of complete technical review. Any errors or omissions will be recorded on DA Form 468, Unsatisfactory Equipment Report, and forwarded to the Commanding Officer, Raritan Arsenal, Metuchen, N. J., ATTN: ORDJR-CPRA.

2. Field and Depot Maintenance Allocation

Refer to Maintenance Allocation Chart in C 3, TM 9-8030.

3. Forms, Records, and Reports

Refer to TM 9-8030. Additional forms are listed in appendix I.

CHAPTER 2

PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR FIELD AND DEPOT MAINTENANCE

4. General

Tools, equipment, and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units and depot shops for maintaining, repairing, and/or rebuilding the materiel.

5. Parts

Maintenance parts are listed in Department of the Army Supply Manual ORD 8 SNL G-741, which is the authority for requisitioning replacements. Parts not listed in the ORD 8 supply manual, but required by depot shops in rebuild operations may be requisitioned from the listing in the corresponding ORD 9 supply manual and will be supplied if available. Requisitions for ORD 9 parts will contain a complete justification of requirements.

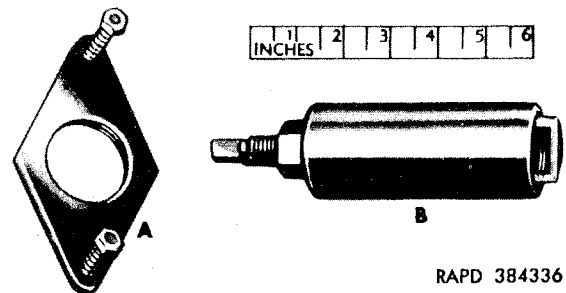
6. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are listed in ORD 6 SNL J-8, Sections 7 and 13; ORD 6 SNL J-9, Sections 1, 2, 6, 8, and 9; and ORD 6 SNL J-10, Sections 4, 7, and 15; and are authorized for issue by TA and TOE.

7. Special Tools and Equipment

The special tools (fig. 1), tabulated in table I, are listed in Department of the Army Supply Manual ORD 6 SNL J-16, Section 15. This tabulation contains only those special tools and

equipment necessary to perform the operations described in this manual, is included for information only, and is not to be used for requisitions.



RAPD 384336

Item	Federal stock No.	Ordnance stock No.	Ord part No.
A.—Puller	5120-795-0048	41-P-2956-30	B7950048
B.—Puller	5120-473-7254	41-P-2956-50	B62966132

Figure 1. Special tools.

Table I. Special Tools and Equipment for Field and Depot Maintenance.

Item	Identifying No.	References		Use
		Fig.	Par.	
PULLER	41-P-2956-30	7	17	Main drive gear bearing removal.
PULLER	41-P-2956-50	12	19	Reverse idler gear shaft removal.

CHAPTER 3

TROUBLESHOOTING

Note. Information in this chapter is for use of ordnance maintenance personnel in conjunction with, and as a supplement to, the troubleshooting section in TM 9-8030. It provides continuation of instructions where a remedy in the operation technical manual refers to ordnance maintenance personnel for corrective action.

8. Purpose

Operation of a deadlined vehicle without a preliminary examination can cause further damage to a disabled component and possible injury to personnel. By careful inspection and troubleshooting, such damage and injury can be avoided and, in addition, the causes of faulty operation of a vehicle or component can often be determined without extensive disassembly.

9. General Instructions and Procedures

This chapter contains inspection and troubleshooting procedures to be performed after a disabled component has been removed from the vehicle.

a. The troubleshooting performed while the component is mounted in the vehicle is that which is beyond the normal scope of the using organization. Check the troubleshooting section in the pertinent operation technical manual, then proceed as outlined in this chapter.

b. Inspection after the component is removed from the vehicle is performed to verify the diagnosis made when the component was in the vehicle, to uncover further defects, or to determine malfunctions if the component alone is received by the Ordnance establishment. This inspection is particularly important in the last case, because it is often the only means of determining the malfunction without completely disassembling the component.

10. Troubleshooting Procedures

a. An improperly functioning or damaged transmission is usually apparent, and troubleshooting, as it pertains to transmission, is seldom required. The most satisfactory and ap-

proved procedure for determining the source or cause of transmission troubles or failures is to examine the component under shop conditions after its removal from the vehicle. Such inspection is performed to verify the diagnosis made when the component was in the vehicle, to uncover further defects, or to determine faults if the component alone is received by the Ordnance establishment.

b. Abusive operation or manipulation and faulty maintenance have been found to be the two greatest single causes of transmission troubles or failures.

