TM 9-2320-213-34

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

w/chg 1-2-3

DIRECT AND GENERAL SUPPORT
~~FIELD~~ MAINTENANCE MANUAL

FOR

TRUCK, PLATFORM UTILITY:
1/2-TON, 4 x 4,
M274 (2320-049-4804)
AND
M274A1 (2320-064-6373)
M274A2 (2320-074-1167) ea 1
M274A3 (2320-~~782~~-6782)
M274A4 (2320-~~782~~-6783) ea 2

HEADQUARTERS, DEPARTMENT OF THE ARMY
DECEMBER 1963

Warning:

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, DEADLY POISONOUS gas which, when breathed, deprives the body of oxygen and causes SUFFOCATION. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent BRAIN DAMAGE OR DEATH can result from severe exposure.

It occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes DANGEROUSLY CONCENTRATED under conditions of INADEQUATE VENTILATION. The following precautions must be observed to ensure the safety of personnel whenever the personnel heater, main, or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

a. DO NOT operate heater or engine of vehicle in an enclosed area unless it is ADEQUATELY VENTILATED.

b. DO NOT idle engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.

c. DO NOT drive any vehicle with inspection plates, cover plates, engine compartment doors removed unless necessary for maintenance purposes.

d. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, administer artificial respiration.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION

TECHNICAL MANUAL)
)
No. 9-2320-213-34)

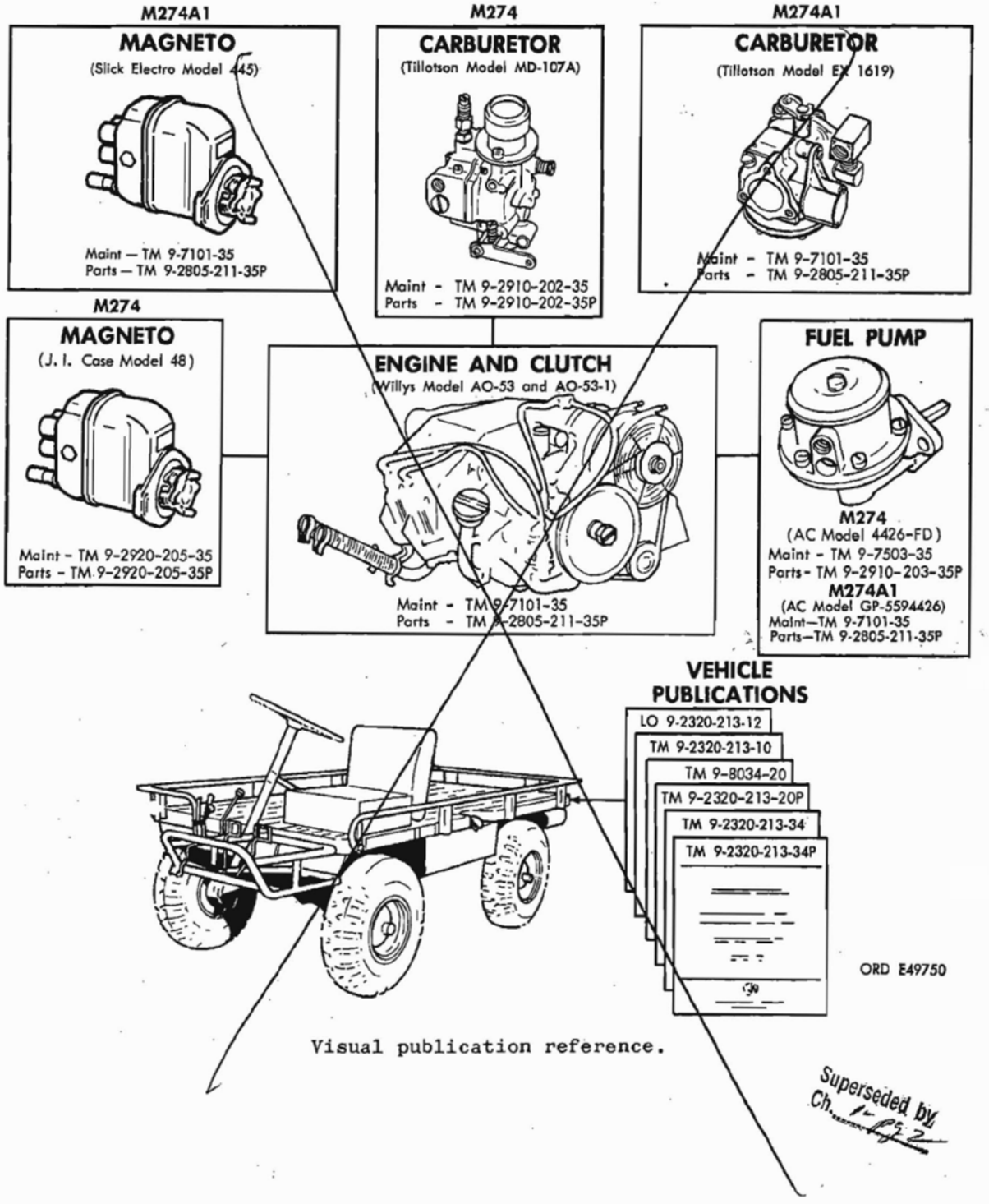
HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 20025, 20 November 1963

FIELD MAINTENANCE MANUAL
FOR
TRUCK, PLATFORM UTILITY: 1/2-TON, 4 x 4, M274 (2320-049-4804) AND M274A1 (2320-064-6373)

*This publication supersedes TM 9-2320-213-35, 15 July 1958; TM 9-2520-224-35, 8 July 1958; TM 9-7820-35, 4 February 1958; and TB 9-2320-213-35/1, 1 April 1960.

CHAPTER 8 Material used in conjunction with major item chg 2

Sec. III Armament Kit - chg 3



Visual publication reference.

Superseded by Ch. 1 [illegible]

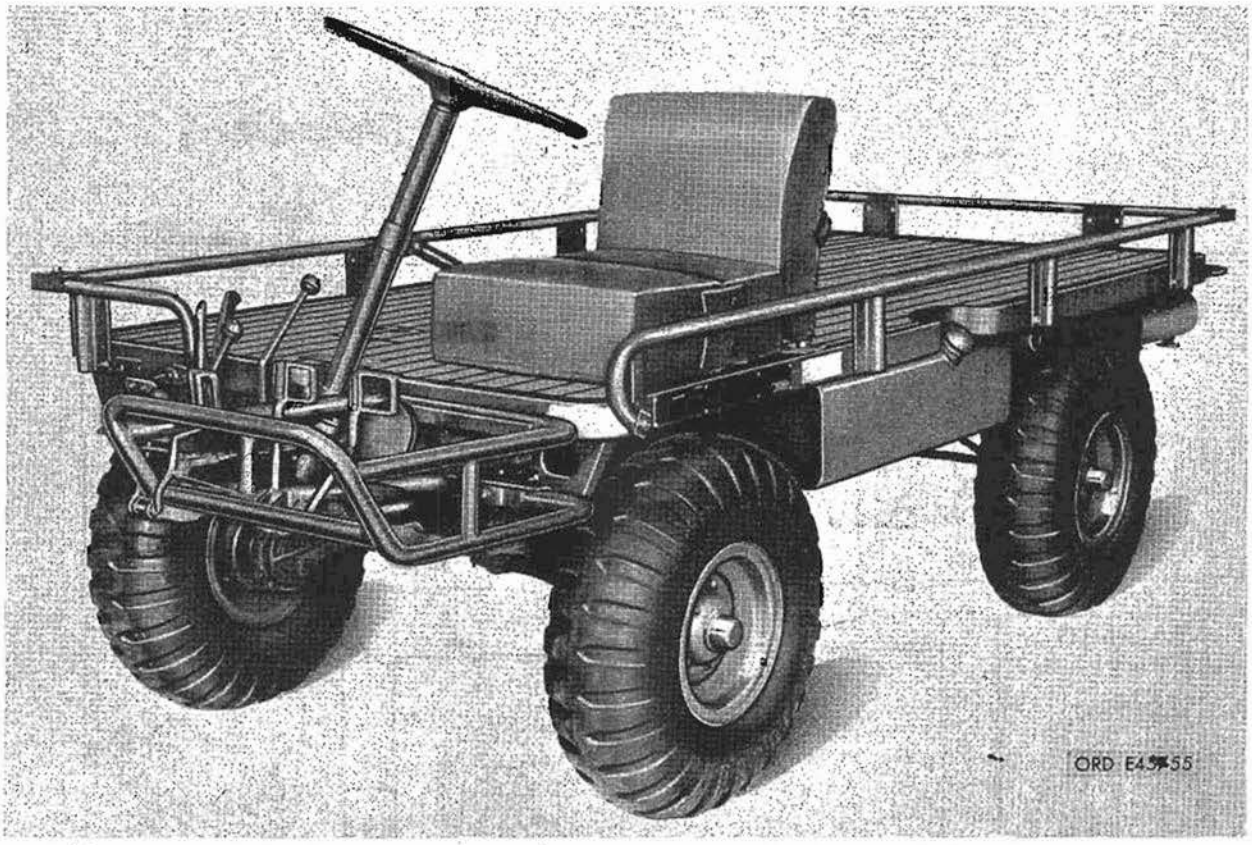


Figure 1. Left front view of 1/2-ton, 4 x 4, Platform Utility Truck — M274.

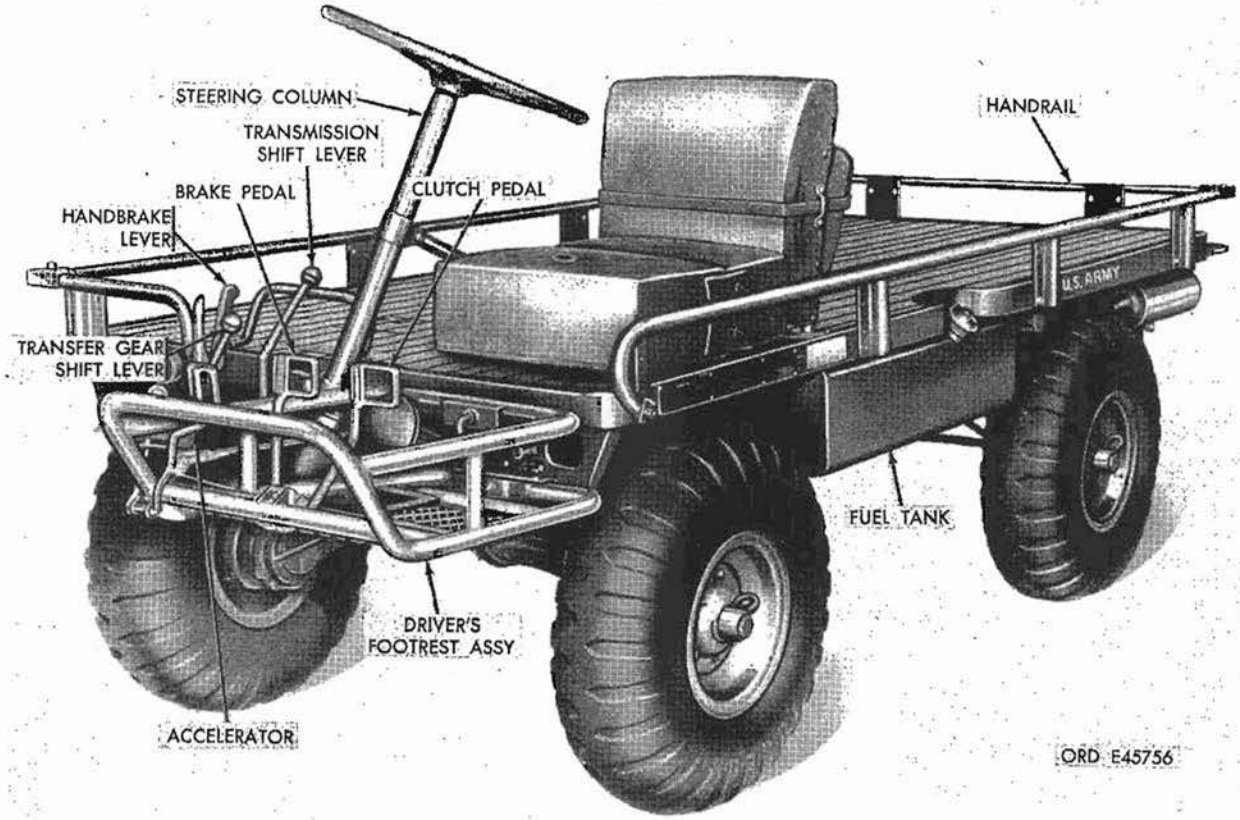


Figure 2. Left front view of 1/2-ton, 4 x 4, Platform Utility Truck — M274A1.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

Superseded by Ch. 1 [illegible]

a. This technical manual contains instructions for field maintenance of the steering system, front axle and gear carrier assembly, rear axle and transmission assembly, body, chassis, and all peculiar type items for the 1/2-ton, 4 x 4, Platform Utility Truck M274 and M274A1. It contains descriptions of and procedures for removal, disassembly, inspection, repair, rebuild, and assembly of the aforementioned components for both vehicle models.

b. The appendix contains a list of current references, including supply manuals, forms, technical manuals, and other available publications applicable to the materiel.

c. The direct reporting of errors, omissions, and recommendations for improving this equipment manual by the individual user, is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pencil, pen, or typewriter. DA Form 2028 will be completed in triplicate and forwarded by the individual using this manual. The original and one copy will be forwarded direct to: Commanding General, U.S. Army Tank-Automotive Center, ATTN: SMOTA-FM, Warren, Michigan, 48090. One information copy will be provided to the individual's immediate supervisor (e.g., officer: noncommissioned officer, supervisor, etc.).

Superseded by Ch. 1 [illegible]

d. LO 9-2320-213-12 contains lubricating instructions for the materiel.

e. TM 9-2320-213-10 contains instructions for operating the materiel as well

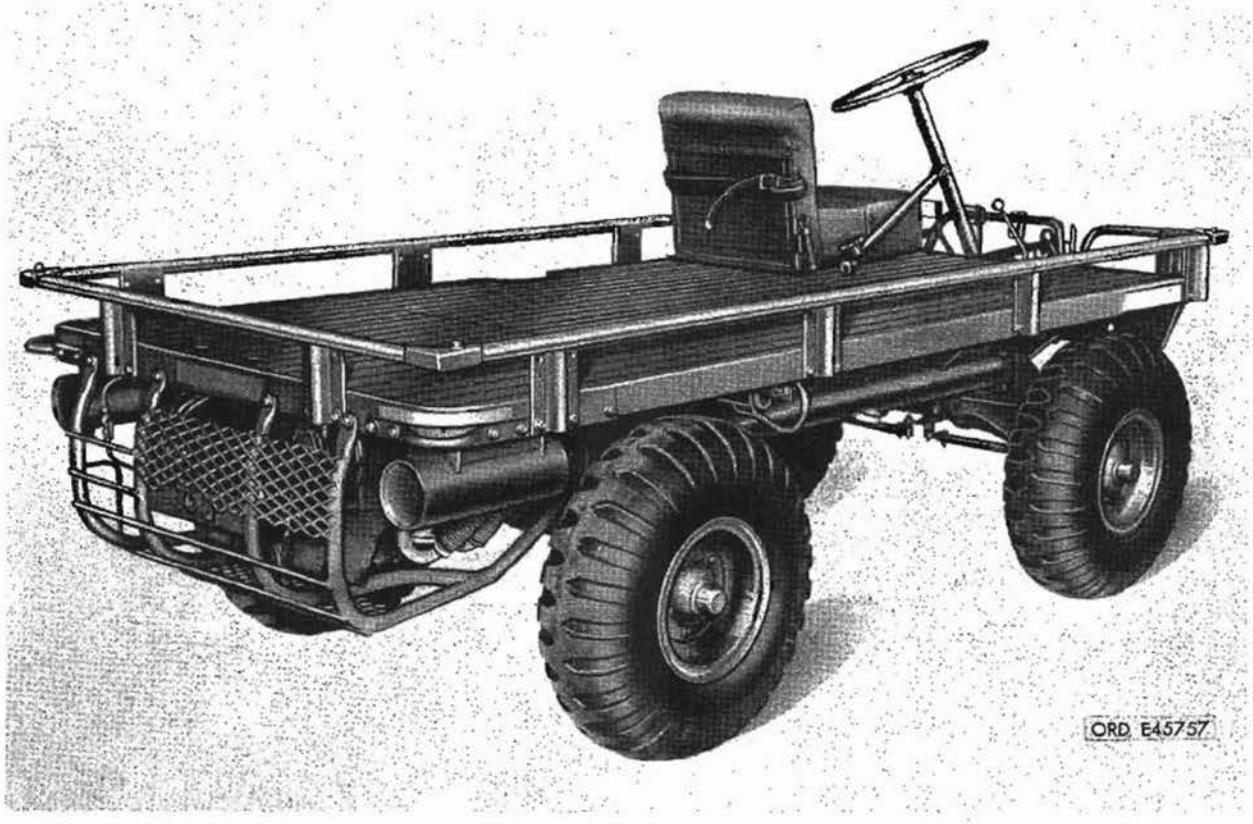


Figure 3. Right rear view of 1/2-ton, 4 x 4, Platform Utility Truck — M274.

as all maintenance operations allocated to the operators in performing maintenance work within their scope.

2320-213-20

f. TM 9-~~8034-20~~ ~~in conjunction with the latest changes~~ contains instructions for the maintenance of the materiel within the scope of organizational maintenance.

2. ~~Field Maintenance Allocation~~ Direct & General Support Maint Alloc.

Refer to the maintenance allocation chart in TM 9-~~8034-20~~ 2320-213-20.

~~3. Troubleshooting~~ Rescinded by Ch.

~~Troubleshooting, when applicable, for components in this manual will be found in the appropriate chapters.~~

4. Forms, Records, and Reports

2320-213-20

Refer to TM 9-2320-213-10 and TM 9-~~8034-20~~ for listing of forms, records, and reports. Additional authorized forms applicable to units maintaining this materiel are listed in the appendix. For a complete listing of all forms, refer to DA Pam 310-2. For instructions on the use of forms, refer to TM 38-750.

Section II. DESCRIPTION AND DATA

5. Description

Description of assemblies and components covered in this manual are located in the pertinent chapter. For description of components covered in other manuals, refer to visual publications reference.

6. Data

Refer to the pertinent chapter of this manual. For data of components covered in separate manuals, refer to the visual publications reference.

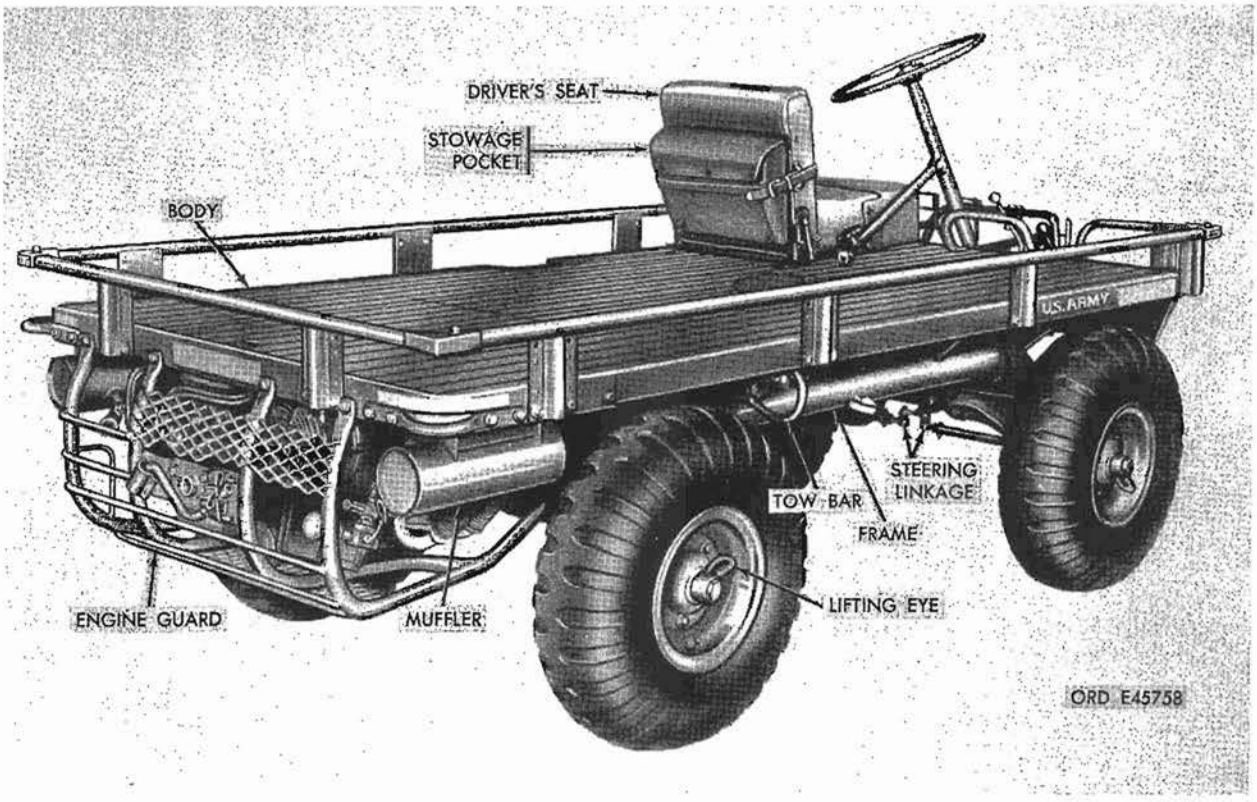


Figure 4. Right rear view of 1/2-ton, 4 x 4, Platform Utility Truck — M274A1.

ATTN: SEE CH 1-Pg 3 for fig. 4-1

CHAPTER 2

PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR FIELD MAINTENANCE

7. General

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

8. Repair Parts

Superseded by Ch. 1-Ad 3

~~Repair parts required for the maintenance of this materiel are listed in Department of the Army Supply Manual TM 9-2320-213-34P~~ which is authority for requisitioning replacements.

9. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are authorized for issue by tables of allowances (TA) and table of organization and equipment (TOE).

10. Special Tools and Equipment

The special tools and equipment illustrated in figures 5 through 7 and listed in table I are necessary to perform the field maintenance, repair, and rebuild operations described in this technical manual. This list is not to be used for requisitioning. Refer to TM 9-2320-213-34P for listing of authorized special tools, kits, and equipment.

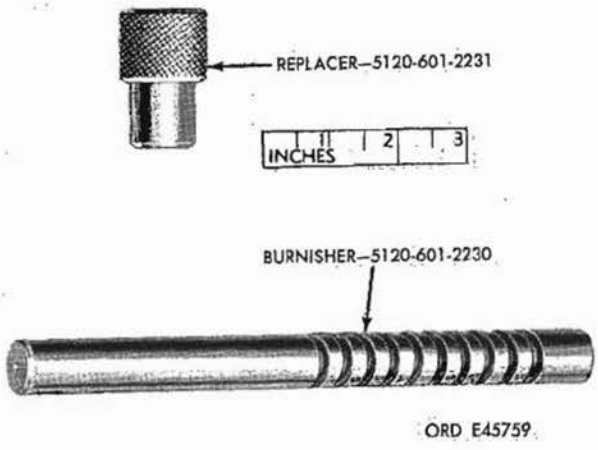


Figure 5. Special tools for steering gear assembly.

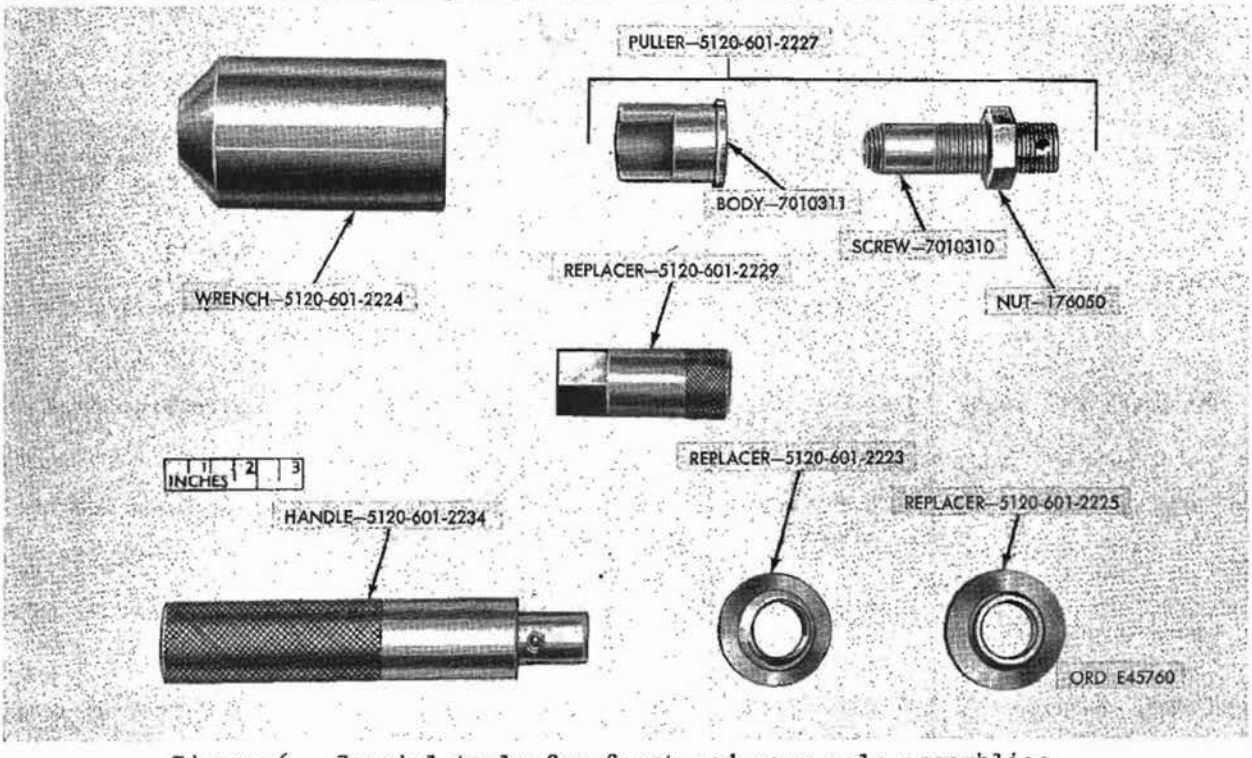


Figure 6. Special tools for front and rear axle assemblies.

Table I. Special Tools and Equipment

Item	Identifying No.	Reference		Use
		Fig.	Par.	
BURNISHER, bushing	5120-601-2230 (7010317)	5,36	26	Used with REPLACER – 5120-601-2231 for burnishing lever shaft bushings.
FIXTURE, backlash setting	4910-713-1013 (7045666)	7,84	46	Checking backlash between drive pinion and drive gear.
FIXTURE, depth setting	4910-713-1014 (7045667)	7,83	46	Checking depth setting of drive pinion.
GUIDE SHAFT	4910-766-7750 (8744081)	7,129	68	Installing outer bearing retainer on input spur gearshaft.
HANDLE	5120-601-2234 (7010321)	6,75, 76, 78,80	44, 45	Used with REPLACER – 5120-601-2223 and REPLACER – 5120-601-2225.
PULLER, oil seal	5120-601-2227 (7010309)	6,90, 91	54	Removing oil seals from shift shaft.
Consisting of:				
BODY, oil seal puller	(7010311)			
SCREW, oil seal puller	(7010310)			
NUT, oil seal puller	(176050)			
REPLACER, bearing and oil seal	5120-601-2223 (7010301)	6,75, 78	44	Used with HANDLE – 5120-601-2234 for installing needle bearings in axle housings, steering knuckle covers, and gear carrier.
REPLACER, bushing	5120-601-2231 (7010318)	5,34, 35	26	Used with BURNISHER – 5120-601-2230 for removing and installing lever shaft bushings.
REPLACER, oil seal	5120-601-2229 (7010314)	6,92	55	Installing oil seals around shift shafts.
REPLACER, seal	5120-601-2225 (7010305)	6,76, 80	44, 45	Installing axle shaft inner and outter oil seals.
SCALE, drive pinion bearing preload	6670-347-5922 (7950157)	7,81	46	Checking drive pinion bearing preload.
WRENCH, socket	5120-601-2224 (7010302)	6,96	60	Removing and installing nut on shaft of rear drive pinion.

11. Improvised Tools

The improvised tool shown in figure 8 applies only to field shops in order to enable these units to fabricate this tool locally, if desired. This tool is of chief value to maintenance organizations engaged in rebuilding a large number of identical components; however, it is not essential for repair and is not available for issue. The data is furnished for information only.

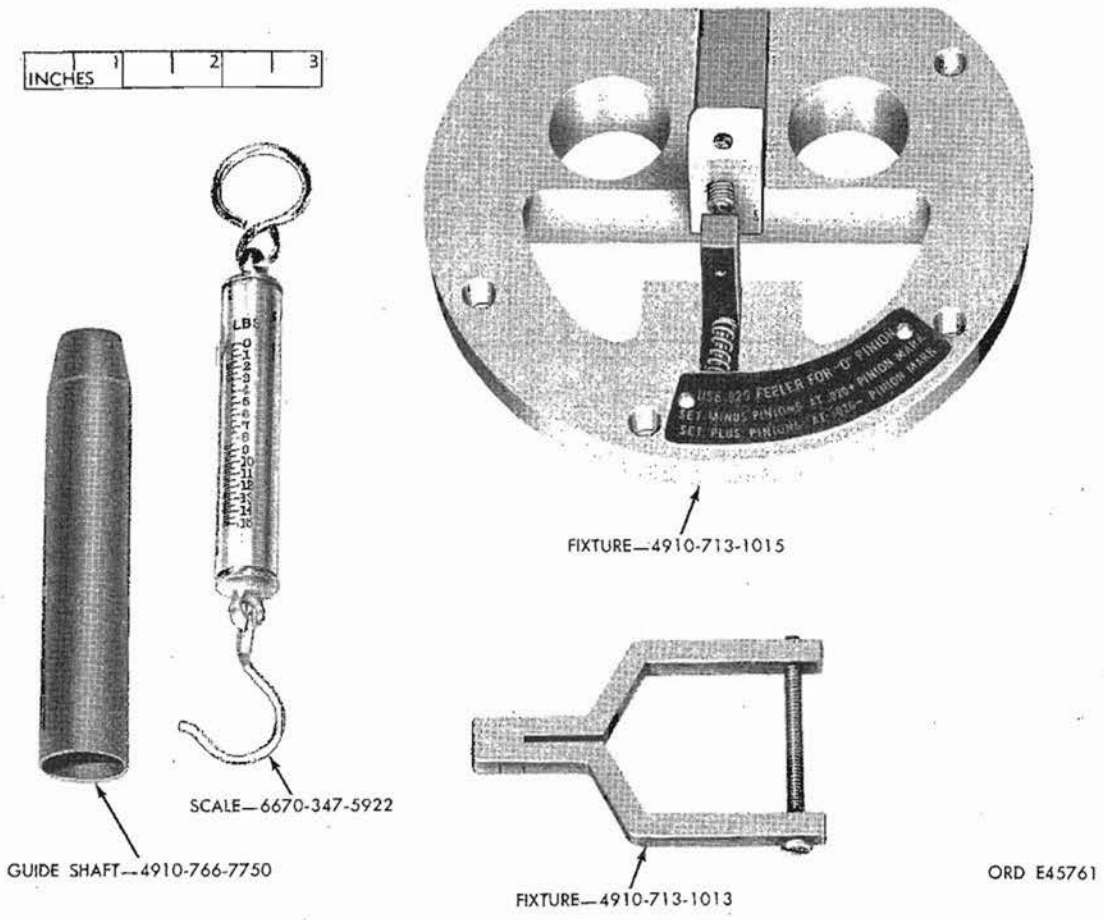


Figure 7. Special tools for front and rear axle assemblies.

BILL OF MATERIALS							
DET. NO.	NO. REQ.	MATERIAL	SIZE	DET. NO.	NO. REQ.	MATERIAL	SIZE
1	1	WELDED	CONST.	6	1	UNIVERSAL INDEX PLUNGER	S8-2
A	4	M.S.	5/8 X 5 X 5	9	1	DOWEL	1/4 X 3/4
B	2	CHANNEL	3 X 5# X 19	10	1	M.S.	13 X 1-1/4
C	2	M.S.	3/4 X 1-1/2 X 2	11	5	WASHER	3/8 ID
D	2	CHANNEL	3 X 5# X 30	12	5	C.R.S.	3/8 X 2-3/8
E	1	M.S.	3/4 X 4 X 12-1/4	13	5	HEX NUT	3/8-16
F	1	CHANNEL	3 X 5# X 13	14	2	C.R.S.	1/2 X 1-1/4 X 2-5/8
2	1	C.R.S.	3/4 X 1-1/4 X 8	15	2	C.R.S.	2-1/2 X 3-1/2 X 3-1/2
3	1	DOWEL	3/8 X 2-1/4	16	1	SOC. HD. SCR.	3/4-10 X 1-3/4
4	1	DOWEL	5/16 X 1-1/4	17	1	C.R.S.	2-1/2 X 5/8
5	1	WELDED	CONST.	18	1	WASHER	3/4 ID
A	1	C.R.S.	1-1/4 X 2 X 6	19	1	HEX NUT	3/4-10
B	2	C.R.S.	1 X 2 X 14-1/2	20	1	C.R.S.	1 X 15-1/2
C	1	M.S.	3/4 X 8 X 14	21	1	OILITE BUSHING	A-1711-3
D	1	M.S.	3 X 1-1/4	22	4	SOC. HD. SCR.	3/8-16 X 1
E	1	M.S.	2 X 2-1/2 X 3	23	6	SOC. HD. SCR.	3/8-16 X 2-3/4
F	1	HEX NUT	3/4-10	24	1	EYEBOLT	WILLIAMS #5

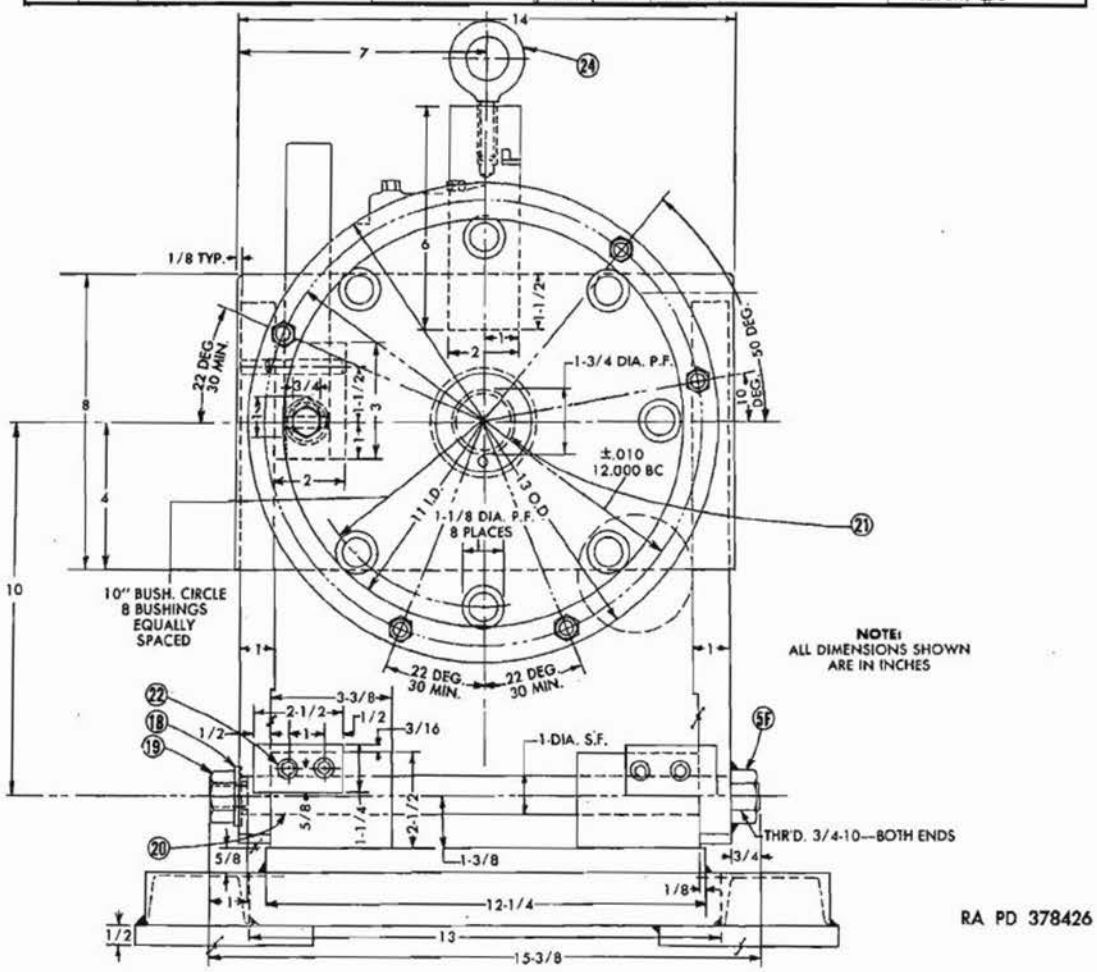


Figure 8. Improvised stand for rebuilding engine or transmission and housing fixture – 65909-914241-T17 (sheet 1 of 2).

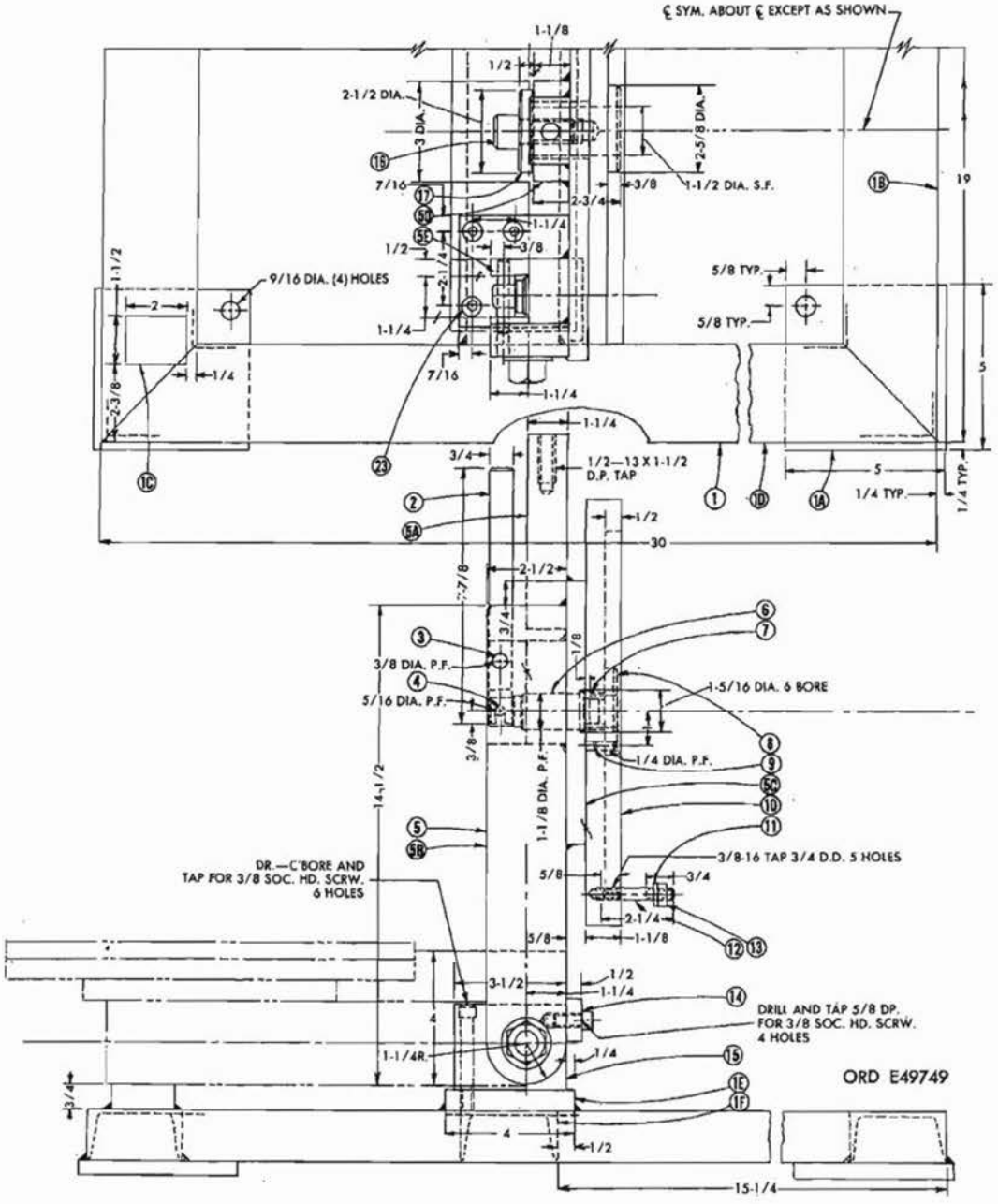


Figure 8. Improvised stand for rebuilding engine or transmission and housing fixture – 65909-914241-T17 (sheet 2 of 2).

CHAPTER 3
REPAIR OF STEERING SYSTEM

Section I. DESCRIPTION, DATA, AND TROUBLESHOOTING

12. Description

a. General. Refer to TM 9-~~8034-20~~ 2320-213-20 and Change 1 for detailed description of the complete steering system.

b. Steering Gear Assembly (fig. 9). The steering gear assembly is a manually operated cam and lever type unit. A tapered stud, fixed in the upper end of the lever shaft, engages in a cam groove cut in the cam of the steering cam shaft. The cam is machine welded to the cam shaft with the outer ends acting as inner races for the cam thrust bearing balls. The complete unit is mounted in a housing with the splined end of the lever shaft extending through the housing to accommodate the steering arm assembly. The steering cam shaft extends through the upper cover and is splined to accommodate the steering wheel shaft coupling. A setscrew, in the side cover, provides adjustment of the lever shaft stud in the cam while shims, between the upper cover and the housing, provide adjustment for the cam thrust bearings.

c. Differences Between Models.

(1) ~~The upper cover of the steering gear assembly used on the M274A1 has a thicker wall section than the cover used on the M274.~~

(2) Lubrication fittings have been removed from the steering tie rod assemblies on the M274A1 since these have self-lubricating type bearings.

Superseded by Ch. 2 9-4-62

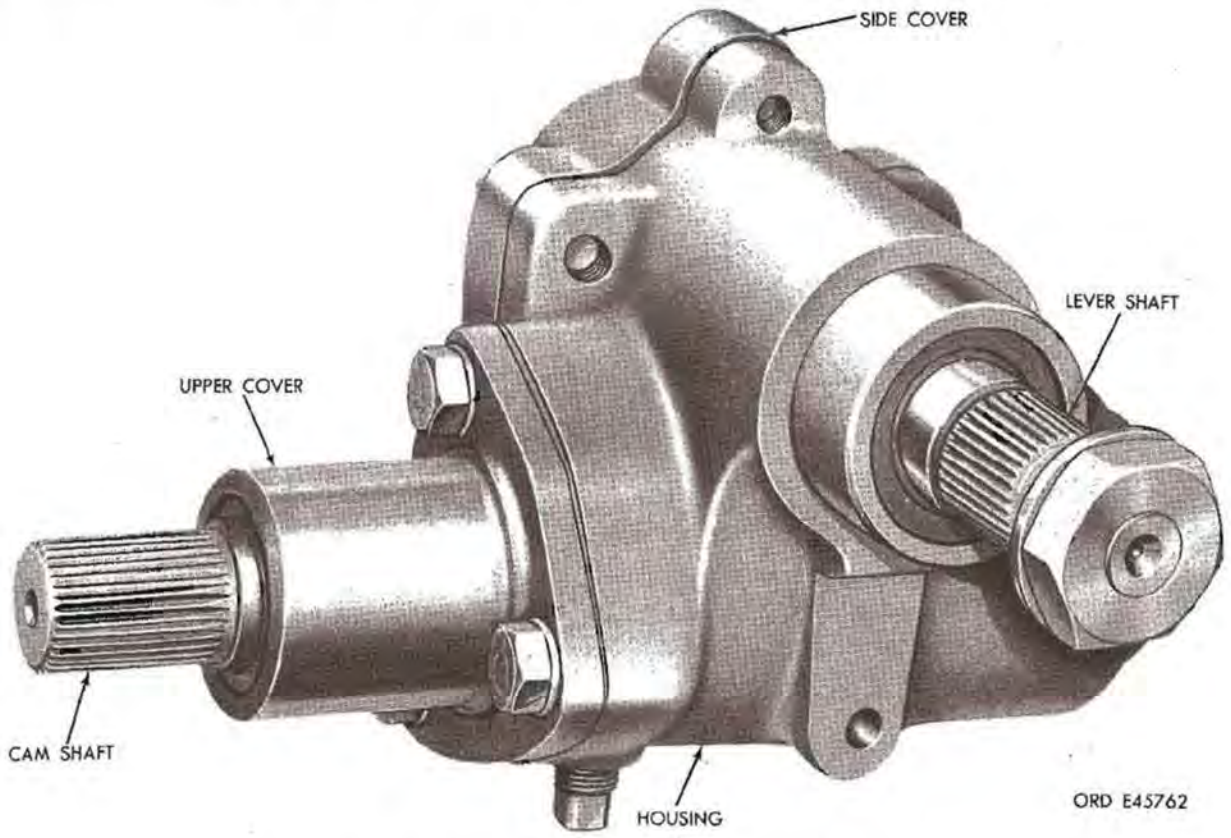


Figure 9. Steering gear assembly.

Superseded by Ch. 1 Par 3 & 4

(3) The upper and lower bellcrank steering arms used on the M274A1 are splined for more positive steering control.

(4) A split type trunnion support assembly is used on the M274A1 instead of the solid type used on the M274.

13. Data

Superseded by Ch. 2 Par 3 & 4

Make	Ross
Model	S12
Angular travel of lever shaft	76 degrees
Number of cam thrust bearing balls	10 each end
Ratio	14:1

14. Troubleshooting

a. Purpose.

Note. Information in this paragraph is for use by Ordnance maintenance personnel in conjunction with and as a supplement to the troubleshooting section in TM 9-2320-213-20(3) ~~8034-20~~. It provides a continuation of instructions where a remedy in the organizational maintenance manual refers to Ordnance maintenance personnel for the corrective action.

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.

b. General Instructions. This paragraph contains inspection and troubleshooting procedures to be performed while a disabled component is mounted in the vehicle and after it has been removed.

(1) The inspections made while the component is mounted in the vehicle are for the most part visual and are to be performed before attempting to operate the vehicle. The object of these inspections is to avoid possible damage or injury and to determine the condition of the defective component and its cause.

(2) The troubleshooting performed while the component is mounted in the vehicle is beyond the normal scope of the using organization. Check the troubleshooting section of TM 9-2320-213-20 ~~8034-20~~, then proceed as follows: These troubleshooting operations are used to determine if the fault can be remedied without removing the component from the vehicle and, when subsequent removal is necessary, to indicate when repair can be made without complete disassembly of the component.

(3) 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 faults 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 trouble without completely disassembling the component.

c. Troubleshooting Before Removal or Operation. Refer to table II.

d. Troubleshooting After Removal and Before Operation. Refer to table III.

Table II. Troubleshooting Before Removal or Operation – Steering System

Malfunction	Probable causes	Corrective action
1. Hard or loose steering.	a. Improper cam thrust bearing adjustment.	a. Adjust bearing (par. 27).
	b. Improper lever shaft stud adjustment.	b. Adjust lever shaft stud (par. 27).
2. Wandering.	a. Worn lever shaft.	a. Replace shaft (pars. 20 and 26).
	b. Worn lever shaft bearings.	b. Replace bearings (pars. 20 and 26).

Table III. Troubleshooting After Removal and Before Operation – Steering System

Malfunction	Probable causes	Corrective action
1. Rough steering.	a. Chipped or pitted lever shaft stud.	a. Replace shaft (pars. 20 and 26).
	b. Chipped or pitted steering cam.	b. Replace steering cam shaft (pars. 20 and 26).
2. Wandering.	a. Worn cam thrust bearing balls.	a. Replace bearing balls (pars. 20 and 26).
	b. Clevis pins and clevis pin holes worn.	b. Replace pins or rods as required by the rebuild standards (par. 24).

Section II. REMOVAL AND DISASSEMBLY

15. General

a. Disassembly of the components of the complete steering system should be performed in figure number sequence. Instructions provided with each illustration should, in turn, be performed in the order of their respective index letters. If no instructions are provided with an illustration, the procedures involved are relatively simple and the parts should be removed in the sequence indicated by the callout letters.

b. The exploded views, figures 29 through 33, are included to provide a visual reference to the components of the steering system and for part identification.

c. Discard all gaskets during disassembly and make sure they are replaced with new ones at assembly.

16. Removal

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal of the steering system components.

17. Disassembly of Tow Bar Bellcrank

Note. Do not remove bellcrank sleeve bearing unless inspection (par. 22) indicates the need for replacement.

Remove bellcrank sleeve bearing as shown in figure 10.

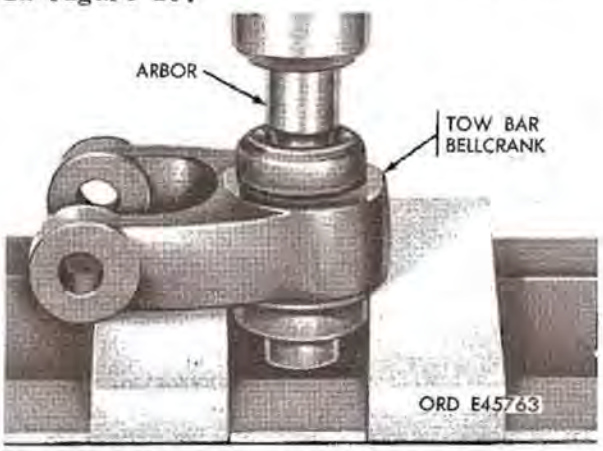
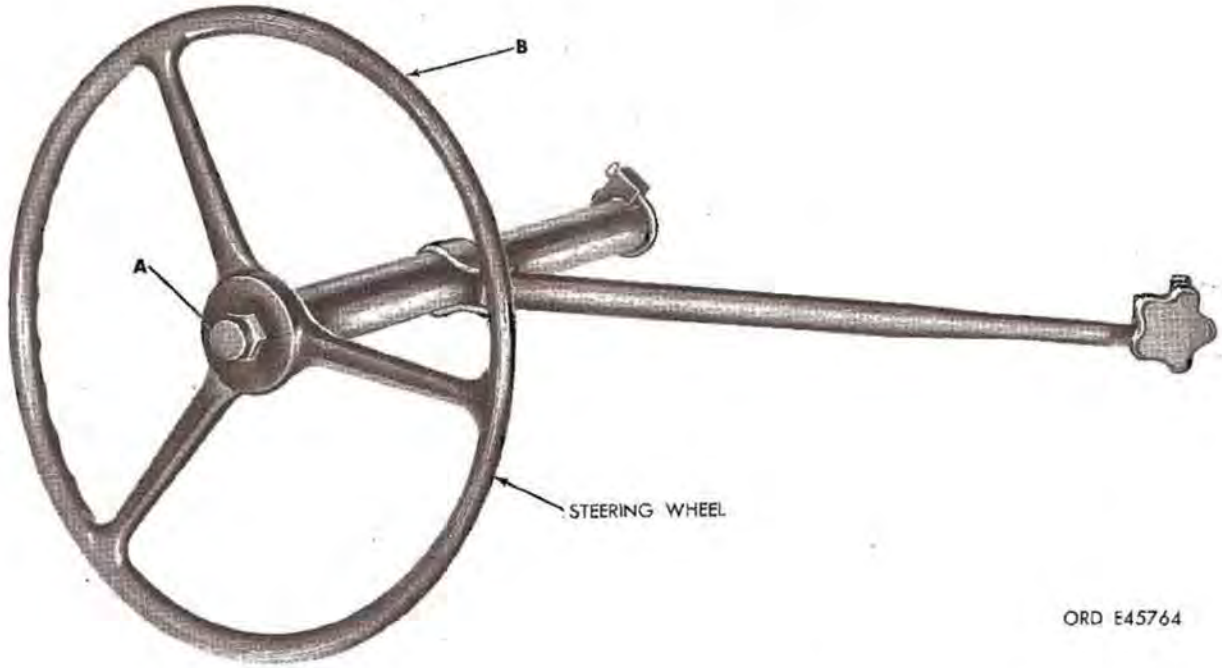


Figure 10. Removing or installing bellcrank sleeve bearing.