(1) *Abusive operation includes:*

- (a) Careless or poorly timed shifting.
- (b) Coasting, either with the clutch disengaged or with the shift lever in the neutral position.
- (c) Overloading the vehicle.
- (d) Lugging the engine.
- (e) Shock loading.
- (f) Riding clutch pedal.

(2) *Faulty maintenance includes:*

- (a) Failure to change the lubricant at the required intervals.
- (b) Allowing the lubricant level to fall too low before replenishing.
- (c) Filling the transmission case to excess with lubricant.
- (d) Towing vehicle with propeller shaft connected.

c. Most transmission troubles or failures can be traced to one or another of these causes (*b* above), generally to one of those listed under "abusive operation."

Table II. Troubleshooting

Malfunction	Probable causes	Corrective action
Hand shifting	Shift rails tight or seized in cover openings.	Determine if shift rails are scored or sprung out of alinement. Replace damaged parts (par. 34 c-e). If rails are in good condition but tight in cover openings, dress down with crocus cloth to obtain free sliding action.
	Shift rails excessively worn.	Check rails and cover openings for excessive wear. Replace worn parts (par. 34 c-e).
	Shift forks worn or bent.	Check forks for wear and mis-alinement. Replace as necessary (par. 34 c-e).
	Clutch operating improperly.	Check operation of clutch and correct as necessary. Refer to TM 9-8030.
	Gears too tight on main shaft splines or splines damaged.	Check for free movement of gears on shaft. If gears are tight on shaft, dress down splines with crocus cloth. If this does not free the gears, replace one or all parts as necessary to obtain the desired results (par. 33b and c). Check splines for scores or burs. Remove imperfections with file and crocus cloth or replace parts as necessary.
Gears clash	Synchronizer assembly not functioning properly.	Check outer and inner stop rings for wear and/or mis-alinement. Re-

Table II—Continued

Malfunction	Probable causes	Corrective action
	Worn gear teeth or bearings.	Look for worn or damaged gear teeth. Also, check ball and roller bearings for wear or damage. Replace worn or damaged parts as necessary (pars. 32, 33, 38, and 39).
	Clutch operating improperly.	Check operation of clutch and correct as necessary. Refer to TM 9-8030.
	Transmission noisy.	Examine ball and roller bearings for wear, roughness, or other damage. Also, check bushing in reverse idler gear for wear. Replace worn or damaged parts (pars. 32, 33, 38, and 39).
	Worn or damaged gears.	Look for worn or broken gear teeth. Also, check fit of gears on main shaft. Replace worn or damaged parts (pars. 32, 33, 38, and 39).
	Clutch operating improperly.	Check operation of clutch and correct as necessary. Refer to TM 9-8030.
	Insufficient or incorrect grade of lubricant.	Check lubricant level and grade and replenish or drain and refill transmission as required (pars. 15 and 47).
	Broken or weak shift rail poppet ball springs.	Check springs with specifications (par. 30). Replace weak or

Table II—Continued on page 6

Table II—Continued from page 5

Malfunction	Probable causes	Corrective action
Transmission sticks in gear.	Worn shift rail ball grooves.	broken springs (par. 34 c through e). Examine shift rails to determine if ball grooves are worn. Replace worn shift rails (par. 34 c-e).
	Gears not fully in mesh as result of incorrect shifting, or an internal defect.	To check for internal defects, all gears, shafts, and shifting parts must be examined for wear, breakage, and misalignment. Replace worn or damaged parts.
	Worn or damaged main shaft splines.	Check main shaft splines for wear or damage and replace shaft if necessary (par. 33).
	Worn or tapered gear teeth.	Examine all gear teeth for wear and taper. Replace worn gears (pars. 32, 33, 38, and 39).
	Excessive side play of third speed gear.	Check gear for side play and replace worn gears or clutch gear snap ring as necessary (par. 33 b (4)).
	Clutch operating improperly.	Check operation of clutch and correct as necessary. Refer to TM 9-8030.
	Insufficient chamfer on shift rail ball grooves.	Examine grooves and compare chamfer with shift rail known to be in good condition. Replace rails if found to be at fault (par. 34 c-e).
	Gears tight on main shaft.	Check for free movement of gears on shaft. If gears are tight