18. Disassembly of Steering Wheel, Column Assembly, and Tube Brace

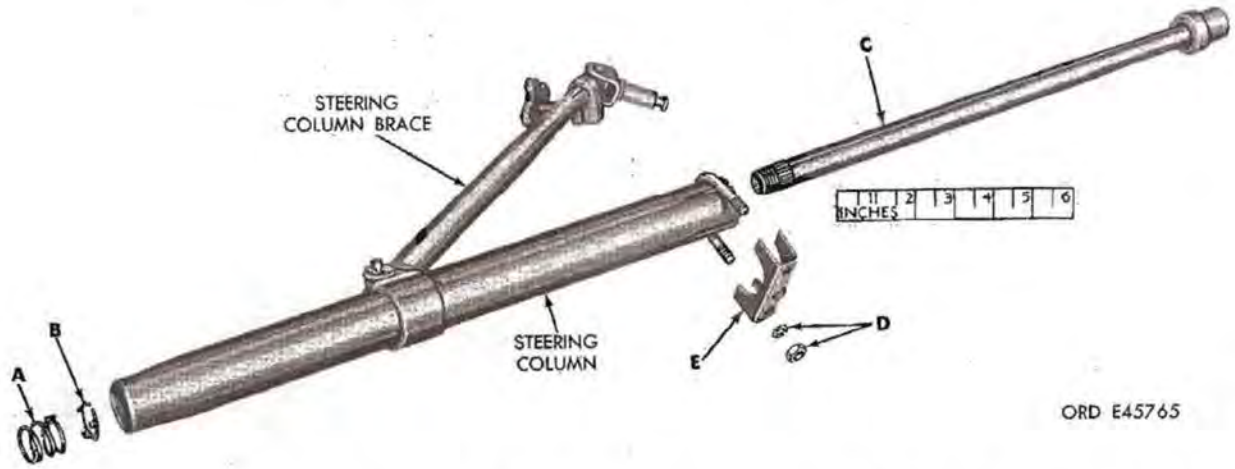
Refer to figures 11 through 16 for disassembly of the steering wheel, column assembly, and tube brace.



A – Remove retaining nut.

B – Pull steering wheel from serrations on upper end of steering wheel shaft.

Figure 11. Removing or installing steering wheel.



A – Remove helical compression spring.

B – Remove steering column bearing retainer.

C – Remove steering wheel shaft.

D – Remove two 5/16-inch hexagon nuts and 5/16-inch external-tooth lock washers (M274A1 only).

E – Remove saddle clamp (M274A1 ~~only~~) and M274A2.

Figure 12. Removing or installing steering wheel shaft.

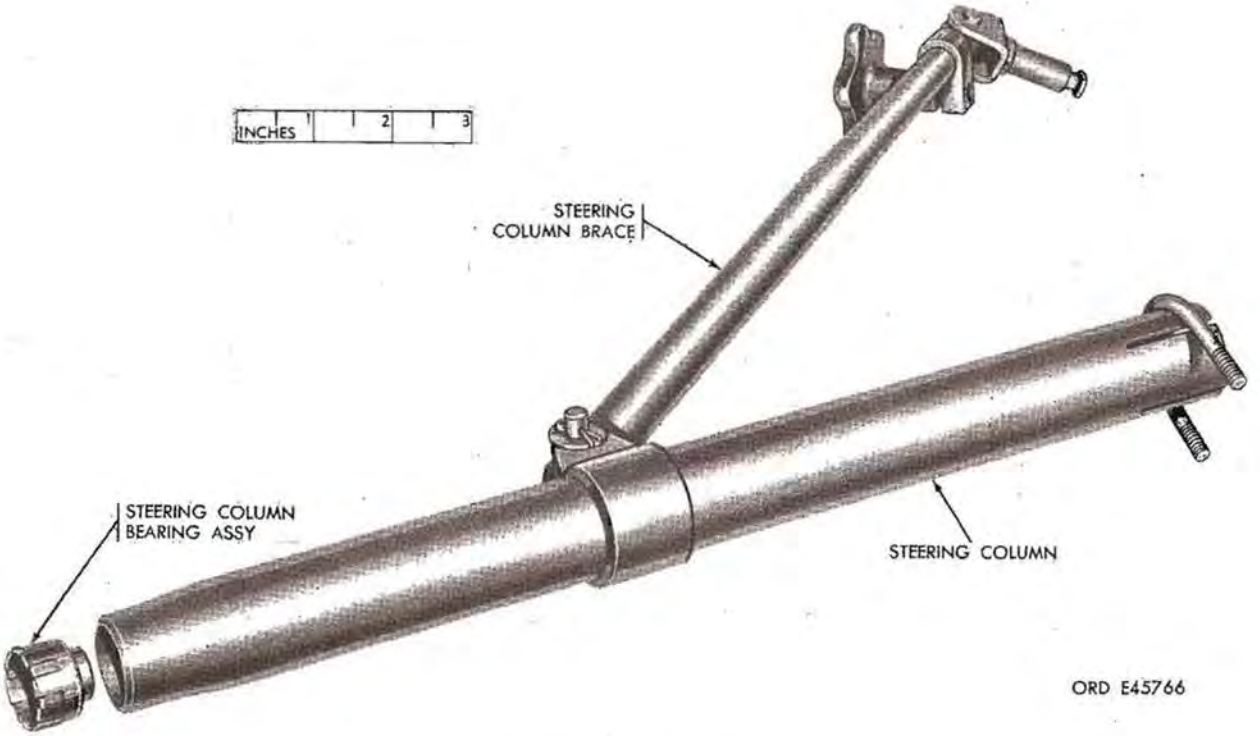
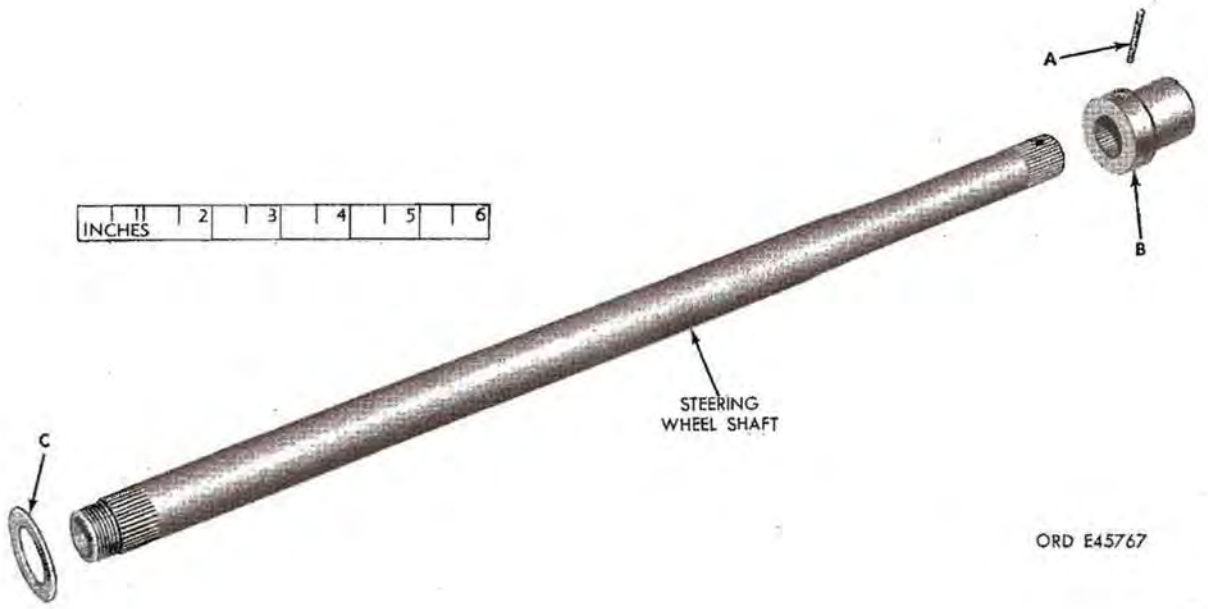


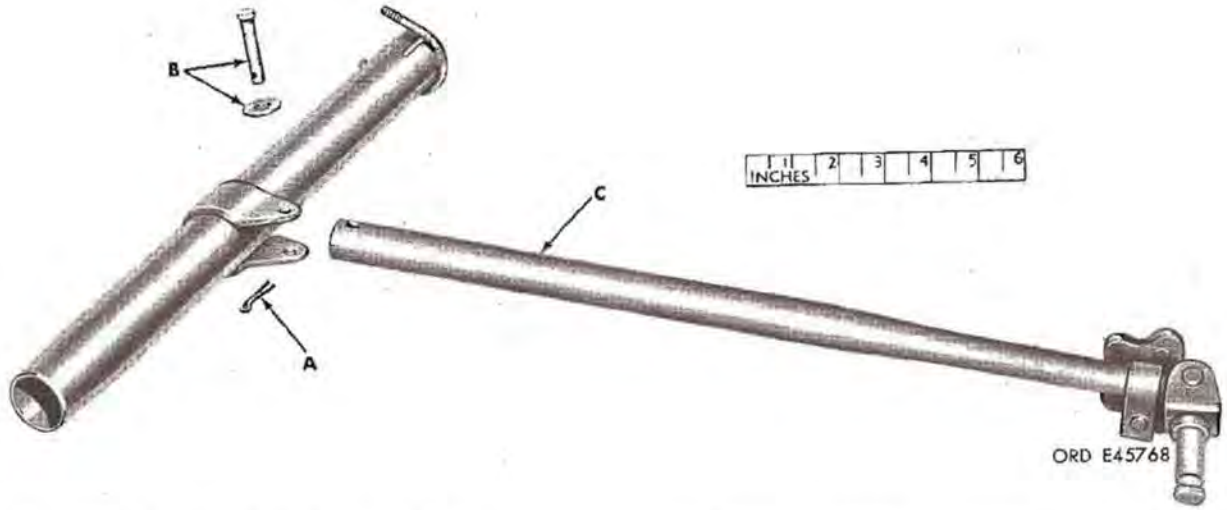
Figure 13. Removing or installing steering column bearing assembly.



A – Remove spring pin.

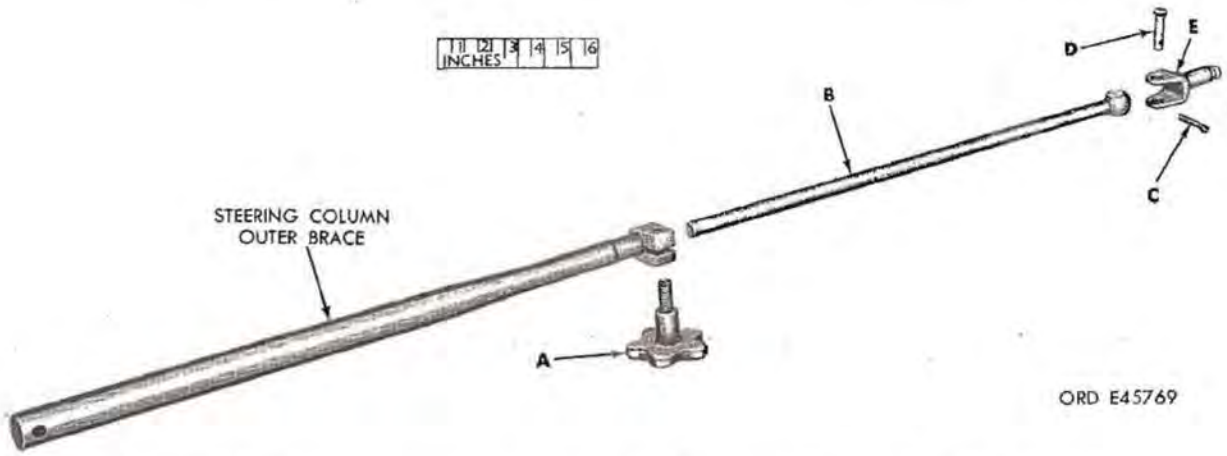
B – Remove steering wheel shaft coupling.
C – Remove thrust washer.

Figure 14. Removing or installing steering wheel shaft coupling.



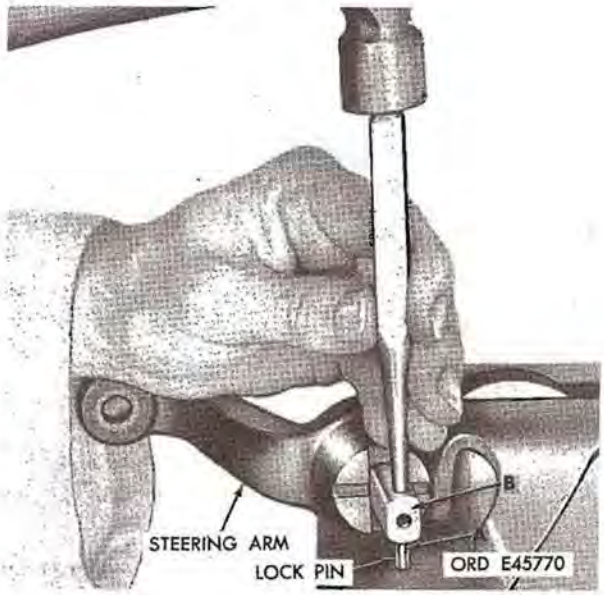
A – Remove 3/32 x 5/8 cotter pin.
B – Remove 13/32-inch flat washer and headed straight pin.
C – Remove steering support shaft tube brace.

Figure 15. Removing or installing steering support shaft tube brace.



A – Remove brace knob.
B – Remove inner brace steering tube shaft.
C – Remove 3/32 x 5/8 cotter pin.
D – Remove headed straight pin.
E – Remove clevis.

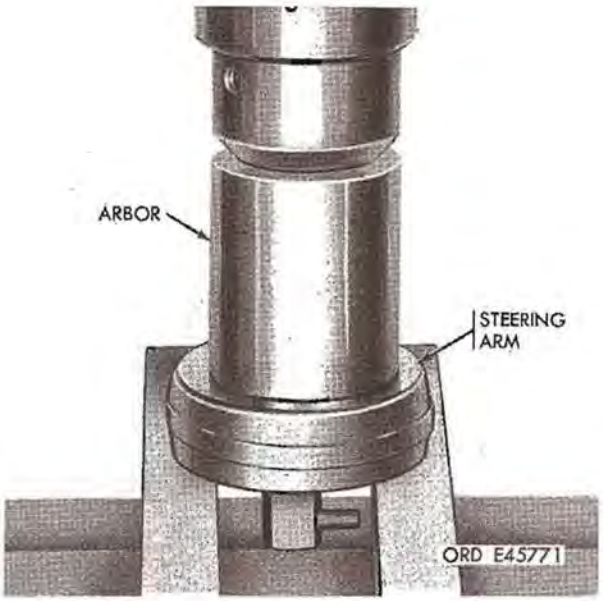
Figure 16. Removing or installing support brace inner shaft and shaft anchor bracket.



A — Remove lock pin.

B — Remove locking pin and compression spring.

Figure 17. Removing or installing steering arm spring pin.



Press bushing-type bearing from steering arm using an arbor press and suitable 1-5/8-inch arbor.

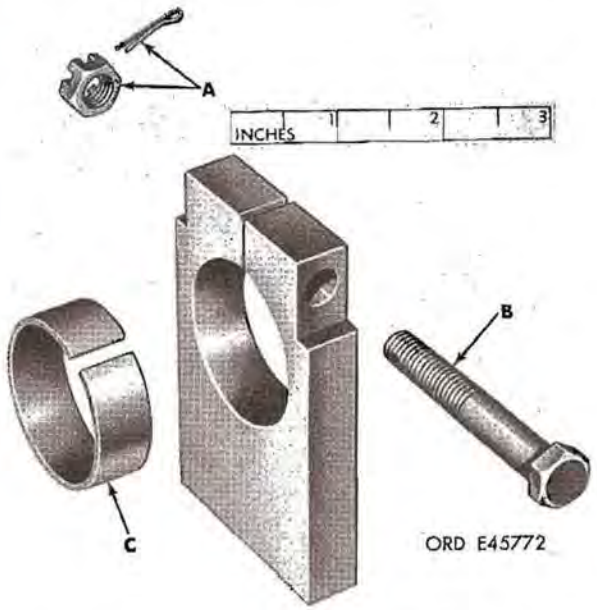
Figure 18. Removing or installing steering arm bushing-type bearing.

19. Disassembly of Steering Arm and Trunnion Support Assemblies

Note. Do not remove bushing (fig. 18) unless inspection (par. 22) indicates need for replacement.

a. Refer to figures 17 and 18 for disassembly of the steering arm assembly.

b. Refer to figure 19 for disassembly of the trunnion support assembly.



A — Remove 3/32 x 7/8 cotter pin and 3/8-inch slotted nut.

B — Remove special bolt from trunnion support assembly.

C — Remove bushing-type bearing from trunnion.

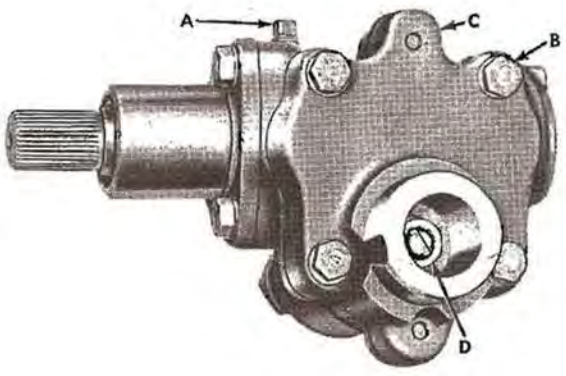
Note. On M274 press bushing-type bearing from trunnion using an arbor press and suitable adapter.

Figure 19. Disassemble or assemble trunnion support assembly — M274A1.

20. Disassembly of Steering Gear Assembly

Note. Do not remove expansion plug (E, fig. 33) unless evidence of oil leakage is noted. Do not remove the lever shaft bearings (G) unless the lever shaft is replaced or inspection (par. 22) indicates need for replacement.

Refer to figures 20 through 28 for disassembly of the steering gear assembly.



ORD E45773

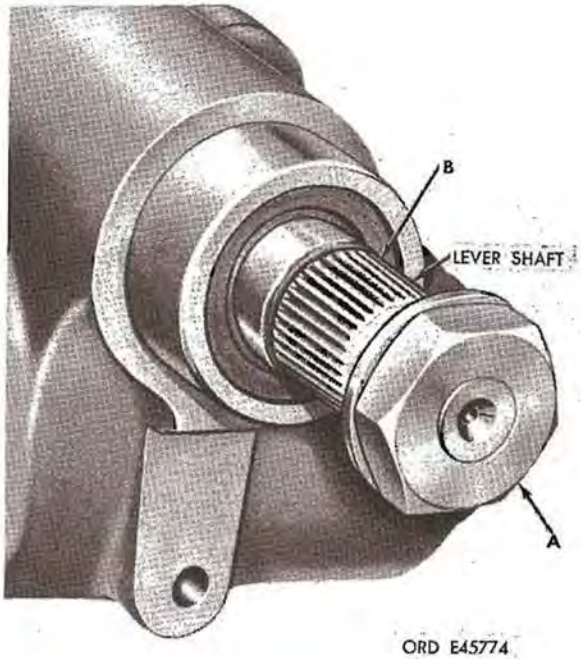
A – Remove pipe plug and drain lubricant.

B – Remove four 5/16 x 1 cap screws and 5/16-inch flat washers.

C – Remove side cover and gasket.

D – Remove locknut and setscrew from cover.

Figure 20. Removing or installing steering gear side cover.

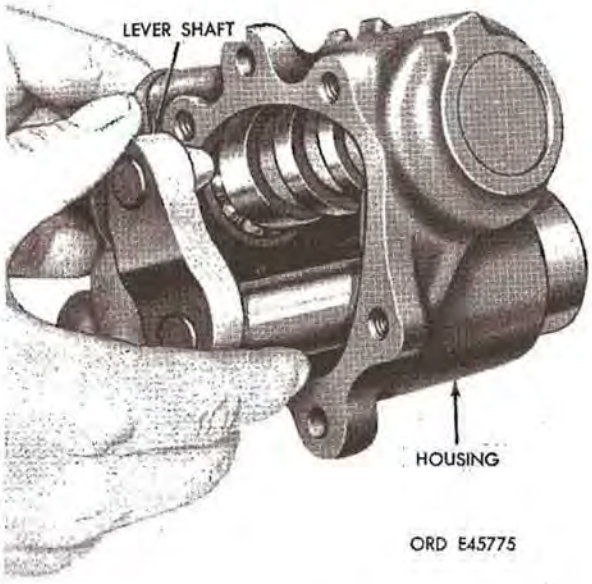


ORD E45774

A – Remove jam nut and lock washer.

B – Remove any burs on end of lever shaft before removing shaft.

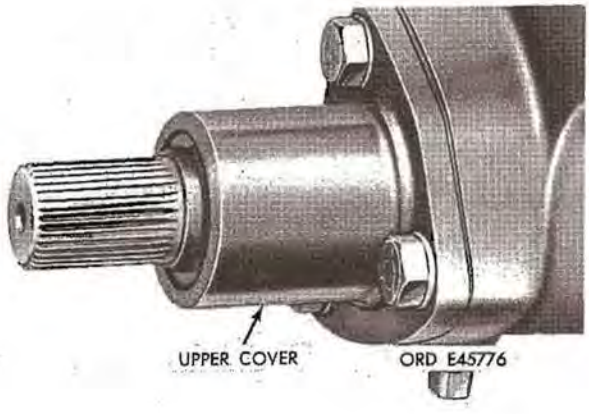
Figure 21. Removing or installing lever shaft jam nut.



ORD E45775

Remove lever shaft from housing.

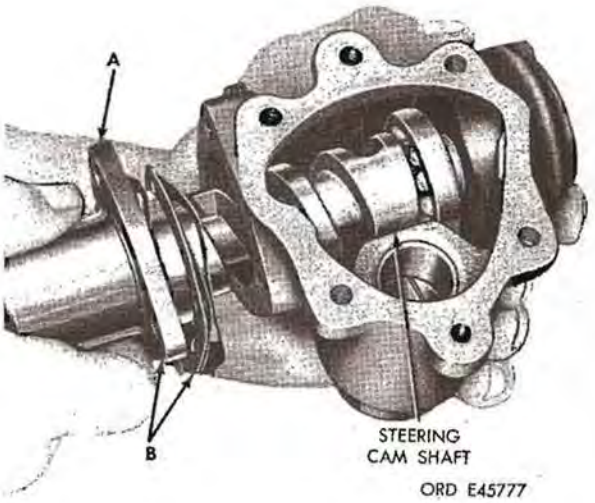
Figure 22. Removing or installing lever shaft jam nut.



ORD E45776

Remove three 5/16 x 3/4 screws and 5/16-inch flat washers.

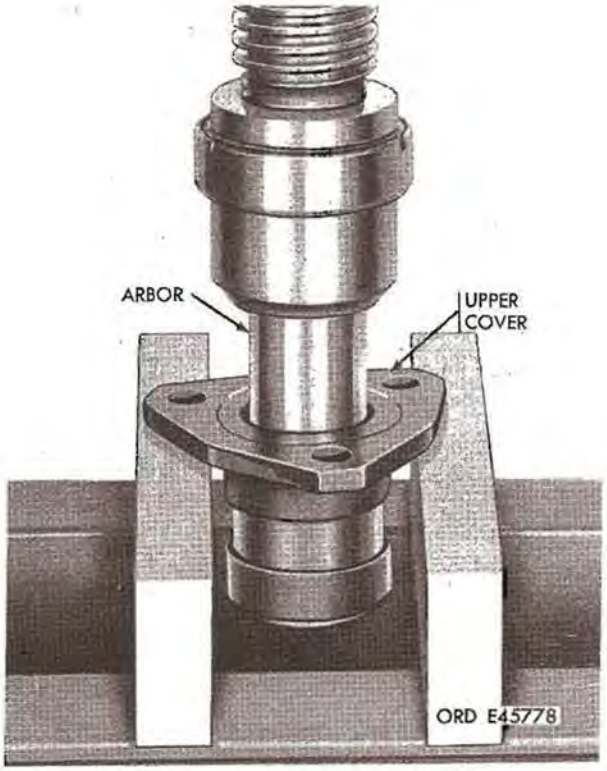
Figure 23. Removing or installing steering gear upper cover.



A – Grasp upper cover and carefully pull steering cam shaft from housing being careful not to damage the cam groove.

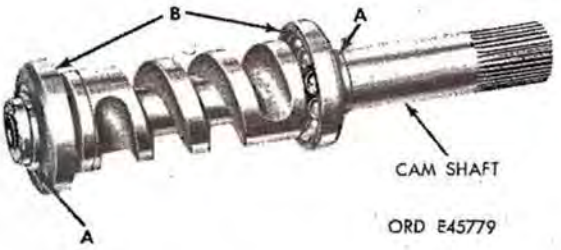
B – Pull cover and shims from shaft.

Figure 24. Removing or installing steering cam shaft.



Remove two oil seals from upper cover.

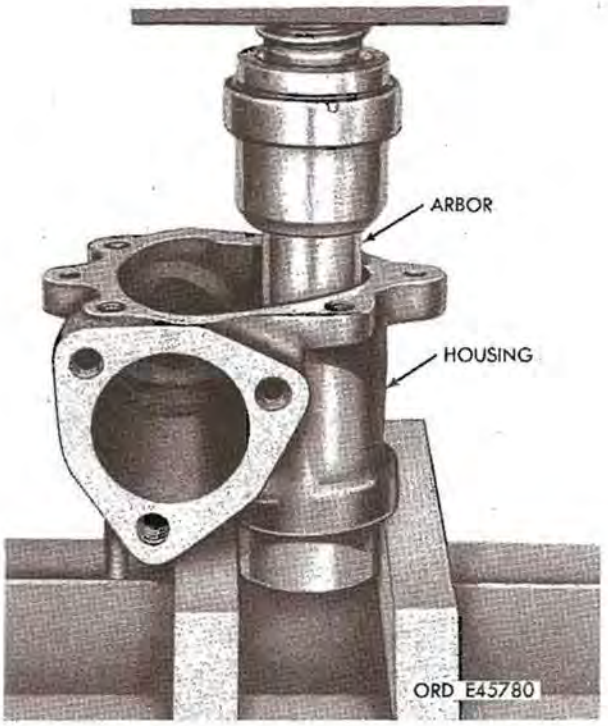
Figure 25. Pressing shaft oil seals from upper cover.



A – Remove two retaining rings.

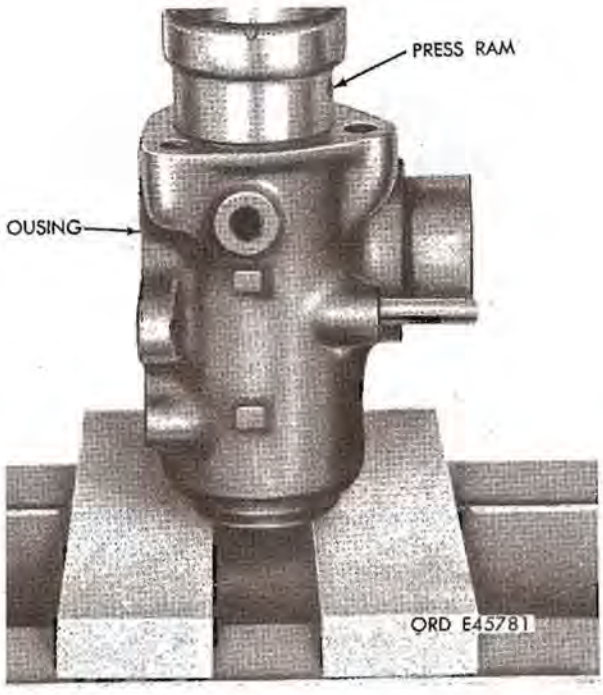
B – Remove bearing outer races from shaft. Be careful not to lose the bearing balls.

Figure 26. Removing or installing cam thrust bearings.



Press or drive expansion plug from housing. Remove lever shaft bearings and oil seal from housing using an arbor press and suitable adapter.

Figure 27. Removing or installing lever shaft bearings and oil seal.



Press or drive housing expansion plug from housing.

Figure 28. Removing or installing housing expansion plug.

Section III. CLEANING, INSPECTION, AND REPAIR

21. Cleaning

a. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts with a stiff bristle brush that has been dipped in the cleaning agent.

b. Use lint free cloths to clean machined surfaces of the steering gear parts.

c. After cleaning, dry parts, except bearings, with dry compressed air.

Caution: Bearings must not be dried or spun with compressed air. Refer to TM 9-214 for care and maintenance of bearings.

22. Inspection

a. Steering System Rods, Levers, Links, and Tow Bar Bellcrank.

Note. The key letters shown below refer to figure 29 except where otherwise indicated.

(1) Inspect all threaded parts for worn or damaged threads.

(2) Inspect tie rod assemblies (B and DD) for cracks or distortion. Inspect tie rod ends (A and H, fig. 30) for lost motion of the ball in the socket.

(3) Inspect bellcrank steering arms (H, L, and CC) for damage. Inspect bearing surfaces and clevis pin holes against limits specified in repair and rebuild standards (par. 24). Inspect the taper holes, for rod ends, for distortion.

(4) Inspect roller needle bearing (D) for damage or wear, against limits specified in repair and rebuild standards (par. 24).

(5) Inspect all clevis pins and pin assemblies for wear, against limits specified in repair and rebuild standards (par. 24).

(6) Inspect steering connecting rod (K) and drag link assemblies (M and Z) for cracks or distortion. Inspect clevis pin holes against limits specified in re-

pair and rebuild standards (par. 24).

(7) Inspect tow bar bellcrank (V) for cracks or distortion. Inspect clevis pin hole and bellcrank sleeve bearing (T) against limits specified in repair and rebuild standards (par. 24).

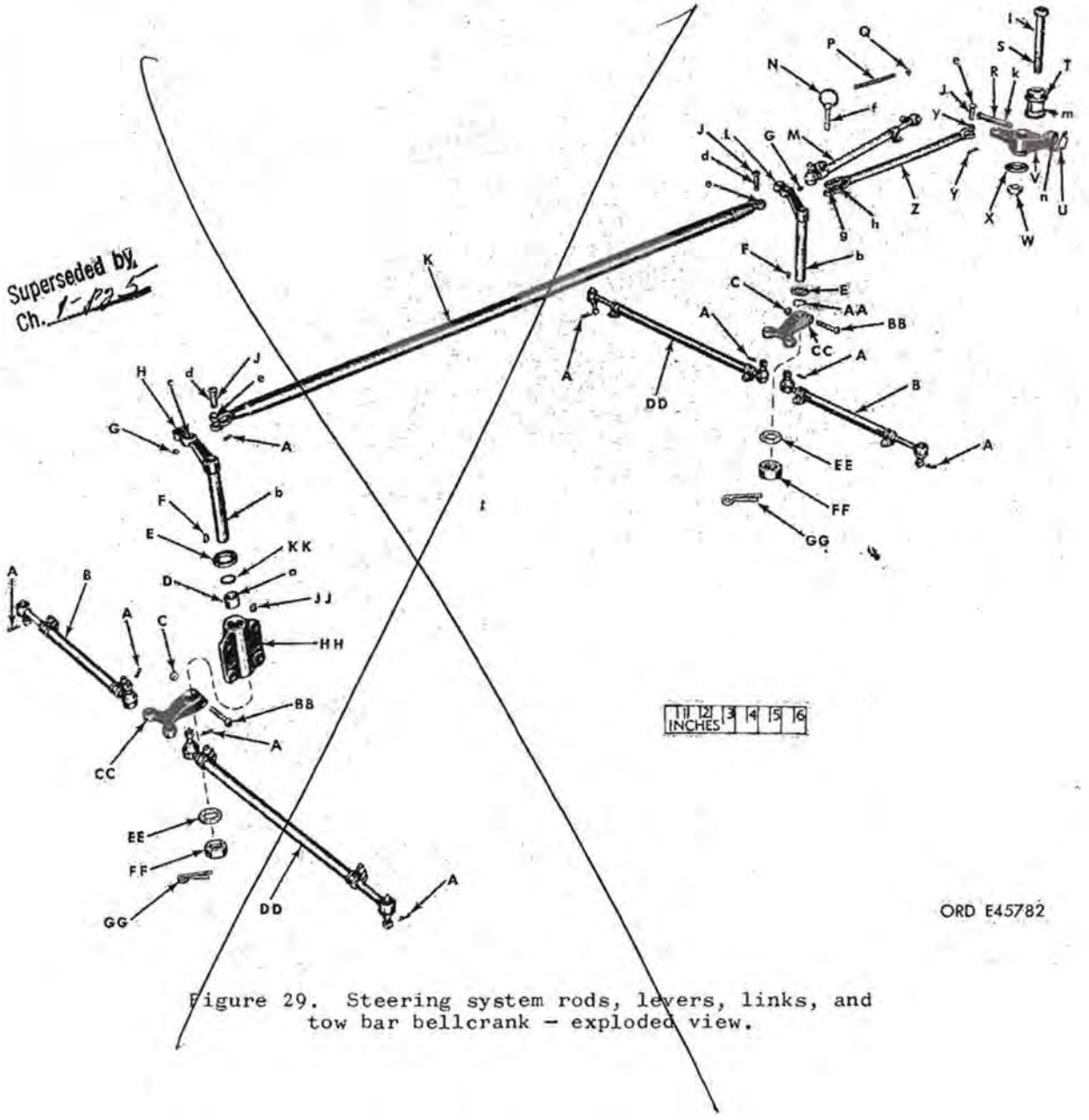
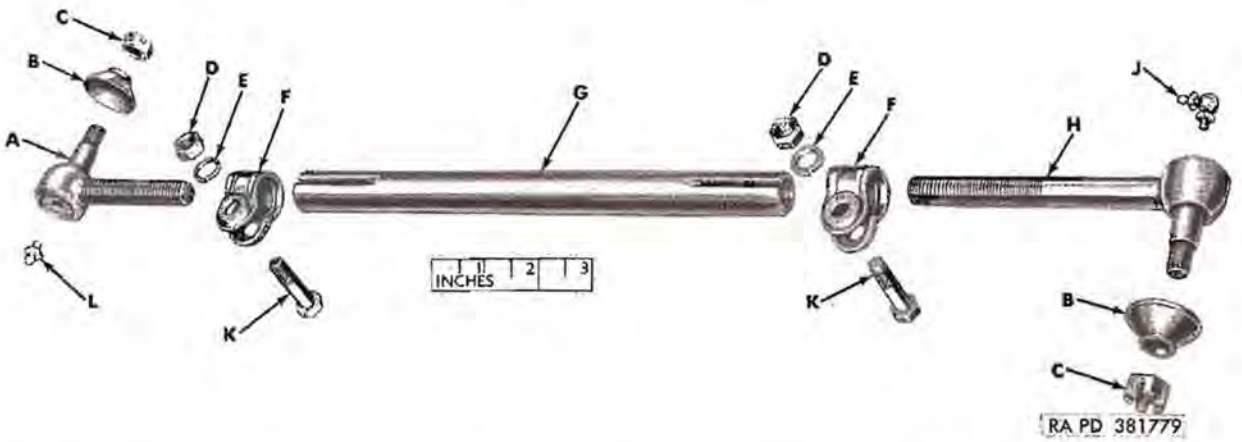


Figure 29. Steering system rods, levers, links, and tow bar bellcrank - exploded view.

A – 3/32 x 1 cotter pin – 121224
B – Steering tie rod assembly
– 7966816 (M274)
– 65909-923707 (M274A1)
C – 3/8-24 hexagon self-locking nut – 443336 (M274 only)
D – Needle bearing – 709482 (M274)
– 713759 (M274A1)
E – Recessed washer
– 8336163 (M274)
– 65909-934067 (M274A1)
F – 5/32 x 3/4 Woodruff key – 124548 (M274 only)
G – 1/4-28 straight lubrication fitting – 96906-15001-1
H – Upper rear bellcrank steering arm
– 7966726 (M274)
– 65909-933811 (M274A1)
J – Headed straight pin – 138086 (M274)
– 8716942 (M274A1)
K – Steering connecting rod – 8336209
L – Upper front bellcrank steering arm
– 7966725 (M274)
– 65909-933803 (M274A1)
M – Drag link assembly
– 7966814 (M274)
– 65909-923706 (M274A1)
N – Quick release pin assembly
– 8716941 (M274)
– 65909-928177 (M274A1)
P – Chain – 8336287
Q – No. 2 x 1/4 drive screw – 145371
R – Headed straight pin – 7045670
S – 3/4-16 x 5-1/2 hexagon head cap screw – 96906-35304-200
T – Bellcrank sleeve bearing – 7966196
U – Snap clip – 8332074
V – Tow bar bellcrank – 8336045
W – 3/4-16 hexagon self-locking nut – 7966195
X – 13/16-inch flat washer – 131000
Y – 1/8 x 7/8 cotter pin – 137180
Z – Tow bar drag link assembly – 8336222
AA – Retaining ring – 65909-934099
BB – 3/8-24 x 2 hexagon head cap screw – 120678 (M274 only)
CC – Lower bellcrank steering arm
– 7966724 (M274)
– 65909-933799 (M274A1)
DD – Steering tie rod assembly
– 7966815 (M274)
– 65909-923707 (M274A1)
EE – 5/8-inch flat washer – 131016 (M274A1 only)
FF – 5/8-18 hexagon slotted nut – 125267 (M274A1 only)
GG – 3/16 x 1-1/4 cotter pin – 187988 (M274A1 only)
HH – Bracket – 8336165
JJ – 1/8-inch straight lubrication fitting – 96906-15003-1
KK – Plain encased seal – 7966727

ATTN: SEE CH. 1-P25

Figure 29 – Continued.



A – ~~Tie rod end – 7966905 (M274)~~ * – 65909-923705 (M274A1)
B – Dust cover – 7760070
C – 3/8-24 hexagon slotted nut – 96906-35692-625
D – 5/16-24 hexagon plain nut – 96906-35690-525
E – 5/16-inch lock washer – 96906-35338-26
F – Clamp – 7760089
* G – ~~Tube – 65909-928021~~
* H – ~~Tie rod end – 7966813 (M274)~~ – 65909-923704 (M274A1)
J – 1/4-28 elbow lubrication fitting – 96906-15001-4 (M274 only)
K – 5/16-24 x 1-1/4 hexagon head screw – 96906-35292-36
L – 1/4-28 straight lubrication fitting – 96906-15001-1 (M274 only)

Figure 30. Steering tie rod assembly – exploded view.

* Superseded by Ch. 1-P22

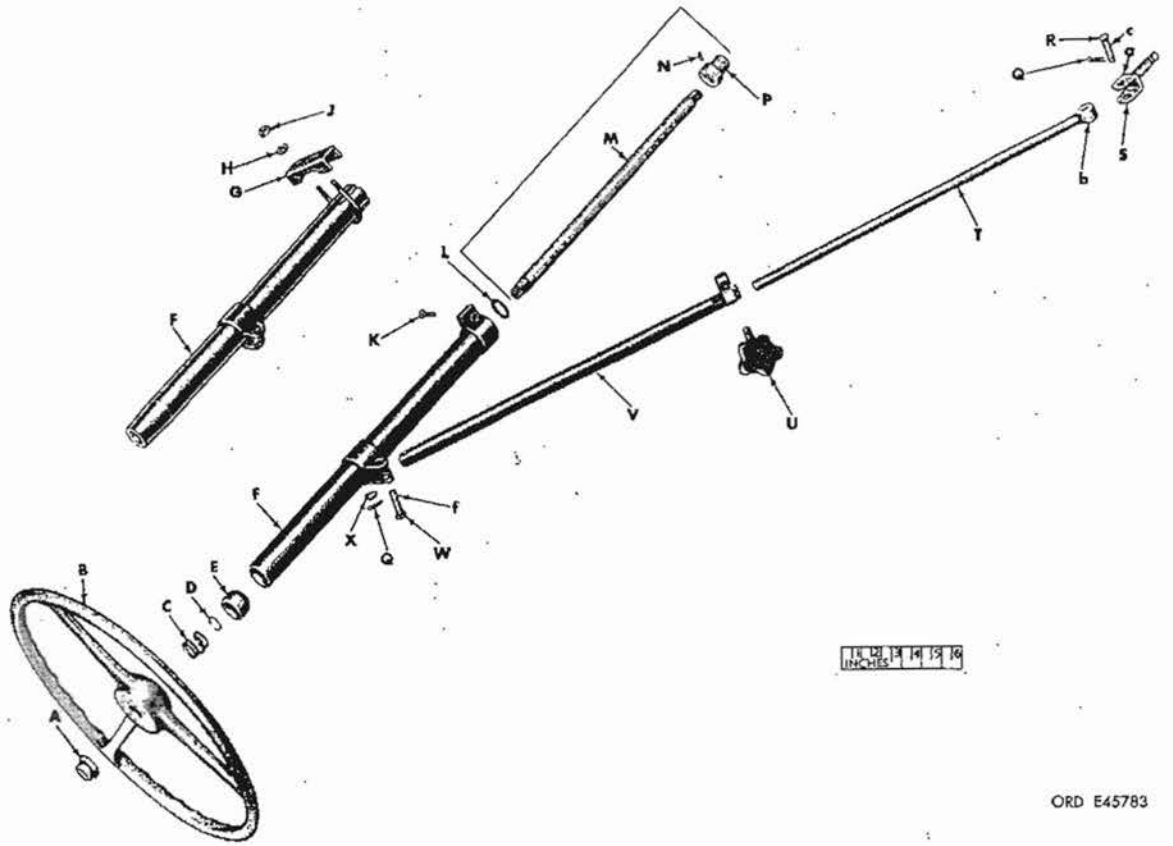
b. Steering Wheel, Column Assembly, and Tube Brace.

Note. The key letters shown below refer to figure 31.

(1) Inspect the serrations in the steering wheel (B), steering wheel shaft (M), and steering wheel shaft coupling (P) for burs, nicks, or other damage.

(2) Inspect the steering wheel for cracks or distortion.

(3) Inspect all shafts and tubes for cracks, distortion, or other damage. Inspect clevis pin holes and clevis pins against limits specified in repair and rebuild standards (par. 24).



A – Retaining nut – 7412579 (M274)
– 7760061 (M274A1)
B – Steering wheel – 7375336
C – Helical compression spring – 7696370
D – Steering column bearing retainer – 7696348
E – Steering column bearing assembly – 8677346
F – ~~Steering column assembly – 7966751 (M274) – 65909-933838 (M274A1)~~
G – ~~Saddle clamp – 65909-933835 (M274A1 only)~~
H – ~~5/16-inch external-tooth lock washer – 96906-35335-20 (M274A1 only)~~
J – ~~5/16-24 hexagon nut – 8764609 (M274A1 only)~~
K – 3/8-24 x 1 assembled washer screw – 425859 (M274 only)
L – Flat washer – 8716940
M – Steering wheel shaft – 8716938
N – Spring pin – 96906-9048-164
P – Steering wheel shaft coupling – 8716939
Q – 3/32 x 5/8 cotter pin – 96906-24665-295
R – Headed straight pin – 7760076
S – Clevis – 7760075
T – Inner brace steering tube shaft – 7966822
U – Steering column brace knob – 7760065
V – Steering support shaft tube brace – 7966818
W – Headed straight pin – 7760077
X – 13/32-inch flat washer – 96906-15795-214

Figure 31. Steering wheel, column assembly, and support shaft tube brace – exploded view.

* Superseded by Ch. 1-Supp. 2

c. Steering Arm Assembly and Supports.

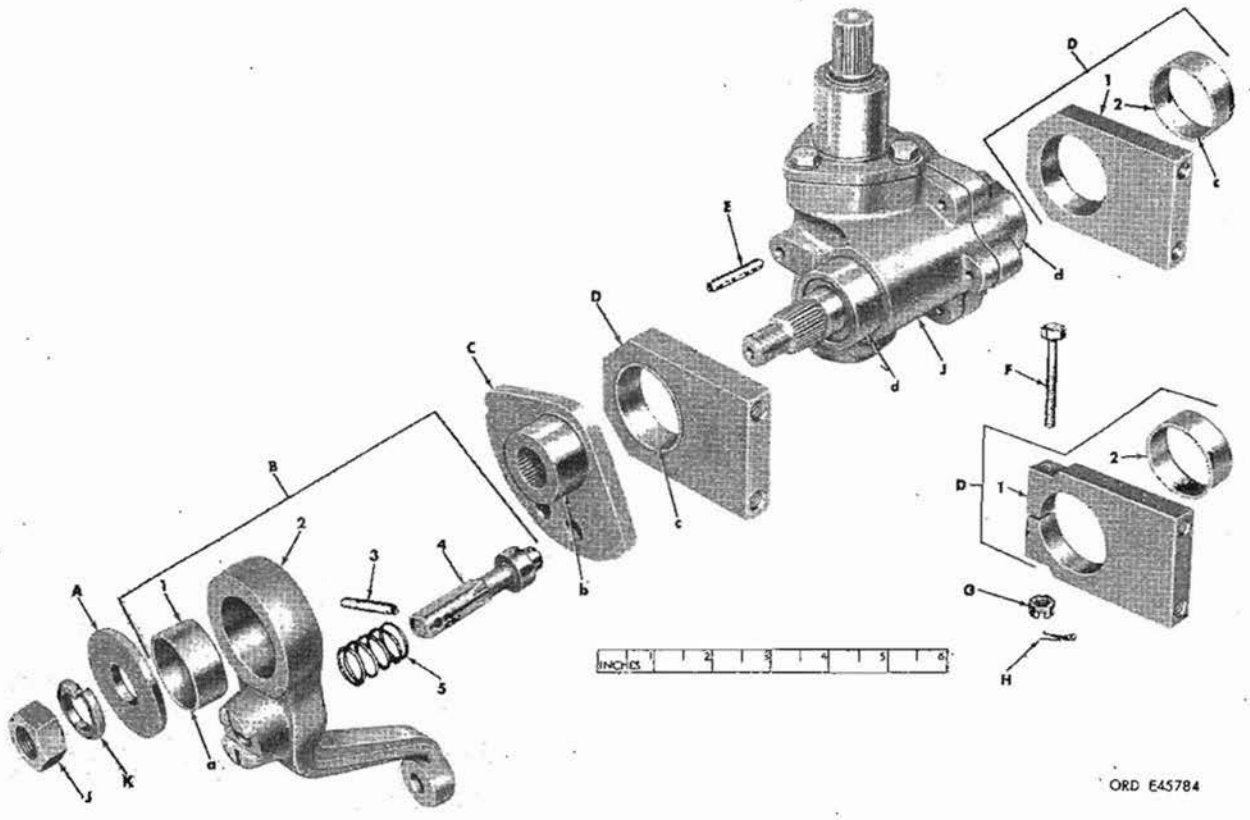
Note. The key letters shown below refer to figure 32.

(1) Inspect steering arm bearing (B-1) against limits specified in repair and rebuild standards (par. 24).

(2) Inspect trunnion support bushings (D-2) against limits specified in the repair and rebuild standards (par. 24).

(3) Inspect the splines in the locking plate (C) for nicks, burs, or other damage.

(4) Inspect all parts for cracks or distortion. Inspect the machined surfaces for burs or nicks.



A – Thrust washer – 7760071
B – ~~Steering arm assembly~~
~~– 7966750 (M274)~~ *
~~– 65909-927172 (M274A1)~~
1 – ~~Steering arm bearing~~
~~– 7760072 (M274)~~ *
~~– 65909-927174 (M274A1)~~
2 – ~~Steering arm – 65909-927173~~ *
3 – Lock pin – 96906-9048-176
4 – Locking pin – 7966823
5 – Compression spring – 7966824
C – ~~Locking plate – 7966783 (M274)~~ *
~~– 65909-927426 (M274A1)~~

* D – ~~Trunnion support assembly~~
~~– 65909-913368 (M274)~~
~~– 65909-927176 (M274A1)~~
* 1 – ~~Trunnion support~~
~~– 94537-913370 (M274)~~
~~– 65909-927177 (M274A1)~~
* 2 – ~~Bushing – 8386872 (M274)~~
~~– 65909-927178 (M274A1)~~
E – Spring pin – 96906-9048-235
* F – ~~Special hex head bolt – 65909-927175~~ (~~M274A1 only~~)
* G – ~~3/8-24 slotted hex nut – 125348~~
* H – ~~3/32 x 7/8 cotter pin – 137168~~
* J – ~~Steering gear assembly – No Number~~
K – Lock washer – 103325
L – Jam nut – 451537

Figure 32. Steering arm and support – exploded view.

* Superseded by Ch. 1-Rev 2 + 8

d. Steering Gear Assembly.

Note. The key letters shown below refer to figure 33.

(1) Inspect the cam groove in the steering cam shaft (M) for chipping or scoring. Inspect the bearing race at each end for signs of wear or scoring. Inspect the splines on the end for burs, nicks, flat spots, or evidence of twist or fracture.

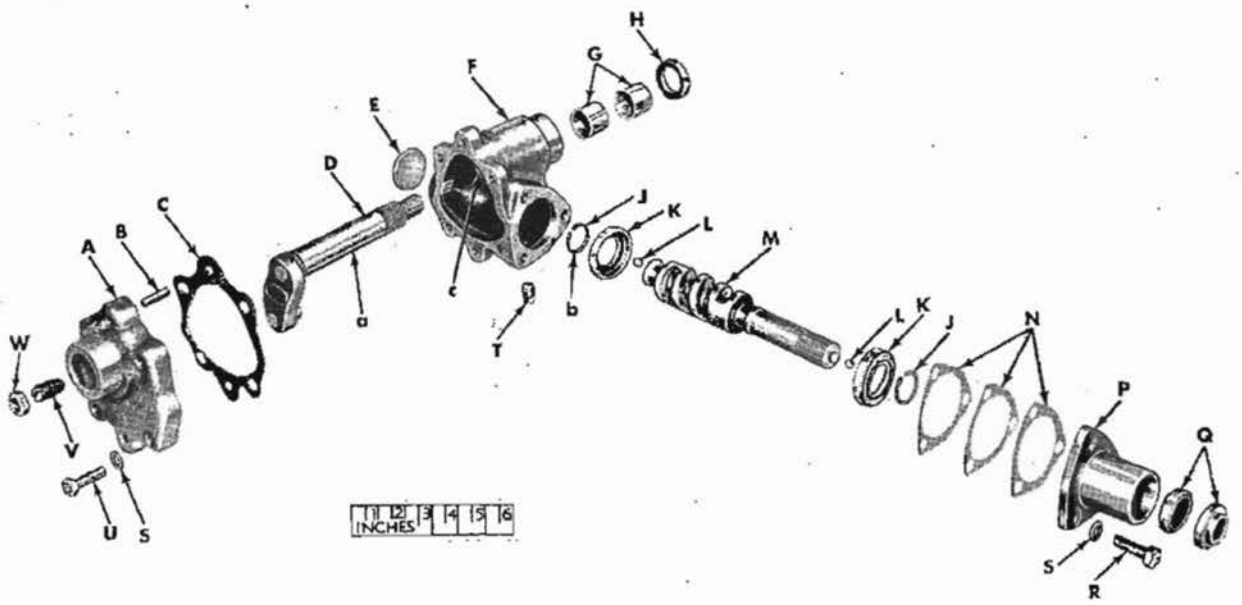
(2) Inspect the splines on the end of the lever shaft (D) for nicks, flat spots, or evidence of twist or fracture. Inspect the shaft against limits specified in repair and rebuild standards (par. 24).