Table II—Continued

Malfunction	Probable causes	Corrective action
Loss of lubricant.	Lubricant level too high.	on shaft, dress down splines with crocus cloth. If this does not free the gears, replace one or all parts as necessary to obtain the desired results (par. 83). Check lubricant level and adjust to proper level. Refer to TM 9-840.
	Damaged or incorrectly installed gaskets or oil seal.	Use new gaskets and oil seal when assembling transmission. Make sure oil holes in gaskets for main shaft and main drive gear bearing retainers are aligned with corresponding holes in transmission case. Prepare oil seal for installation as explained in paragraph 44a.
	Cracked or broken transmission case.	Determine if case is cracked or broken. Replace damaged case.
	Loose power-take-off covers or bearing retainers.	Use new gaskets and tighten retaining screws securely (par. 36).
	Loose drain plug.	Tighten plug securely (par. 37).
	Use of excessively foaming lubricant.	Check lubricant level and grade and drain and refill if necessary. Refer to TM 9-840.
	Overheating	Check for tightness or binding of transmission parts and/or lubricant level and grade of lubricant. Also check engine for overheating. Service component units as necessary.

CHAPTER 4
NEW PROCESS MODEL 420 TRANSMISSION

Section I. DESCRIPTION AND DATA

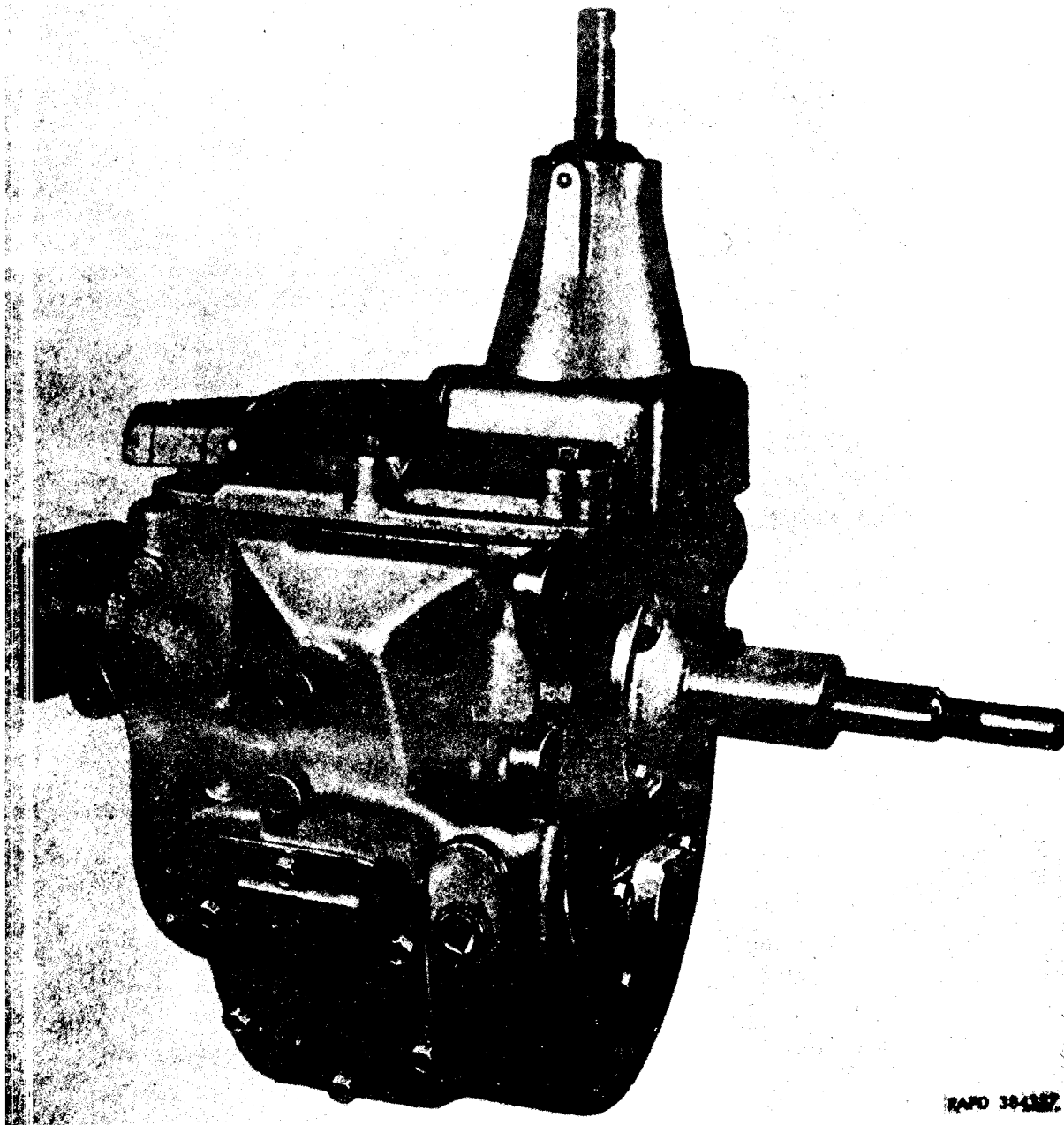


Figure 2. Transmission assembly—right—front view.

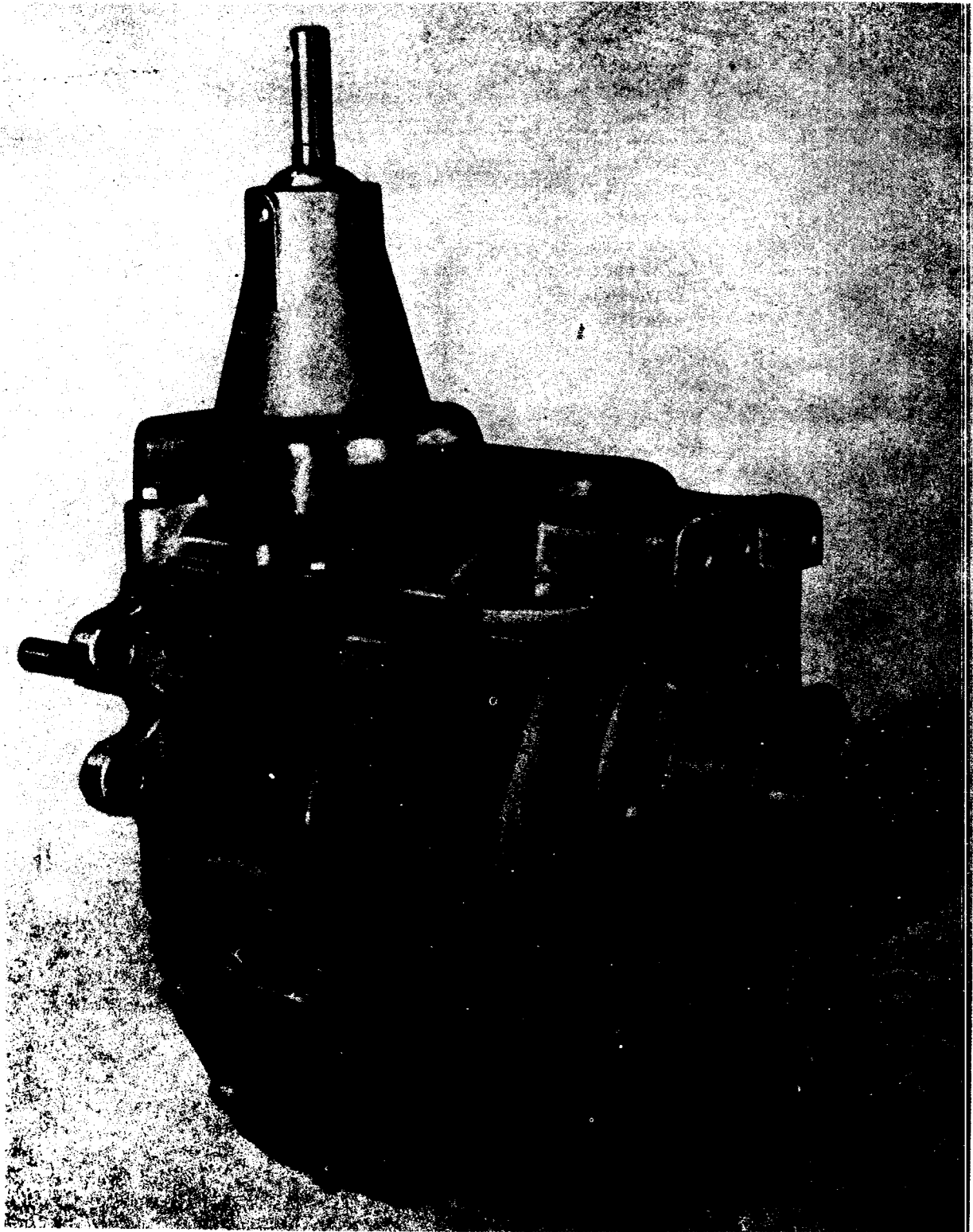


Figure 3. Transmission assembly—left—rear view.