(3) Inspect the bearing outer races (K) and bearing balls (L) for galling or flat spots.

Note. Refer to TM 9-214 for care and maintenance of bearings.

(4) Inspect the lever shaft bearings (G) against limits specified in repair and rebuild standards (par. 24).

(5) Inspect the machined surfaces in the housing (F) for burs or nicks. Inspect the outer surface for signs of cracks. Inspect side cover (A) and upper cover (P) for cracks or nicks to machined surfaces.



ORD E45785

A – Side cover – 65909-915823
B – Headless straight pin – 141199
C – Gasket – 8716931
D – Lever shaft – 8716935
E – Expansion plug – 541402
F – Housing – 65909-915799
G – Lever shaft bearing – 7351023
H – Encased plain seal – 545269
J – Retaining ring – 8716933
K – Bearing outer race – 8716932
L – Bearing ball – 104919
M – Cam shaft – 8716929
N – Shim – 0.002-inch thick – 94537-639108
– 0.003-inch thick – 94537-639109
– 0.010-inch thick – 94537-639110
P – Upper cover – 77640-T126032 (M274)
– 65909-933696 (M274A1)
Q – Encased plain seal – 8716934
R – 5/16-18 x 3/4 hexagon head – 179816
S – 5/16-inch flat washer – 7412883
T – Pipe plug – 219188
U – 5/16-18 x 1 hexagon cap screw – 179818
V – Setscrew – 7696342
W – Hexagon head nut – 272121

Figure 33. Steering gear assembly – exploded view.

23. Repair

a. General. The following subparagraphs cover only those parts that are repairable. Parts not covered must be replaced if they fail to pass inspection (par. 22).

b. Steering System Rods, Levers, Links, and Tow Bar Bellcrank.

(1) Minor damage to threaded parts may be corrected by the use of a tap or die. Major damage requires replacement of the damaged part.

(2) If the tow bar bellcrank bearings are worn beyond the limits specified, replace the bearings as shown in figure 10.

(3) Minor bends to steering connecting rod, tie rod assemblies, or drag link assemblies may be straightened with a hammer on a flat surface.

c. Steering Wheel, Column Assembly, and Tube Brace.

(1) Burs or minor nicks on serrations in the steering wheel, steering wheel shaft, or shaft coupling may be removed with a fine mill file.

(2) Minor bends to steering wheel column, shaft, support brace, and inner shaft may be straightened with a hammer on a flat surface.

d. Steering Arm Assembly and Supports.

(1) Burs or minor nicks on splines in lever shaft locking plate may be removed with a fine mill file.

(2) Minor bends in steering arm may be straightened with a hammer on a flat surface. Minor cracks may be welded.

(3) Burs or nicks on machined or bearing surfaces may be removed with crocus cloth.

e. Steering Gear Assembly.

(1) Minor burs or nicks on splines on the steering cam shaft or lever shaft may be removed with a three-corner file.

(2) If lever shaft is replaced, the lever shaft bearings must be replaced.

(3) Burs or nicks on machined surfaces in housing, side cover, or upper cover may be removed with crocus cloth.

24. Repair and Rebuild Standards

a. General. The repair and rebuild standards included herein give the minimum, maximum, and key clearances of new or rebuilt parts. They also give wear limits which indicate that point to which a part or parts may be worn before replacement in order to receive maximum service with minimum replacement. Normally, all parts which have not been worn beyond the dimensions shown in the "Wear limits" column or damaged from corrosion will be approved for service. An asterisk (*) in the "Wear limits" column indicates that the part or parts should be replaced when worn beyond the limits given in the "Sizes and fits of new parts" column. In the "Sizes and fits of new parts" column, the letter "L" indicates a loose fit (clearance) and the letter "T" indicates a tight fit (interference).

b. Steering Bellcrank Bearings.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
29	a	Inside diameter of bellcrank needle bearings	0.875	0.8755
	b	Outside diameter of steering bellcrank	0.875 to 0.8755	0.8740
	a-b	Fit of steering bellcrank in bearing	0.0000 to 0.0005T	0.0015L

c. Clevis Pins and Bolt.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
29	c	Diameter of hole in steering bellcrank	0.498 to 0.500	0.502
	d	Diameter of clevis pin	0.4960 to 0.4975	0.494
	c-d	Fit of rear steering bellcrank on clevis pin	0.0005L to 0.0040L	0.008L
	e	Diameter of hole in steering connecting rod	0.499 to 0.501	0.502
	e-d	Fit of rear end steering connecting rod to clevis pin	0.0015L to 0.0050L	0.008L
	f	Diameter of pin assembly	0.4970 to 0.4985	0.495
	e-f	Fit of front end steering connecting rod to pin assembly	0.0005L to 0.0040L	0.0007L
	g	Diameter of rear hole rear end bellcrank drag link	0.502 to 0.504	0.506
	g-f	Fit of rear hole rear end bellcrank drag link to pin assembly	0.0035L to 0.0070L	0.011L
	h	Diameter of front hole rear end drag link	0.498 to 0.500	0.502
	h-d	Fit of front hole rear end bellcrank drag link to clevis pin	0.0005L to 0.0040L	0.008L
	j	Diameter of front hole rear end bellcrank drag link to clevis pin	0.4980 to 0.5010	0.503
	j-d	Fit of front end tow bar drag link on clevis pin	0.0005L to 0.0050L	0.009L
	k	Diameter of clevis pin	0.491 to 0.496	0.489
	l	Diameter of bolt	0.7410 to 0.7500	
	m	Inside diameter of bellcrank sleeve bearing	0.750 to 0.755	
	l-m	Fit of bellcrank sleeve bearing on bolt	0.0000 to 0.014L	
	n	Diameter of clevis pin hole in tow bar bellcrank	0.500 to 0.505	0.507
	n-k	Fit of clevis pin in tow bar bellcrank	0.004L to 0.014L	0.018L

d. Steering Wheel, Column Assembly, and Tube Brace.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
31	a	Diameter of clevis pin hole in clevis ----	0.375 to 0.380	0.382
	b	Diameter of clevis pin hole in inner brace steering tube shaft ----------	0.374 to 0.376	0.378
	c	Diameter of clevis pin ----------	0.368 to 0.373	0.364
	a-c	Fit of clevis on clevis pin ----------	0.002L to 0.012L	0.020L
	b-c	Fit of shaft on clevis pin ----------	0.001L to 0.008L	0.014L
	d	Diameter of clevis pin hole in steering shaft tube support brace ----------	0.375 to 0.380	0.384
	e	Diameter of clevis pin hole in steering column assembly ----------	0.375	0.378
	f	Diameter of clevis pin ----------	0.368 to 0.373	0.364
	d-f	Fit of shaft tube brace on clevis pin --	0.002L to 0.012L	0.020L
	e-f	Fit of steering column assembly on clevis pin ----------	0.002L to 0.007L	0.014L

e. Steering Arm and Support.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
32	a	Inside diameter of steering arm bearing	1.380 to 1.381	
	b	Diameter lever shaft locking plate hub -	Variable, expands with taper application	
	a-b	Fit of steering arm bearing on locking plate hub ----------	0.0010L to 0.004L	0.007L
	c	Inside diameter trunnion support bushing	1.625 to 1.627	1.628
	d	Diameter steering gear trunnion --------	1.620 to 1.624	1.618
	c-d	Fit of trunnion support bushing on trunnion ----------	0.001L to 0.007L	0.010L

f. Steering Gear Assembly.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
33	a	Diameter of lever shaft ----------	0.8735 to 0.8725	0.871
	a-b	Fit of lever shaft bearings ----------	0.0005L to 0.00025L	0.0007L
	b	Inside diameter of shaft bearings (burnish) ----------	0.874 to 0.875	0.878
	c	Outside diameter shaft bearings --------	1.003 to 1.001	*
	b-c	Fit of bearings in housing bore --------	0.001T to 0.005T	

Section IV. ASSEMBLY AND INSTALLATION

25. General

The instructions covering assembly of the complete steering system are almost identically the reverse of those covering disassembly. Therefore, the following assembly procedure, for the most part, will be referenced to the illustrations appearing under disassembly. When this occurs, the instructions appearing with each referenced illustration should be performed in the reverse order from which they are given. For example, callout letters A, B, C, D, and E indicate the sequence of the disassembly steps provided with figure 12. Assembly may be accomplished by performing these steps in reverse order; i.e., E, D, C, B, and A.

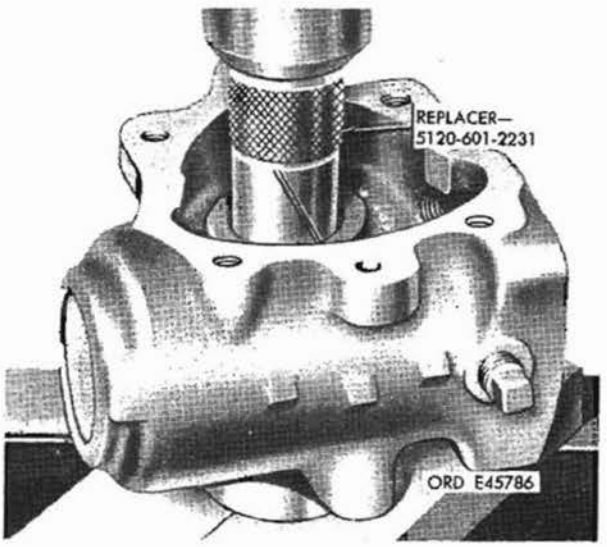


Figure 34. Installing inner lever shaft bearing using replacer – 5120-601-2231.

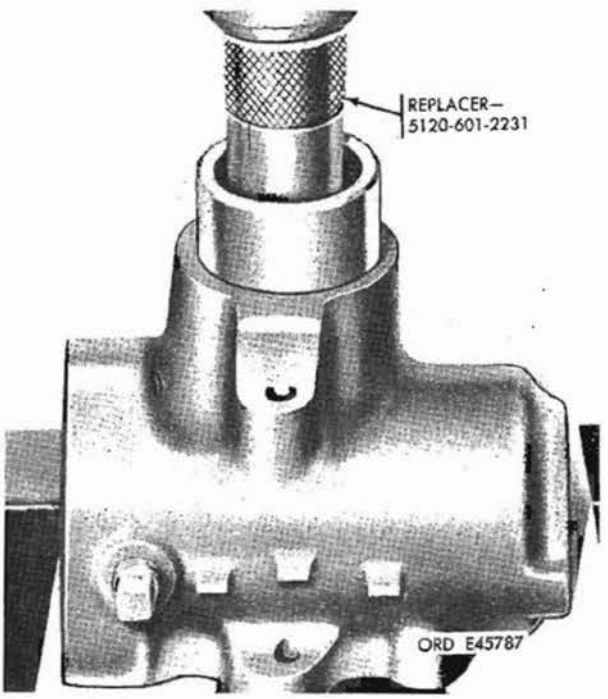


Figure 35. Installing outer lever shaft bushing using replacer – 5120-601-2231.

26. Assembly of Steering Gear Assembly

a. If lever shaft bearings were removed (par. 20) position one new bearing in the bore inside the housing and press in with replacer – 5120-601-2231 (fig. 34). Turn housing over and press in second bearing with the same replacer (fig. 35). Drill the oil hole in the outer bearing using a 0.190-inch drill. Burnish the bearings to the dimensions specified in paragraph 24, using burnisher – 5120-601-2230 (fig. 36).

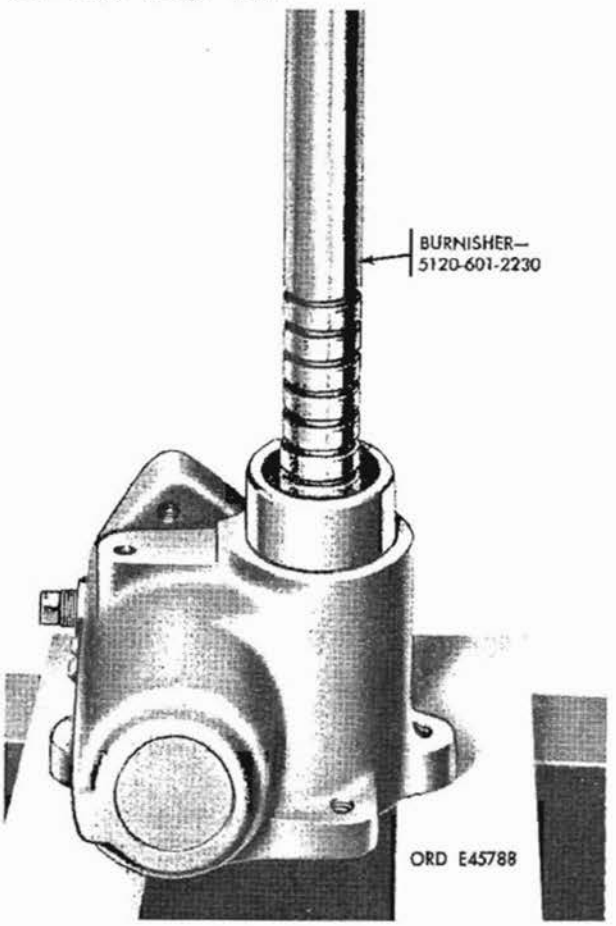


Figure 36. Burnishing lever shaft bearings using burnisher – 5120-601-2230.

b. If expansion plug was removed (par. 20), insert new plug in lower end of housing and drive into place.

c. Assemble ten bearing balls in each bearing outer race and refer to figure 26 covering installation of bearings and retaining rings.

d. Refer to figure 24 for assembly of shaft oil seals in upper cover.

e. Refer to figure 23 for assembly of steering cam shaft.

f. Refer to figure 22 for assembly of steering gear upper cover.

g. Refer to figure 21 for assembly of lever shaft. The tapered stud on the shaft should be at the approximate center of the cam groove.

h. Refer to figure 19 for assembly of the side cover. Do not tighten the setscrew locknut until after adjustment (par. 27).

i. Lubricate steering gear assembly in accordance with LO 9-2320-213-12 and install pipe plug.

27. Adjustment of Steering Gear Assembly

a. General. Two adjustments are required on the steering gear assembly. The first adjustment, preload on the cam thrust bearings, is made prior to installing the steering gear assembly in the vehicle. The second, backlash of the stud in the cam groove, is made after completing the cam thrust bearing adjustment and with the steering gear assembly mounted in the vehicle.

b. Adjust Cam Thrust Bearings.

(1) Find the midposition of steering gear shaft travel by counting the number of turns required to turn the shaft from one extreme position to the other and back off one-half the number of turns. Check preload of the cam thrust bearings by rotating the shaft with a torque indication wrench. Read torque wrench while wrench is in motion to obtain accurate results. The pull at midposition must be 1 to 4 lb-in. torque.

(2) If torque is greater than the maximum value, add a 0.003-inch shim between the upper cover and housing (par. 26). Add shims as required to attain proper preload. If torque is below the minimum value, reduce shims as required.

c. Adjust Lever Shaft Stud.

(1) Install the steering gear assembly in the vehicle. Refer to TM 9-~~8034-20~~ 2320-213-20.

(2) Rotate the steering wheel from one extreme position to the other, making note of the number of turns required. Turn the steering wheel back one-half the total turns. This places the stud in the lever shaft in the normal straight ahead position.

(3) Rotate the steering wheel with a torque indicating wrench. Read torque wrench while wrench is in motion. Use a screwdriver to adjust the setscrew (V, fig. 33) until the pull at the center position is 5 to 9 lb-in. torque. After adjustment, tighten the locknut securing the setscrew.

28. Assembly of Steering Arm Assembly

Refer to figures 17, 18, and 19 and reverse the sequence of illustrations and instructions.

29. Assembly of Steering Wheel, Column Assembly, and Tube Brace

Refer to figures 11 through 16 and reverse the sequence of illustrations and instructions.

30. Installation and Adjustment

Refer to TM 9-~~8034-20~~ 2320-213-20 for installation and adjustment of steering system components.

CHAPTER 4
REPAIR OF FRONT AXLE ASSEMBLY

Section I. DESCRIPTION, DATA, AND TROUBLESHOOTING

31. Description

a. General. The front axle (fig. 37) is mounted directly between flanges on the two frame tubes and two front support tubes without spring suspension of any type. The axle consists of three main units; i.e., the gear carrier assembly with the brake assembly and the two drop gear axle housings. The gear carrier assembly contains the drive pinion with bearings, drive gear with bearings and cage, and the brake assembly which is mounted on the shaft of the drive pinion. The two drop gear axle housings are identical and contain the wheel hubs, steering knuckles, universal joints, steering knuckle covers, and axle shafts; together with the various seals, gears, bearings, gaskets, and connecting parts.

b. Operation. Power from the propeller shaft is transmitted through the companion flange to the drive pinion. From the pinion, power flows to the drive gear which rotates in a cage secured between the carrier assembly and the left drop gear axle housing. From the drive gear, two splined axle shafts carry the power to the universal joints through gear trains located in the outer ends of the axle housings. Steering knuckle covers, attached to the outer ends of the housings, cover the gear trains and serve as attachment points to which the steering knuckles are pivoted.

c. Differences Between Models.

(1) Drop gear axle assembly. The lower portion of the drop gear axle housing casting on the M274A1 is larger than the housing casting on the M274. In addition, axle housing on the M274A1 contains a pipe plug in place of the vent assembly found on the M274 axle housing.

Superseded by, Ch. 1-008

(2) Gear carrier assembly. The gear carrier housing on the M274A1 contains a pipe plug in place of

Rescinded by, Ch. 1

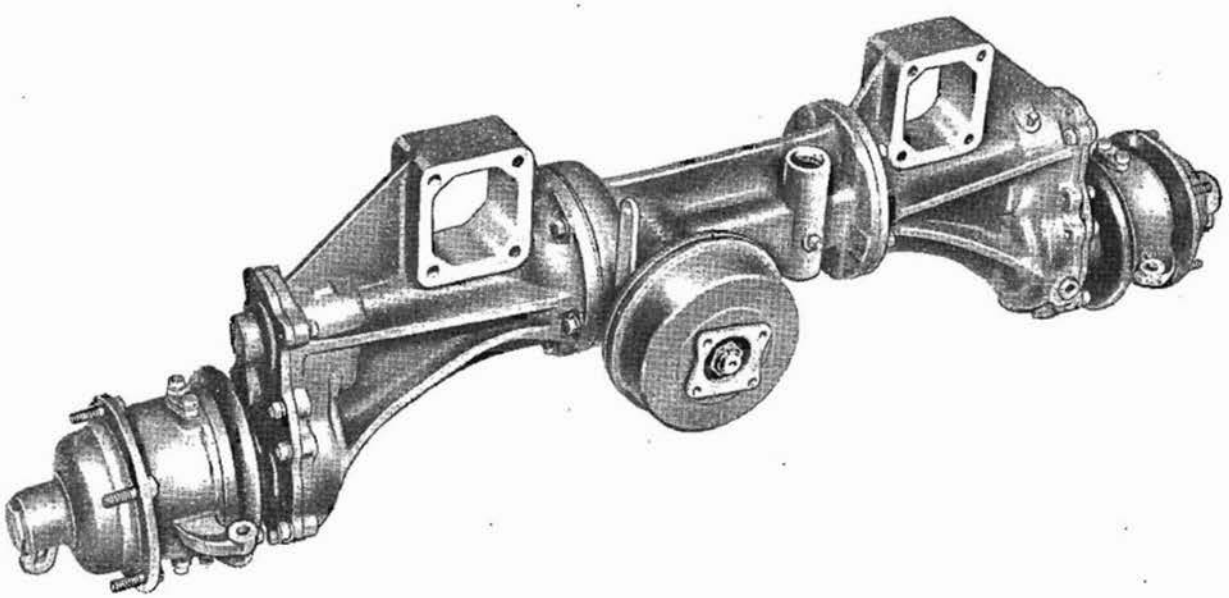


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Figure 37. Front axle assembly – left rear view.

the ~~vent assembly~~ found on the ~~M274 gear carrier housing~~.

(3) Brake assembly. The brake assembly on the M274A1 has a larger lining area for more positive braking action and the brake drum casting is ribbed to increase the cooling area. In addition, the brake assembly on the M274A1 uses two brake shoes whereas the brake assembly on the M274 uses a brake band.

32. Data

Make ——— Willys
Type ——— drop gear drive
Lubricant capacity:
  Gear carrier assembly ——— 6 oz
  Axle housing ——— 12 oz each
Universal joint:
  Make ——— Bendix
  Type ——— constant velocity
  Size ——— large — 3-3/16-in.
  Maximum turning angle ——— 27 deg
Ratio drive pinion to drive gear ——— 1.866 to 1
Ratio axle shaft to universal joint ——— 2.2 to 1
Axle shaft to universal joint gears ——— helical spur
Drive gearset:
  Pinion ——— 15 teeth, LH spiral bevel
  Gear ——— 28 teeth, RH spiral bevel
Brake:
  Type ——— mechanical, internal expanding
  Method of operation ——— hand lever or foot pedal
  Diameter of drum:
    M274 ——— 5-1/2-in.
    M274A1 ——— 7-3/8-in.
  Width:
    M274 ——— 1.375-in.
    M274A1 ——— 1.500-in.
  Area of lining:
    M274 ——— 17.3 sq-in.
    M274A1 ——— 20-15/16 sq-in.

33. Troubleshooting

a. Purpose. Refer to paragraph 13.

b. General Instructions. Refer to paragraph 13.

c. Troubleshooting Before Removal or Operation. Refer to table IV.

Table IV. Troubleshooting Before Removal or Operation — Front Axle Assembly

Malfunction	Probable causes	Corrective action
1. Excessive noise at end of axle.	a. Lack of lubricant for drop gears.	a. Lubricate as directed in lubrication order.
	b. Worn or broken parts in gears, bearings, or universal joints.	b. Disassemble and replace parts as required (pars. 37 through 44).
2. Excessive noise in gear carrier assembly.	a. Lack of lubricant.	a. Lubricate as directed on lubrication order.
	b. Adjustment of gearset incorrect.	b. Disassemble and adjust gears (pars. 36 through 45).
	c. Drive gears or bearings worn or broken.	c. Disassemble and replace parts as required (pars. 36 through 45).
3. Brake will not hold.	a. Lining worn.	a. Replace brake band assembly (pars. 36 through 45).
	b. Brake operating parts broken.	b. Disassemble and replace parts as required (pars. 36 through 45).
	c. Brake drum cracked or worn.	c. Replace brake drum (pars. 36 through 45).
4. Brake drags.	Brake operating parts broken.	Disassemble and replace parts as required (pars. 36 through 45).

Section II. REMOVAL AND DISASSEMBLY

34. General

a. Disassembly of the components of the front axle assembly should be performed in figure number sequence. Instructions provided with each illustration should, in turn, be performed in the order of their respective index letters. If no instructions are provided with an illustration, the procedures involved are relatively simple and the parts should be removed in the sequence indicated by the callout letters.

b. The exploded views, figures 69 through 74, are included to provide a visual reference to the components of the axle assembly and for part identification.

c. Discard all gaskets during disassembly and make sure they are replaced with new ones at assembly.

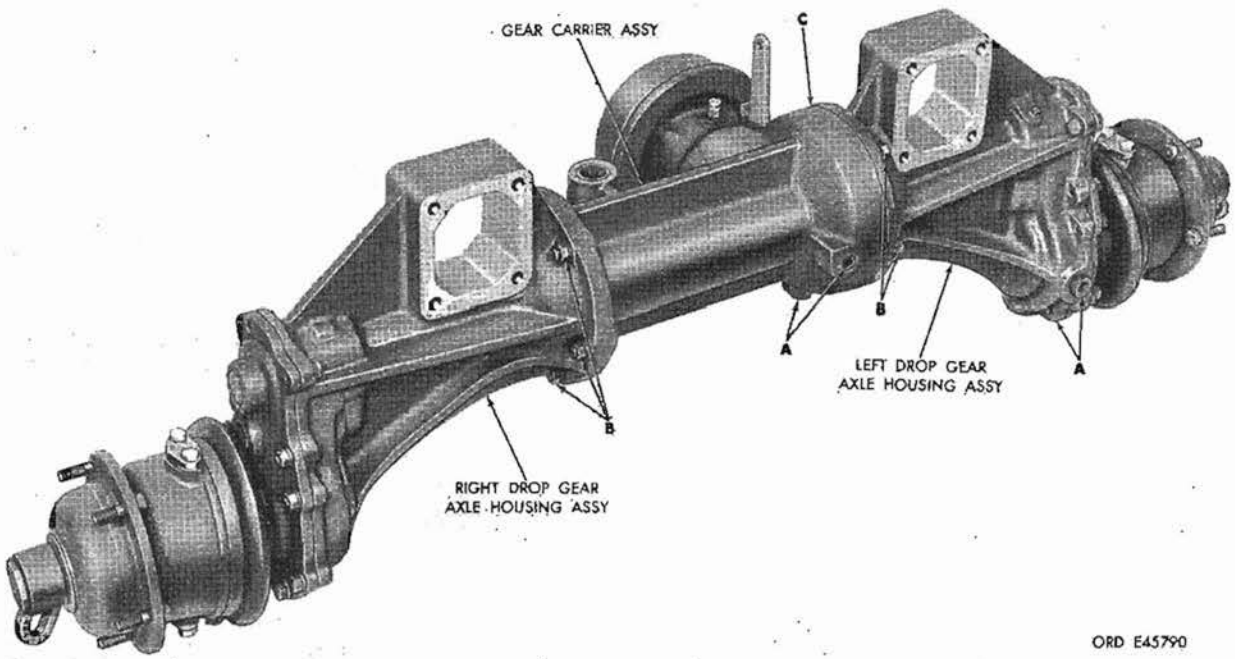
35. Removal and Disassembly into Subassemblies

a. Removal. Refer to TM 9-~~8034-20~~ 2320-213-20 for removal of the front axle assembly.

b. Disassembly into Subassemblies. Refer to figure 38 for disassembly of the front axle assembly into subassemblies.

36. Disassembly of Gear Carrier Assembly

a. Removal of Brake Assembly – M274. Refer to figures 39 through 42 for removal of the brake assembly.

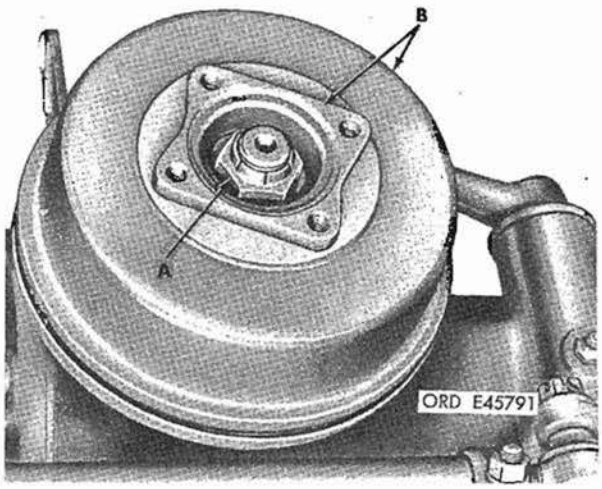


A – Remove drain plugs and drain lubricant from right and left drop gear axle housings and gear carrier assembly.

B – Remove twelve 5/16-inch hexagon nuts and 5/16-inch lock washers and carefully pull each drop gear axle housing with attached parts from studs.

C – Remove and discard gasket between left housing and gear carrier assembly.

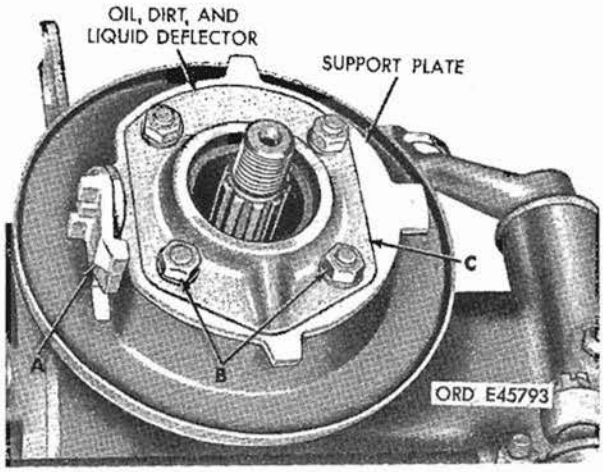
Figure 38. Removing or installing drop gear axle housings with attached parts.



A – Remove 3/4-inch self-locking nut and 3/4-inch flat washer.

B – Remove companion flange and brake drum from drive pinion shaft.

Figure 39. Removing or installing companion flange and brake drum – M274.

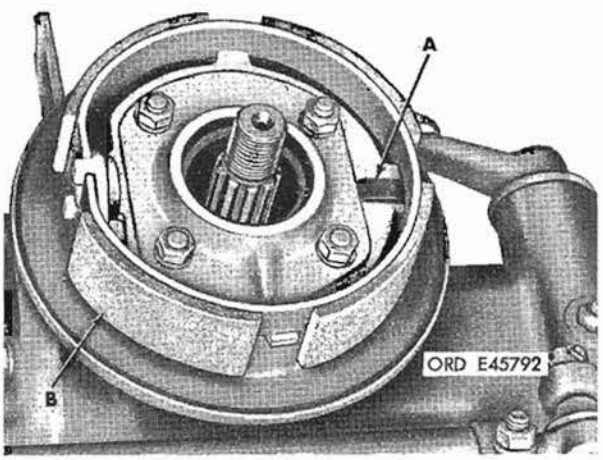


A – Remove actuating cam.

B – Remove four 5/16-inch hexagon plain nuts and 5/16-inch lock washers.

C – Remove oil dirt and liquid deflector, gasket, support plate, and second gasket.

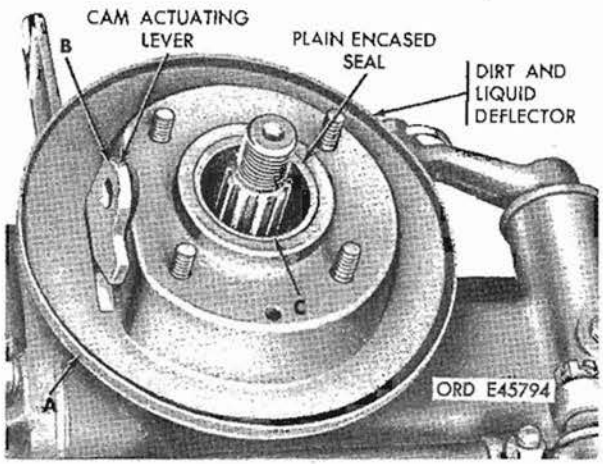
Figure 41. Removing or installing oil dirt and liquid deflector and associated parts – M274.



A – Remove band locating spring.

B – Remove brake band assembly from support plate.

Figure 40. Removing or installing brake band assembly and associated parts – M274.



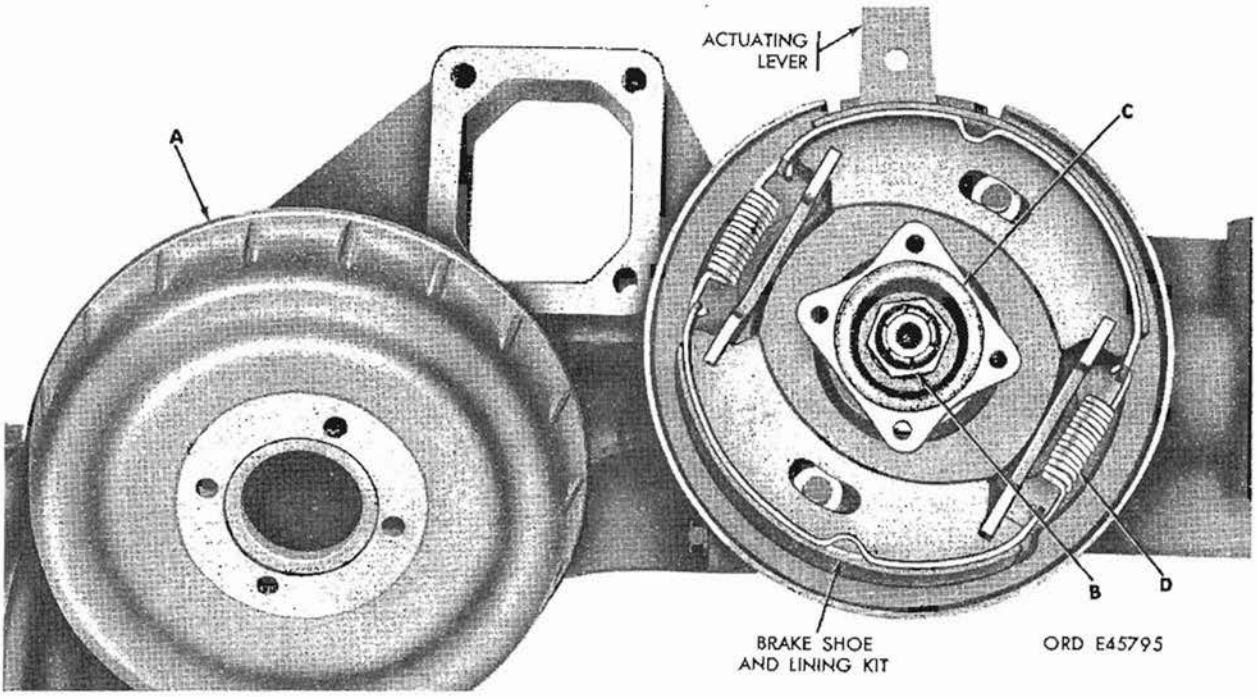
A – Remove dirt and liquid deflector from studs.

B – Remove cam actuating lever from deflector.

C – Remove plain encased seal from deflector.

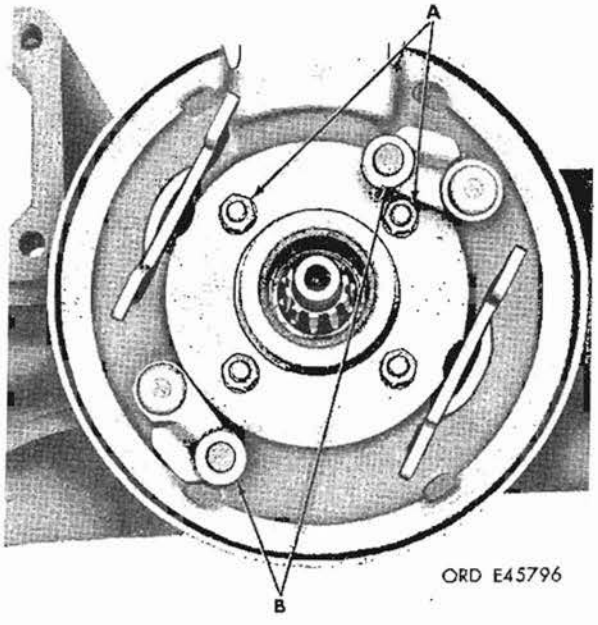
Figure 42. Removing dirt and liquid deflector and associated parts – M274.

b. Removal of Brake Assembly – M274A1 and M274A2.
Refer to figures 43 through 45 for removal of the brake assembly.



A – Remove brake drum.
B – Remove 3/4-inch hexagon self-locking nut and 3/4-inch flat washer.
C – Remove companion flange from drive pinion shaft.
D – Remove return spring, two brakeshoes, and actuating lever.

Figure 43. Removing or installing brake drum and associated parts – M274A1, and M274A2.

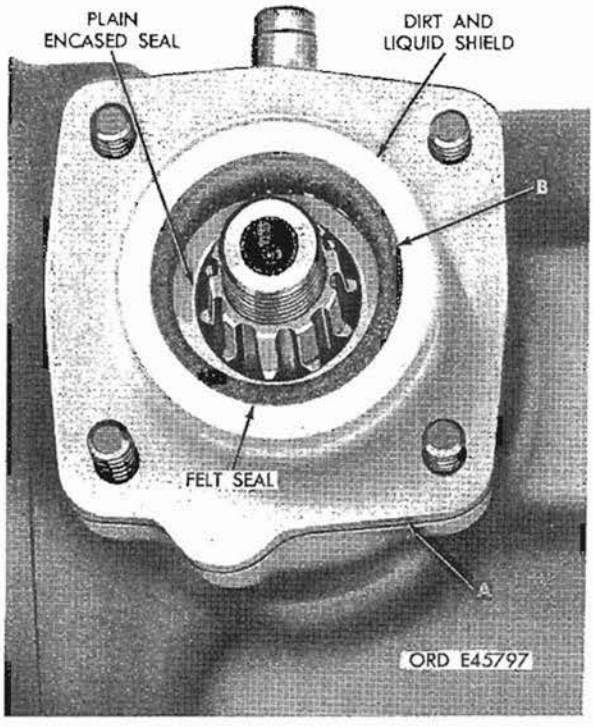


A – Remove four 5/16-inch hexagon plain nuts and 5/16-inch lock washers.

B – Remove two rollers from plate.

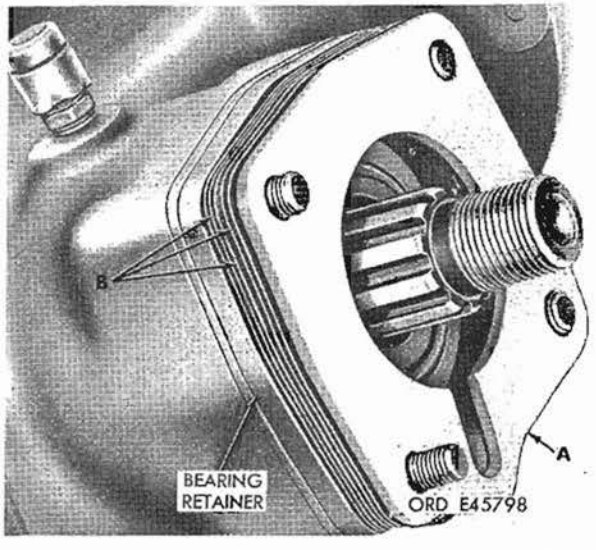
C – Remove plate from studs.

Figure 44. Removing or installing plate – M274A1, and M274A2.



A – Remove dirt and liquid shield from studs.
B – Remove plain encased seal, nonmetallic washer, and felt seal from shield.

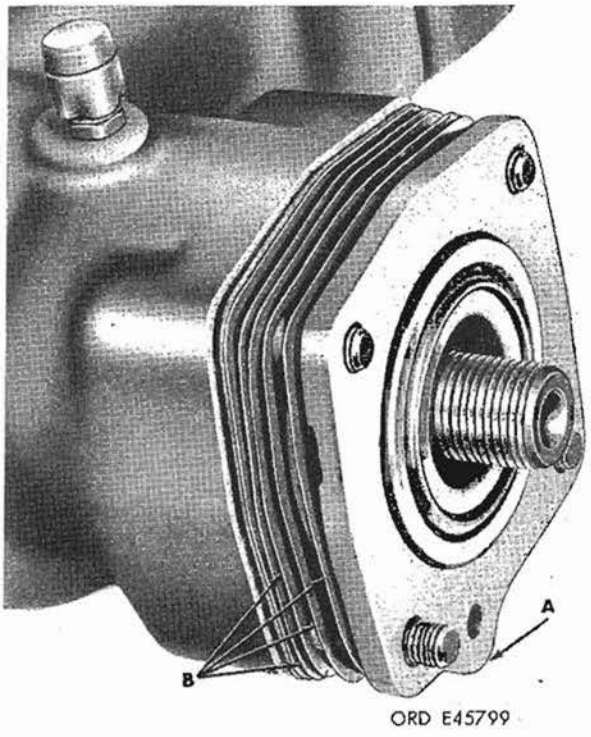
Figure 45. Removing or installing dirt and liquid shield – M274A1, M274A2,



A – Remove bearing retainer plate from studs.
B – Remove shims from studs. Identify shims and tie together for use during assembly.

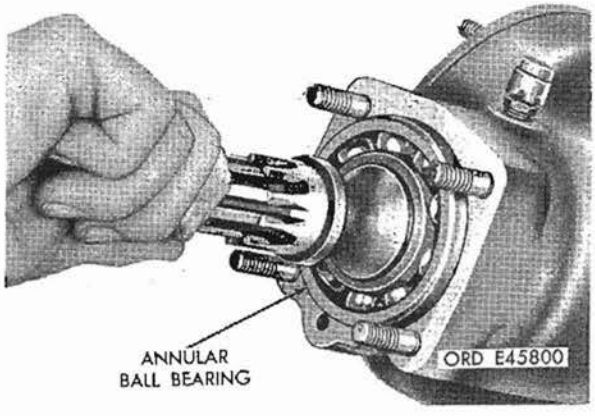
Figure 46. Removing or installing bearing retainer plate.

c. Removal of Drive Pinion and Associated Parts. Refer to figures 46 through 50 for removal of the drive pinion and associated parts.



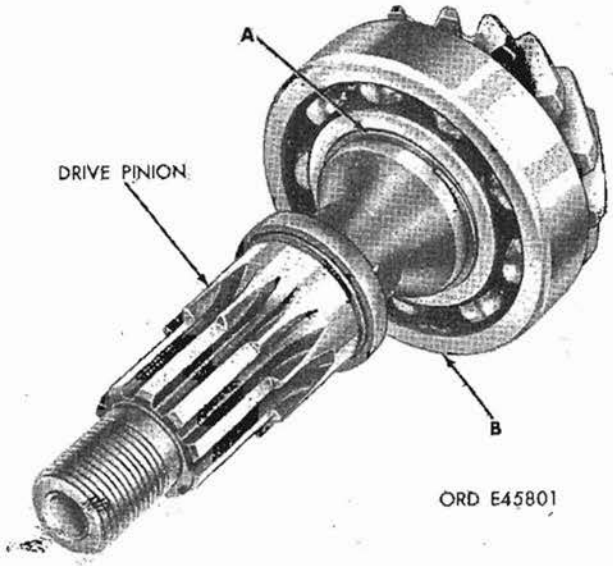
A – Remove bearing retainer from studs.
B – Remove shims from studs. Identify shims and tie together for use during assembly.

Figure 47. Removing or installing bearing retainer.



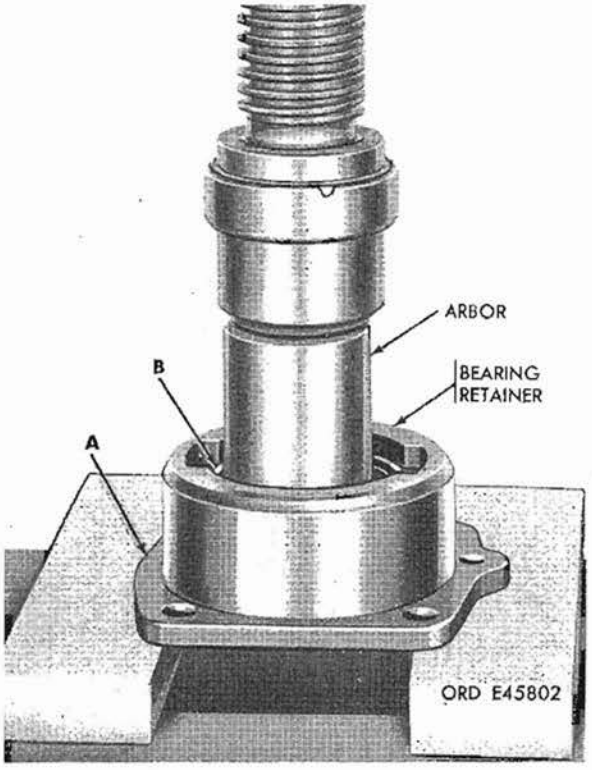
Remove drive pinion with annular ball bearing from carrier housing.

Figure 48. Removing or installing drive pinion with annular ball bearing.



A – Remove retaining ring from pinion.
B – Remove ball bearing from pinion.

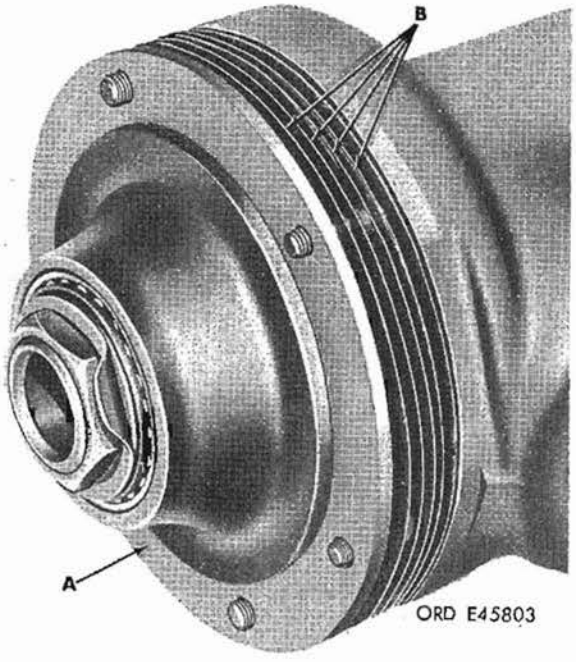
Figure 49. Removing or installing annular ball bearing.



A – Position bearing retainer in an arbor press.
B – Press two roller bearing cone and rollers and cups from bearing retainer.

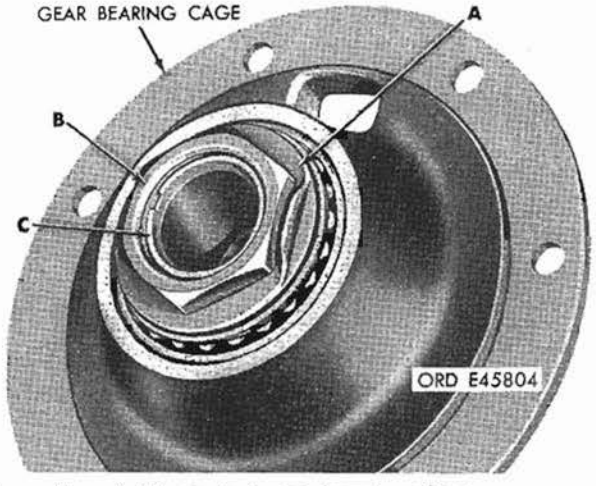
Figure 50. Disassembling or assembling bearing retainer.

d. Removal of Gear Bearing Cage and Associated Parts. Refer to figures 51 through 54 for removal and disassembly of the gear bearing cage and associated parts.



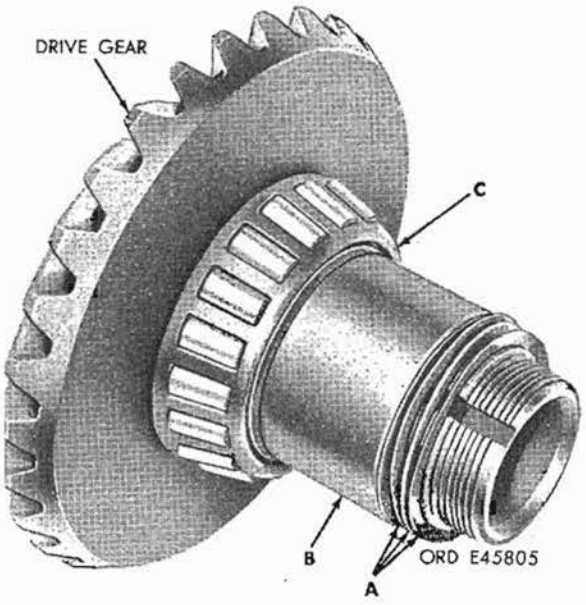
A – Remove gear bearing cage from studs.
B – Remove shims from studs. Identify shims and tie together for use during assembly.

Figure 51. Removing or installing gear bearing cage and associated parts.



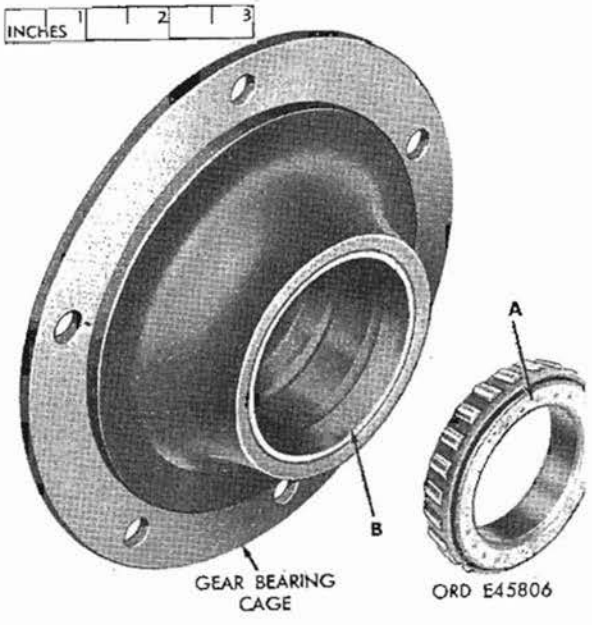
A – Straighten tab on key washer.
B – Remove hexagon nut from drive gear.
C – Remove drive gear from bearing cage.

Figure 52. Removing or installing drive gear and associated parts.



A – Remove shims from drive gear. Identify shims and tie together for use during assembly.
B – Remove sleeve spacer.
C – Remove tapered roller bearing cone and rollers.

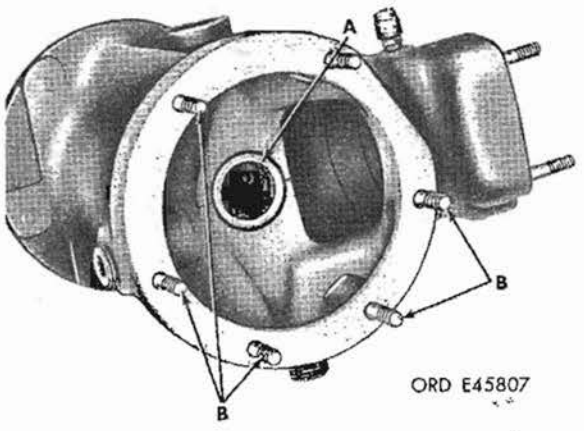
Figure 53. Removing or installing sleeve spacer and associated parts.



A – Remove tapered roller bearing cone and rollers from gear bearing cage.
B – Remove tapered roller bearing cup from each side of bearing cage.

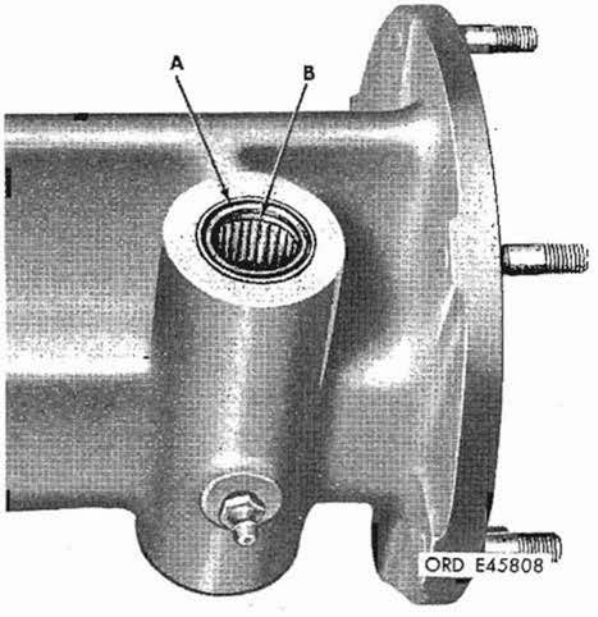
Figure 54. Disassembling or assembling gear bearing cage.

e. Disassembly of Gear Carrier Assembly. Refer to figures 55 and 56 for disassembly of the gear carrier assembly.



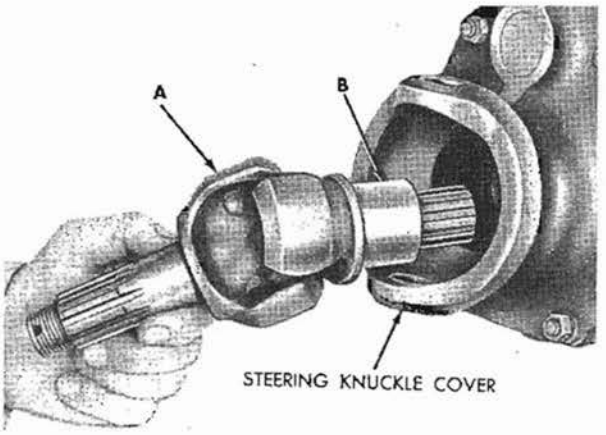
A – Remove plain encased seal from carrier assembly with a hooked tool.
B – Do not remove plain studs from carrier assembly unless inspection (par. 39) indicates replacement is necessary.

Figure 55. Removing or installing plain encased seal.



A – Remove plain encased seal from each side of bellcrank steering arm mounting flange in carrier assembly.
B – Remove roller needle bearings from each side of flange.

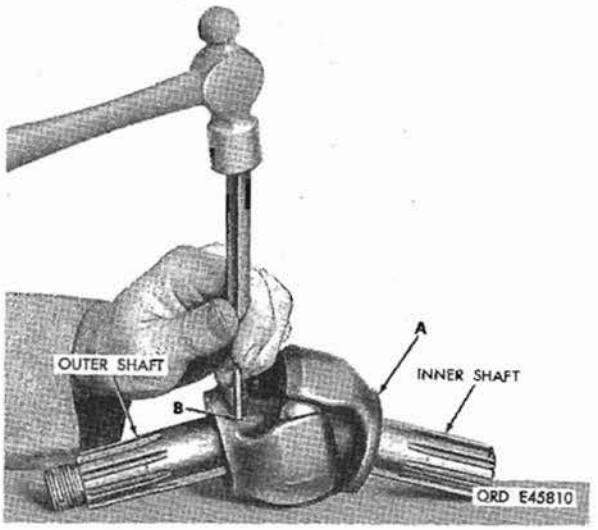
Figure 56. Removing or installing plain encased seal and roller needle bearings.



A – Pull universal joint from steering knuckle cover.

B – Remove sleeve bearing from universal joint.

Figure 57. Removing or installing universal joint.



A – Place universal joint on a wood block.

B – Drive retaining pin from outer shaft.

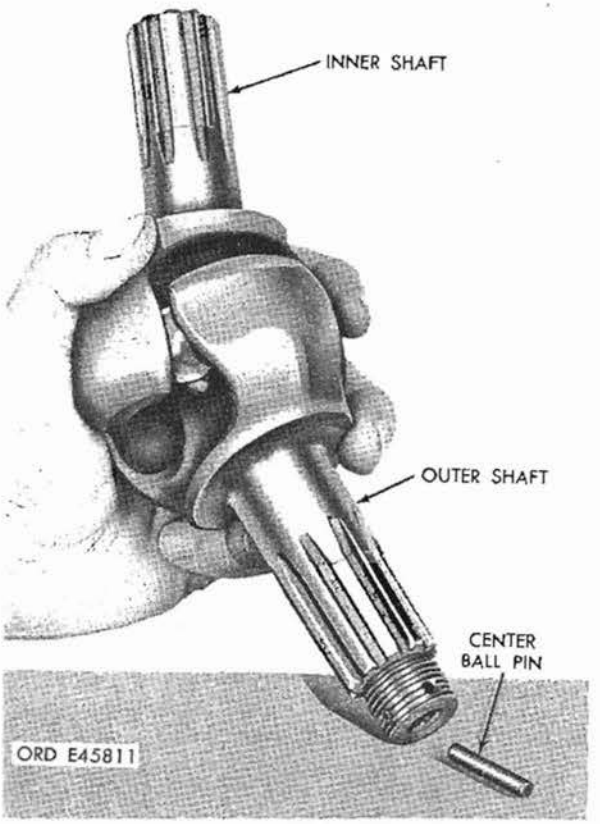
Figure 58. Removing or installing retaining pin.

37. Disassembly of Drop Gear Axle Housing Assembly

2320-23-20

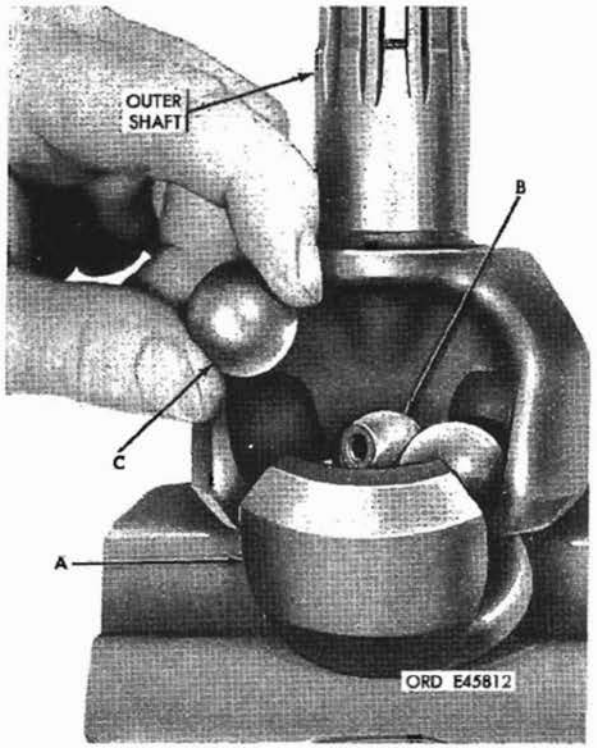
a. General. Refer to TM 9-~~8034-20~~ for removal of the wheel hub, steering knuckle and associated parts, and dust and moisture seal boot.

b. Removal and Disassembly of Universal Joint. Refer to figures 57 through 60 for removal and disassembly of the universal joint.



Hold joint in a vertical position and tap outer shaft against wood block to remove center ball pin.

Figure 59. Removing center ball pin.



A – Place the inner shaft of the joint in a soft-jawed vise.

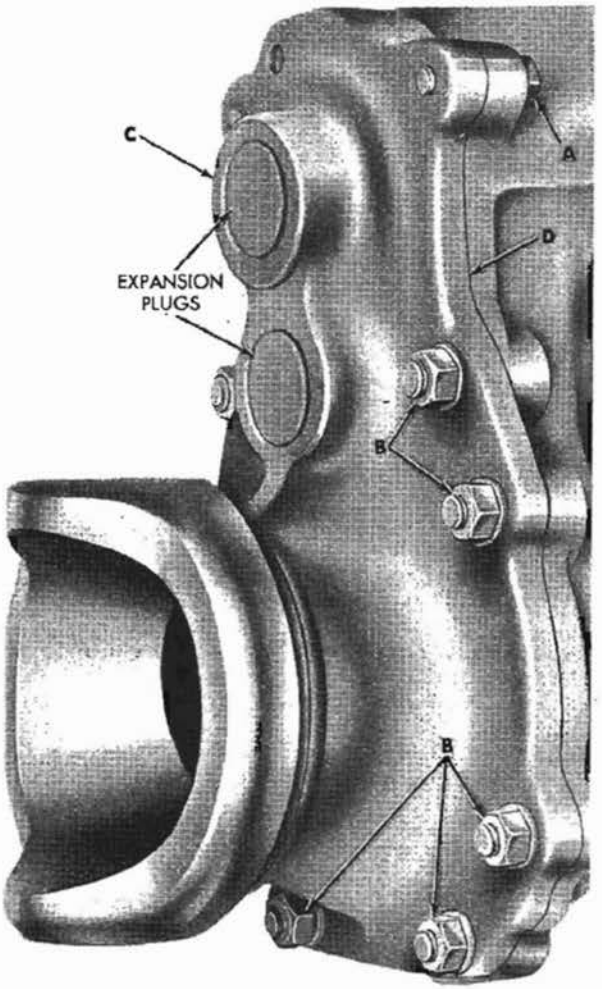
B – Turn outer shaft to one side and turn center ball until opening for center ball pin is against one of the race balls.

C – Lift race ball from joint, turn outer shaft to opposite side and remove remaining three race balls and center ball.

Figure 60. Removing or installing race balls.

c. Removal and Disassembly of Steering Knuckle Cover. Refer to figures 61 through 63 for removal and disassembly of the steering knuckle cover.

Note. Complete disassembly of the cover is not necessary unless inspection (par. 39) indicates damage to needle bearings or tapered roller bearing cups. If removal is necessary, refer to figures 62 and 63.



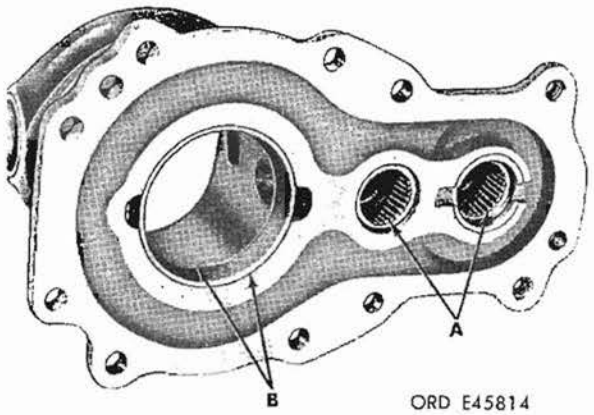
A – Remove two 5/16-inch machine bolts and 5/16-inch lock washers from top of drop gear axle housing.

B – Remove eight 5/16-inch hexagon nuts and 5/16-inch lock washers from sides and bottom of housing.

C – Pull steering knuckle cover from studs on housing.

D – Remove steering knuckle cover gasket.

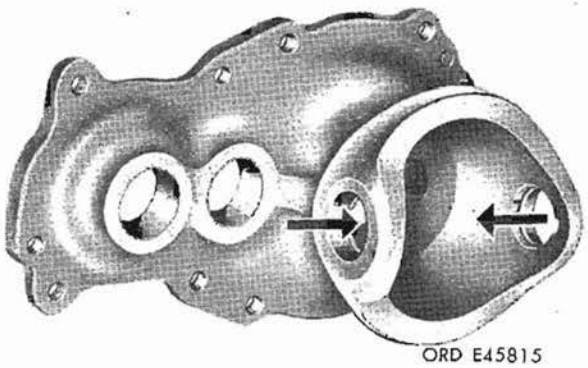
Figure 61. Removing or installing steering knuckle cover and associated parts.



A – Drive needle bearings out of cover from the inside. Expansion plugs (fig. 61) will be removed at the same time.

B – Drive tapered roller bearing cup and shims out of cover. Identify shims and tie together for use during assembly.

Figure 62. Removing or installing needle bearings and associated parts.

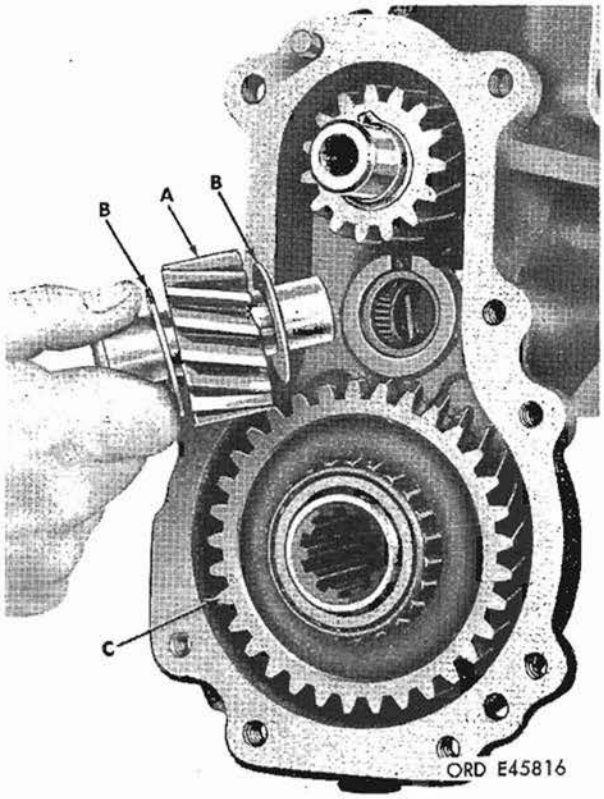


Drive two tapered roller bearing cups from cover by pressing cups in the direction shown by the arrows.

Figure 63. Removing or installing tapered roller bearing cups.

d. Disassembly of Drop Gear Axle Housing. Refer to figures 64 through 68 for disassembly of the drop gear axle housing.

Note. Complete disassembly of the drop gear axle housing is not necessary unless inspection (par. 39) indicates damage to roller needle bearing, tapered roller bearing cup, headless straight pins, or 5/16-24 x 5/16-18 x 1-1/4 plain studs. If removal is necessary, refer to figure 68.

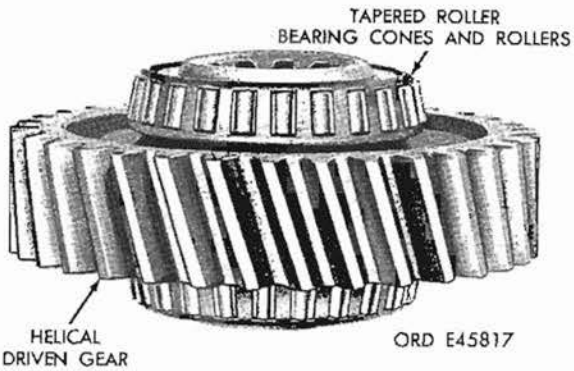


A – Remove helical idler gear from housing.

B – Remove two thrust washers from idler gear.

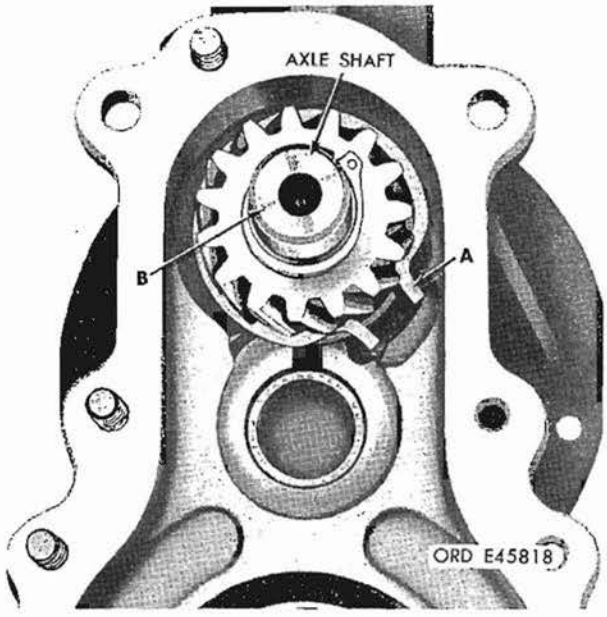
C – Remove helical driven gear from housing.

Figure 64. Removing or installing helical idler gear and driven gear.



Remove two tapered roller bearing cones and rollers from driven gear.

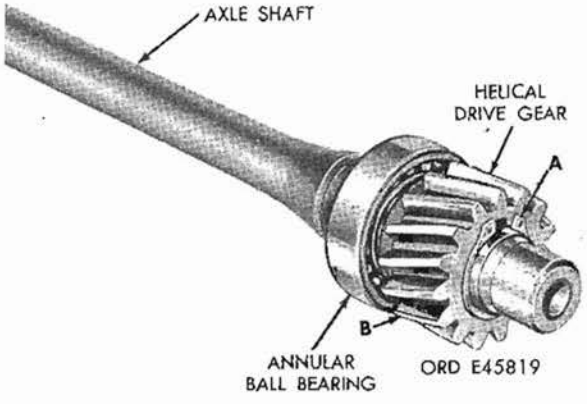
Figure 65. Removing or installing tapered roller bearing cones and rollers.



A – Remove retaining ring securing axle shaft in housing.

B – Remove shaft and associated parts.

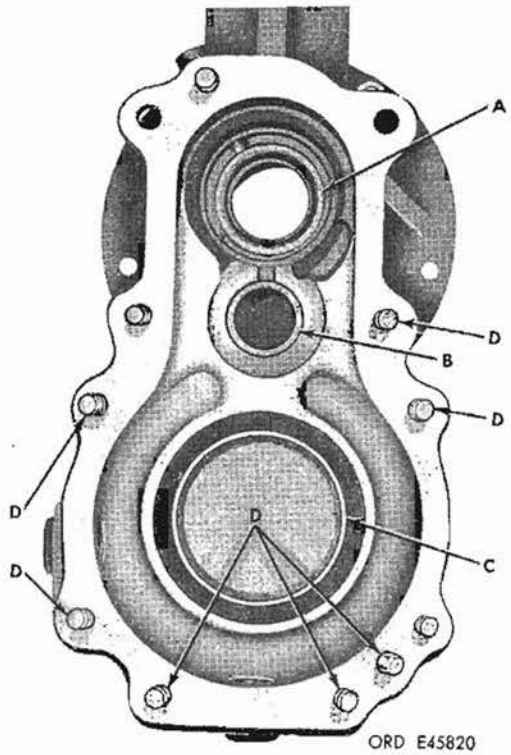
Figure 66. Removing or installing axle shaft and associated parts.



A – Remove retaining ring from axle shaft.

B – Remove helical drive gear, Woodruff key, and annular ball bearing from shaft.

Figure 67. Removing or installing helical drive gear and associated parts.



A – Remove plain encased seal from housing.

B – Remove roller needle bearing from center of housing.

C – Remove tapered roller bearing cup from housing.

D – Do not remove 5/16-24 x 5/16-18 x 1-1/4 plain studs and headless straight pins unless damaged.

Figure 68. Removing or installing plain encased seal and associated parts.

Section III. CLEANING, INSPECTION, AND REPAIR

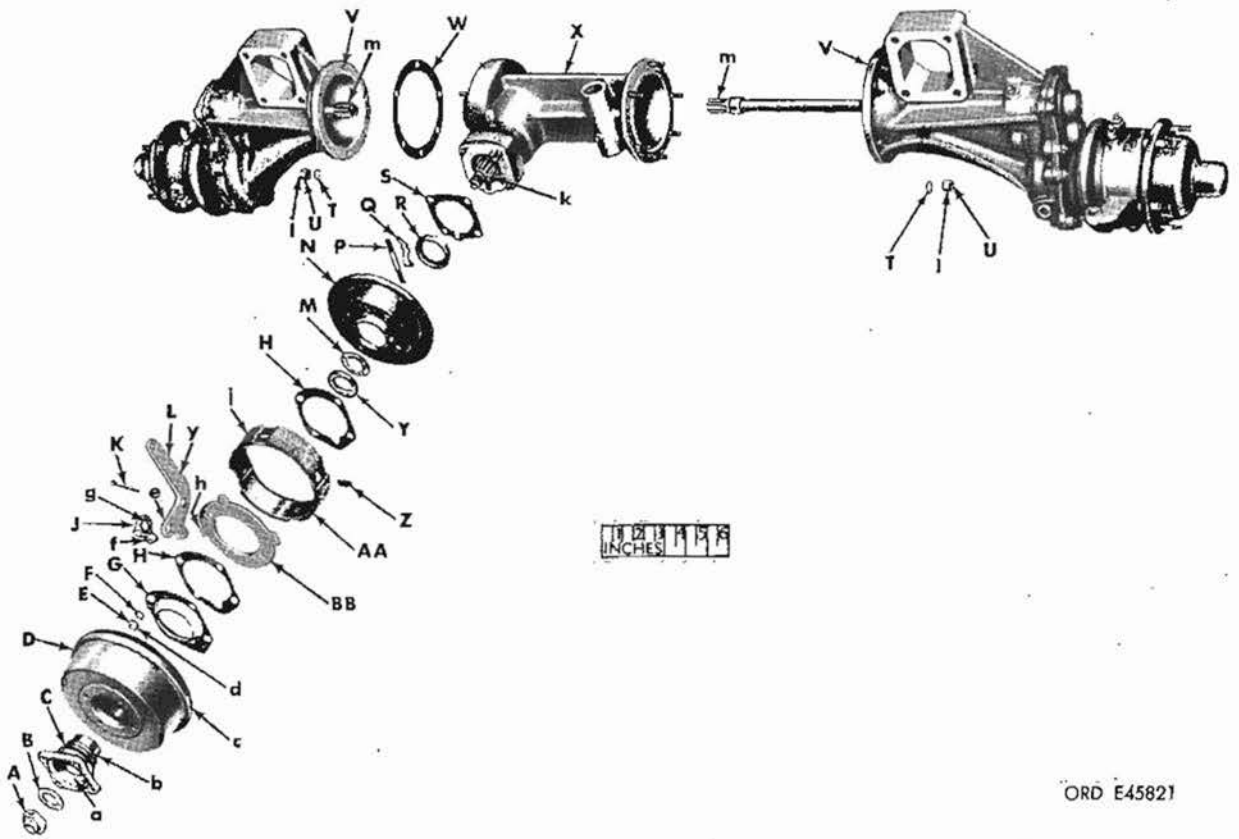
38. Cleaning

a. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts with a stiff bristle brush that has been dipped in the cleaning agent.

b. Use lint free cloths to clean machined surfaces and gears.

c. After cleaning, dry parts, except bearings, with dry compressed air.

Caution: Bearings must not be dried or spun with compressed air. Refer to TM 9-214 for inspection, care, and maintenance of anti-friction bearings.



A – 3/4-inch hexagon self-locking nut – 7032635
B – 3/4-inch flat washer – 221442
C – Companion flange – 7966699
D – Brake drum – 7966797
E – 5/16-inch hexagon plain nut – 120368
F – 5/16-inch lock washer – 96906-35338-26
G – Oil dirt and liquid deflector – 7966796
H – Gasket – 7048698
J – Actuating cam – 06848-307766
K – 3/32 x 1 cotter pin – 121224
L – Cam actuating lever – 06848-307767
M – Flat washer – 7998707
N – Dirt and liquid deflector – 7966795
P – Lever hole cover – 94537-906879
Q – Spring tension clip – 7760078
R – Plain encased seal – 7966683
S – Gasket – 7966778
T – 5/16-inch lock washer – 96906-35338-26
U – 5/16-inch hexagon plain nut – 96906-35690-525
V – Drop gear axle housing – No Number
W – Gasket – 7966698
X – Drop gear carrier assembly – No Number
Y – Nonmetallic washer – 7998708
Z – Band locating spring – 65909-120086
AA – Brake band assembly – 7018861
BB – Support plate – 06848-307764

Figure 69. Brake assembly – M274 – exploded view.

39. Inspection

a. Brake Assembly – M274.

Note. The key letters shown below refer to figure 69.

(1) Inspect brake drum (D) for distortion or cracks. Inspect inside diameter for wear beyond limits specified in repair and rebuild standards (par. 41). Inspect threads in bolt holes for damage.

(2) Inspect actuating cam (J), cam actuating lever (L), and support plate (BB) for distortion or wear beyond limits specified in repair and rebuild standards (par. 41).

(3) Inspect brake band assembly (AA) for distortion and wear in the support plate slots. Inspect lining against limits specified in repair and rebuild standards (par. 41).

(4) Inspect splines in companion flange (C) for nicks, burs, or flat spots. Inspect the flange against limits specified in repair and rebuild standards (par. 41).

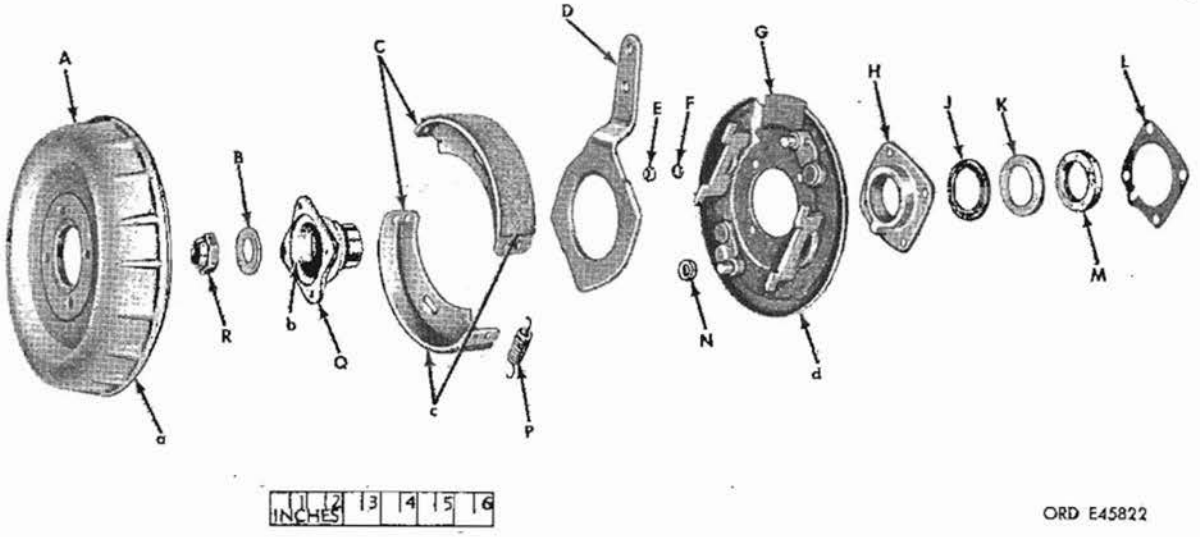
(5) Inspect plain encased seal (R) for wear or breaks in sealing surface. Inspect all parts for cracks or rough edges.

b. Brake Assembly – M274A1 of M274A2.

Note. The key letters shown below refer to figure 70.

(1) Inspect the brake drum (A) for cracks or distortion. Inspect inside diameter for wear beyond limits specified in repair and rebuild standards (par. 41).

(2) Inspect splines in companion flange (Q) for nicks, burs, or flat spots and check it against the limits specified in repair and rebuild standards (par. 41).



A – Brake drum – 65909-923512
B – 3/4-inch flat washer – 7372868
C – Brake shoe and lining kit – 65909-936020
D – Actuating lever – 65909-935990
E – 5/16-inch hexagon plain nut – 96906-35690-525
F – 5/16-inch lock washer – 96906-35338-26
G – Plate – 65909-935979
H – Dirt and liquid shield – 65909-923495
J – Felt seal – 65909-923497
K – Nonmetallic washer – 65909-928407
L – Shield gasket – 7966778
M – Plain encased seal – 7966683
N – Roller – 65909-935991
P – Return spring – 65909-935989
Q – Companion flange – 65909-923980
R – 3/4-inch hexagon self-locking nut – 7032635

Figure 70. Brake assembly – M274A1 – exploded view, of M274A2.

(3) Inspect brake shoe and lining kit (C) for distortion and wear in the plate slots. Inspect lining against limits specified in repair and rebuild standards (par. 41).

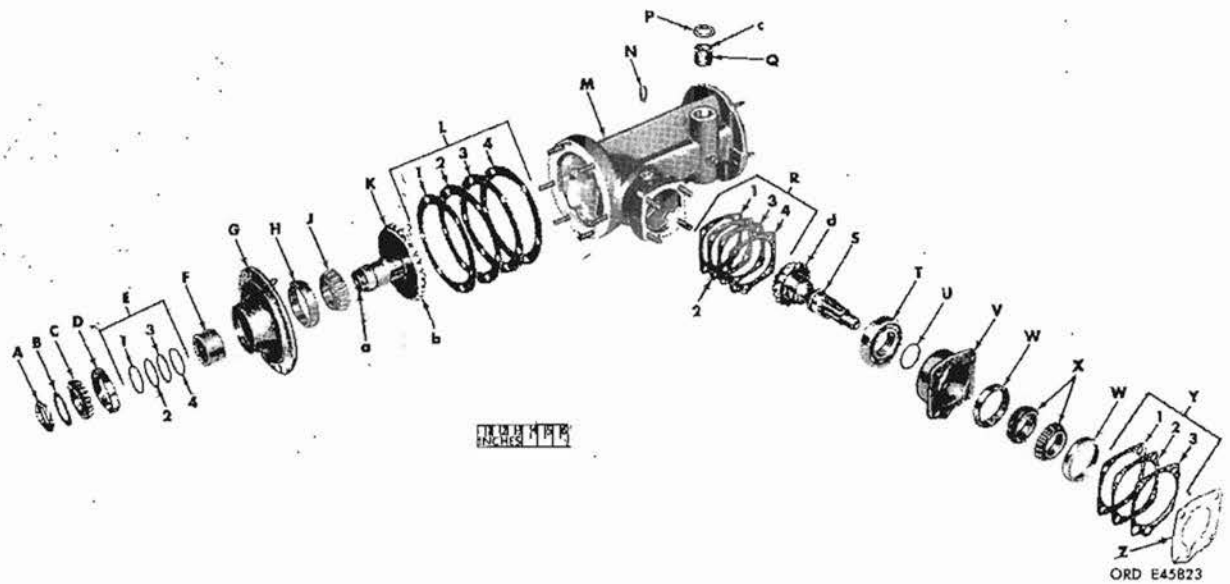
(4) Inspect actuating lever (D) and plate (G) for distortion or cracks. Inspect plate against limits specified in repair and rebuild standards (par. 41).

(5) Inspect plain encased seal (M) for wear or breaks in sealing surface. Inspect dirt and liquid shield (H) for cracks. Inspect all parts for cracks or rough edges.

c. Drive Pinion, Gear Bearing Cage and Associated Parts.

Note. The key letters shown below refer to figure 71 except where otherwise indicated.

(1) Inspect shaft of bevel drive



A – Plain hex nut – 7966689
B – Key washer – 7966808
C – Tapered roller bearing cone and rollers – 705391
D – Tapered roller bearing cup – 7998565
E – Shim set – 5702424
1 – Shim 0.003-inch – 7966947
2 – Shim 0.005-inch – 7966948
3 – Shim 0.010-inch – 7966949
4 – Shim 0.030-inch – 7966950
F – Sleeve spacer – 7966684
G – Gear bearing cage – 7966917
H – Tapered roller bearing cup – 706817
J – Tapered roller bearing cone and rollers – 705389
* K – ~~Bevel drive gear – 94537-914382~~
L – Shim set – 5702426
1 – Shim 0.003-inch – 7966685
2 – Shim 0.005-inch – 7966686
3 – Shim 0.010-inch – 7966687
4 – Shim 0.030-inch – 7966688
* M – ~~Carrier assembly~~
– ~~7966806 (M274)~~
– ~~65909-935558 (M274A1)~~ →
N – Vent assembly – 7966661 (M274)
Pipe plug – 444688 (M274A1)
* P – ~~Plain encased seal – 7966727~~
Q – Roller needle bearing
– 709452 (M274)
– 713759 (M274A1)
R – Shim set – 5702427
1 – Shim 0.003-inch – 7966704
2 – Shim 0.005-inch – 7966705
3 – Shim 0.010-inch – 7966706
4 – Shim 0.030-inch – 7966707
* S – ~~Bevel drive pinion – 94537-914441~~ →
T – Annular ball bearing – 700080
* U – ~~Retaining ring~~
– ~~7966701 (M274)~~
– ~~65909-935907 (M274A1)~~ →
V – Bearing retainer – 7966700
W – Tapered roller bearing cup – 7966697
X – Tapered roller bearing cone and rollers – 7966696
Y – Shim set – 5702426
1 – Shim 0.003-inch – 7966704
2 – Shim 0.005-inch – 7966705
3 – Shim 0.010-inch – 7966706
Z – Bearing retainer plate – 8336141

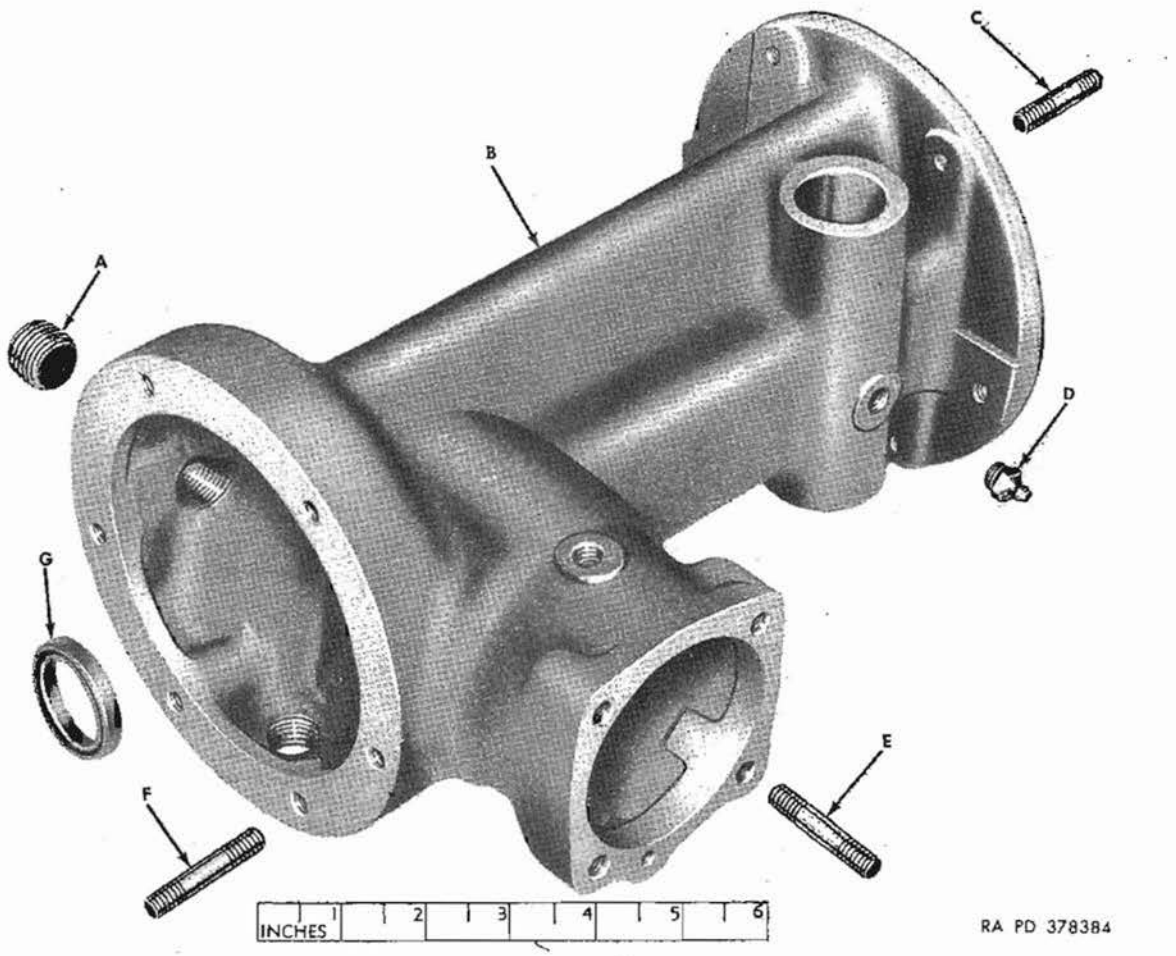
Figure 71. Gear carrier assembly and associated parts – exploded view.

* Superseded by Ch. 1 Pg. 2

gear (K) and drive pinion (S) for scoring or signs of discoloration. Inspect gear teeth for chipping or rough spots. Inspect surfaces against limits specified in repair and rebuild standards (par. 41). Inspect machined surfaces of bearing retainer (V) for burs or nicks.

(2) Inspect tapered roller bearing cones and rollers (C, J, and X), tapered roller bearing cups (D, H, and W), and annular ball bearing (T) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect inside diameter of roller needle bearings (Q) against limits specified in repair and rebuild standards (par. 41).

(3) Inspect machined surfaces of gear bearing cage (G) and carrier assembly (M) for burs or nicks. Inspect the outer surfaces for signs of cracks. Inspect all studs (C, E, and F, fig. 72) for damaged threads, bends, or looseness in casting.



A – Pipe plug – 444667
B – ~~Gear carrier – 94537-914778~~ *
C – 5/16-18(5/8) x 5/16-24(15/32) x 1-1/2 plain stud – 7966649
D – ~~Lubrication fitting – 504208~~ *

* E – ~~5/16-18 x 5/16-24 x 1-11/16 plain stud – 7966680 (M274)~~ ~~– 148062 (M274A1)~~
F – 5/16-18(5/8) x 5/16-24(15/32) x 1-3/4 plain stud – 7966650
G – Plain encased seal – 7966787

Figure 72. Gear carrier assembly – exploded view.

* Superseded by Ch. 1-102

Inspect plain encased seals (P, fig. 71 and G, fig. 72) for wear or nicks in sealing surfaces. Inspect shims (E, L, R, and Y) for tears or creases.

d. Drop Gear Axle Housing Assembly.

Note. The key letters shown below refer to figure 73 except where otherwise indicated.

(1) Inspect machined surfaces of drop gear axle housing (EE) for burs or nicks. Inspect the outer surfaces for signs of cracks. Inspect all studs (GG) for damaged threads, bends, or looseness in housing. Inspect headless straight pins (JJ) for looseness in housing.

(2) Inspect annular ball bearing

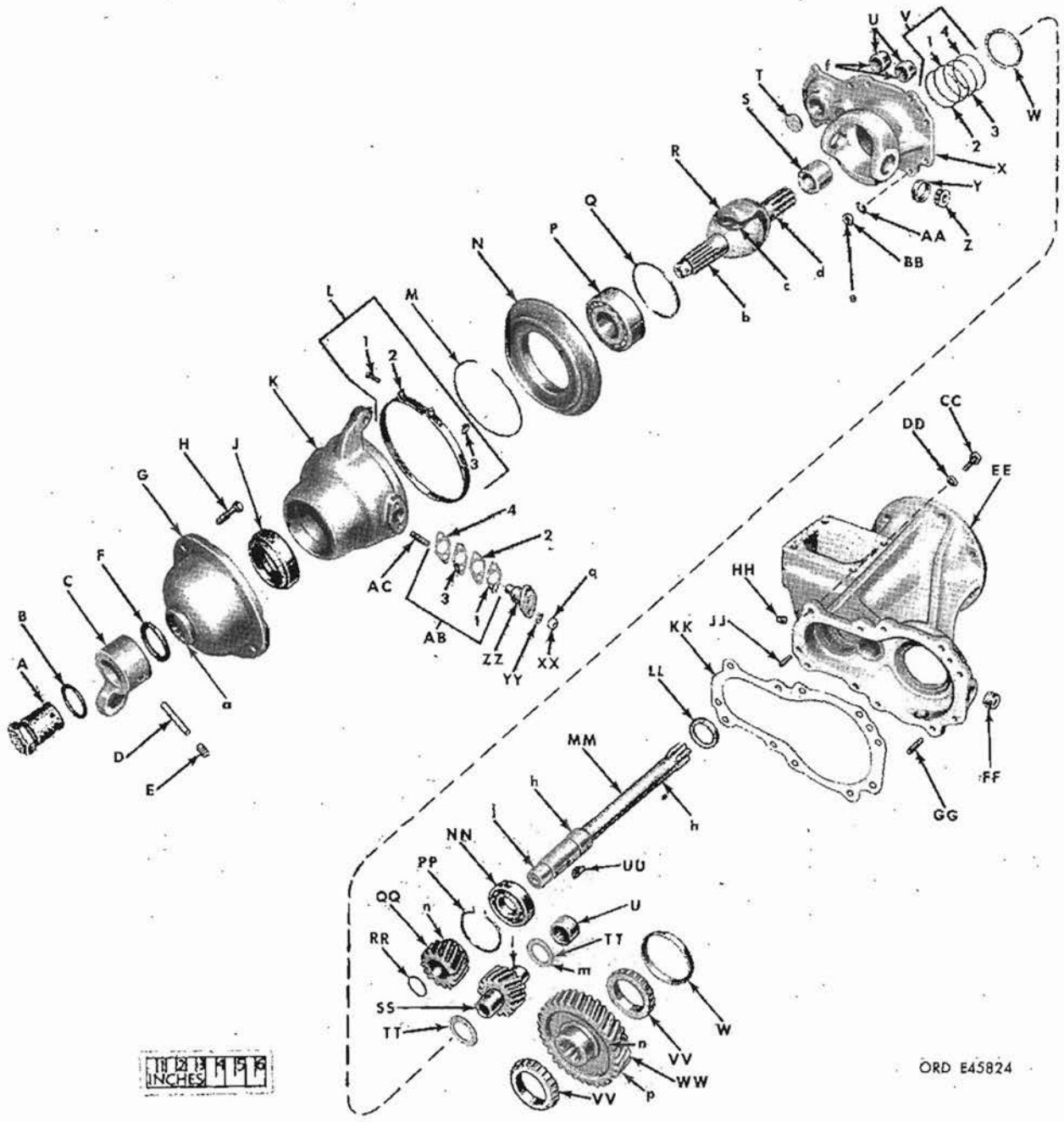


Figure 73. Drop gear axle housing and associated parts — exploded view.

(P and NN), tapered roller bearing cups (W and Y), and tapered roller bearing cones and rollers (Z and VV) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect inside diameter of roller needle bearings (U) against limits specified in repair and rebuild standards (par. 41).

(3) Inspect axle shaft (MM), helical drive gear (QQ), idler gear (SS), and driven gear (WW) for scoring or signs of discoloration on shafts. Inspect gear teeth and splines for chipping or rough spots. Inspect surfaces against limits specified in repair and rebuild standards (par. 41).

(4) Inspect machined surfaces of steering knuckle cover (X), steering knuckle (K), and wheel hub (G) for burs or nicks. In-

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A – Retainer nut – 7045710
B – Preformed packing – 7953454
C – Wheel hub lift hook – 7953455
D – ~~Spring pin – 7341446 (M274A1 only)~~ *
E – ~~1/8-inch pipe plug – 125947 (M274A1 only)~~ *
F – Preformed packing
– 8329732 (M274)
– 7045709 (M274A1)
G – ~~Wheel hub – 7966746 (M274)~~
– ~~65909-921961 (M274A1)~~ *
H – Machine bolt – 7953458
J – ~~Encased plain seal –~~
– ~~7966784 (M274)~~ *
– ~~65909-922600 (M274A1)~~
K – ~~Steering knuckle~~ *
~~Left front and right rear~~
– ~~7966758 (M274)~~ *
– ~~8336228 (M274A1)~~
~~Right front and left rear~~
– ~~7966757 (M274)~~ *
– ~~8336229 (M274A1)~~
L – Steering knuckle boot clamp assembly – 7966756
1 – No. 10 machine screw – 96906-35223-69
2 – Clamp – 7049711
3 – No. 10 square plain nut – 120619
M – Carbon steel wire – 80244-22-W-1631-110
N – Dust and moisture seal boot – 7966754
P – Annular ball bearing – 714249
Q – ~~Retaining ring~~ –
– ~~7966781 (M274)~~ *
– ~~65909-935908 (M274A1)~~
R – Universal joint – 7966766
S – Sleeve bearing – 7966792
T – Expansion plug – 8336138
U – ~~Roller needle bearing~~
– ~~709452 (M274)~~ *
– ~~713759 (M274A1)~~
V – Shim set – 8686935
1 – Shim 0.003-inch – 94537-810726
2 – Shim 0.005-inch – 94537-810727
3 – Shim 0.010-inch – 94537-810728
4 – Shim 0.030-inch – 94537-810729
W – Tapered roller bearing cup – 7998565
X – Steering knuckle cover – 7966679
Y – Tapered roller bearing cup – 706736
Z – Tapered roller bearing cone and rollers – 705245
AA – 5/16-inch lock washer – 96906-35338-26
BB – 5/16-24 hexagon nut – 96906-35690-525
CC – 5/16-18 machine bolt – 96906-35291-34
*DD – ~~5/16-inch lock washer – 96906-35338-26~~
*EE – ~~Drop gear axle housing~~ –
– ~~7966906 (M274)~~
– ~~65909-933924 (M274A1)~~
FF – Pipe plug – 444667
GG – 5/16-24 x 5/16-18 x 1-1/4 plain stud – 7966528
*HH – ~~Vent assembly – 7966661 (M274)~~
~~Pipe plug – 444688 (M274A1)~~
JJ – Headless straight pin – 141217
KK – Steering knuckle cover gasket – 7966597
LL – Plain encased seal – 7966768
*MM – ~~Axle shaft:~~
~~Left front and right rear – 7966911~~
~~Right front and left rear – 7966912~~
NN – Annular ball bearing – 700078
PP – Retaining ring – 7966810
QQ – Helical drive gear – 7966763
*RR – ~~Retaining ring – 583041~~
SS – Helical idler gear – 7966764
TT – Thrust washer – 7966793
*UU – ~~Woodruff key – 120502~~
VV – Tapered roller bearing cone and rollers – 705391
WW – Helical driven gear – 7966765
XX – 5/16-inch plain hexagon nut – 96906-35690-525
*YY – ~~5/16-inch lock washer – 96906-35333-24 (M274)~~
5/16-inch tab washer – 65909-933505 (M274A1)
ZZ – Steering pivot pin – 7966755
AB – Shim set – 5702423
1 – Shim 0.003-inch – 94537-951216
2 – Shim 0.005-inch – 94537-951217
3 – Shim 0.010-inch – 94537-951218
4 – Shim 0.030-inch – 94537-951219
AC – 5/16-18 x 5/16-24 x 1-1/8 plain stud – 113240

Figure 73 – Continued.

Superseded by
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spect the outer surfaces for signs of cracks. Inspect studs (AC) in knuckle and bolts (H) in hub for damaged threads, bends, or looseness in castings. Inspect splines in hub against limits specified in repair and rebuild standards (par. 41).

(5) Inspect thrust washers (TT) against limits specified in repair and rebuild standards (par. 41). Inspect plain encased seal (LL) for wear or breaks in sealing surfaces. Inspect dust and moisture seal boot (N) for cuts or tears.

(6) Inspect splines on each end of the universal joint inner and outer shafts (D and F, fig. 74) against limits specified in repair and rebuild standards (par. 41). Inspect movement of joint against limits specified in repair and rebuild standards (par. 41).

40. Repair

a. General. The following subparagraphs cover only those parts that are repairable. Parts not covered must be replaced if they fail to pass inspection (par. 39).

b. Brake Assembly. Minor damage to threaded holes in the brake drum may be corrected by the use of a tap. Burs or minor nicks on splines in the companion flange may be removed with a fine mill file.

c. Drive Pinion, Gear Bearing Cage, and Associated Parts.

(1) Burs or minor nicks to splines in bevel drive gear or drive pinion may be removed with a fine mill file. Remove sharp fins and burs from gear teeth with a crocus cloth.

Note. The drive pinion and bevel drive gear are matched sets and must be replaced as a unit.

(2) Burs or nicks on machined surfaces of gear bearing cage or carrier assembly may be removed with crocus cloth. Repair damaged stud threads with a thread chaser. Straighten any creases found in shims.

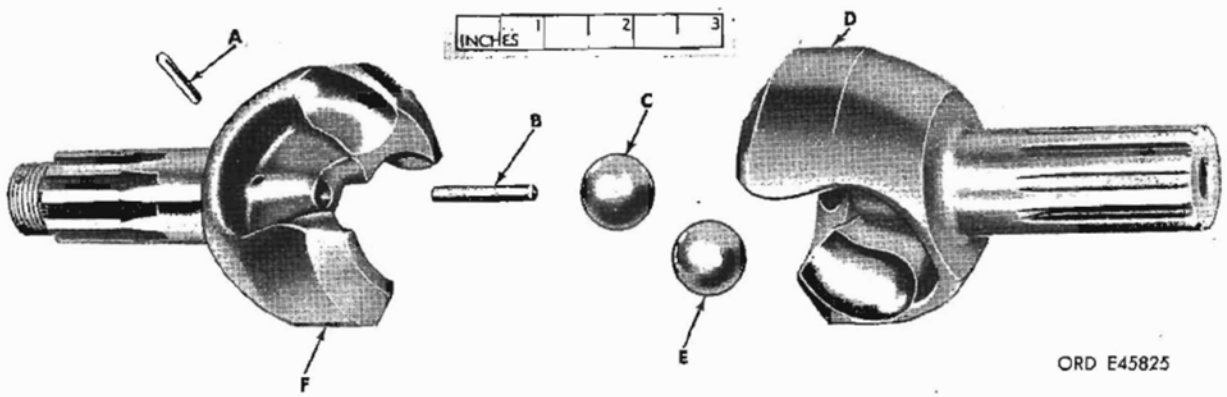
d. Drop Gear Axle Assembly.

(1) Burs or minor nicks to machined surfaces of drop gear axle housing, steering knuckle cover, steering knuckle, or wheel hub may be removed with crocus cloth. Damaged stud threads may be repaired with a thread chaser.

(2) Burs or minor nicks to splined shafts may be removed with a fine mill file. Sharp fins or burs on gear teeth may be removed with a crocus cloth.

41. Repair and Rebuild Standards

a. General. Refer to paragraph 23.



A – Retaining pin – 7760096
B – Center ball pin – 7760095
C – Center ball – 7760094
D – Inner shaft – 7760092
E – Race balls – 7760097
F – Outer shaft – 7760093

Figure 74. Universal joint – exploded view.

b. Brake Assembly – M274.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
69	a	Width of spline spaces on companion flange ---	0.1535 to 0.1550	*
	b	Seal surface of companion flange ----------	1.500 to 1.503	1.485
	c	Inside diameter of brake drum ----------	5.495 to 5.505	5.625
	e	Bore of cam actuating lever ----------	0.441 to 0.446	0.451
	f	Dimension of lug on actuating cam ----------	0.208 to 0.213	0.203
	g	Bore of cam ----------	0.286 to 0.276	0.291
	h	Dimension of lug on support plate ----------	0.436 to 0.438	0.431
	e-h	Fit of lever on lug ----------	0.003L to 0.010L	0.020L
	j	Thickness of brake band and lining ----------	0.285 to 0.338	0.1665
	k	Width of spline spaces on drive pinion -------	0.1535 to 0.1550	*
	a-k	Fit of flange on pinion ----------	0.0005L to 0.0015L	
	m	Width of axle shaft splines ----------	0.150 to 0.153	*

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c. Brake Assembly – M274A1 & M274A2.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
70	a	Inside diameter of brake drum ----------	7.245 to 7.255	
	b	Width of spline spaces on companion flange ---	0.1535 to 0.1550	*
70-69	b-k	Fit of flange on pinion ----------	0.0005L to 0.0015L	
70	c	Thickness of brake shoe and lining ----------	0.285 to 0.338	0.1665
	d	Dimension of lugs on plate ----------	0.436 to 0.438	

d. Gear Carrier Assembly and Associated Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
71	a	Width of spline spaces in bevel drive gear ---	0.154 to 0.156	*
71-69	a-m	Fit of drive gear splines to axle shaft ------	0.001L to 0.005L	*
71	b-d	Fit of drive gear to bevel pinion gear -------	0.004 to 0.007 backlash	*
	c	Inside diameter of roller needle bearing ----	0.875	0.876
71-69	c-b	Fit of arm in bearing ----------	0.0000 to 0.0005T	0.002L

e. Drop Gear Axle Housing and Associated Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
73	a	Width of spline spaces in wheel hub ---------	0.1645 to 0.1660	*
	b	Width of splines on outer shaft of universal joint	0.1630 to 0.1660	*
	a-b	Fit of hub on universal joint ----------	0.001L to 0.003L	*
	c	Backlash between parts of universal joint ----	None at angles up to 15 deg straight	
	d	Width of splines on inner shaft of universal joint	0.1590 to 0.1620	*
	f	Inside diameter of roller needle bearings ----	0.875	0.876
	h	Inner seal surface on axle shaft ---------- *	~~0.123 to 0.130~~	~~1.118~~
	j	Outer seal surface on axle shaft ---------- *	~~0.8745 to 0.8750~~	~~0.8735~~
	k	Outside diameter of axle shaft ---------- *	~~0.8745 to 0.8750~~	~~0.874~~
	f-k	Fit of axle shaft in bearing ----------	0.0000 to 0.0005T	0.002L
	l	Outside diameter of helical idler gear shaft *	~~0.8745 to 0.8750~~	~~0.874~~
	l-f	Fit of shaft in bearing ----------	0.0000 to 0.0005L	0.002L
	m	Thrust washers ----------	0.052 to 0.054 Must pass between vertical, parallel plates spaced 0.057 by own weight	
	n	Width of spline spaces in helical driven gear	0.164 to 0.166	*
	n-d	Fit of gear on universal joint ----------	0.004 to 0.007L	*
	p	Backlash with helical drive gear, idler gear, and driven gear ----------	0.004 to 0.008	*

* Superseded by Ch. 1 - Pg 11

42. Torque Wrench Specifications

Fig. No.	Ref. letter	Location	Torque lb-ft
69	c	Bearing retainer plate to gear carrier ----------	10-15
69	l	Drop gear axle housing to gear carrier ----------	10-15
73	e	Steering knuckle cover to axle housing nuts -----	10-15
73	g	Steering knuckle cover to axle housing bolts ----	10-15
73	q	Steering pivot pin nuts ------------------------	10-15

Section IV. ASSEMBLY AND INSTALLATION

43. General

The instructions covering assembly of the front axle assembly are almost identically the reverse of those covering disassembly. Therefore, the following assembly procedure, for the most part, will be referenced to the illustrations appearing under disassembly. When this occurs, the instructions appearing with each referenced illustration should be performed in the reverse order from which they are given. For example, callout lotters A, B, C, and D indicate the sequence of the disassembly steps provided with figure 43. Assembly may be accomplished by performing these steps in reverse order; i.e., D, C, B, and A.

44. Assembly of Drop Gear Axle Housing Assembly

a. Assembly of Drop Gear Axle Housing.

(1) If headless straight pins were removed (par. 37) press new pins into drop gear axle housing. If 5/16-24 x 5/16-18 x 1-1/4 plain studs were removed (par. 37) thread new ones into place, allowing 0.750-inch to protrude from housing. If tapered roller bearing cup was removed, press new cup into place, small bore end first, until seated on shoulder.

(2) If roller needle bearing was removed, drive new bearing into place using replacer – 5120-601-2223 and handle – 5120-601-2234 (fig. 75).

(3) Install plain encased seal in bore in housing, with lip of seal toward open end of housing, using replacer – 5120-601-2225 and handle – 5120-601-2234 (fig. 76).

(4) Refer to figure 67 and reverse

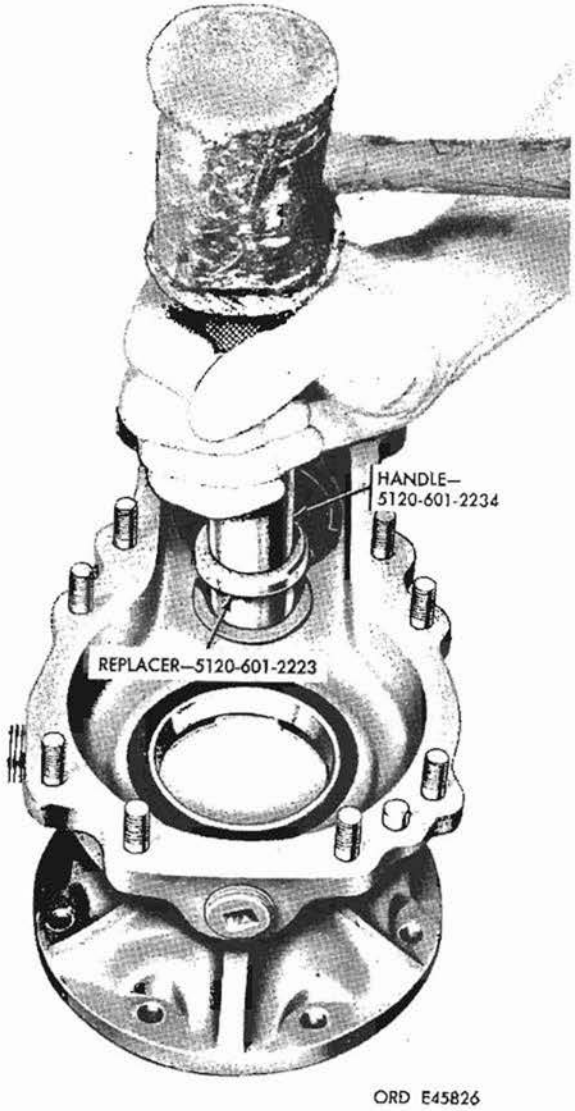


Figure 75. Installing roller needle bearing in drop gear axle housing using replacer – 5120-601-2223 and handle – 5120-601-2234.

the sequence of instructions to install the helical drive gear and associated parts.

(5) Refer to figure 66 and reverse the sequence of instructions to install the axle shaft and associated parts.

Note. Lightly coat the lip of the oil seal prior to installing the axle shaft.

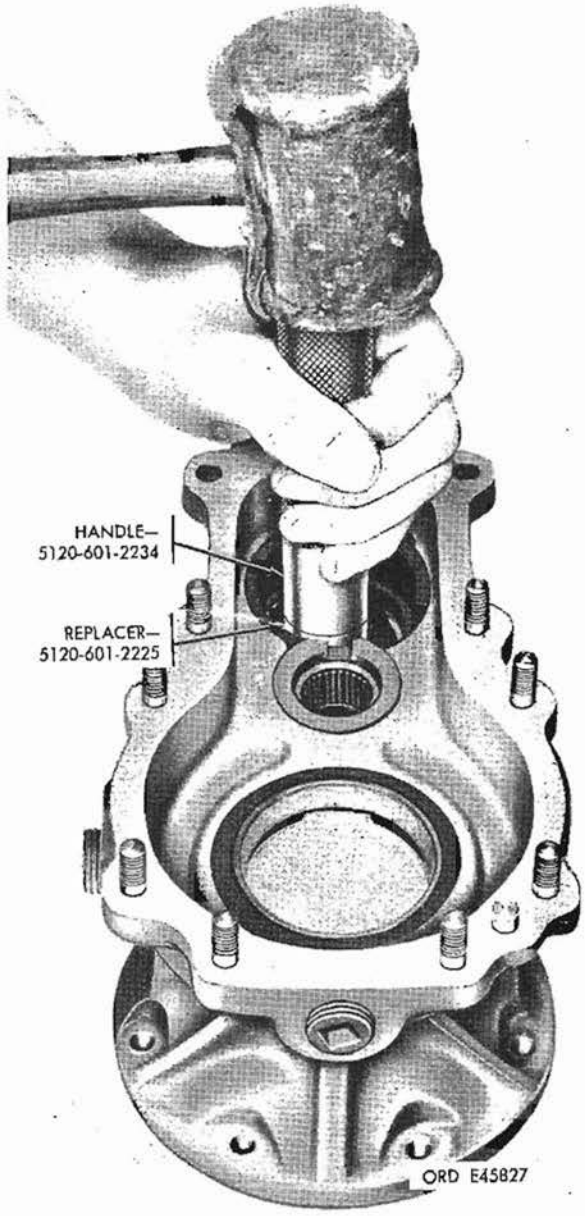


Figure 76. Installing plain encased seal in drop gear axle housing using replacer — 5120-601-2225 and handle — 5120-601-2234.

(6) Press tapered roller bearing cones and rollers on each side of helical driven gear. Refer to figure 64 and reverse the sequence of instructions to install the driven gear and helical idler gear and associated parts.

(7) Check backlash between the helical drive gear, idler gear, and driven gear with a feeler gage (fig. 77). Correct backlash should be from 0.004- to 0.008-inch between gears. Insert gage between gear teeth while holding gear in position. If necessary, change idler gear or driven gear to obtain correct backlash.

b. Assembly and Installation of Steering Knuckle Cover.

(1) If tapered roller bearing cups were removed from outside of steering knuckle cover (par. 37), refer to figure 63 and press new cups into bores in cover.

(2) If tapered roller bearing cup and shims were removed from inside of cover (par. 37), install same shims and new cup in bore in cover.

Note. It may be necessary to adjust shims when checking end play of helical driven gear (c, below).

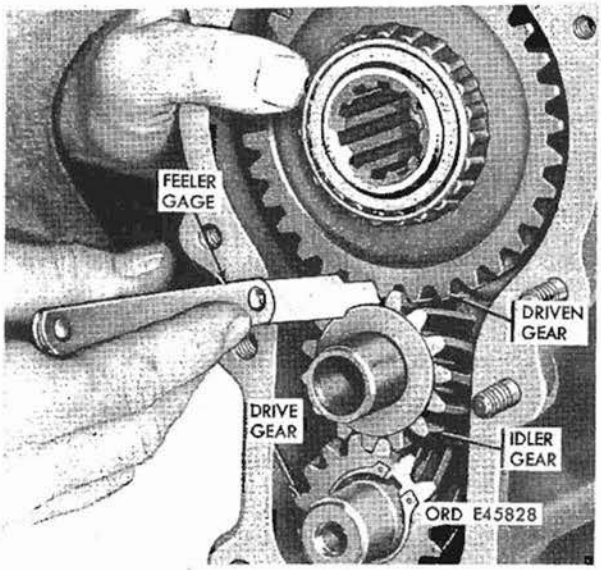


Figure 77. Checking backlash between helical drive gear, idler gear, and driven gear.

(3) If roller needle bearings were removed from inside of cover (par. 37), install new bearings in cover, using replacer – 5120-601-2223 and handle – 5120-601-2234 (fig. 78).

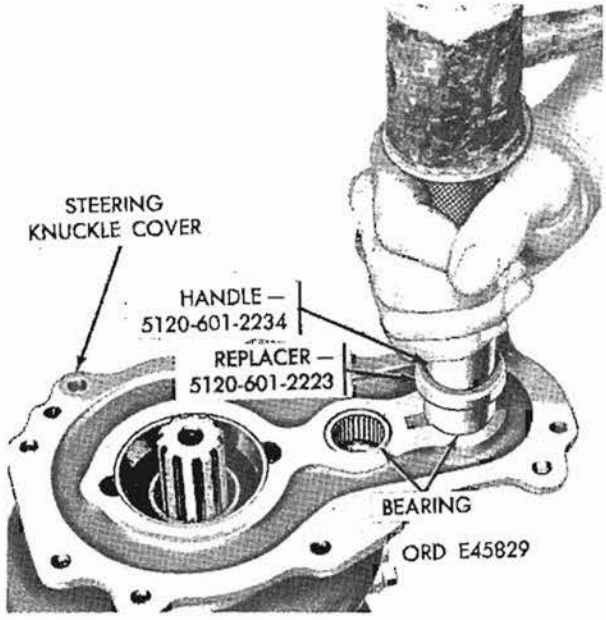


Figure 78. Installing roller needle bearings in steering knuckle cover using replacer – 5120-601-2223 and handle – 5120-601-2234.

(4) Refer to figure 61 for installation of steering knuckle cover. Tighten machine bolts and hexagon nuts to a torque of 10 to 15 lb-ft.

c. Adjustment of Helical Driven Gear in Drop Gear Axle Housing. Turn the axle shaft to make sure the gears and bearings are properly seated. Place a dial indicator through universal joint opening in steering knuckle cover with indicator resting against helical driven gear. Remove pipe plug from side of drop gear axle housing and insert a screwdriver under driven gear. Move gear back and forth and check dial indicator. The end play of the gear must be 0.001- to 0.003-inch. If end play is not within limits, remove cover and tapered roller bearing cup (par. 37c). Add or remove shims as necessary to obtain correct end play and install cover (b, above).

d. Assembly and Installation of Universal Joint.

(1) Refer to figure 60 for installation of race balls.

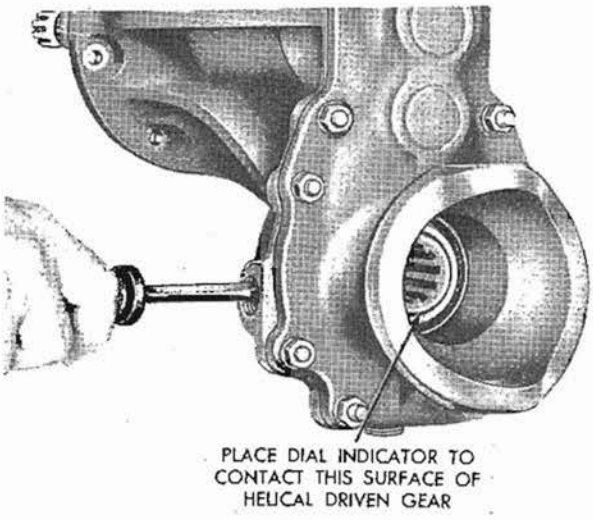


Figure 79. Checking helical driven gear end play.

(2) Drop the center ball pin through the hole in the outer shaft and rotate the center ball until the pin enters the hole in the center ball.

(3) Refer to figure 58 for installation of the retaining pin.

(4) Refer to figure 57 for installation of the universal joint and sleeve bearing.

e. Assembly of Remaining Components. Refer to TM 9-~~8034-20~~ for installation of the dust and moisture seal boot, steering knuckle and associated parts, and wheel hub. 9-2320-213-20

45. Assembly of Gear Carrier Assembly

a. If any plain studs were removed (par. 36), screw new studs into place in gear carrier. Refer to figure 72 and install 5/16-18 x 5/16-24 x 1-1/2 studs (C) allowing 0.940-inch to protrude from carrier; install 5/16-18 x 5/16-24 x 1-11/16 studs (E) allowing 1.190-inch to protrude from carrier; and install 5/16-18 x 5/16-24 x 1-3/4 studs (F) allowing 1.190-inch to protrude from carrier.

b. Install plain encased seal (fig. 80) in seat in right end of carrier as shown in figure 16. Lip of seal must be toward open end of carrier.

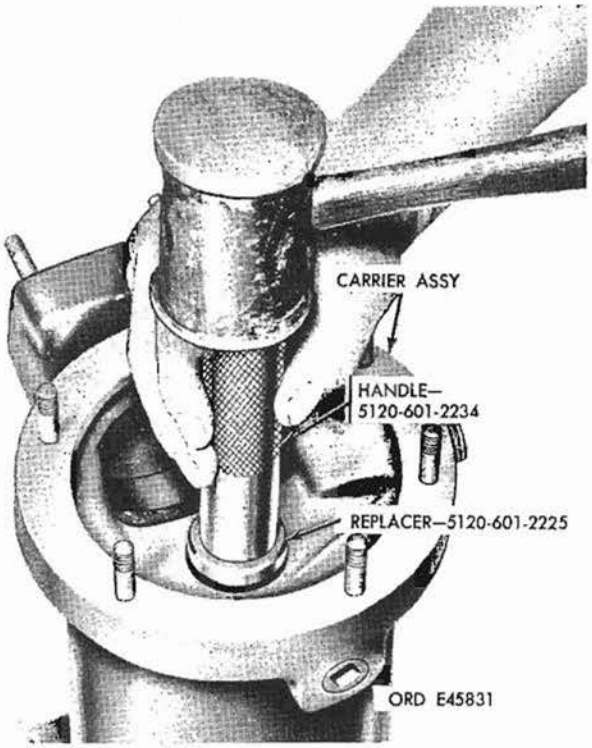


Figure 80. Installing plain encased seal in gear carrier assembly, using replacer – 5120-601-2225 and handle – 5120-601-2234.

c. Refer to TM 9-~~8034-20~~ 2320-213-20 for installation of the two roller needle bearings and plain encased seals in the bellcrank steering arm mounting flange in carrier.

46. Installation and Adjustment of Drive Pinion, Gear Bearing Cage, and Associated Parts

a. General. During assembly and installation of the drive pinion and gear bearing cage, five important adjustments must be made to insure correct positioning of these parts. The adjusting points are outlined briefly below and explained in detail in the following subparagraphs. To insure correct final adjustment they must be accomplished in the order given.

(1) Preload of drive pinion bearings; adjusted by shims (R, fig. 71) and checked using scale – 6670-347-5922 (fig. 7).

(2) Depth of drive pinion in gear carrier housing; adjusted by shims (Y, fig. 71) and checked using mark on pinion and fixture – 4910-713-1015 (fig. 7).

(3) Preload of bevel drive gear bearings; adjusted by shim set (E, fig. 71) and checked using torque indicating wrench.

(4) Backlash between drive pinion and bevel drive gear; adjusted by shims (L, fig. 71) and checked using fixture – 4910-713-1013 (fig. 7).

(5) Final adjustment for correct tooth contact between pinion and gear; may require adjustment of shims (L or R, fig. 71) and checked using red-lead test.

b. Assembly of Drive Pinion and Adjustment Preload of Bearings.

(1) Refer to figure 49 and assembly drive pinion and annular ball bearing.

(2) Refer to figure 50 and assemble bearing retainer and two tapered

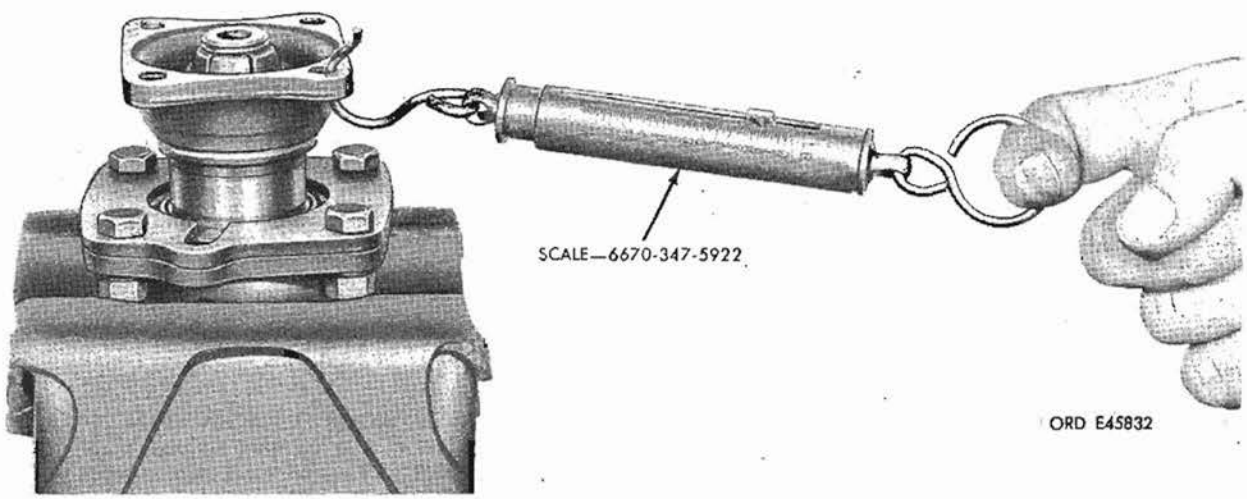


Figure 81. Checking preload on drive pinion bearings, using scale – 6670-347-5922.

roller bearing cone and rollers and cups.

(3) Position assembled drive pinion in assembled bearing retainer and install shim set and bearing retainer plate against retainer. Install four 5/16-24 x 1 bolts through holes in retainer, shims, and plate and secure with four 5/16-inch lock washers and four 5/16-inch nuts. Place the assembled unit in a vise, install companion flange on splines of drive pinion, and install 3/4-inch flat washer and 3/4-inch self-locking nut. Tighten nuts finger tight, turn pinion to seat bearing cups and cones and tighten the four bolts to a torque of 10-15 lb-ft and the 3/4-inch nut to a torque of 80-100 lb-ft. Install scale – 6670-347-5922 (fig. 81) in companion flange bolt hole and measure pull required to turn flange and pinion. If shim thickness is correct, a pull of 3 to 5 pounds will be required to turn the pinion in the bearings. If specified pull is not obtained, remove shims to increase the pull and add shims to decrease pull.

(4) Remove the 3/4-inch self-locking nut, 3/4-inch flat washer, and 5/16-inch nuts, 5/16-inch lock washers, and 5/16-24 x 1 bolts. Remove plate and tie shim set together for use in final assembly.

c. Installation of Drive Pinion and Adjustment of Depth in Gear Carrier Housing.

(1) The base of the drive pinion contains two markings (fig. 82). The two figures and letter are for manufacturing use only. The second marking is used in conjunction with the depth setting fixture (fig. 7). The pinion in figure 82, marked "+2", when combined with the instructions on the fixture plate will require an 0.018-inch feeler gage for correct depth setting of pinion.

(2) Refer to figure 48 and install drive pinion and annular ball bearing in gear carrier housing.

(3) Refer to figure 47 and install shims and assembled bearing retainer on housing studs. If the drive pinion was not replaced, install same shims removed at disassembly (par. 36). If a new drive pinion is installed, use a complete set of shims.

(4) Refer to figure 46 and install shims established in b, above, and bearing retainer plate. Install four 5/16-inch lock washers and four 5/16-inch hexagon plain nuts on studs and tighten to a torque of 10-15 lb-ft. Install companion flange on splines of drive pinion, install 3/4-inch flat washer, and 3/4-inch self-locking nut. Tighten nut to a torque of 80-100 lb-ft.

(5) Install depth setting fixture – 4910-713-1015 (fig. 83) on studs on gear bearing cage side of housing. Make sure arm of fixture is against base of drive pinion and insert correct feeler gage (c(1), above) between arm and fixed stud in fixture. Follow procedures on plate of fixture and add or remove shims between bearing retainer and housing to obtain correct depth setting of pinion. Remove shims to increase depth and add shims to decrease depth.

Figure 82. Depth setting mark on drive pinion.

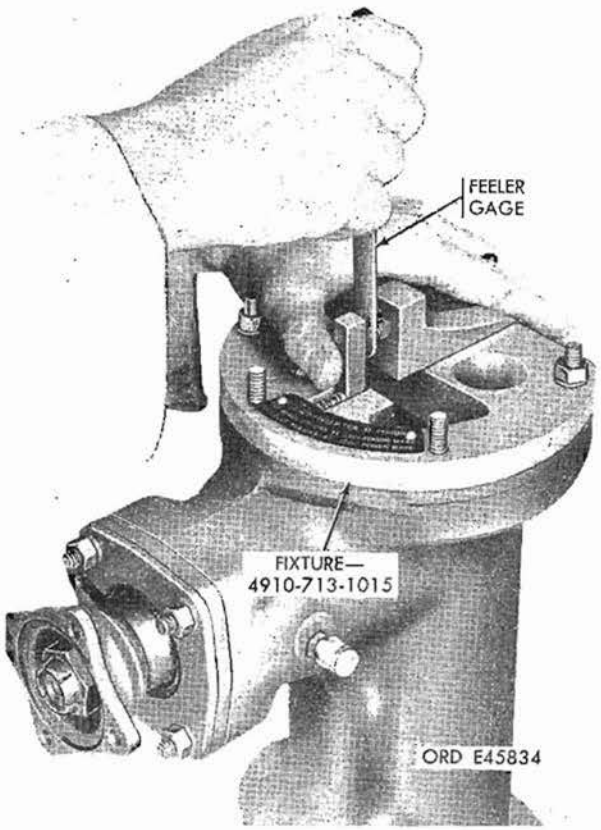


Figure 83. Checking depth of drive pinion using fixture – 4910-713-1015.

d. Assembly of Drive Gear in Gear Bearing Cage and Adjustment of Preload of Bearings.

(1) Refer to figure 54 and assemble tapered roller bearing cone and rollers and cups in gear bearing cage.

(2) Refer to figure 53 and assemble tapered roller bearing cone and rollers, sleeve spacer, and shims on drive gear. If the drive gear was not replaced, install same shims removed at disassembly (par. 36). If a new drive is installed, use a complete set of shims.

(3) Refer to figure 52 and assemble drive gear in gear bearing cage with key washer and plain hexagon nut. Turn gear in bearings as nut is being tightened to seat bearings. If shims are correct, a torque of 5 to 15 lb-in. will be required to turn the gear in the cage. If adjustment is not correct, remove shims to increase preload and add shims to decrease preload. After correct preload is established, bend edge of key washer against flat of nut to prevent nut turning.

e. Installation of Gear Bearing Cage and Adjustment of Gear Backlash.

(1) Refer to figure 51 and assemble shims and assembled gear bearing cage on studs in gear carrier housing. If the drive gear was not replaced, install same shims removed at disassembly (par. 36). If a new drive gear is installed use complete set of shims. Temporarily secure cage on studs with six 5/16-inch lock washers and 5/16-24 hexagon nuts.

(2) Install backlash setting fixture – 4910-713-1013 (fig. 84) on plain hexagon nut. Attach a dial indicator to one of the studs in such a position that the indicator plunger will contact fixture between the two lines toward the end of the fixture. Clamp the drive pinion to prevent turning, and turn the drive gear back and forth to determine the backlash as shown by the indicator. The backlash should be from 0.004 to 0.007-inch. If backlash is not within the specified limits, add shims between cage and housing to increase the reading and remove shims to decrease the reading.

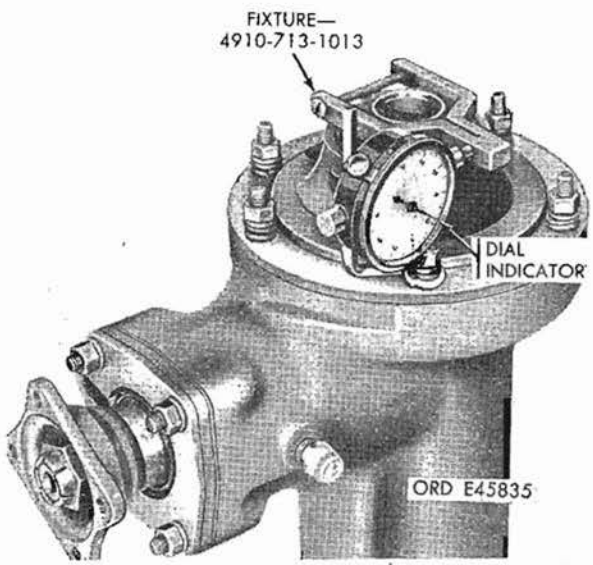


Figure 84. Checking backlash between drive pinion and bevel drive gear using fixture – 4910-713-1013.

f. Determination of Correct Tooth Contact Between Drive Pinion and Bevel Drive Gear.

(1) General. When the drive pinion and bevel drive gear are installed in operating position, they are completely enclosed and cannot be seen. For this reason, it is necessary to remove either the gear or the pinion (preferably the gear) to see the results of a red-lead test. As noted in subparagraphs a, c, and e, above, the position of the drive gear is adjusted by changing the thickness of shims (L, fig. 71), and the position of the drive pinion is adjusted by changing the thickness of shims (Y, fig. 71). In both cases, removing shims moves the unit into closer mesh, and adding shims moves the unit into more open mesh. Figure 85 shows the drive gear assembled and illustrates the nomenclature which will be used in (2), below.

Note. Shims used to adjust bearing preload for the drive pinion (b, above) and for the drive gear with gear bearing cage (d, above), have no effect on tooth contact and should not be changed.

(2) Tooth contact. The desired tooth contact as seen on the teeth of the drive gear after a red-lead test is shown in A, figure 86. The size of the contact area depends largely on the load applied between the gear and pinion during the test; the greater the load, the larger the area. The location of the contact area is the important point. On the drive or convex face of the gear tooth, the contact area should be approximately centered between the top and bottom of the tooth and should extend well out toward the toe and heel. However, the area must not extend all the way to either the toe or heel end. Figure 85 shows the five possible tooth contact areas, each of which is explained below.

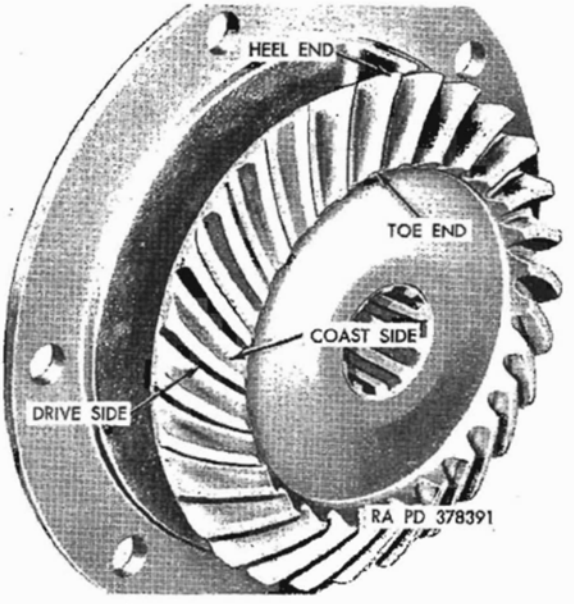


Figure 85. Drive gear for front axle assembled in gear bearing cage, with nomenclature for gear teeth.

(a) Tooth contact, illustrated in A, figure 86, is satisfactory. The contact area on the drive side of the tooth is well centered between the top and bottom of the tooth, starts close to the toe and extends well out toward the heel.

(b) Tooth contact illustrated in B, figure 86, shows a high narrow contact on the drive side of the tooth. This is an undesirable contact and results from the pinion being too far from the gear. To correct, move the pinion toward the gear. Check backlash (e, above) and if necessary, move gear away from pinion.

(c) Tooth contact illustrated in C, figure 86, shows a low narrow on the drive side of the tooth. This undesirable contact results from the pinion being too close to the gear. To correct, move the pinion away from the gear. Check backlash (e, above) and if necessary, move gear toward pinion.

(d) Tooth contact, illustrated in D, figure 86, shows a short contact at the toe on the drive side of the tooth. This undesirable contact results from the gear being too close to the pinion. To correct, move the gear away from the pinion. Check backlash (e, above) and if necessary, move pinion toward gear.

(e) Tooth contact, illustrated in

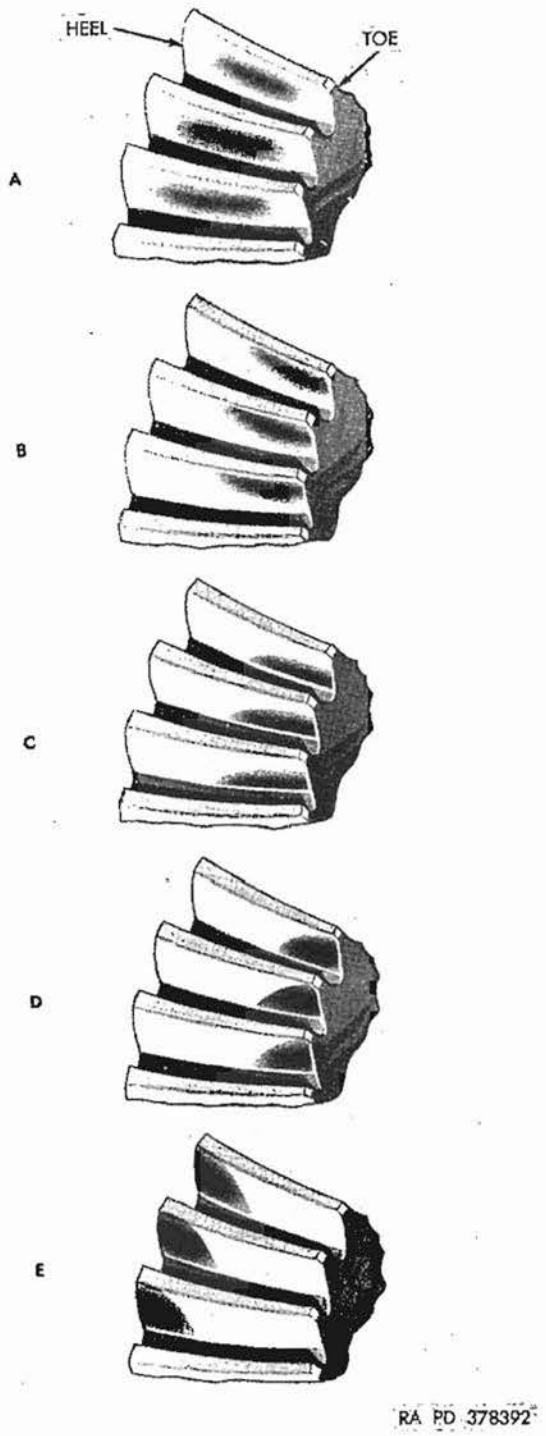


Figure 86. Correct and incorrect areas on drive side of gear teeth – front axle.

E, figure 86, shows a short contact at the heel on the drive side of the tooth. This undesirable contact results from the bear being too far from the pinion. To correct, move the gear toward the pinion. Check backlash (e, above) and if necessary, move pinion away from gear.

47. Assembly of Brake Assembly

a. Installation of Brake Assembly – M274A1 & M274A2.

(1) Refer to figure 45 for assembly and installation of dirt and liquid shield. Lip of plain encased seal must be toward front of shield.

(2) Refer to figure 44 for installation of the plate and associated parts.

(3) Refer to figure 43 for installation of the brake drum and associated parts.

b. Installation of Brake Assembly – M274.

(1) Refer to figure 42 for installation of the dirt and liquid deflector and associated parts.

(2) Refer to figure 41 for installation of the oil dirt and liquid deflector and associated parts.

(3) Refer to figure 40 for installation of the brake band assembly and associated parts.

(4) Refer to figure 39 for installation of the companion flange and brake drum.

48. Assembly from Subassemblies

Refer to figure 38 and assemble gear carrier assembly to each drop gear axle housing with attached parts. Tighten 5/16-24 hexagon nuts to a torque of 10-15 lb-ft. Lubricate carrier assembly and two drop gear axle housings as instructed in LO 9-2320-213-12.

49. Installation

Refer to TM 9-~~8034-20~~ 2320-213-20 for installation of the front axle assembly.

CHAPTER 5
REPAIR OF TRANSMISSION AND REAR AXLE ASSEMBLY

Section I. DESCRIPTION, DATA, AND TROUBLESHOOTING

50. Description

a. General. The transmission and rear axle assembly (fig. 87) is mounted directly between flanges on the two frame tubes and two rear support tubes. The axle consists of three main units; the transmission assembly and the two drop gear axle housing assemblies. The drop gear axle housing assemblies are exactly the same as the corresponding parts of the front axle assembly described in paragraph 30. The transmission (fig. 88) contains the necessary gears, shafts, shift forks, bearings, seals, etc. to transmit power from the clutch-driven disk to the drive pinion in any one of three forward speeds or one reverse and in either one of two speed range ratios.

b. Differences ~~Between~~ Among Models.

(1) Drop gear axle assembly. Refer to paragraph 30.

(2) Transmission assembly. The bearing ball and helical compression spring holding the second and high speed gear shift shaft in position (M274A2) have been relocated in the M274A1 transmission assembly. These parts now enter the transmission housing from the gear bearing cage side of the shift shaft and an additional shifter shaft poppet plug has been added to hold the spring and ball in the housing.

51. Data

Make	Willys
Type	combined drop gear drive axle and transmission
Lubricant capacity	2 qts
Transmission	
Lubricant capacity	12 oz each
Axle housings	
Ratio, engine to drive pinion, high gear, high range:	
M274	2.838 to 1
M274A1	2.440 to 1
M274A2	2.440 to 1
Ratio, engine to drive pinion, high gear, low range:	
M274	5.310 to 1
M274A1	4.560 to 1
M274A2	4.560 to 1

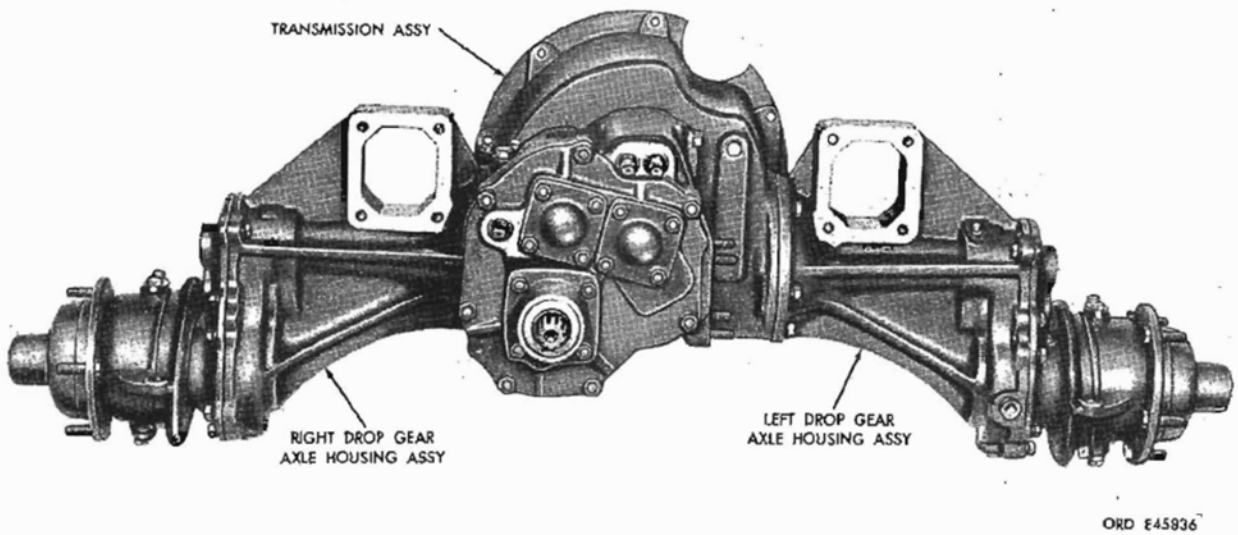
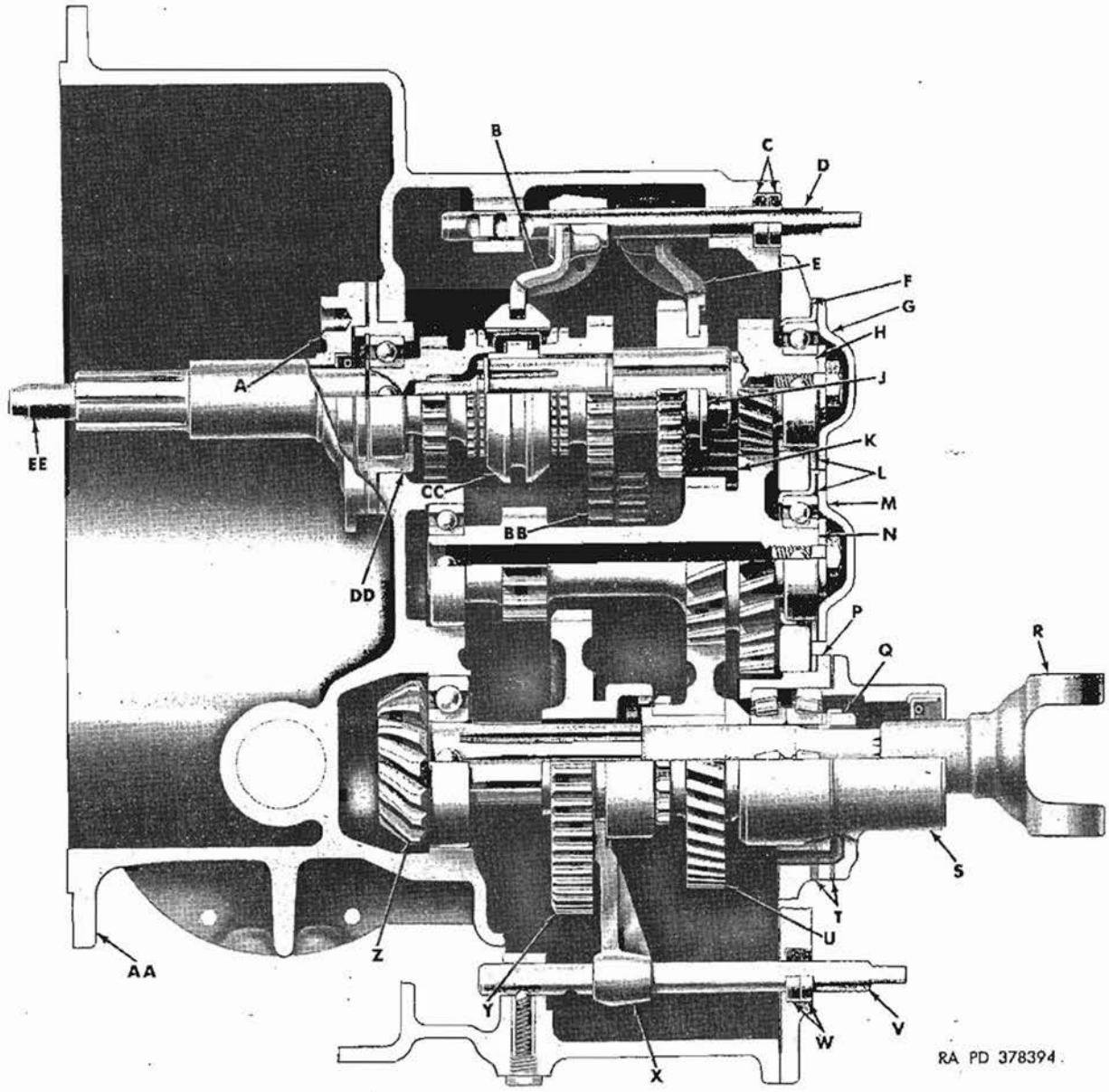


Figure 87. Transmission and rear axle assembly – front view.



A — Outer bearing retainer
B — Second and high speed gear shift fork
C — Plain encased seal
D — Gear shift shafts
E — First and reverse gear shift fork
F — End cover
G — Bearing retainer
H — Helical gearshaft
J — First and reverse spur gear
K — Reverse idler spur gear
L — Bearing retainer
M — Bearing retainer
N — Bevel spur gearshaft
P — Bearing retainer
Q — Plain hexagon nut
R — Propeller shaft yoke
S — Bearing retainer
T — Adjusting shims
U — High speed spur gears
V — Gear shift shaft
W — Plain encased seals
X — Range shift fork
Y — Low speed spur gear
Z — Drive pinion
AA — Rear axle and transmission housing
BB — Countershaft cluster gear
CC — Synchronizer assembly
DD — Inner bearing retainer
EE — Input spur gearshaft

Figure 88. Cross-sectional view of transmission assembly.

Ratio, input drive pinion to drive gear:
M274 ——— 1.866 to 1
M274A1 ——— 1.866 to 1
Ratio, axle shaft to universal joint ——— 2.2 to 1
Speeds ——— 3 forward and 1 reverse with high and low range synchronized – intermediate and high

M274 at 4200 rpm engine speed:	High range	Low range
High	25 mph	13 mph
Intermediate	14 mph	7 mph
Low and reverse	8 mph	4 mph

M274A1 at 3600 rpm engine speed:	High Range	Low Range
High	25.0 mph	13.2 mph
Intermediate	14.4 mph	7.7 mph
Low and Reverse	8.4 mph	4.5 mph

Drive gearset:
Pinion ——— 15 teeth RH spiral bevel
Gear ——— 28 teeth LH spiral bevel
Universal joint:
Make ——— Bendix
Type ——— constant velocity
Size ——— large 3-3/16-inch
Maximum turning angle ——— 27 deg

52. Troubleshooting

a. Purpose. Refer to paragraph 31a.

b. General Instructions. Refer to paragraph 31b.

c. Troubleshooting Before Removal or Operation. Refer to table V.

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Table V. Troubleshooting Before Removal or Operation – Transmission and Rear Axle Assembly

Malfunction	Probable causes	Corrective action
1. Excessive noise at ends of axle.	a. Lack of lubricant.	a. Lubricate as directed on lubrication order.
	b. Worn or broken gears, bearings, or universal joints.	b. Disassemble and replace parts as required.
2. Excessive noise from axle and transmission housing.	a. Lack of lubricant.	a. Lubricate as directed on lubrication order.
	b. Worn or broken gears or bearings in housing.	b. Disassemble and replace parts as required.
3. Intermittent howl in transmission.	Gear out-of-round or eccentric with center line of shaft.	Disassemble and replace parts as required.
4. Intermittent knocking or thudding.	Burs on gear teeth or faulty bearing. Generally caused by damaged teeth engaging those of mating gear.	Disassemble and replace parts as required. Faulty gear can generally be identified by highly polished area on mating gear.
5. High pitched howl or whine.	Improperly machined or adjusted gears.	Disassemble and replace or adjust parts as required.
6. High pitched squeal, thudding, or knocking.	Usually caused by faulty or damaged bearings.	Disassemble and replace parts as required.
7. Slips out of gear.	a. Gear teeth worn or broken.	a. Disassemble and replace parts as required.
	b. Shift forks loose on shaft or bent.	b. Disassemble and replace parts as required.

Table V. Troubleshooting Before Removal or Operation — Transmission and Rear Axle Assembly — Continued

Malfunction	Probable causes	Corrective action
7. Slips out of gear — continued.	c. Notches on shift shaft for bearing ball worn or compressing spring broken.	c. Disassemble and replace parts as required.
8. Shifts into first and reverse but not into second and third.	a. Synchronizer parts worn or broken.	a. Disassemble and replace parts as required.
	b. Gears worn or broken.	b. Disassemble and replace parts as required.
	c. Shift fork bent, broken, or loose on shift shaft.	c. Disassemble and replace parts as required.
9. Trouble shifting into desired ranges.	Gears worn or broken.	Disassemble and replace parts as required.
10. Shifts hard.	Shift shaft bent.	Disassemble and replace bent shift shaft.
11. Lubricant leaks into clutch housing.	Plain encased seal in bearing retainer worn.	Disassemble and replace worn parts.

Section II. REPLACEMENT OF SHIFT SHAFT PLAIN ENCASED SEALS

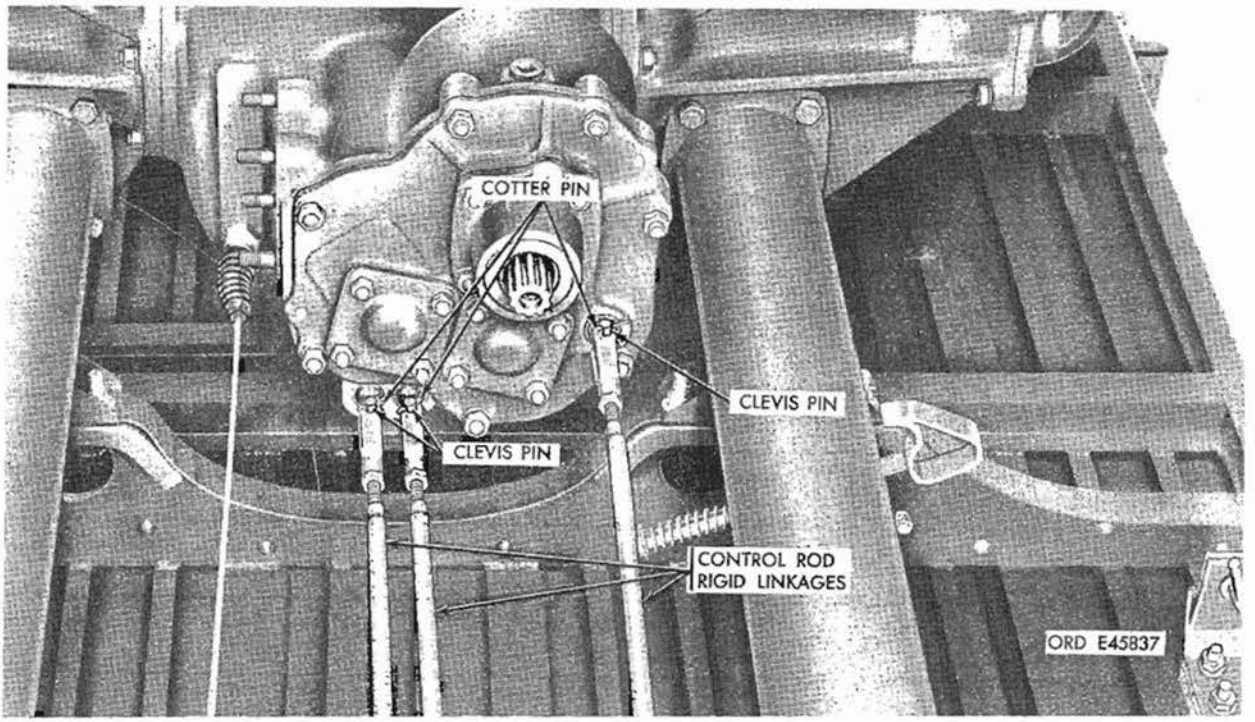
53. General

The ends of the range shift shaft, first and reverse gear shift shaft, and second and high speed gear shift shaft, project from the front of the axle and transmission housing and cover. Each shaft is equipped with two plain encased seals to prevent the entrance of water or road dirt in the housing. As replacement of these seals may become necessary before the axle and transmission assembly has to be removed, three special tools are provided to replace the seals while the assembly is installed in the vehicle. Their use is described in paragraphs 54 and 55.

54. Removal of Shift Shaft Plain Encased Seals

a. Disconnect Transmission Linkage. Refer to figure 89.

b. Remove Plain Encased Seals. Refer to figures 90 and 91.



Remove three cotter pins and clevis pins connecting control rod rigid linkages to front ends of shafts and move linkages to one side of shafts.

Figure 89. Disconnecting or connecting control rod rigid linkages.

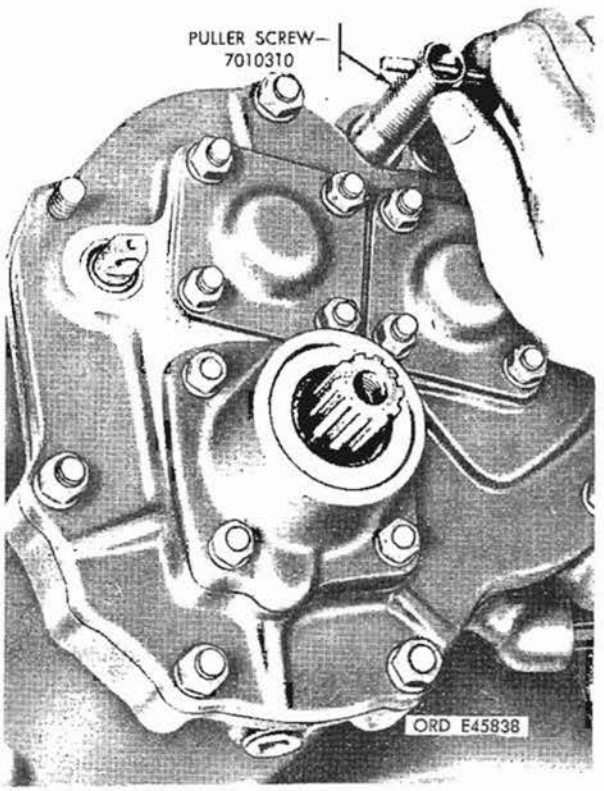
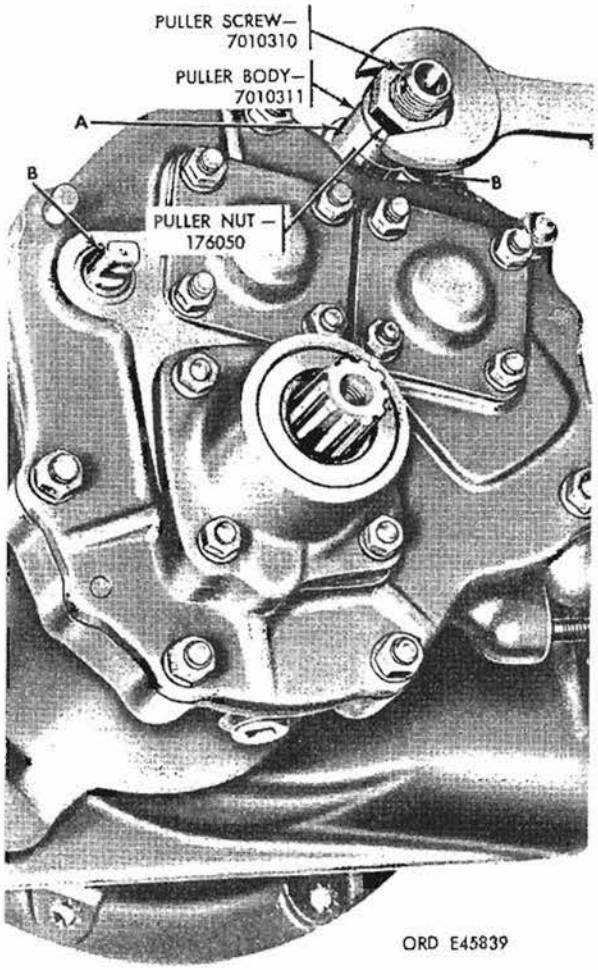


Figure 90. Instruction.

Position puller screw – 7010310 over a shift shaft and screw taper-threaded end into seal.

Figure 90. Screwing puller screw – 7010310 into plain encased seal on shift shaft.



A — Position puller body — 7010311 over puller screw — 7010310 (fig. 90) and screw on the puller nut — 176050, which will pull the plain encased seal out into the puller body — 7010311.

Note. If the second seal is not removed, repeat the operation.

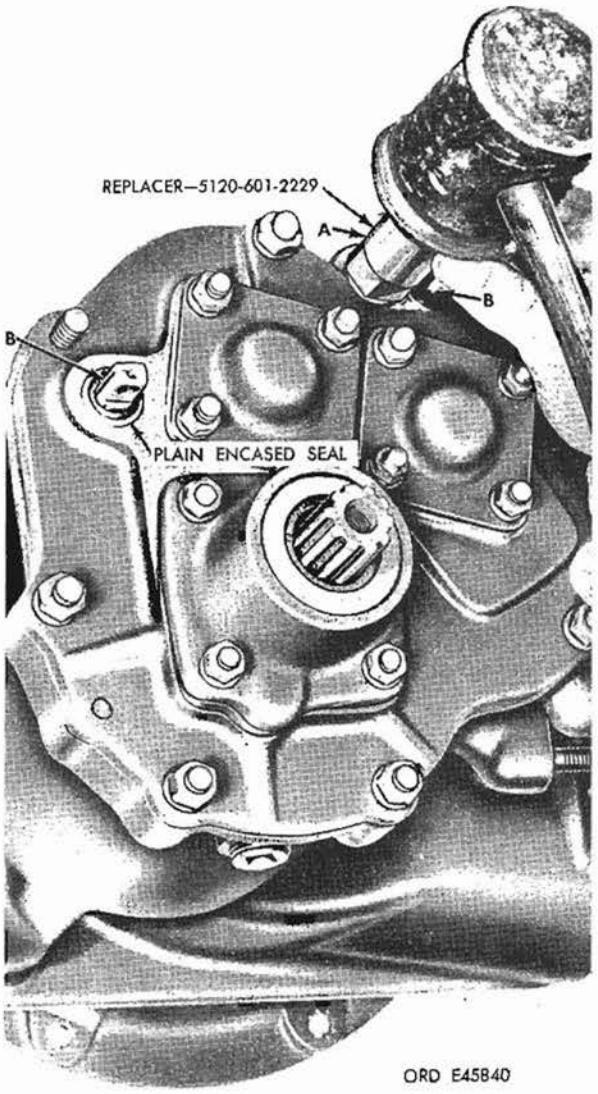
B — Seals are pulled from the other two shift shafts in the same manner.

Note. The puller — 5120-601-2227 is composed of the puller screw — 7010310, puller body — 7010311, and the puller nut — 176050.

Figure 91. Removing plain encased seals from shift shaft using puller — 5120-601-2227.

55. Installation of Shift Shaft Plain Encased Seals

a. Install Plain Encased Seals. Refer to figure 92.



A — Position first plain encased seal on shift shaft, lap end in, being careful not to injure lip of seal. Position second seal on shaft, lip end out. Position replacer — 5120-601-2229 on shaft, against outer face of seal, and carefully drive both seals into axle and transmission housing.

B — Seals are installed on the other two shift shafts in the same manner.

Figure 92. Installing plain encased seals for shift shaft using replacer — 5120-601-2229.

b. Connect Transmission Linkage. Refer to figure 89 and reverse the sequence of instructions to connect the control rod rigid linkages to shift shafts.

Section III. REMOVAL AND DISASSEMBLY

56. General

a. Disassembly of the components of the transmission and rear axle assembly should be performed in figure number sequence. Instructions provided with each illustration should, in turn, be performed in the order of their respective index letters. If no instructions are provided with an illustration the procedures involved are relatively simple and the parts should be removed in the sequence indicated by the callout letters.

b. The exploded views, figures 121 through 128, are included to provide a visual reference to the components of the transmission assembly and for parts identification.

c. Discard all gaskets and packings during disassembly and make sure they are replaced with new ones at assembly.

57. Removal

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal of the transmission and rear axle assembly.

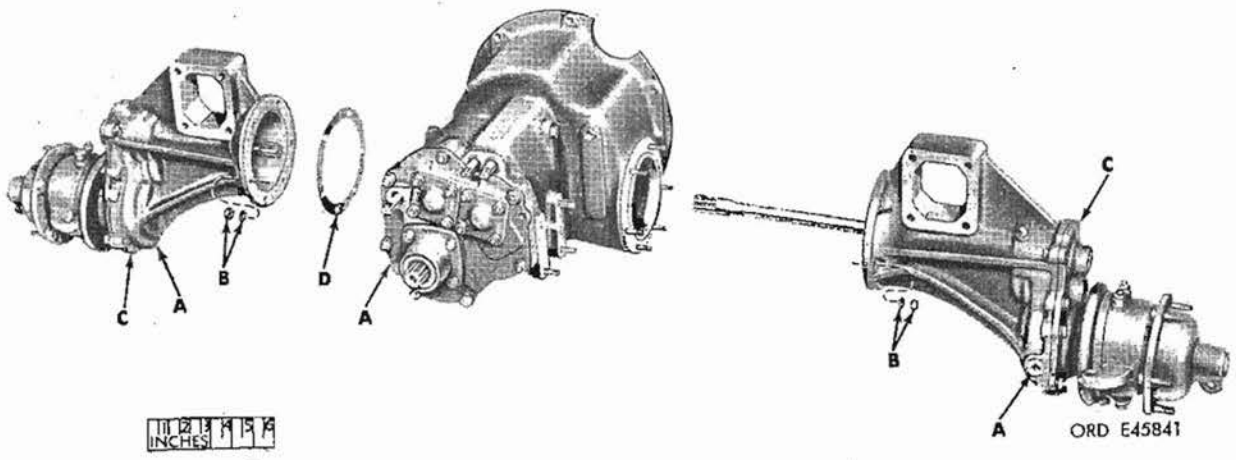
58. Disassembly of Transmission and Rear Axle Assembly into Subassemblies

Refer to figure 93.

59. Disassembly of Drop Gear Axle Housing Assembly and Gear Bearing Cage

a. Drop Gear Axle Housing Assembly. Refer to paragraph 37.

b. Gear Bearing Cage. The gear bearing cage and attached parts on the studs connecting the right drop gear axle housing assembly and the transmission assembly is the same as the like unit on the front axle assembly, except that the drive gear has teeth with a left-hand spiral instead of the right-hand spiral used in the front axle. Refer to figure 94 for removal of the gear bearing cage. Refer to paragraph 36 for disassembly of the gear bearing cage.



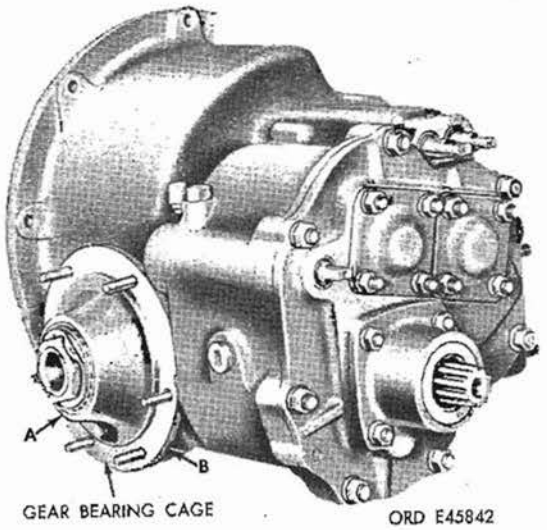
A – Remove drain plugs and drain lubricant from right and left drop gear axle housings and transmission assembly.

B – Remove twelve 5/16-inch hexagon nuts and 5/16-inch lock washers.

C – Carefully pull each drop gear axle housing with attached parts from transmission housing studs.

D – Remove and discard gasket between right drop gear axle housing and transmission assembly.

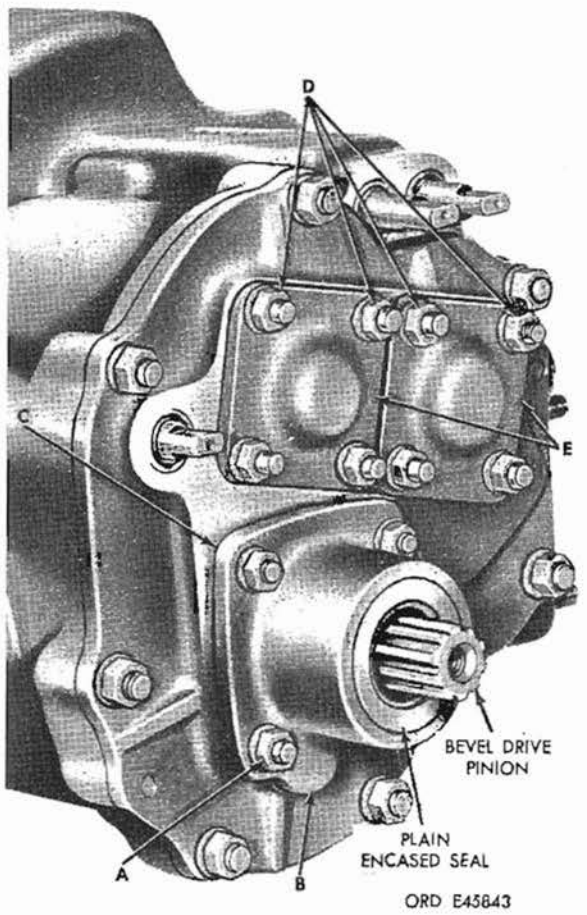
Figure 93. Removing or installing drop gear axle housings with attached parts.



A – Remove the gear bearing cage from studs on axle and transmission housing.

B – Remove and identify shims and tie together for use during assembly.

Figure 94. Removing or installing gear bearing cage and attached parts from axle and transmission housing.



A – Remove four 5/16-inch plain hexagon nuts and 5/16-inch lock washers.

B – Remove bearing outer retainer and plain encased seal.

C – Remove shims from studs. Identify shims and tie together for use during assembly.

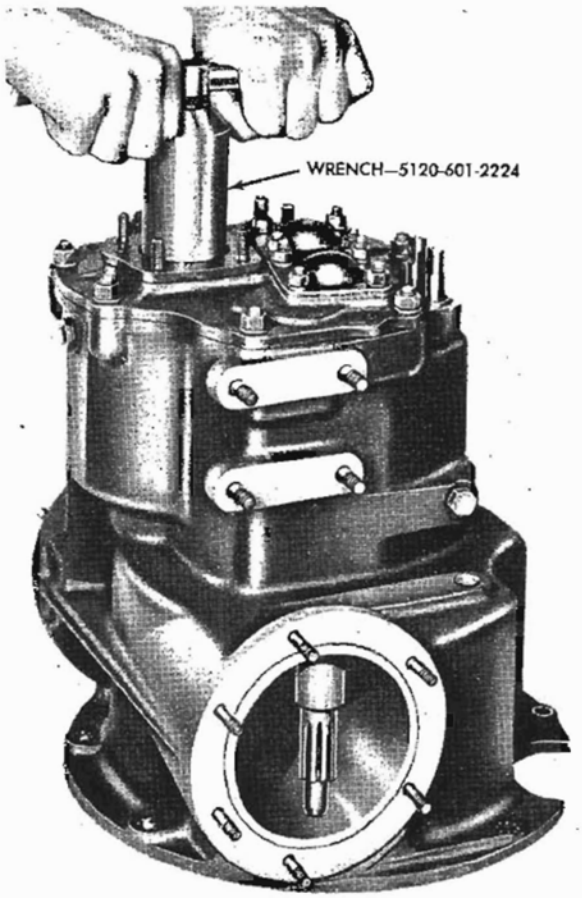
D – Remove eight 5/16-inch plain hexagon nuts and 5/16-inch lock washers.

E – Remove two bearing outer retainers and gaskets. Discard gaskets.

Figure 95. Removing or installing bearing outer retainers and associated parts.

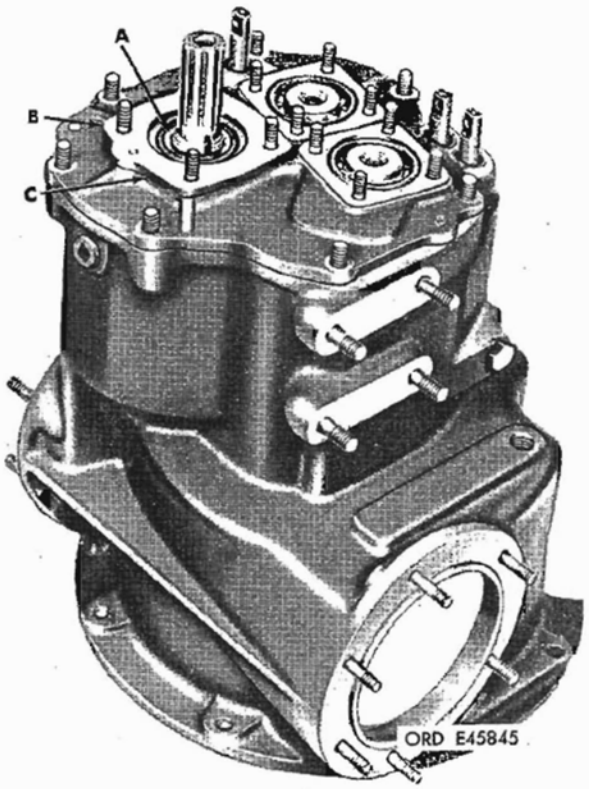
60. Disassembly of Axle and Transmission Housing End Cover Assembly and Related Parts

a. Remove Axle and Transmission Housing End Cover Assembly. Refer to figures 95 through 98 for removal of the axle and transmission housing end cover assembly.



Remove plain hexagon nut from drive pinion using socket wrench – 5120-601-2224.

Figure 96. Removing or installing plain hexagon nut using socket wrench – 5120-601-2224.



A – Remove key washer and flat washer.

B – Remove bearing inner retainer.

Note. The procedure for disassembly of the retainer is the same for both axles, refer to figure 50.

C – Remove shims from studs. Identify shims and tie together for use during assembly.

Figure 97. Removing or installing bearing inner retainer and associated parts.

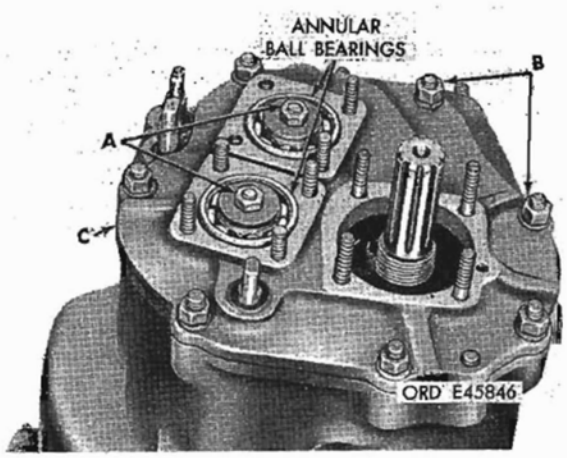


Figure 98. Instructions.

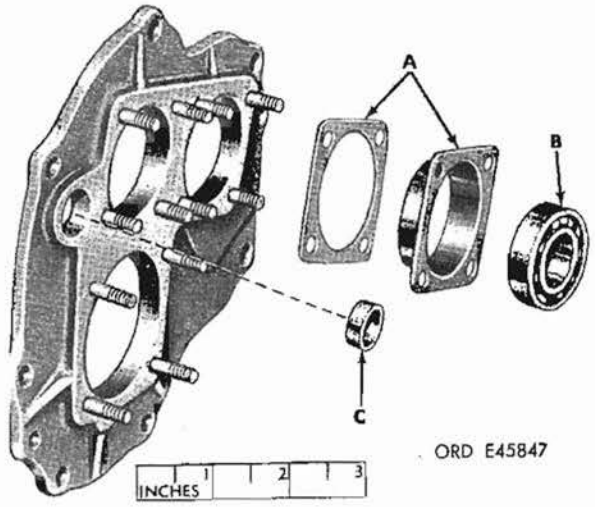
A – Remove two 3/8 x 24 x 7/8 self-locking bolts and flat washers.

B – Remove seven 3/8-inch plain hexagon nuts and 3/8-inch lock washers.

C – Carefully lift cover from studs while tapping on ends of helical gearshaft and bevel spur gearshaft to drive them out of the annular ball bearings. Discard cover gasket.

Figure 98. Removing or installing axle and transmission end cover assembly.

b. Disassemble Axle and Transmission Housing End Cover Assembly. Refer to figure 99 for disassembly instructions.



A — Remove two bearing inner retainers and gaskets from cover. Discard gaskets.

B — Remove annular ball bearing from each retainer.

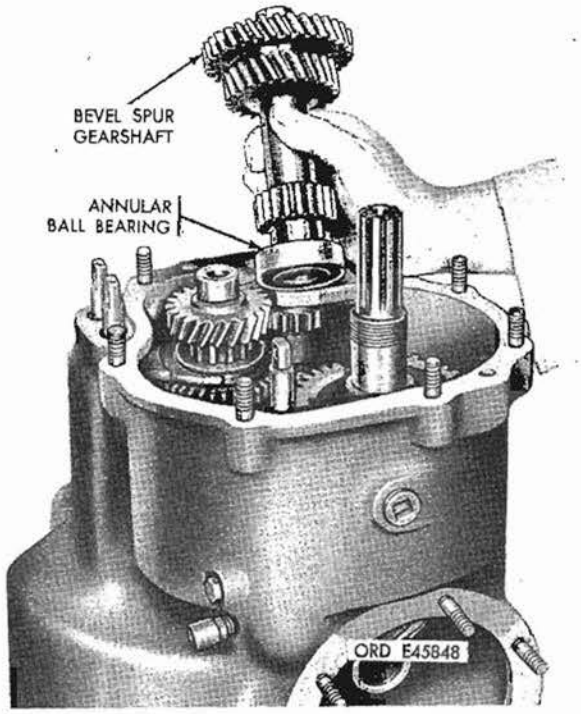
C — Remove two plain encased seals.

Note. Do not remove the plain studs unless inspection (par. 63) indicates replacement is necessary.

Figure 99. Disassembly or assembly of axle and transmission housing end cover assembly.

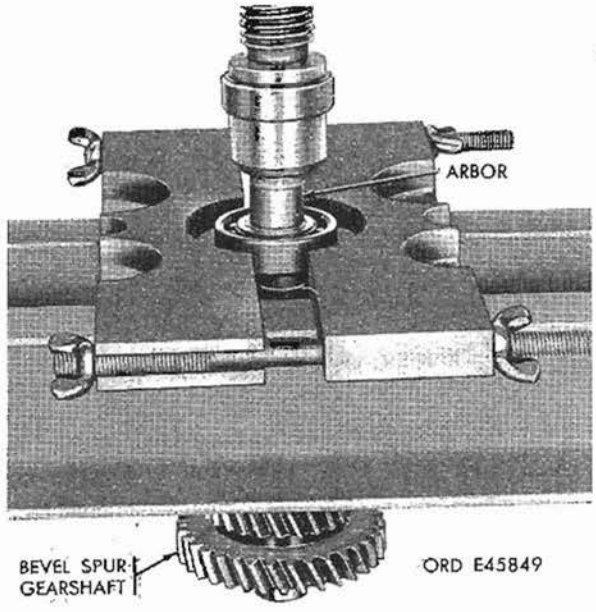
61. Disassembly of Transmission Gears and Related Parts

a. Removal of Bevel Spur Gearshaft and Related Parts. Refer to figures 100 and 101 for removal of bevel spur gearshaft.



Remove bevel spur gearshaft with annular ball bearing.

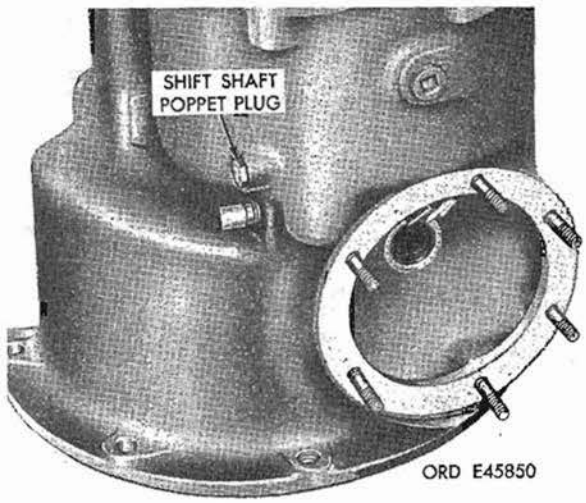
Figure 100. Removing or installing bevel spur gearshaft with annular ball bearing.



Remove annular ball bearing from bevel spur gearshaft using an arbor press and suitable adapter.

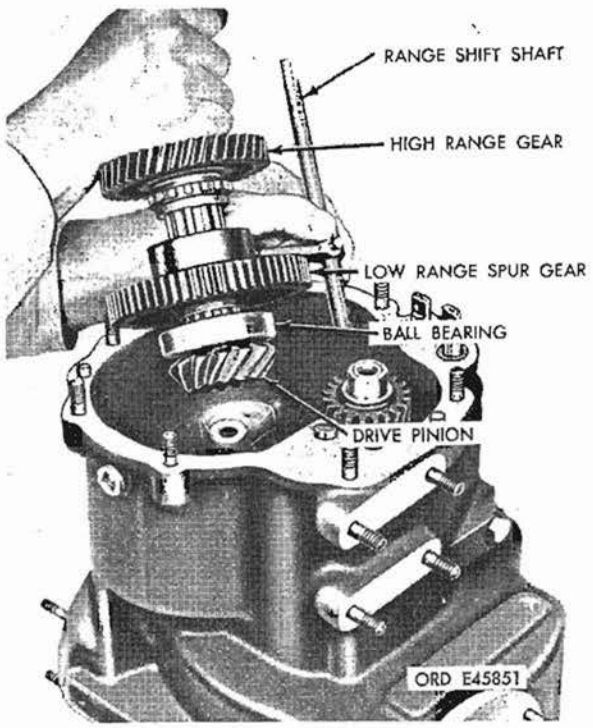
Figure 101. Removing or installing annular ball bearing.

b. Removal of Drive Pinion Range Shift Shaft and Related Parts. Refer to figures 102 through 105 for removal of the drive pinion and related parts.



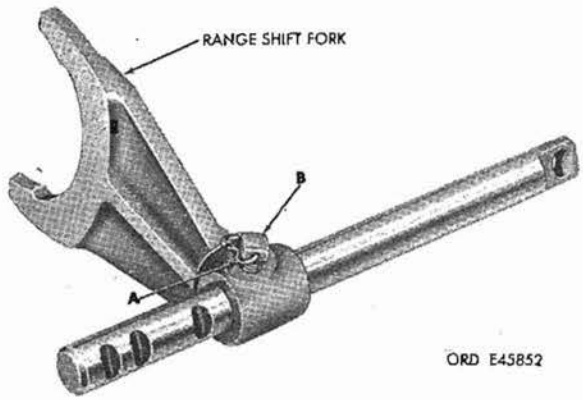
Remove shift shaft poppet plug and remove helical compression spring and bearing ball.

Figure 102. Removing or installing shift shaft poppet plug.



Remove drive pinion with related parts and range shift shaft.

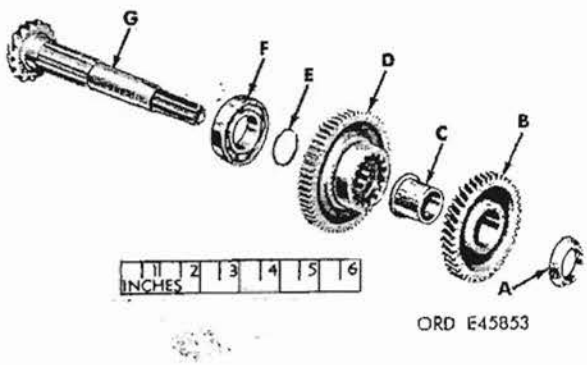
Figure 103. Removing or installing drive pinion and range shift shaft.



A — Remove locking wire.

B — Remove setscrew from range shift shaft fork and slide fork from shaft.

Figure 104. Removing or installing range shift fork.



Note. Remove parts from drive pinion in reference letter sequence.

A — Thrust washer

B — High speed spur gear

C — Sleeve bearing

D — Low speed spur gear

E — Retaining ring

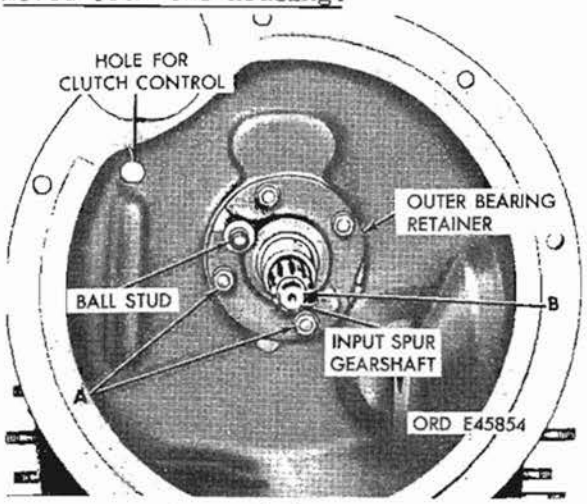
F — Annular ball bearing

G — Drive pinion

Figure 105. Removing or installing high speed spur gear, low speed spur gear, and associated parts.

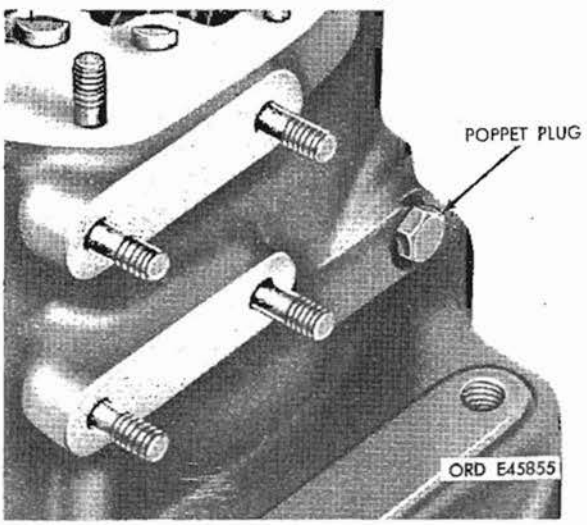
c. Removal of Helical Gearshaft and Related Parts. Refer to figures 106 through 109 for removal and disassembly of the helical gearshaft and related parts.

Note. The lower end of the helical gearshaft rides in roller needle bearings in the end of the input spur gearshaft. To prevent damage to these bearings, and because of the limited clearances in the axle and transmission housing, the input spur gearshaft should be partially removed from the housing.



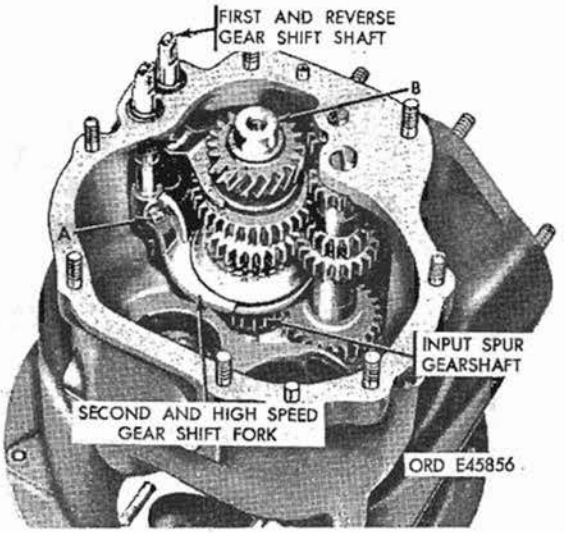
A – Loosen four 5/16-inch hexagon nuts.
B – Pull spur gearshaft and bearing retainer partially from housing.

Figure 106. Loosening or tightening input spur gearshaft and outer bearing retainer retaining nuts.



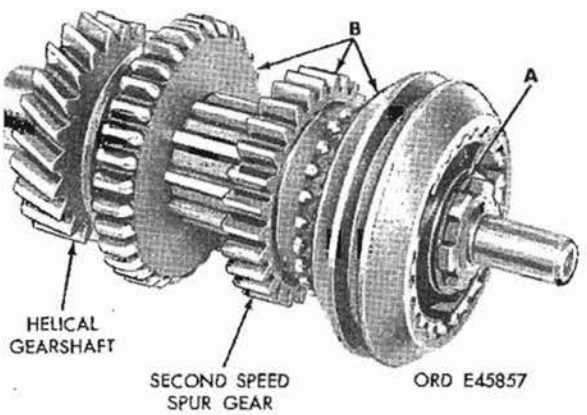
Remove shift shaft poppet plug, helical compression spring, and bearing ball, securing first and reverse gear shift shaft.

Figure 107. Removing or installing shift shaft poppet plug.



A – Remove locking wire and setscrew in second and high speed gear shift fork.
B – Remove helical gearshaft and related parts by pulling first and reverse gear shift shaft partially from housing. Lift gearshaft out of roller needle bearings in end of input spur gearshaft, swing gearshaft toward center and remove from housing.

Figure 108. Removing or installing helical gearshaft and related parts.

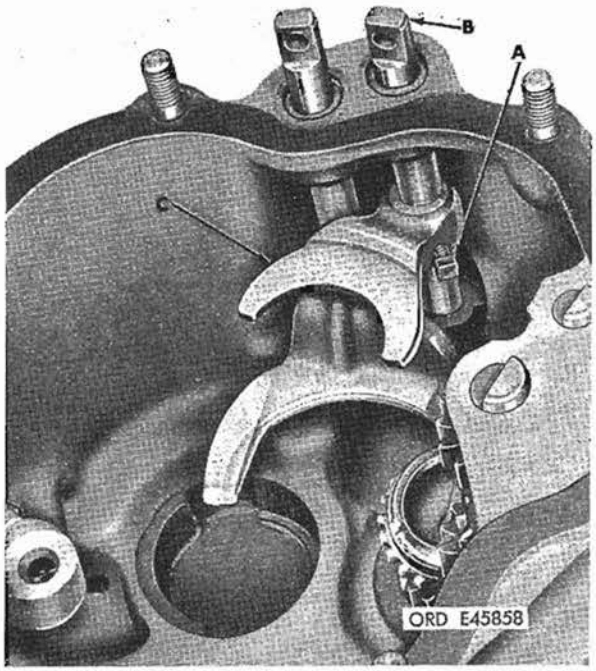


A – Remove retaining ring.
B – Slide synchronizer assembly, second speed spur gear, and first and reverse speed spur gear from helical gearshaft.

Note. Do not remove bushing-type bearing from second speed spur gear unless inspection (par. 63) indicates replacement is necessary.

Figure 109. Removing or installing synchronizer assembly, second speed spur gear, and first and reverse speed spur gear.

d. Removal of First and Reverse Gear Shift Shaft. Refer to figure 110.



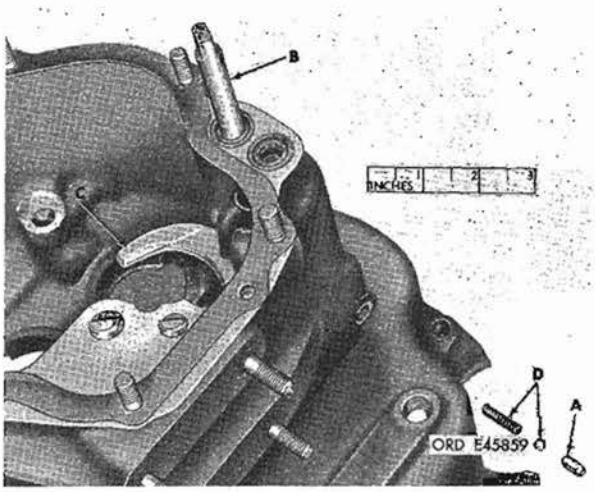
A – Remove setscrew.

B – Remove first and reverse gear shift shaft.

C – Remove first and reverse gear shift fork.

Figure 110. Removing first and reverse gear shift shaft.

e. Removal of Second and High Speed Gear Shift Shaft. Refer to figure 111.



A – Remove headless straight pin from shift shaft poppet plug opening in side of axle and transmission housing.

Note. On M274A1 ~~M274A2~~ remove shift shaft poppet plug, helical compression spring and bearing ball from gear bearing cage side of axle and transmission housing and omit step D.

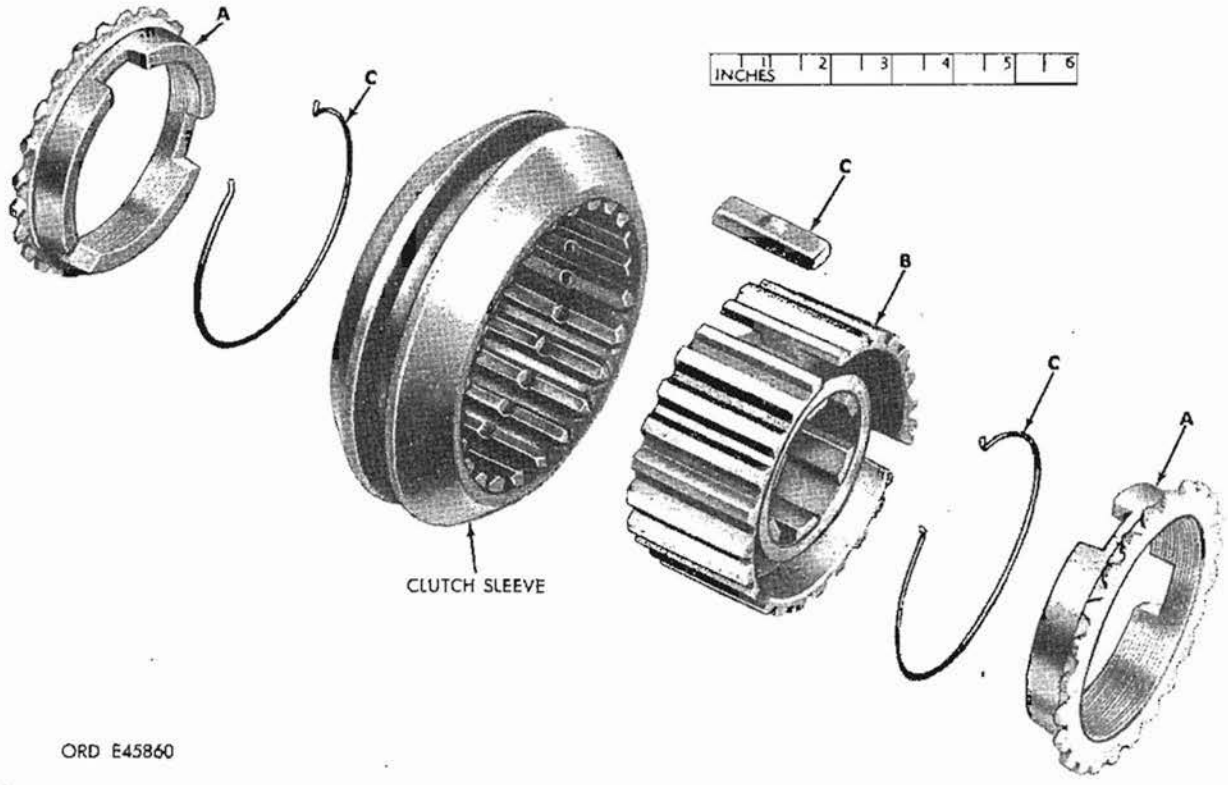
B – Remove second and high speed gear shift shaft.

C – Remove second and high speed gear shift fork.

D – Remove bearing ball and helical compression spring (M274 only).

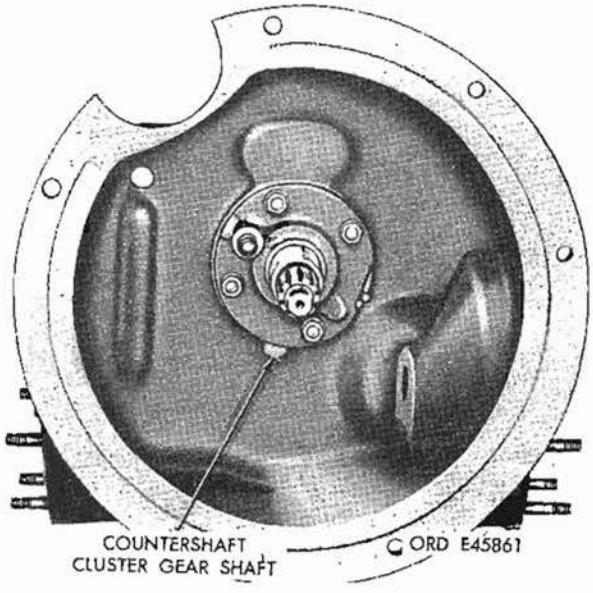
Figure 111. Removing second and high speed gear shift shaft.

f. Disassembly of Synchronizer Assembly. Refer to figure 112.



A – Remove two blocking rings from ends of hub.
B – Push hub from clutch sleeve.
C – Remove three shift plates and two poppet springs from hub.

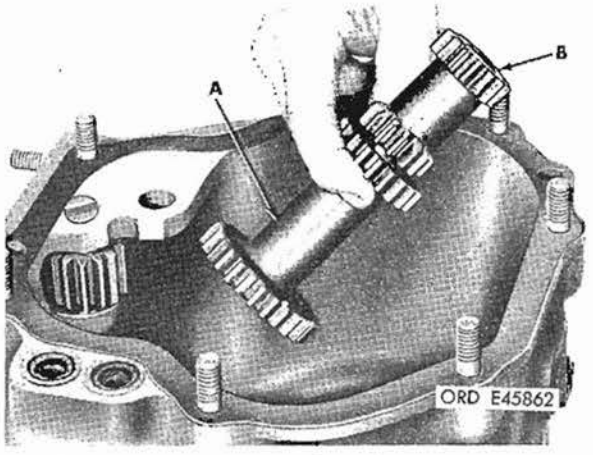
Figure 112. Disassembling or assembling synchronizer assembly.



Drive countershaft cluster gear shaft from axle and transmission housing.

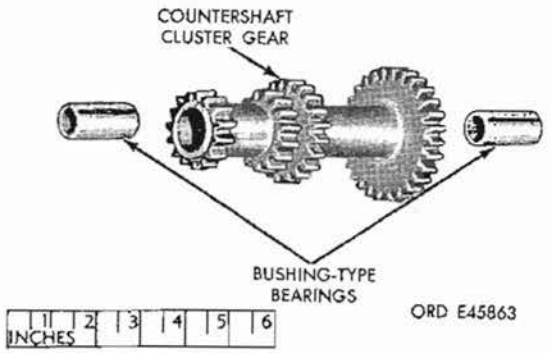
Figure 113. Removing countershaft cluster gear shaft.

g. Removal of Countershaft Cluster Gear. Refer to figures 113 through 115 for removal and disassembly of countershaft cluster gear.



A – Remove countershaft cluster gear.
B – Remove thrust washer on each end of gear.

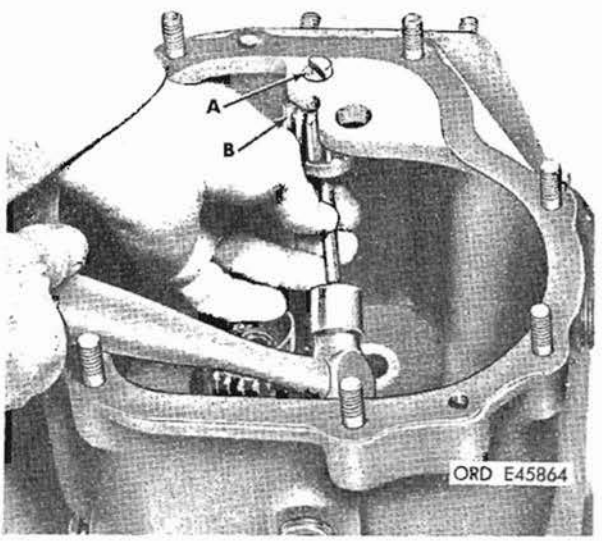
Figure 114. Removing or installing countershaft cluster gear.



Do not remove bushing-type bearings from each end of gear unless inspection (par. 63) indicates replacement is necessary.

Figure 115. Countershaft cluster gear and bushing-type bearings.

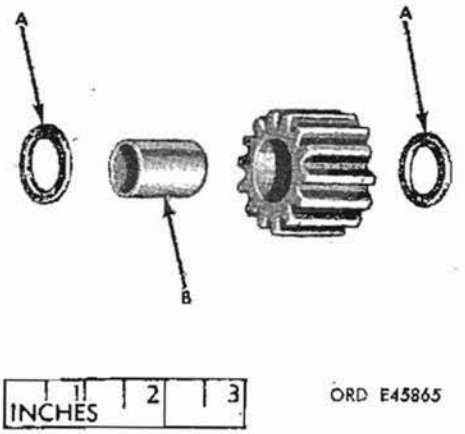
h. Removal of Reverse Idler Spur Gear. Refer to figures 116 and 117 for removal and disassembly of reverse idler spur gear.



A — Drive reverse idler spur gear shaft from axle and transmission housing.

B — Remove reverse idler spur gear.

Figure 116. Removing or installing reverse idler spur gear shaft.

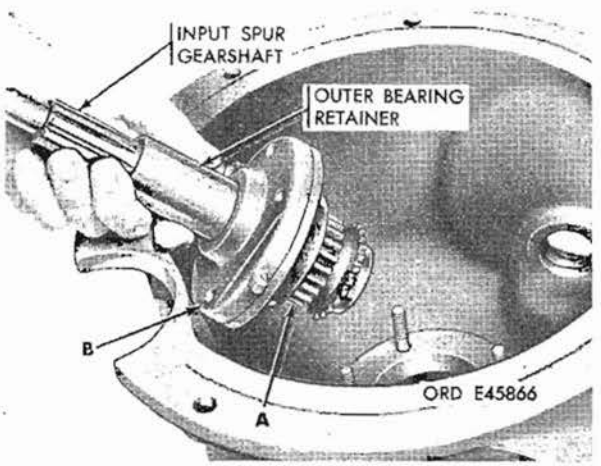


A — Remove thrust washers.

B — Do not remove bushing-type bearing unless inspection (par. 64) indicates replacement is necessary.

Figure 117. Reverse idler spur gear and bushing-type bearing.

i. Removal of Input Spur Gearshaft. Refer to figures 118 and 119 for removal and disassembly of input spur gearshaft and related parts.

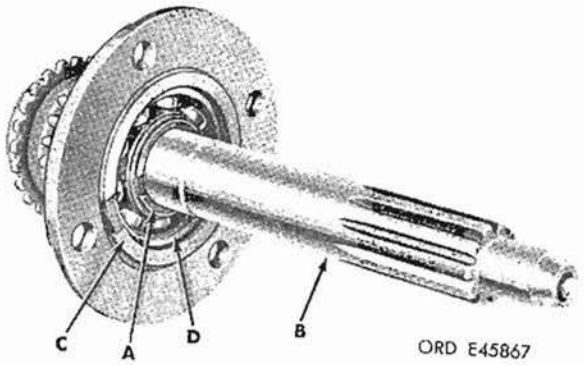


Note. Remove four 5/16-inch plain hexagon nuts and 5/16-inch lock washers loosened in step A of figure 106.

A — Remove input spur gearshaft with outer bearing retainer and related parts. Remove and discard gasket.

B — Remove outer bearing retainer. Remove and discard second gasket. Remove plain encased seal from retainer.

Figure 118. Removing or installing input spur gearshaft and related parts.



A — Remove retaining ring.

B — Remove input spur gearshaft.

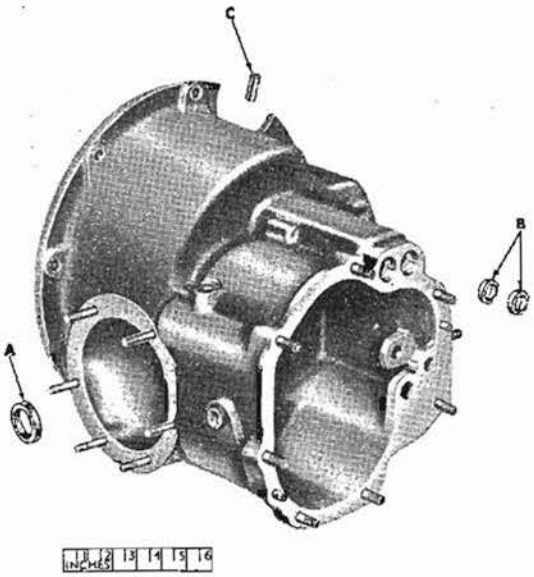
C — Remove retaining ring.

D — Remove annular ball bearing.

Note. Do not remove roller needle bearing from end of gearshaft unless inspection (par. 63) indicates replacement is necessary.

Figure 119. Removing or installing inner bearing retainer and related parts from input spur gearshaft.

j. Disassembly of Axle and Transmission Housing. Refer to figure 120.



A — Remove plain encased seal from inside axle and transmission housing.

B — Remove four plain encased seals from top of housing.

C — Remove shift shaft poppet bushing with a hooked tool.

Figure 120. Removing and installing seals and poppet bushing from transmission housing.

Section IV. CLEANING, INSPECTION, AND REPAIR

62. Cleaning

a. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts with a stiff bristle brush that has been dipped in the cleaning agent.

b. Use lint free cloths to clean machined surfaces and gears.

c. After cleaning, dry parts, except bearings, with dry compressed air.

Caution: Bearings must not be dried or spun with compressed air. Refer to TM 9-214 for inspection, care, and maintenance of anti-friction bearings.

63. Inspection

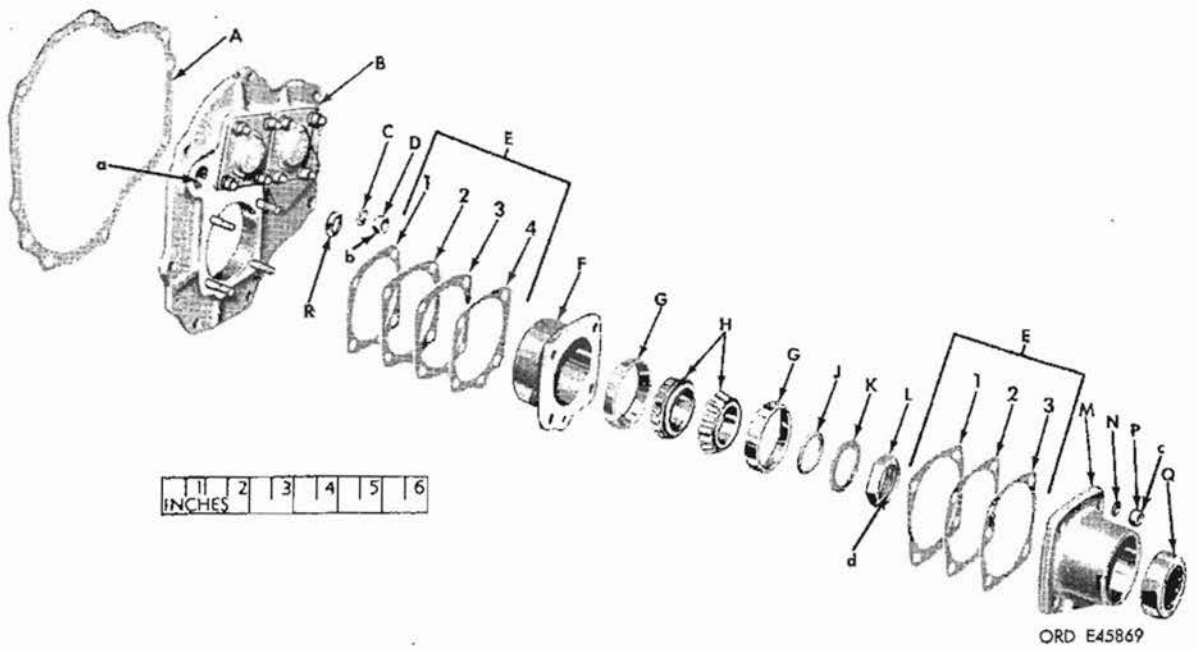
a. Drop Gear Axle Housing Assembly and Gear Bearing Cage. Refer to paragraph 39.

b. Axle and Transmission Housing End Cover Assembly and Related Parts.

(1) Bearing retainers and related parts.

Note. The key letters shown below refer to figure 121.

Inspect bearing outer retainer (M) and bearing inner retainer (F) for cracks or distortion. Inspect machined surfaces for burs or nicks. Inspect plain encased seals (Q and R) for nicks in sealing surfaces. Inspect tapered roller bearing cups (G) and tapered roller bearing cones and rollers (H) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect shims (E) for tears or creases.



A – Gasket – 7966598
* B – ~~End cover assembly – 7966646~~
C – 3/8-inch lock washer – 96906-35338-46
D – 3/8-inch plain hex nut – 96906-35690-625
E – Shim set – 5702427
1 – Shim 0.003-inch – 7966704
2 – Shim 0.005-inch – 7966705
3 – Shim 0.010-inch – 7966706
4 – Shim 0.030-inch – 7966707
F – Bearing inner retainer – 7966690
* G – ~~Tapered roller bearing cup – 706799~~
H – Cone and roller – 7966696
J – Flat washer – 7966693
K – Key washer – 7966803
L – Plain hexagon nut – 7966714
M – Bearing outer retainer – 7966694
* N – ~~5/16-inch lock washer – 96906-35338-26~~
P – 5/16-inch plain hexagon nut – 96906-35690-525
Q – Plain encased seal – 7966691
R – Plain encased seal – 7966631

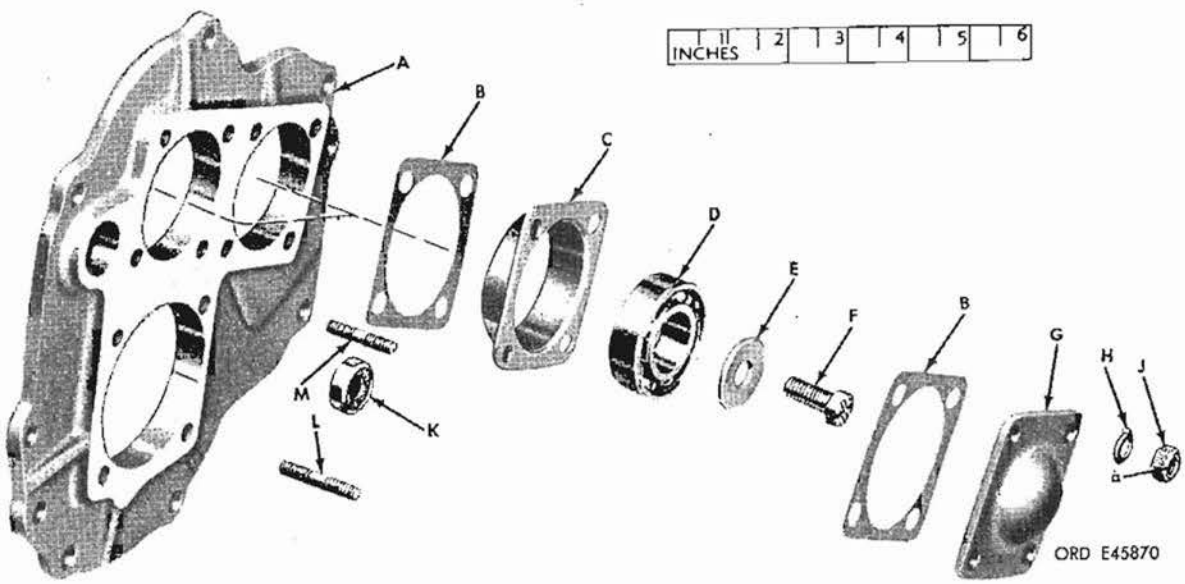
Figure 121. Axle and transmission housing end cover assembly, drive pinion bearing retainers, and related parts – exploded view.

* Superseded by Ch. 1-22-13

(2) Axle and transmission housing end cover assembly and related parts.

Note. The key letters shown below refer to figure 122.

Inspect axle and transmission housing end cover (A) for cracks or distortion. Inspect studs (L and M) for damaged threads, bends, or looseness in casting. Inspect bearing inner retainer (C) and bearing outer retainer (G) for cracks. Inspect machined surfaces for burs or nicks. Inspect annular ball bearing (D) for galling, wear, scoring, or discoloration. Check bearing movement for any looseness, roughness, or binding. Inspect plain encased seal (K) for nicks in sealing surfaces. Inspect hole in cover, for range shift shaft, against limits specified in repair and rebuild standards (par. 65).



A – ~~End cover assembly – 7966646~~ ✱
B – Gasket – 7966599
C – Bearing inner retainer – 7966708
D – Annular ball bearing – 700078
E – Flat washer – 8764611
F – 3/8-24 x 7/8 self-locking bolt – 8764610
G – Bearing outer retainer – 7966695

✱ H – ~~5/16-inch lock washer – 96906-35338-26~~
J – 5/16-24 plain hex nut – 96906-35690-525
K – Plain encased seal – 7966631
L – 5/16-18 x 5/16-24 x 1-1/2 plain stud – 7966648
M – 5/16-18 x 5/16-24 x 1-1/4 plain stud – 7966528

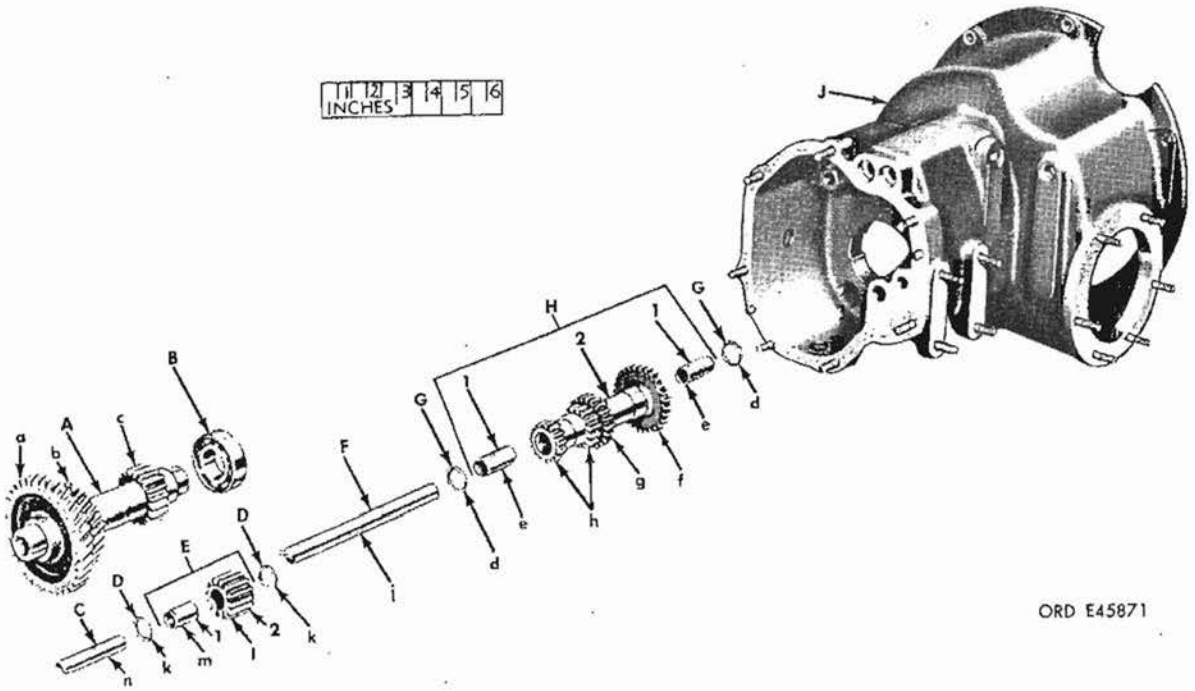
Figure 122. Axle and transmission housing end cover assembly, bevel spur gearshaft and helical gearshaft bearing retainers, and related parts – exploded view.

Superseded by
Ch. 1-Pg. 1-2

c. Bevel Spur Gearshaft, Countershaft Cluster Gear, Reverse Idler Spur Gear, and Related Parts.

Note. The key letters shown below refer to figure 123.

Inspect bevel spur gearshaft (A), countershaft cluster gear (H), and reverse idler spur gear (E) for scoring or signs of discoloration. Inspect gear teeth for chipping or rough spots. Inspect gears against limits specified in repair and rebuild standards (par. 65). Inspect annular ball bearing (B) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect reverse idler spur gear shaft (C) and countershaft cluster gear shaft (F) for nicks or burs. Inspect shafts against limits specified in repair and rebuild standards (par. 65). Inspect thrust washers (D and G) and bushing-type bearings (E-1 and H-1) against limits specified in repair and rebuild standards (par. 65).



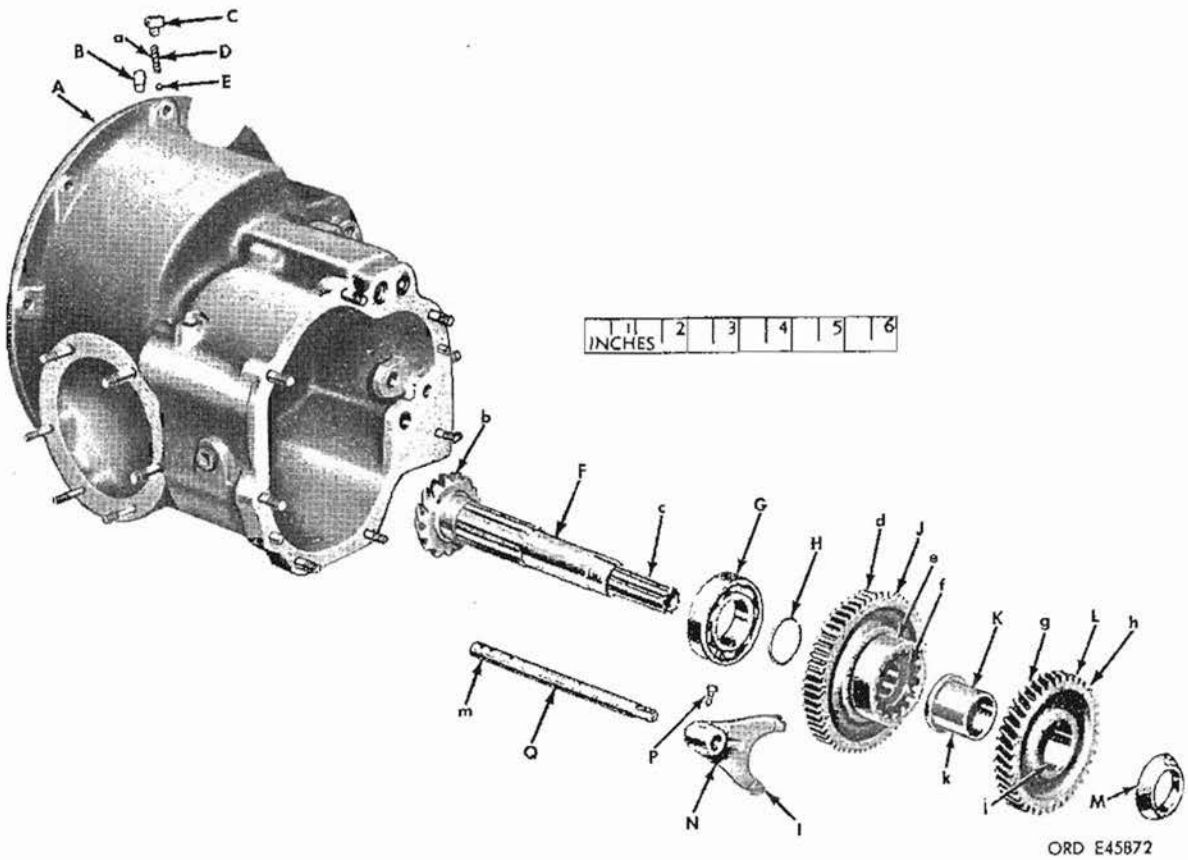
A – Bevel spur gearshaft
  – 7966668 (M274)
  – 65909-933697 (M274A1)
B – Annular ball bearing – 700078
C – Reverse idler spur gear shaft – 7966638
D – Thrust washer – 7966640
E – Reverse idler spur gear – 7966636
  1 – Bushing-type bearing – 8336244
  2 – Gear – 8336243
F – Countershaft cluster gear shaft – 7966637
G – Thrust washer – 7966639
H – Countershaft cluster gear – 7966635
  1 – Bushing-type bearing – 8336235
  2 – Gear – 8336245
J – Axle and transmission housing assembly

Figure 123. Bevel spur gearshaft, countershaft cluster gear, reverse idler spur gear, and related parts – exploded view.

d. Drive Pinion, Low Speed Spur Gear, High Speed Spur Gear, and Related Parts.

Note. The key letters shown below refer to figure 124.

Inspect drive pinion (F) bearing surfaces for scoring or signs of discoloration. Inspect splines and gear teeth for chipping or rough spots. Inspect pinion against limits specified in repair and rebuild standards (par. 65). Inspect annular ball bearing (G) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect low speed spur gear (J) and high speed spur gear (L) for scoring or signs of discoloration. Inspect gear teeth and splines for chipping or rough spots. Inspect gears against limits specified in repair and rebuild standards (par. 65). Inspect the sleeve bearing (K) against limits specified in repair and rebuild standards (par. 65). Inspect range shift fork (N) fingers for straightness. Inspect threads in fork for damage. Inspect range shift shaft (Q) for burs or nicks in grooves. Inspect fork and shaft against limits specified in repair and rebuild standards (par. 65). Inspect helical compression spring (D) against limits specified in repair and rebuild standards (par. 65).



A – ~~Axle and transmission housing assembly – 7966802 (M274) – 65909-933590 (M274A1)~~ *
B – Vent assembly – 7966661 (M274)
Pipe plug – 444688 (M274A1)
C – Shift shaft poppet plug – 7696481
D – Helical compression spring – 7089670
E – ~~Bearing ball – 145629~~ *
F – Drive pinion – 8336247
G – Annular ball bearing – 700080
H – Retaining ring
– 7966701 (M274)
– 65909-935907 (M274A1)
J – Low speed spur gear – 7966666
K – Sleeve bearing – 7966669
L – High speed spur gear – 7966667
M – Thrust washer – 7966670
N – Range shift fork – 7966673
P – Setscrew – 7966632
Q – Range shift shaft – 7966629

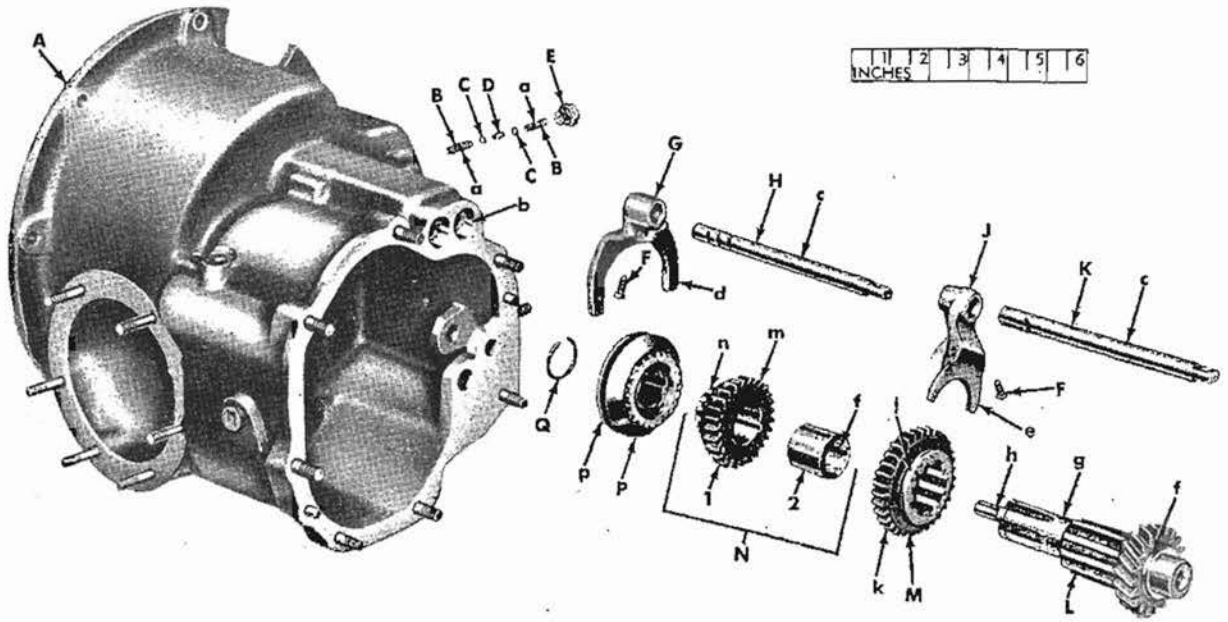
Figure 124. Drive pinion, low speed spur gear, high speed spur gear, and related parts – exploded view.

* Superseded by
Ch. 1 – Par. 63

e. Helical Gearshaft Synchronizer Assembly and Related Parts.

Note. The key letters shown below refer to figure 125.

Inspect helical gearshaft (L) gear teeth and splines for chipping or rough spots. Inspect gearshaft against limits specified in repair and rebuild standards (par. 65). Inspect first and reverse spur gear (M) and second speed spur gear (N-1) for chipping, rough spots, or burs in gear teeth or splines. Inspect gears against limits specified in repair and rebuild standards (par. 65). Inspect bushing-type bearing (N-2) against limits specified in repair and rebuild standards (par. 65). Inspect second and high speed gear shift shaft (H) and first and reverse gear shift shaft (K) for burs or nicks in grooves. Inspect shafts against limits specified in repair and rebuild standards (par. 65). Inspect second and high speed gear shift fork (G) and first and reverse gear shift fork (J) fingers for straightness. Inspect threads in forks for damage. Inspect forks to limits specified in repair and rebuild standards (par. 65). Inspect helical compression springs against limits specified in repair and rebuild standards (par. 65).



✱ A – ~~Rear axle and transmission housing assembly – 7966802 (M274) – 65909-933590 (M274A1)~~
B – Helical compression spring – 7089670
✱ C – ~~Bearing ball – 145629~~
D – Headless straight pin – 7966675
E – Shift shaft poppet plug – 7696481
F – Setscrew – 7966632
G – Second and high speed gear shift fork – 8687099
H – Second and high speed gear shift shaft – 8687097 (M274) – 65909-933612 (M274A1)
J – First and reverse gear shift fork – 7966672
K – First and reverse gear shift shaft – 7966628
✱ L – ~~Helical gearshaft – 8686930 (M274) – 65909-933698 (M274A1)~~
M – First and reverse spur gear – 7966711
N – Second speed spur gear – 8686931
1 – Gear – 8336250
2 – Bushing-type bearing – 8336249
P – Synchronizer assembly – 8686932
Q – Retaining ring – 7372452

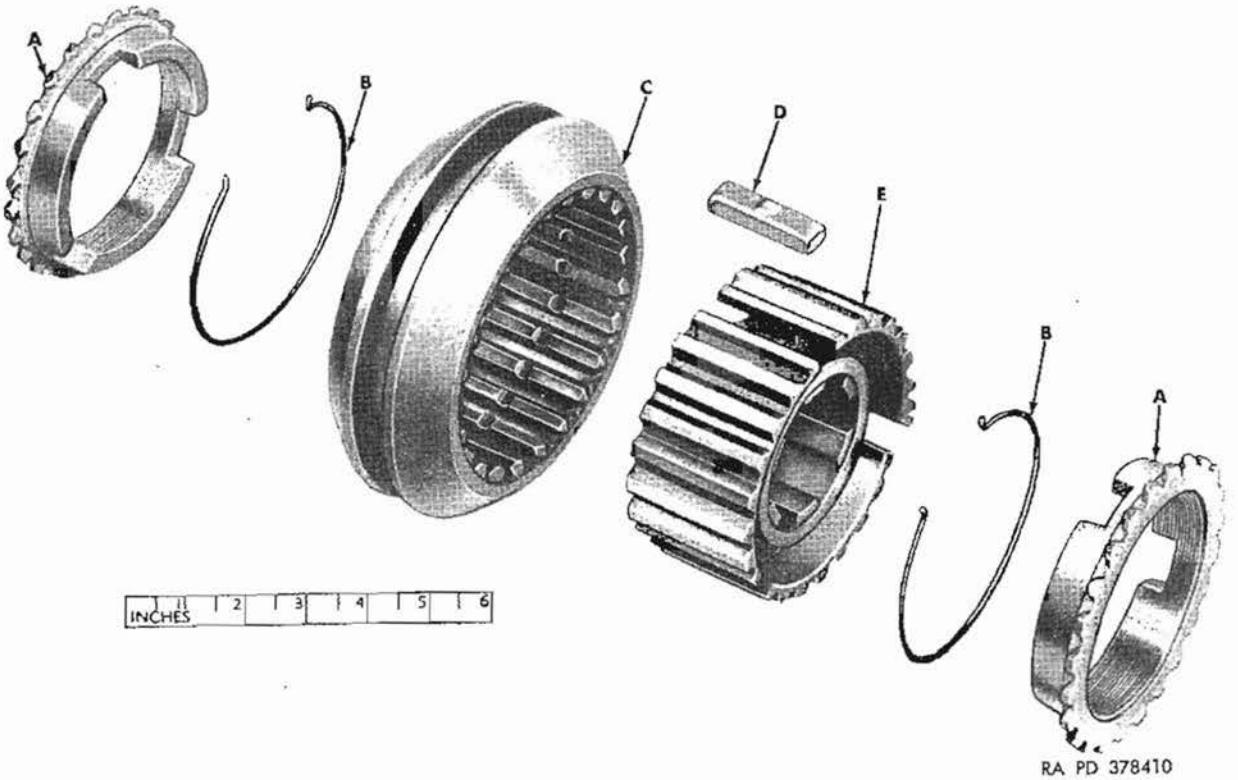
Figure 125. Helical gearshaft, synchronizer assembly, and related parts – exploded view.

✱ Superseded by,
Ch. 1 – [illegible]

f. Synchronizer Assembly.

Note. The key letters shown below refer to figure 126.

Inspect splines of clutch sleeve (C) and hub (E) for burs, nicks, or signs of scoring. Inspect sleeve and hub against limits specified in repair and rebuild standards (par. 65). Inspect blocking rings (A) and shift plates (D) for nicks, burs, or signs of distortion.



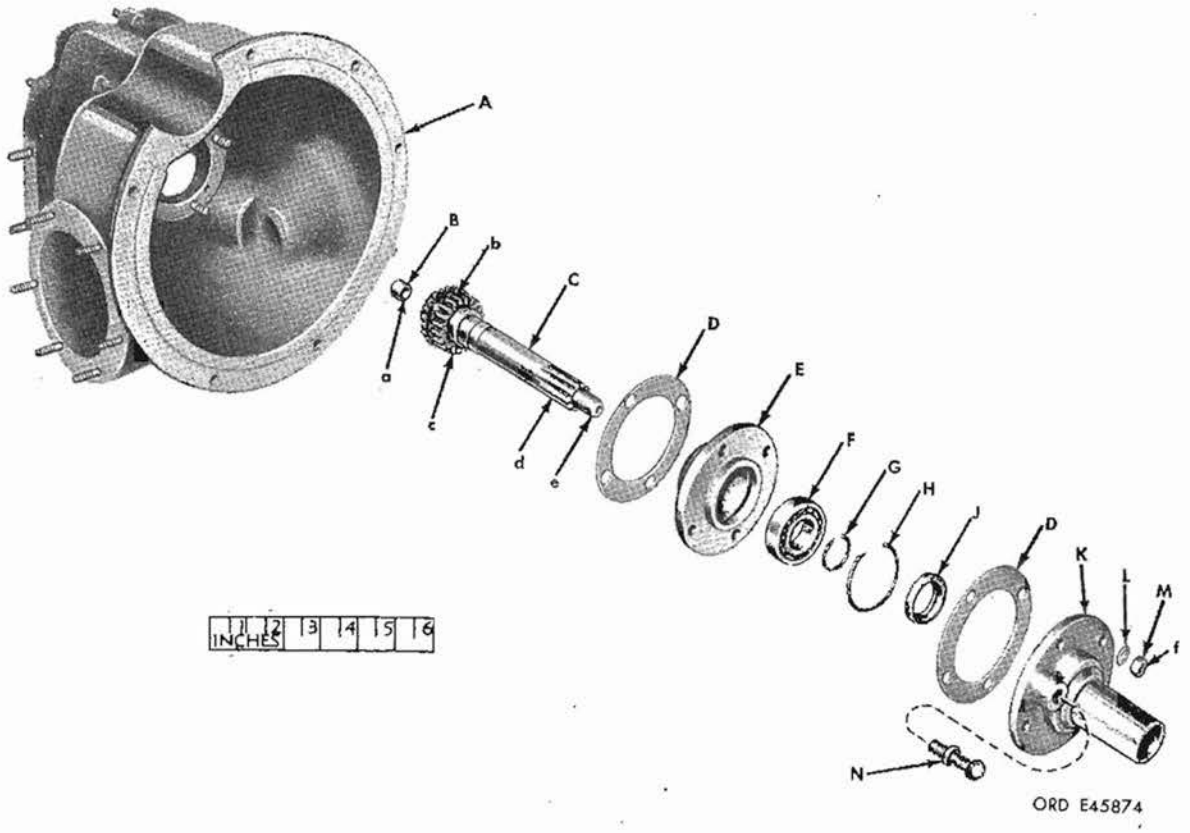
A – Blocking ring – 65909-6266117
B – Spring – 65909-5307456
C – Clutch sleeve – 8336241
D – Shift plate – 8336240
E – Hub – 8336239

Figure 126. Synchronizer assembly – exploded view.

g. Input Spur Gearshaft and Related Parts.

Note. The key letters shown below refer to figure 127.

Inspect input spur gearshaft (C) gear teeth and splines for chipping, burs, or rough spots. Inspect gearshaft and roller needle bearing (B) against limits specified in repair and rebuild standards (par. 65). Inspect inner bearing retainer (E) and outer bearing retainer (K) for cracks and nicks or burs to machined surfaces. Inspect annular ball bearing (F) for galling, wear, scoring, or discoloration. Inspect bearing movement for any looseness, roughness, or binding. Inspect plain encased seal (J) for nicks in sealing surfaces.



* A – ~~Axle and transmission housing assembly~~
- ~~7966802 (M274)~~
- ~~65909-933590 (M274A1)~~

B – Roller needle bearing – 709413
C – Input spur gearshaft – 8686929
D – Gasket – 7966596
E – Inner bearing retainer
- 7760062 (M274)
- 65909-927179 (M274A1)

F – Annular ball bearing – 700078
G – Retaining ring – 15434-66071B
H – Retaining ring – 7966658
J – Plain encased seal – 65909-935864
K – Outer bearing retainer
- 7760063 (M274)
- 65909-927181 (M274A1)

L – 5/16-inch lock washer – 96906-35338-26
M – 5/16-24 plain hex nut – 96906-35690-525
N – Stud ball – 7055683

perseded by 1-8213

Figure 127. Input spur gearshaft and related parts – exploded view.

h. Axle and Transmission Housing.

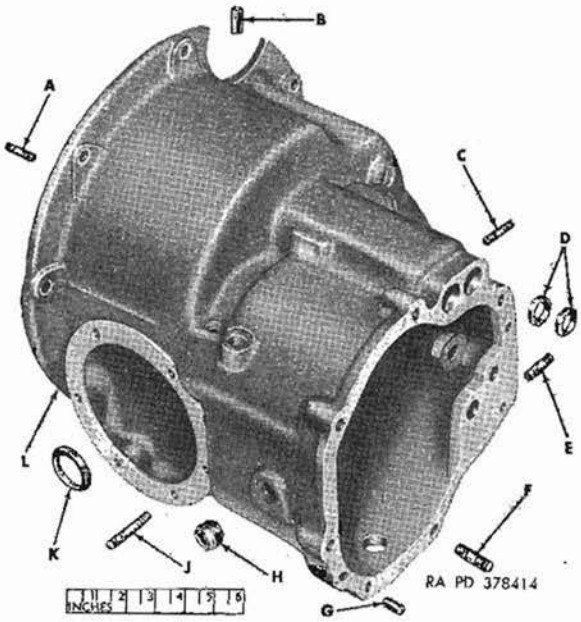
Note. The key letters shown below refer to figure 128.

Inspect axle and transmission housing (L) machined surfaces for burs or nicks. Inspect the outer surface for signs of cracks and threaded holes for damage. Inspect studs (A, C, E, F, and J) for damaged threads, bends, or looseness in housing. Inspect bores in housing for shift shafts, against limits specified in repair and rebuild standards (par. 65). Inspect shift shaft poppet bushing (B) for looseness in housing. Inspect headless straight pins (G) for looseness in housing. Inspect plain encased seals (D and K) for nicks in sealing surfaces.

64. Repair

a. General. The following subparagraphs cover only those parts that are repairable. Parts not covered must be replaced if they fail to pass inspection (par. 63).

b. Bearing Retainers and Related Parts. Burs or nicks to machined surfaces of the bearing outer retainer and bearing inner retainer may be removed with crocus cloth. Straighten any creases found in shims.



A – 5/16-18 x 5/16-24 x 1-5/8 plain stud – 7055670
B – Shift shaft poppet bushing – 7760079
C – 5/16-18 x 5/16-24 x 1-1/2 plain stud – 7966649
D – Plain encased seal – 7966631
E – 3/8-16 x 3/8-24 x 1-1/2 plain stud – 7966508
F – 3/8-16 x 3/8-24 x 1-3/8 plain stud – 7966647
G – Headless straight pin – 141217
H – Pipe plug – 444667
J – 5/16-18 x 5/16-24 x 1-3/4 plain stud – 7966650
K – Plain encased seal – 7966787
L – ~~Axle and transmission housing – 7966820 (M274) – 65909-933590 (M274A1).~~ *

Figure 128. Axle and transmission housing – exploded view.

c. Axle and Transmission Housing End Cover Assembly and Related Parts. Burs or nicks to machined surfaces of the axle and transmission housing end cover may be removed with a crocus cloth. Damage to stud threads may be repaired with a thread chaser. Burs or nicks to machined surfaces of the bearing inner retainer and bearing outer retainer may be removed with a crocus cloth.

d. Bevel Spur Gearshaft, Countershaft Cluster Gear, Reverse Idler Spur Gear, and Related Parts. Sharp fins or rough spots on bevel spur gearshaft, countershaft cluster gear, or reverse idler spur gear may be removed with a crocus cloth.

e. Drive Pinion, Low Speed Spur Gear, High Speed Spur Gear, and Related Parts. Sharp fins or rough spots on drive pinion, low speed spur gear, or high speed spur gear may be removed with a crocus cloth. Burs or minor nicks to splines may be removed with a fine mill file. Minor damage to threaded hole in range shift fork may be corrected by the use of a tap. Burs or nicks in grooves of range shift shaft may be removed with a crocus cloth.

Note. The drive pinion and bevel drive gear, in gear bearing cage, are matched sets and must be replaced as a unit.

f. Helical Gearshaft, Synchronizer Assembly, and Related Parts. Sharp fins or rough spots on helical gearshaft, first and reverse speed spur gear, and second speed spur gear may be removed with a crocus cloth. Burs or minor nicks to splines may be removed with a fine mill file. Burs or nicks in grooves of second and high speed gear shift shaft or first and reverse gear shift shaft may be removed with a crocus cloth. Minor damage to threaded hole in second and high speed gear shift fork or first and reverse gear shift fork may be corrected by the use of a tap.

g. Synchronizer Assembly. Burs or nicks in blocking rings and shift plates may be removed with a crocus cloth.

h. Input Spur Gearshaft and Related Parts. Sharp fins or rough spots on input spur gearshaft may be removed with a crocus cloth. Burs or minor nicks to splines may be removed with a fine mill file. Nicks or burs to machined surfaces of the inner bearing retainer and outer bearing retainer may be removed with a crocus cloth.

i. Axle and Transmission Housing. Burs or nicks to machined surfaces of the axle and transmission housing may be removed with a crocus cloth. Minor damage to threaded holes may be corrected by the use of a tap. Damage to stud threads may be repaired with a thread chaser.

65. Repair and Rebuild Standards

a. General. Refer to paragraph 23.

* Superseded by Ch. 1-8243

b. Axle and Transmission Housing End Cover.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
121	a	Bore for range shift shaft ----------	0.500 to 0.505	0.508

c. Bevel Spur Gearshaft, Countershaft Cluster Gear, Reverse Idler Spur Gear, and Related Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
123	a	36-tooth gear (M274) and 34-tooth gear (M274A1) ----------	Backlash 0.004 to 0.008 with helical gearshaft.	0.012
	b	26-tooth gear ----------	Backlash 0.004 to 0.008 with high speed spur gear.	0.012
	c	20-tooth gear (M274) and 22-tooth gear (M274A1) ----------	Backlash 0.004 to 0.008 with low speed spur gear.	0.012
	d	Thickness of thrust washer ----------	0.060 to 0.062 must be flat and parallel within 0.001.	0.056
	e	Inside diameter of bushing-type bearing -	Grind after installation to 0.6225 to 0.6235 true with pitch line.	0.6240
	f	21- ~~28~~-tooth cluster gear ---------- 0.0094	Backlash 0.004 to ~~0.008~~ with helical gearshaft.	0.012
	g	28-tooth cluster gear ---------- 0.0094	Backlash 0.004 to ~~0.008~~ with high speed spur gear.	0.012
	h	15-tooth cluster gear ----------	Backlash 0.004 to 0.008 with low speed spur gear.	0.012
	j	Diameter of countershaft cluster gear shaft	0.6225 to 0.6230 for 7/16-inch under head, balance 0.6200 to 0.6205.	0.620
	e-j	Fit of shaft in bearing ----------	0.0020L to 0.0035L	0.0045
	k	Thickness of thrust washer ----------	0.060 to 0.062 must be flat and parallel within 0.001.	0.056
	l	14-tooth reverse idler ~~spur gear~~ -------- 0.0097	Backlash 0.004 to ~~0.008~~ with countershaft cluster gear or first and reverse spur gear.	0.012
	m	Inside diameter of bushing-type bearing -	Diamond bore after installation to 0.502 to 0.503.	0.5045
	n	Diameter of reverse idler spur gear shaft -	0.4999 to 0.5000	0.4990
	m-n	Fit of shaft in bushing ----------	0.0020L to 0.0031L	0.004L

d. Drive Pinion, Low Speed Spur Gear, High Speed Spur Gear, and Related Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
124	a	Helical compression spring	0.938 long 0.219 to 0.234 dia	0.925
	b	15-tooth spiral bevel pinion	Backlash 0.004 to 0.007 with mating gear.	*
	c	Width of splines on pinion	0.1510 to 0.1525	*
		Width of spline spaces in yoke	0.1535 to 0.1550	*
		Fit of yoke on pinion splines	0.0001L to 0.004L	*
	d	59-tooth low speed spur gear	Backlash 0.004 to 0.008 with bevel spur gearshaft.	0.012
	e	Fork groove in low speed spur gear	1.990 to 2.000 dia, 0.192 to 0.~~198~~ 194 wide.	0.205
	f	16-tooth internal gear	Backlash 0.004 to 0.009 with teeth of high speed spur gear.	0.009 QC1
	g	16-tooth on high speed spur gear	Backlash 0.004 to 0.009 with internal teeth of low speed spur gear.	0.012
	h	41-tooth high speed spur gear	Backlash 0.004 to 0.008 with bevel spur gearshaft.	0.012 QC1
	j	Bore of high speed spur gear	1.5000 to 1.~~5005~~ 5001	1.~~5035~~ 504
	k	Outside diameter of sleeve bearing	1.4975 to 1.4980	1.4945
	j-k	Fit of spur gear on sleeve bearing	0.0020L to 0.0030L	0.006
	l	Range shift fork	0.010 to 0.020 rad, 0.182 to 0.187 wide	0.178
	e-l	Fit of shift fork in groove	0.010 to 0.225L dia, 0.005 to 0.016L wide	0.027L
	m	Diameter of range shift shaft	0.496 to 0.498	0.493

e. Helical Gearshaft, Synchronizer Assembly, and Related Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
125	a	Helical compression spring	0.938 long, 0.219 to 0.234 dia	0.925
	b	Bores for second and high speed shift shaft and first and reverse gear shift shaft	0.500 to 0.505	0.507
	c	Diameter of second and high speed shift shaft and first and reverse gear shift shaft	0.496 to 0.498	0.494
	b-c	Fit of shafts in housing	0.002L to 0.009L	0.012
	d	Second and high speed gear shift fork fingers	2.438 to 2.469 dia, 0.236 to 0.240 wide	0.232
	e	First and reverse gear shift fork fingers	0.823 to 0.833 rad, 0.182 to 0.187 wide	* 0.178
	f	~~20~~ 22-tooth helical gearshaft	Backlash 0.004 to 0.008 with bevel spur gearshaft.	0.012
	g	Diameter of gearshaft for bushing-type bearing	1.1260 to 1.1265	1.125
	h	Diameter of gearshaft for roller needle bearing in input spur gearshaft	~~.4990~~ .4987 to 0.4995	0.4980 QC1
	j	Fork groove in first and reverse spur gear	~~1.620~~ 1.615 to 1.625 dia, 0.192 to 0.198 wide	* 0.202
	e-j	Fit of fork fingers in groove	0.021 to 0.046 dia, 0.005 to 0.016 wide	* 0.024

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
125	k	33-tooth first and reverse spur gear ---- 0.0094	Backlash 0.004 to ~~0.008~~ with countershaft cluster gear.	0.009
	l	Inside diameter of bushing-type bearing -	1.1275 to 1.1280	1.130
	g-l	Fit of bearing on gearshaft ----------	0.0010 to 0.0020L	0.0035L
	m	~~59~~ 27-tooth second speed spur gear ---------- 0.0093	Backlash 0.004 to ~~0.008~~ with bevel spur gearshaft.	0.012
	n	Synchronizer teeth on second speed spur gear 2.3007	~~2.305~~ to ~~2.307~~ over 0.175 pins → 2.3044	
	p	Fork groove in synchronizer assembly ----	2.420 to 2.430 dia, 0.248 to 0.252 wide	0.256
	d-p	Fit of fork fingers in synchronizer -----	0.008 to 0.049 dia, 0.008 to 0.016 wide	* 0.024L

f. Input Spur Gearshaft and Related Parts.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
127	a	Inside diameter of roller needle bearing --	0.500	0.502
125-127	a-h	Fit of gearshaft in bearing ----------	0.0005L to 0.0010L	0.0025L
125	b	Synchronizer teeth ----------	2.~~232~~ 2309 to 2.2347 over 1.1458 dia pins	*
	c	21-tooth input spur gearshaft ----------	Backlash 0.004 to 0.008 with countershaft cluster gear.	0.012
127	d	Width of splines on gearshaft ----------	0.~~1430~~ 1442 to 0.1450	*
		Width of spline spaces in clutch driven plate hub ----------	0.1455 to 0.1475	*
		Fit of hub on gearshaft ----------	0.0005 to 0.0045	*
	e	Outside diameter gearshaft at flywheel journal ----------	0.6250 to 0.6255	0.624
		Inside diameter pilot bearing in flywheel -	0.628 to 0.629	0.630
		Fit of gearshaft in pilot bearing -------	0.0021 to 0.0040L	0.006

66. Torque Wrench Specifications

Fig. No.	Ref. letter	Point of measurement	Torque lb-ft
121	b	Axle and transmission housing end cover to housing nuts	20-30
121	c	Bearing outer retainer to end cover ----------	10-15
121	d	Drive pinion to end cover ----------	80-100
122	a	Bearing outer retainer to end cover ----------	10-15
127	b	Bearing outer retainer to housing ----------	10-15

Section V. ASSEMBLY AND INSTALLATION

67. General

The instructions covering assembly of the transmission and rear axle assembly are almost identically the reverse of those covering disassembly. Therefore, the following assembly procedure, for the most part, will be referenced to the illustrations appearing under disassembly. When this occurs, the instructions appearing with each referenced illustration should be performed in the reverse order from which they are given. For example, callout letters A, B, and C indicate the sequence of the disassembly steps provided with figure 93. Assembly may be accomplished by performing these steps in reverse order; i.e., C, B, and A.

68. Assembly of Transmission Gears and Related Parts

a. Assembly of Axle and Transmission Housing.

(1) If headless straight pins were removed (par. 63) press new pins into axle and transmission housing.

(2) If any plain studs were removed (par. 61), refer to figure 128 and install 5/16-18 x 5/16-24 x 1-5/8 studs (A) allowing 0.870-inch to protrude from housing; install 5/16-18 x 5/16-24 x 1-1/2 studs (C) allowing 0.940-inch to protrude from housing; install 3/8-16 x 3/8-24 x 1-1/2 studs (E) allowing 0.910-inch to protrude from housing; install 3/8-16 x 3/8-24 x 1-3/8 studs (F) allowing 0.870-inch to protrude from housing; and install 5/16-18 x 5/16-24 x 1-3/4 studs (J) allowing 1.190-inch to protrude from housing.

(3) If shift shaft poppet bushing was removed (par. 61), install new bushing with the inner end from flush to 0.016-inch above bore for the shift shaft.

(4) Install the four plain encased seals in bores in top of housing using replacer — 5120-601-2229 (fig. 92). The two inner seals are installed with the sealing lip in, and the two outer seals are installed with the sealing lip out.

(5) Install plain encased seal inside axle and transmission housing with seal lip toward gear bearing cage side of housing.

b. Installation of Input Spur Gearshaft.

(1) Refer to figure 119 for installation of inner bearing retainer and related parts on input spur gearshaft. If roller needle bearing was removed (par. 61) press new bearing in input spur gearshaft until seated against shoulder in gearshaft.

(2) Install plain encased seal in outer bearing retainer with sealing lip toward the inner bearing retainer. Install gasket on inner bearing retainer, slide guide shaft — 4910-776-7750 (fig. 129), over gearshaft, and slide outer bearing retainer on shaft and against gasket.

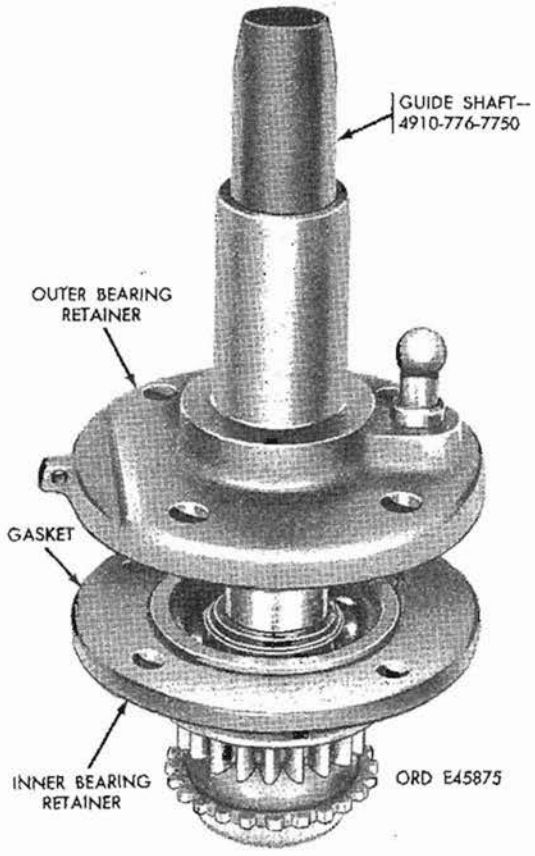


Figure 129. Installing outer bearing retainer, using guide shaft — 4910-776-7750.

(3) Install gasket over studs in axle and transmission housing and install input spur gearshaft assembly on studs with ball stud in retainer alined with hole in housing for clutch control. Install four 5/16-inch lock washers and 5/16-24 plain hexagon nuts on studs. Do not tighten nuts until after installation of helical gearshaft and related parts (h, below).

c. Installation of Reverse Idler Spur Gear. If bushing-type bearing was removed (par. 61), install new bearing in reverse idler spur gear. Assemble gear, with a thrust washer on each end, in axle and transmission housing. Install reverse idler spur gearshaft in housing with flat face of shaft toward inside edge of mounting flange as shown in figure 130.

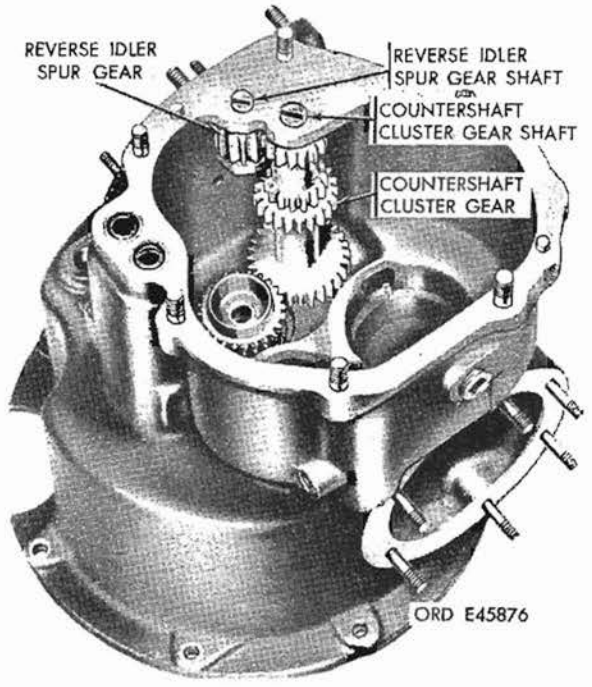


Figure 130. Reverse idler spur gear shaft and countershaft cluster gear shaft installed in axle and transmission housing.

d. Installation of Countershaft Cluster Gear. If bushing-type bearings were removed (par. 61), install new bearing in each end of countershaft cluster gear. Assemble gear, with a thrust washer on each end, in axle and transmission housing. Install countershaft cluster gear shaft in housing with flat face of shaft toward inside edge of mounting flange and in line with reverse idler spur gear shaft as shown in figure 130.

e. Assembly of Synchronizer Assembly. Refer to figure 112 and install the two poppet springs, one at each end of the hub. Position the three shift plates in the slots of the hub, push the plates inward against the springs, and slide the hub into the splines in the clutch sleeve until the knobs on the outside faces of the plates engage the notches inside the sleeve. Make sure the springs engage the small notches in the inner edges of the plates. Install blocking rings at each end of sleeve with edge having three notches toward the center.

f. Installation of Second and High Speed Gear Shift Shaft.

(1) M274 (fig. 131). Lay axle and transmission housing on right side and install helical compression spring and bearing ball in bottom of poppet bore in housing. At this point the ball will extend slightly into the bore for the second and high speed gear shift shaft. Push shift shaft into housing and slide second and high speed gear shift fork over end of shaft in housing. Turn shaft so that one of the three notches will contact the bearing ball. Insert a rod into the poppet bore, push back on ball and spring, and carefully push shaft past ball while removing rod. Position shaft with ball in center notch on side of shaft.

(2) M274A1. Stand axle and transmission housing upright, push second and high speed shift shaft into housing, and slide second and high speed gear shift fork over end of shaft in housing. Turn shaft so that the three notches are facing the outside poppet bore in housing and push shaft into bore in bottom of housing. Install bearing ball, helical compression spring, and shift shaft poppet plug in poppet bore in gear bearing cage side of housing. Position shaft with ball in center notch on side of shaft and tighten poppet plug.

(3) M274 and M274A1. Install headless straight pin in poppet bore between bores for second and high speed gear shift shaft and first and reverse gear shift shaft. Start setscrew into tapped hole in shift fork but do not tighten.

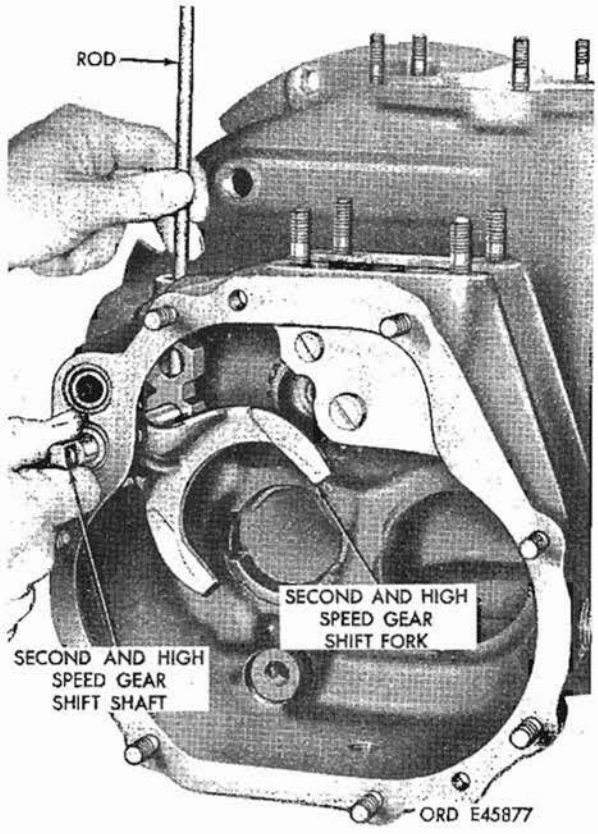


Figure 131. Installing second and high speed gear shift shaft—M274 only.

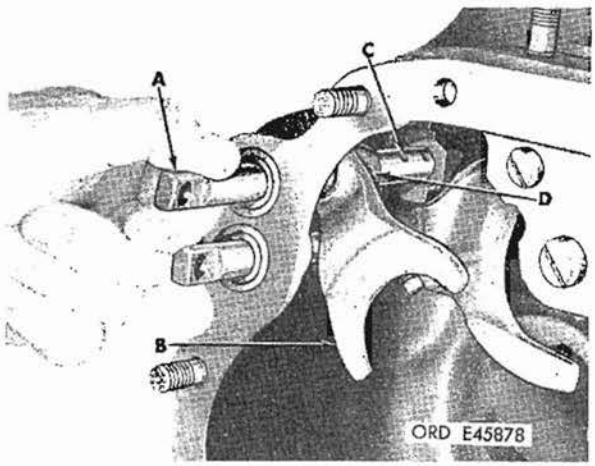
g. Installation of First and Reverse Gear Shift Shaft.

(1) Refer to figure 132 for assembly and installation of the first and reverse gear shift shaft.

(2) Refer to figure 107 and install bearing ball, helical compression spring, and shift shaft poppet plug in poppet bore in housing.

h. Installation of Helical Gearshaft and Related Parts.

(1) If bushing-type bearing was removed (par. 61) install a new bearing in second speed spur gear with the two notches in the edge of the bearing (fig. 133) alined with the oil grooves in the face of the gear hub. The new bearing must be rough burnished to a diameter of 1.116 to 1.117-inch and finished ground to 1.1275 to 1.1280-inch, true with pitch line.



A — Push first and reverse gear shift shaft into axle and transmission housing.
B — Slide first and reverse gear shift fork over end of shaft in housing.
C — Turn shaft so that the three notches are facing the poppet bore in housing and push shaft into housing bore.
D — Position shift fork with tapped hole in fork alined with countersunk hole in shaft. Install setscrew in fork, tighten, and install locking wire.

Figure 132. Installing first and reverse gear shift shaft.

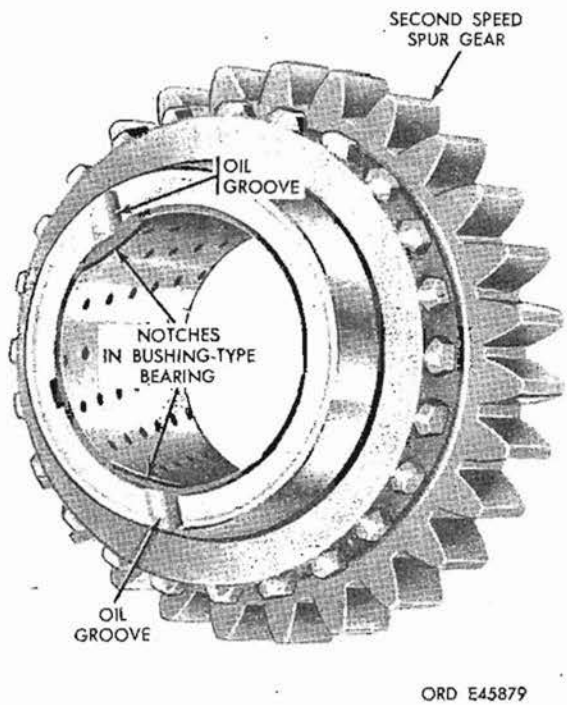


Figure 133. Second speed spur gear with bushing-type bearing installed.

(2) Refer to figure 109 and assemble first and reverse speed spur gear, small end first; followed by second speed spur gear, large end first; and synchronizer assembly on helical gearshaft. Install retaining ring.

(3) Work the helical gearshaft and assembled parts into the roller needle bearing, in the end of the input spur gearshaft and the second and high speed gear shift fork and first and reverse gear shift fork, as shown in figure 108. Aline countersunk hole in second and high speed shift shaft with setscrew in fork, tighten setscrew and install locking wire.

(4) Refer to figure 106 and tighten four 5/16-24 plain hexagon nuts securing input spur gearshaft and bearing retainers in housing. Tighten nuts to a torque of 10 to 15 lb-ft.

i. Installation of Drive Pinion, Range Shift Shaft and Related Parts.

(1) Refer to figure 105 and assemble annular ball bearing; retaining ring; low speed spur gear, gear end first; sleeve bearing; large end first; high speed spur gear, small end first; and thrust washer on pinion.

(2) Refer to figure 104 and assemble range shift fork on range shift shaft.

(3) Refer to figure 103 and install drive pinion and range shift shaft into respective bores in axle and transmission housing. Make sure range shift fork is in groove in low speed spur gear.

j. Installation of Bevel Spur Gearshaft and Related Parts.

(1) Refer to figure 101 and press annular ball bearing on bevel spur gearshaft.

(2) Refer to figure 100 and install gearshaft with bearing in axle and transmission housing.

69. Assembly and Installation of Axle and Transmission Housing End Cover Assembly and Related Parts

a. Assembly.

(1) If any plain studs were removed (par. 60), refer to figure 99 and install 5/16-18 x 5/16-24 x 1-1/4 plain studs (M, fig. 122) allowing 1.000-inch to protrude from axle and housing end cover; install 5/16-18 x 5/16-24 x 1-1/2 plain studs (L, fig. 122) allowing 1.000-inch to protrude from cover.

(2) Refer to figure 99 and install two plain encased seals in cover using replacer - 5120-601-2229. The inner seal is installed with the sealing lip in and the outer seal is installed with the sealing lip out. Install an annular ball bearing in each inner bearing retainer. Install two new gaskets and two retainers with bearings on studs.

b. Installation. Refer to figure 98 and carefully position axle and transmission housing end cover assembly and new cover gasket on axle and transmission housing plain studs. Install seven 3/8-inch lock washers and 3/8-24 plain hexagon nuts. Tighten nuts to a torque of 20-30 lb-ft. Install two 3/8-24 x 7/8 self-locking bolts and flat washers in bevel spur gearshaft and helical gearshaft.

70. Adjustment of Drive Pinion and Gear Bearing Cage

a. General. Adjustment of the drive pinion and gear bearing cage in the transmission and rear axle assembly, for the most part is the same as the procedures outlined for the same parts in the gear carrier assembly (par. 46). Therefore, frequent references are made to the detailed procedures in paragraph 46 and figures 81 through 86. The differences are outlined briefly below along with a reference to shim location for the transmission and rear axle assembly.

(1) Preload of drive pinion bearings; the drive pinion also serves as a shaft for two transmission gears and, unlike the front axle, must be assembled in the housing (par. 68) before adjustment. Adjustment is made in the same way as in gear carrier. Refer to paragraph 46b. Shims (E, fig. 121) are used as a means of adjustment.

(2) Depth of the drive pinion is adjusted in the same manner as drive pinion in gear carrier assembly. Refer to paragraph 46c. Shims (E, fig. 121) are used as a means of adjustment.

(3) Preload of the bevel drive gear bearings is adjusted in the same manner as the preload of the drive pinion bearings in the gear carrier assembly. Refer to paragraph 46d.

(4) Backlash between the drive pinion and bevel drive gear is adjusted in the same manner as the backlash in the gear carrier assembly. Refer to paragraph 46e.

(5) Final adjustment for correct tooth contact between pinion and gear is accomplished in the same manner as in the gear carrier assembly. The only difference is that the gear teeth have a left-hand spiral in the rear axle instead of the right-hand spiral as in the front axle. Adjustment is accomplished using shims (E, fig. 121 or L, fig. 71) and may be checked using red-lead test. Refer to paragraph 46f.

b. Installation of Bearing Inner Retainer, Bearing Outer Retainer, and Associated Parts, and Adjustment Bearing Preload.

(1) Refer to figure 97 and install first shims on studs. Assemble and install bearing inner retainer on studs. Install flat and key washers on drive pinion.

Note. If the drive pinion was not replaced, install same shim set removed at disassembly (par. 60). If a new drive pinion is installed, use a complete shim set.

(2) Refer to figure 96 and install plain hexagon nut on drive pinion, using special wrench — 5120-601-2224. Tighten nut to a torque of 80-100 lb-ft but do not bend edge of key washer to lock nut in place.

(3) Refer to figure 95 and install plain encased seal with sealing lip out, in bearing outer retainer. Install second shim set and retainer on studs and install four 5/16-inch lock washers and 5/16-24 plain hexagon nuts. Tighten nuts to a torque of 10-15 lb-ft. Tie a piece of strong twine to the pinion and wrap several turns around the pinion tightly. Turn a loop in the end and install scale — 6670-347-5592. Measure pull required to turn the pinion. If shim thickness is correct, a pull of 8 to 10 lbs will be required to turn pinion in bearings.

c. Adjustment of Drive Pinion Depth. With drive pinion and bearing retainers installed (b, above), install depth setting fixture — 4910-713-1015 (fig. 82) and follow procedures outlined in paragraph 46c(4).

d. Assembly of Drive Gear in Gear Bearing Cage and Adjustment of Bearing Preload. Refer to paragraph 46d and figures 52 through 54.

e. Installation of Gear Bearing Cage and Adjustment of Gear Backlash. Refer to paragraph 46e and figure 83.

f. Determination of Correct Tooth Contact Between Drive Pinion and Bevel Drive Gear. Refer to paragraph 46f and figure 84. Adjust by changing shims (E, fig. 121) and (L, fig. 71).

g. Installation of Bearing Outer Retainers. Refer to figure 95 and install two new gaskets and bearing outer retainers on studs. Secure with eight 5/16-inch lock washers and 5/16-24 plain hexagon nuts.

71. Assembly of Drop Gear Axle Housing Assembly

Refer to paragraph 44.

72. Assembly of Transmission and Rear Axle Assembly From Subassemblies

Refer to figure 93 and assemble each drop gear axle housing with attached parts on studs. Tighten 5/16-24 hexagon nuts to a torque of 10-15 lb-ft. Lubricate axle and transmission assembly and two drop gear axle housings as instructed in the vehicle lubrication order.

73. Installation of Transmission and Rear Axle Assembly

Refer to TM 9-~~8034-20~~ 2320-213-20 for installation of the transmission and rear axle assembly.

CHAPTER 6
REPAIR OF FRAME, BODY, AND RELATED PARTS

Section I. DESCRIPTION, DATA, AND TROUBLESHOOTING

74. Description

a. Frame. The frame consists primarily of a left and right tube assembly, a left and right rear support, two front tube assemblies, and a support assembly. The tube assemblies and rear supports serve as mountings for the front axle and rear axle and transmission. The tube assemblies extending along the left side of the vehicle and the left rear support serve as the air intake system for the engine air cleaner, with the precleaner assembly mounted on a tube in the front. The support assembly, mounted in the front serves as a mounting for the driver's footrest assembly, steering gear support bracket, brake and shift lever support bracket, and miscellaneous items at the front of the vehicle. Aluminum shims are used at various locations to separate parts made of steel from the magnesium platform.

b. Body. The body consists of a welded magnesium platform, metal handrail assembly, lifting loops, brackets, hangers, and miscellaneous cable guides. Two riveted supports, at the under side of the platform, serve as mountings for the two tube assemblies. Three access openings are left in the top of the platform. One to mount the gun, one to allow access to the engine, and one to allow access to change from two- to four-wheel steering.

c. Differences ~~Between~~ Among Models. The primary difference between the frame and body on the M274 and M274A1 M274A2 is in the mountings and brackets used to attach some of the miscellaneous items. These individual differences are noted in the particular paragraphs under removal and disassembly of the frame and body.

75. Data

a. Frame.

Type	flanged tubular, bolted to axles and body
Material	high-tensile steel tubing
Frame left and right tubes:	
Length	54.720-in.
Outside diameter	3.500-in.
Inside diameter	3.355-in.
Left and right rear supports:	
Length	12.560-in.
Outside diameter	2.500-in.
Inside diameter	2.334-in.
Left and right front:	
Length	10.000-in.
Outside diameter	2.500-in.
Inside diameter	2.334-in.

b. Body.

Material	magnesium
Length	46.60-in.
Width	46.6-in.
Width over handrails	49.00-in.

76. Troubleshooting

a. Purpose. Refer to paragraph 31.

b. General Instructions. Refer to paragraph 31.

c. Troubleshooting Before Removal or Operation. Refer to table VI.

Table VI. Troubleshooting Before Removal or Operation — Frame and Body

Malfunction	Probable causes	Corrective action
1. Rattles or squeaks.	Loose nuts, bolts, or screws.	Tighten all nuts, bolts, and screws.
2. Access opening cover lock will not stay locked.	a. Insufficient washers on lock rod.	a. Install more washers.
	b. Lock catch worn or bent.	b. Replace lock catch.

Section II. REMOVAL OF FRAME AND BODY

77. General

If the field maintenance organization receives a vehicle that requires frame and body replacement or repairs, it will be necessary to remove several components prior to removal of the frame or body. It is recommended that the components be removed from the vehicle in the order described in paragraph 78.

78. Removal of Components

a. Remove engine guard as directed in TM 9-~~8034-20.~~ *

b. Remove mufflers as directed in TM 9-~~8034-20.~~ *

c. Remove air cleaner as directed in TM 9-~~8034-20.~~ *

d. Remove fuel tank and line as directed in TM 9-~~8034-20.~~ *

e. Remove driver's seat as directed in TM 9-2320-213-10 under "stowing driver's seat".

f. Remove driver's seat spring loaded cylinder fastener as directed in TM 9-~~8034-20.~~ *

g. Remove driver's footrest assembly as directed in TM 9-2320-213-10 under "stowing driver's seat".

* 2320-213-20

h. Remove steering gear assembly, support, shaft, and wheel as directed in TM 9-~~8034-20.~~ *

i. Remove brake and shift lever support assembly as directed in TM 9-~~8034-20.~~ *

j. Remove starter rope as directed in TM 9-~~8034-20.~~ *

k. Remove throttle cables and disconnect choke control cable as directed in TM 9-~~8034-20.~~ *

l. Remove transmission and range control rod linkages as directed in TM 9-~~8034-20.~~ *

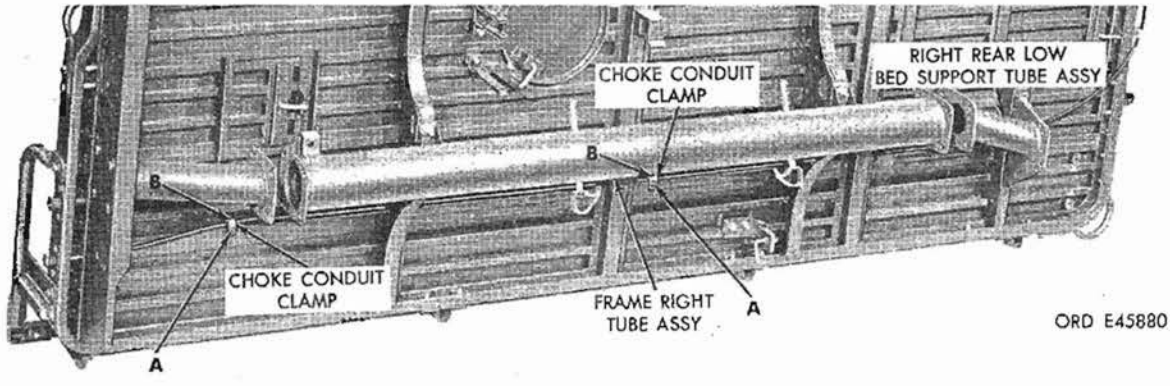
m. Remove ignition switch and cable as directed in TM 9-~~8034-20.~~ *

n. Remove engine and starter rope pulley housing as directed in TM 9-~~8034-20.~~ *

o. Remove brake flexible linkages as directed in TM 9-~~8034-20.~~ *

p. Refer to figures 134 and 135 for removal of the choke conduit clamps, choke control cable assembly, and mounting plate.

Note. The instructions provided in figure 135 apply to both the M274 and M274A1. The only difference exists in the type of attaching hardware.



A — Remove two No. 10 x 1/2 cross-recessed, thread-forming tapping screws.

B — Remove choke conduit clamps.

Figure 134. Removing or installing choke conduit clamps.

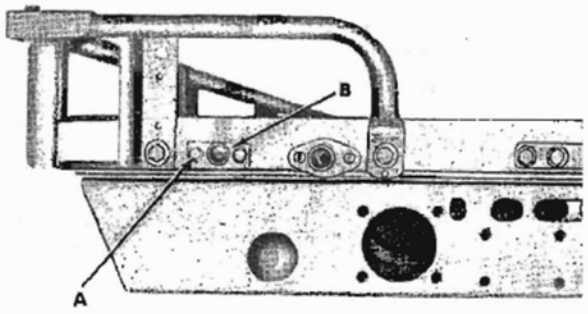


Figure 135. Instructions.

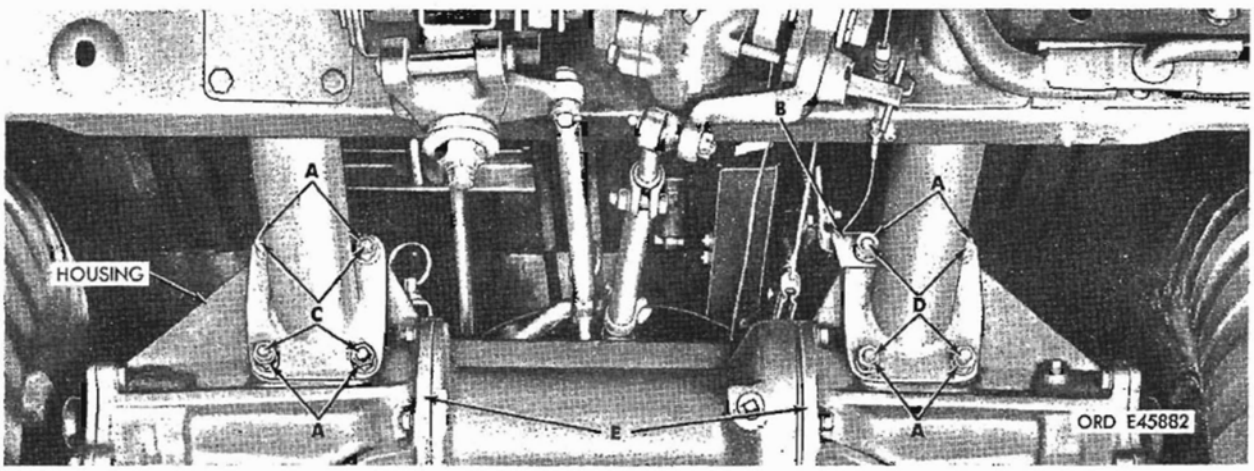
A – Remove two 1/4-20 x 3/4 pan head machine screws, plain washers, 1/4-inch lock washers, and 1/4-20 hexagon nuts.

B – Remove choke control mounting plate with choke control and cable assembly.

Figure 135. Removing or installing choke control and cable assembly and mounting plate – M274.

79. Removal of Frame and Body From Drop Gear Axle Housing Assemblies

Refer to figures 136 and 137 for removal of the frame and body from the axle housing assemblies.



A – Remove eight 7/16-20 stamped nuts, 7/16-20 plain hexagon nuts, and 7/16-inch lock washers.

B – Remove brake flexible linkage bracket.

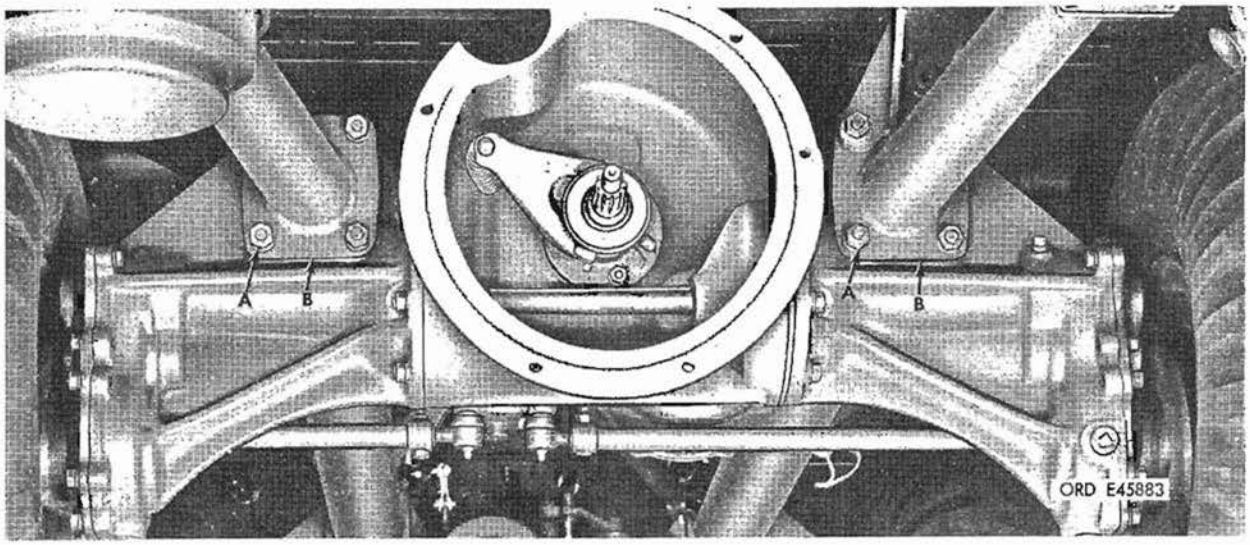
Note. The brake flexible linkage bracket is held by one cap screw on the M274. The bracket on the M274A1 is held by three cap screws and spacers. ↓M274A2

C – Remove four 7/16-20 x 3-1/2 hexagon head cap screws.

D – On M274, remove four 7/16-20 x 3-1/2 hexagon head cap screws. On M274A1, remove one 7/16-20 x 3-1/2 hexagon head cap screw and three 7/16-20 x 4 hexagon head cap screws.

E – Raise front end of body and remove front drop gear axle housing assemblies. Remove and discard two gaskets from left tube assembly.

Figure 136. Removing or installing front axle housing assemblies.



A — Remove seven 7/16-20 stamped nuts, 7/16-20 plain hexagon nuts, and 7/16-inch lock washers.

Note. On M274, remove four 7/16-20 x 3-1/2 hexagon head cap screws, two 7/16-20 x 4-1/2 hexagon head cap screws (engine guard mounting), and two 7/16-20 x 4 hexagon head cap screws (starter rope pulley housing mounting). On M274A1, remove two 7/16-20 x 3-1/2 hexagon head cap screws, four 7/16-20 x 3-3/4 hexagon head cap screws and left and right engine guard bracket assemblies, and two 7/16-20 x 4 hexagon head cap screws (starter rope pulley housing mounting).

M274A2

B — Raise rear end of body and remove rear drop gear axle housing assemblies. Remove and discard two gaskets from left tube assembly.

Figure 137. Removing or installing rear axle housing assemblies.

Section III. DISASSEMBLY OF FRAME AND BODY

80. General

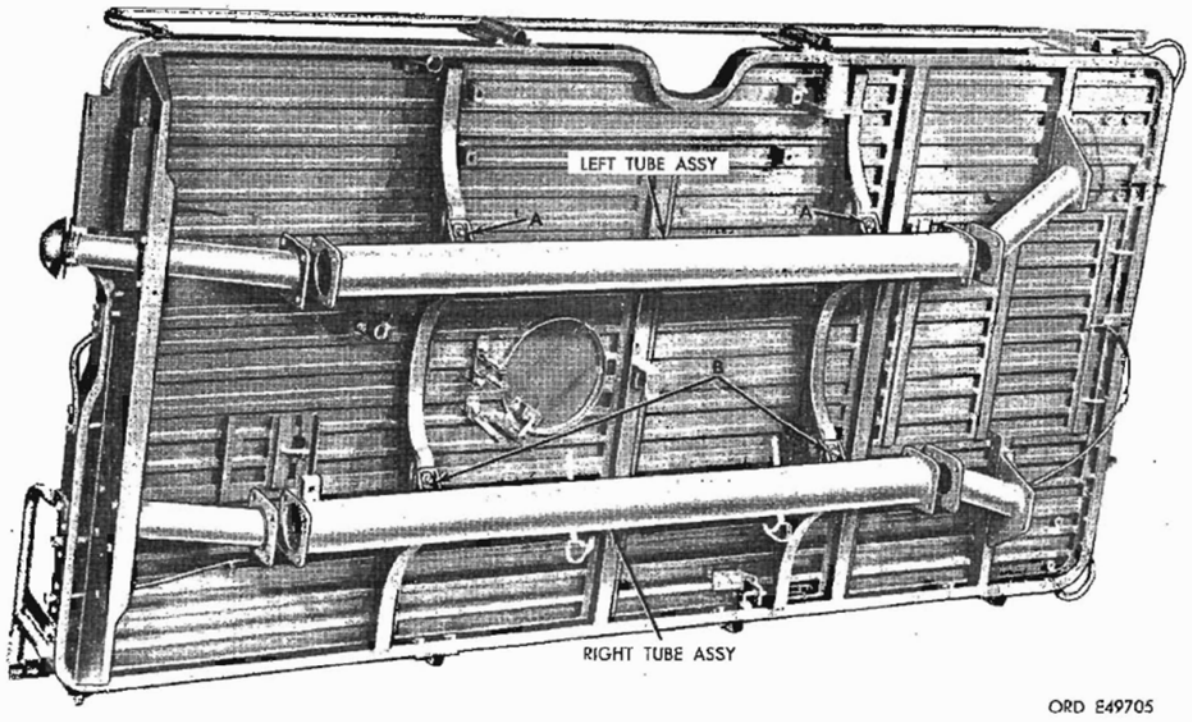
a. Disassembly of the components of the frame and body should be performed in figure number sequence. Instructions provided with each illustration should, in turn, be performed in the order of their respective index letters. If no instructions are provided with an illustration, the procedures involved are relatively simple and the parts should be removed in sequence indicated by callout letters.

b. The exploded views, figures 168 through 176, are included to provide a visual reference to components of frame and body and for parts identification.

c. Discard all gaskets during disassembly and make sure new ones are installed at assembly.

81. Disassembly of Frame Assembly

a. Removal of Left and Right Tube Assemblies. Refer to figures 138 and 139 for removal of the left and right tube assemblies.



A – Remove four 3/8-16 hexagon self-locking nuts, flat washers, and 3/8-16 x 1-1/4 hexagon head cap screws. Remove left tube assembly.

B – Remove four 3/8-16 hexagon self-locking nuts, flat washers, and 3/8-16 x 1-1/4 hexagon head cap screws. Remove right tube assembly.

Figure 138. Removing or installing left and right tube assemblies.

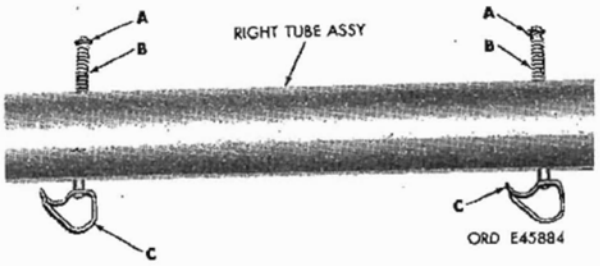


Figure 139. Instructions.

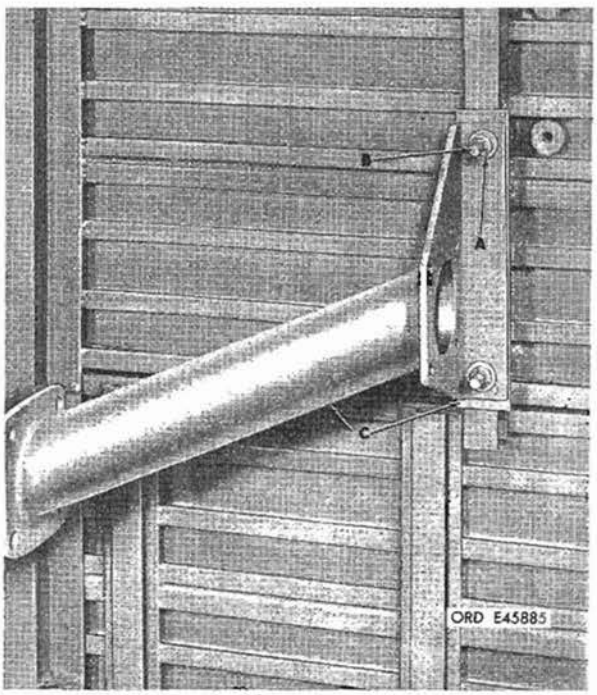
A – Remove two cotter pins and two flat washers.

B – Remove two helical compression springs.

C – Remove two stowage seat hook assemblies.

Figure 139. Removing or installing stowage seat hook assemblies.

b. Removal of Left and Right Rear Supports. Refer to figure 140 for removal of the left and right rear support.



A – Remove two 3/8-16 hexagon self-locking nuts and flat washers.

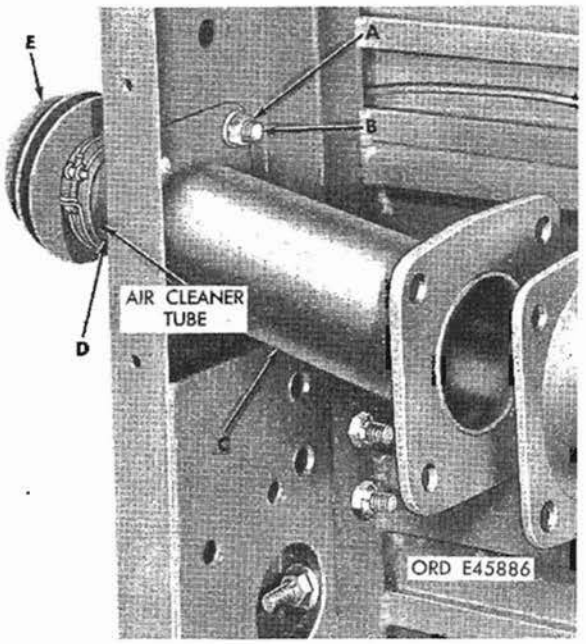
B – Remove two 3/8-16 x 3-3/8 machine screws.

C – Remove left rear support and shim.

Note. Remove right rear support in the same manner.

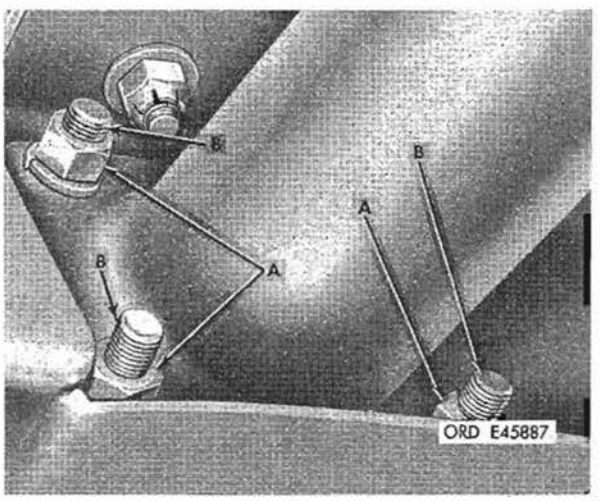
Figure 140. Removing or installing left rear support.

c. Removal of Front Tube Assemblies and Precleaner Assembly. Refer to figures 141 and 142 for removal of the front tube assemblies and precleaner assembly.



A – Remove four 3/8-24 plain hexagon nuts and 3/8-inch lock washers.
B – Remove four 3/8-24 x 1 hexagon head cap screws.
C – Remove left front tube assembly. Discard gasket.
D – Remove tube, precleaner assembly, and gasket.
E – Remove precleaner assembly from tube.

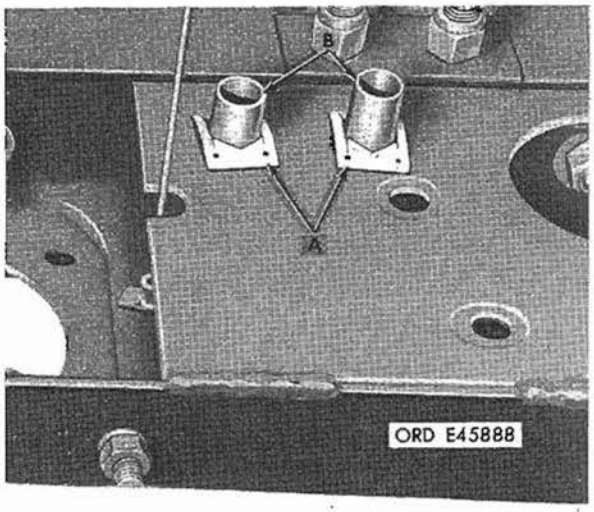
Figure 141. Removing or installing left front tube and precleaner assemblies.



A – Remove four 3/8-24 plain hexagon nuts and 3/8-inch lock washers.
B – Remove four 3/8-24 x 1 hexagon head cap screws.
C – Remove right front tube assembly.

Figure 142. Removing or installing right front tube assembly.

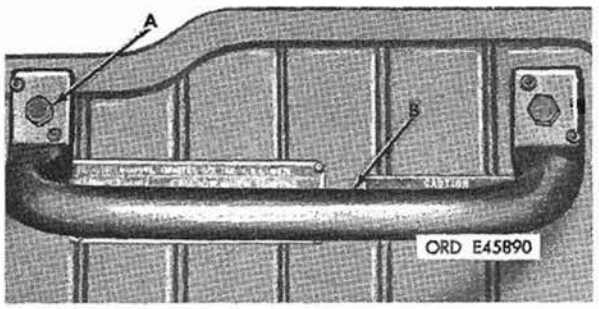
d. Removal of Support Assembly. Refer to figures 143 through 145 for removal of the support assembly.



A – Remove two guide tube nuts.

B – Push two cable guide tubes from support assembly.

Figure 143. Removing or installing cable guide tubes.



A – Remove two 3/8-16 hexagon self-locking nuts, 3/8-inch flat washers, and 3/8-16 x 3-1/2 hexagon head bolts.

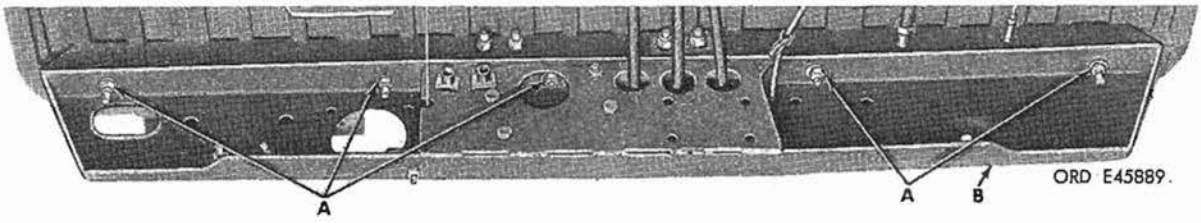
B – Remove guard assembly.

Note. On M274, two special bolts replace two machine screws to attach the guard assembly to the top of the platform.

Figure 145. Removing or installing guard assembly – M274A1 ~~only~~ and M274A2.

82. Disassembly of Body Assembly

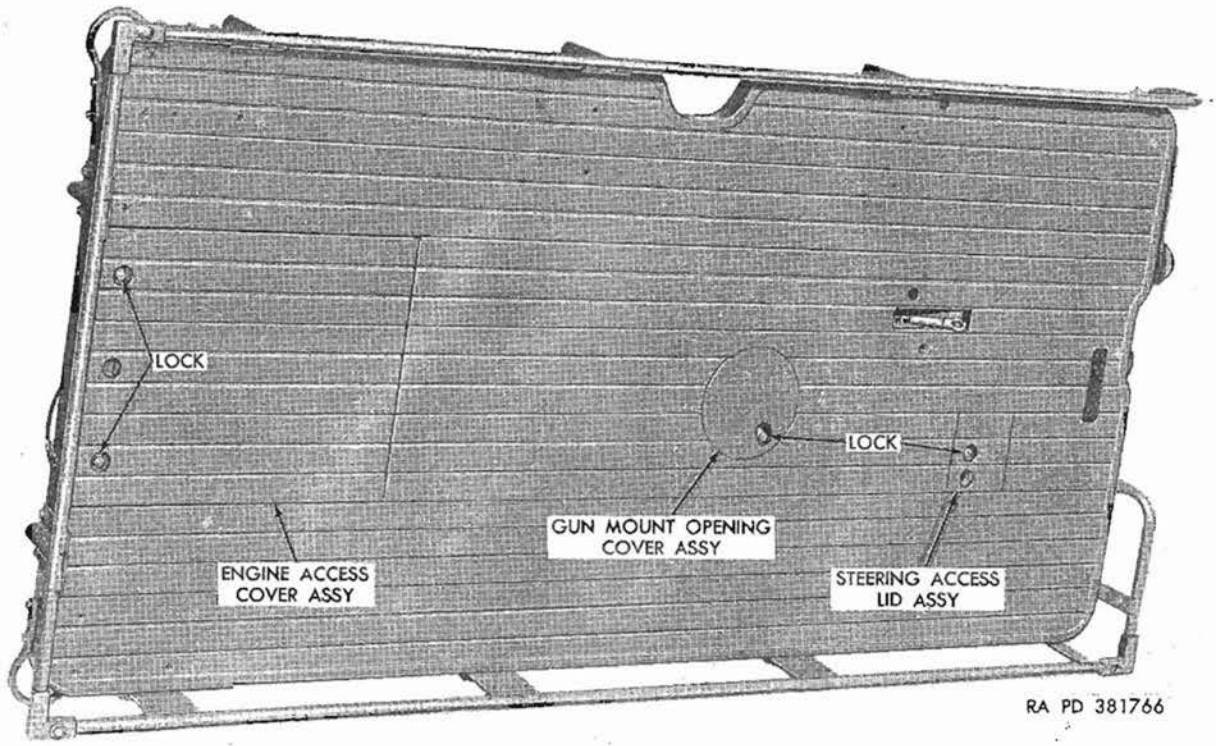
a. Removal and Disassembly of Steering Access Lid Assembly, Gun Mount Opening Cover Assembly, and Engine Access Cover Assembly – M274A1 M274A2. Refer to figures 146 through 149 for removal and disassembly of the steering access lid assembly, gun mount opening cover assembly, and engine access cover assembly.



A – Remove five 3/8-16 hexagon self-locking nuts and flat washers and five 3/8-16 x 3-3/8 machine screws.

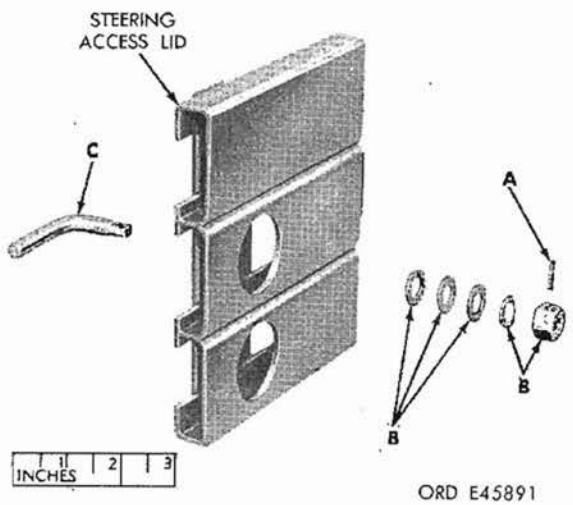
B – Remove support assembly.

Figure 144. Removing or installing support assembly.



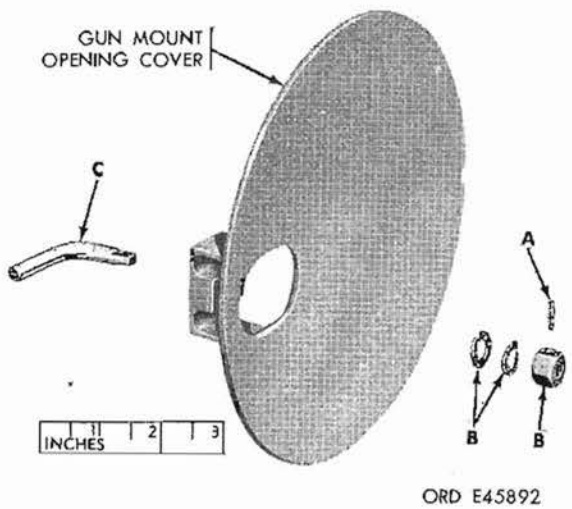
Turn locks counterclockwise, using socket wrench on handle of hand crank.

Figure 146. Removing or installing steering access lid assembly, gun mount opening cover assembly, and engine access cover assembly – M274.



A – Drive spring pin from rod lock.
B – Remove rod lock, spring tension washer, and flat washers.
C – Remove lock rod.

Figure 147. Disassembling or assembling steering access lid assembly – M274.



A – Drive spring pin from rod lock.
B – Remove rod lock, spring tension washer, and flat washer.
C – Remove lock rod.

Figure 148. Disassembling or assembling gun mount opening cover assembly – M274.

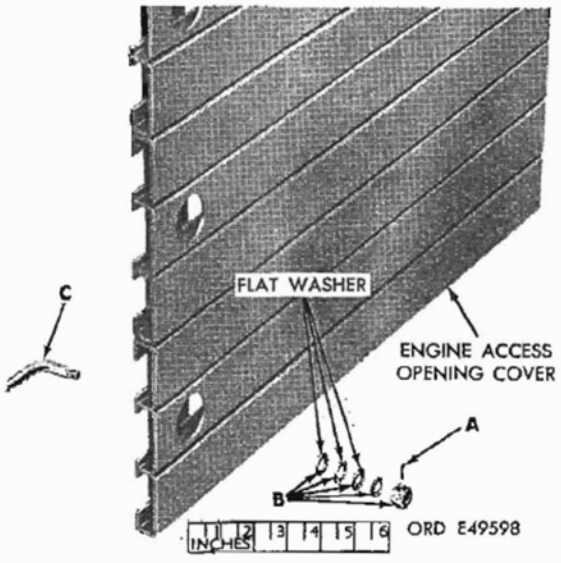


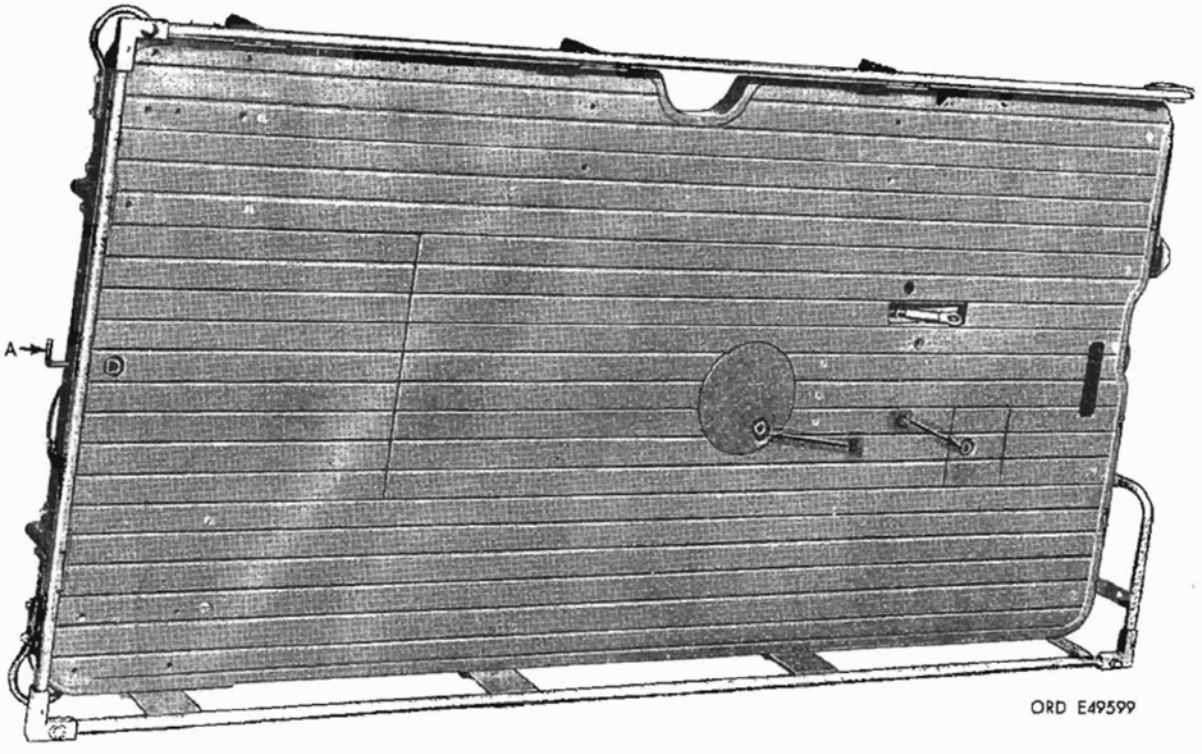
Figure 149. Disassembling or assembling engine access cover assembly - M274.

Figure 149. Instructions.

A - Drive spring pin from each rod lock.
B - Remove rod lock, spring tension washer, and flat washer from lock rods.
C - Remove rods.

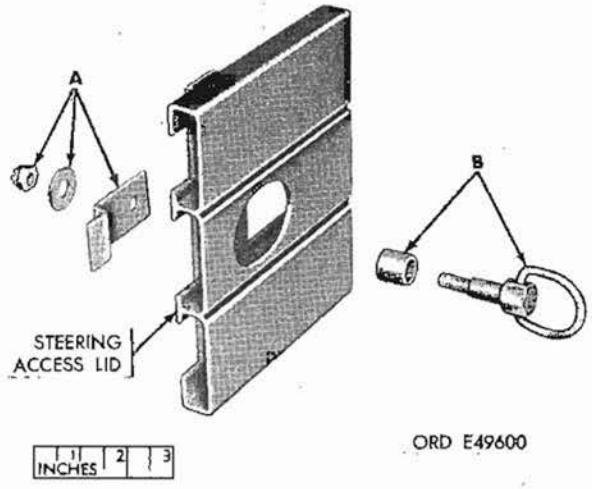
b. Removal and Disassembly of Steering Access Lid Assembly, Gun Mount Opening Cover Assembly, and Engine Access Cover Assembly - M274A1*. Refer to figures 150 through 153 for removal and disassembly of the steering access lid assembly, gun mount opening cover assembly, and engine access cover assembly.

* M274A2



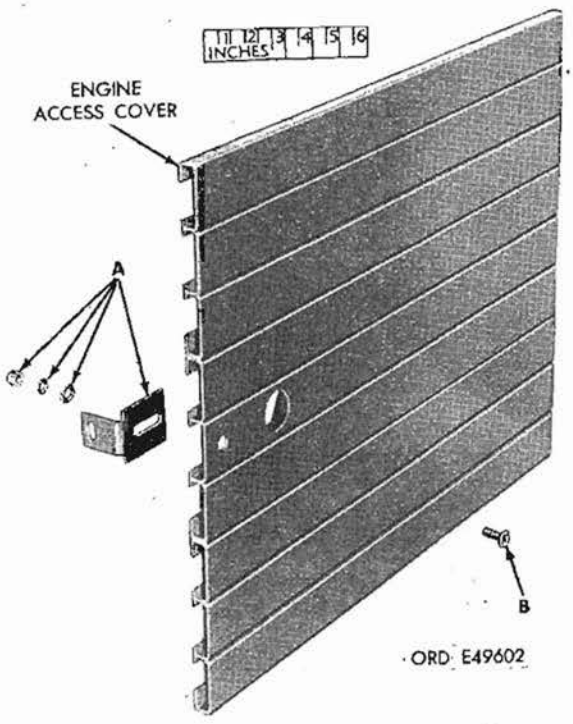
A - Turn lock rod counterclockwise and remove engine access cover assembly.
B - Turn "D" ring counterclockwise and remove gun mount opening cover assembly.
C - Turn "D" ring counterclockwise and remove steering access lid assembly.

Figure 150. Removing or installing steering access lid assembly, gun mount opening cover assembly, and engine access opening cover assembly - M274A1, and M274A2.



A – Remove nut, washer, and latch.
B – Remove and separate spacer and pin.

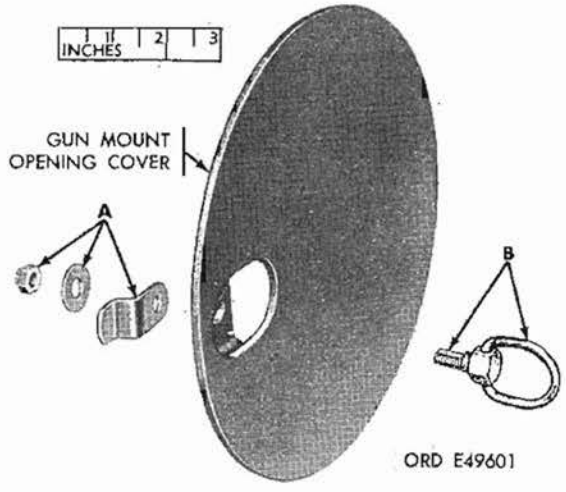
Figure 151. Disassembling or assembling steering access lid assembly – M274A1, and M274A2.



A – Remove nut, lock washer, flat washer, and bracket.

B – Remove screw.

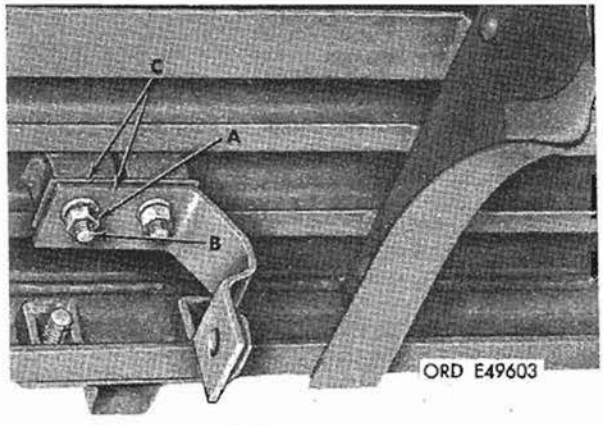
Figure 153. Disassembling or assembling engine access cover assembly – M274A1 and M274A2.



A – Remove nut, washer, and latch.
B – Remove pin and "D" ring.

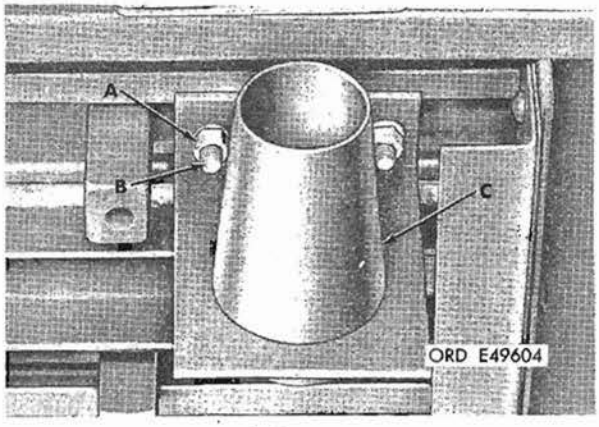
Figure 152. Disassembling or assembling gun mount opening cover assembly – M274A1, and M274A2.

c. Removal of Tow Bar Bracket and Support. Refer to figures 154 and 155 for removal of the tow bar bracket and support.



A – Remove two 5/16-24 plain hexagon nuts and 5/16-inch lock washers.
B – Remove two 5/16-24 x 1-1/2 machine screws.
C – Remove tow bar bracket and shim.

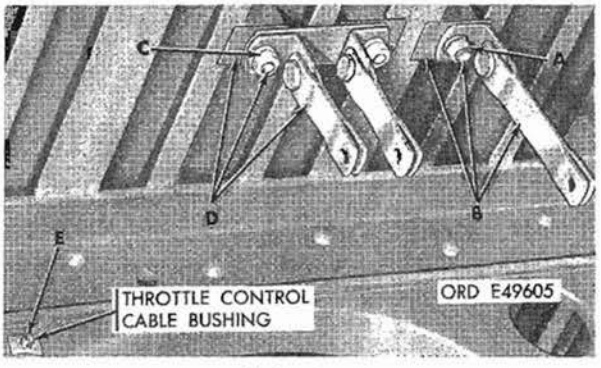
Figure 154. Removing or installing tow bar bracket.



A – Remove two 5/16-24 plain hexagon nuts and 5/16-inch lock washers.
B – Remove two 5/16-24 x 1-1/2 machine screws.
C – Remove tow bar support and shim.

Figure 155. Removing or installing tow bar support.

d. Removal of Transfer Linkage Hanger Assembly, Transmission Linkage Hanger Assembly, and Throttle Control Cable Bushings. Refer to figure 156 for removal of the transfer and transmission linkage hanger assemblies and throttle control cable bushings.

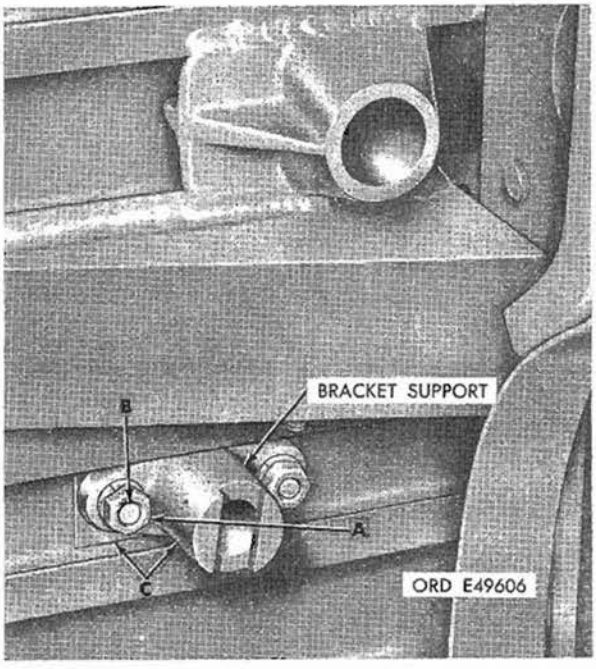


A – Remove one 5/18-18 plain hexagon nut and 5/16-inch lock washer.
B – Remove one 5/16-18 x 1-1/2 flat head machine screw, transfer linkage hanger assembly, and shim.
C – Remove two 5/16-18 plain hexagon nuts and 5/16-inch lock washers.
D – Remove two 5/16-18 x 1-1/2 flat head machine screws, transmission linkage hanger assembly, and shim.
E – Remove 1/4-inch clip and push throttle control cable bushing through cross member.

Note. One throttle control cable bushing is located on each support.

Figure 156. Removing or installing transfer and transmission linkage hanger assemblies and throttle control cable bushing.

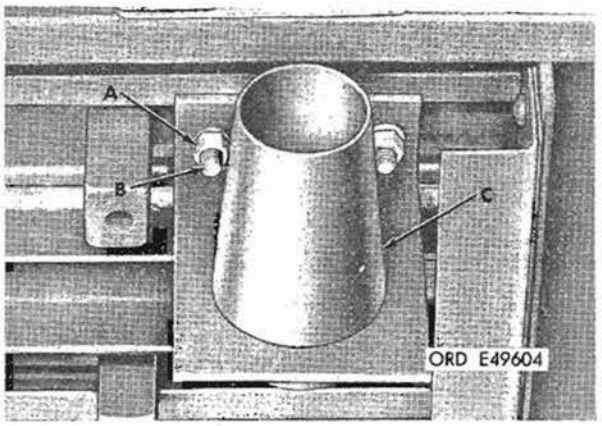
e. Removal of Anchor Pin Flanged Sleeve. Refer to figure 157 for removal of the anchor pin flanged sleeve.



A – Remove two 5/16-24 plain hexagon nuts and 5/16-inch lock washers.
B – Remove two 5/16-24 x 1/2 flat head machine screws.
C – Remove anchor pin flanged sleeve and shim.

Figure 157. Removing or installing anchor pin flanged sleeve.

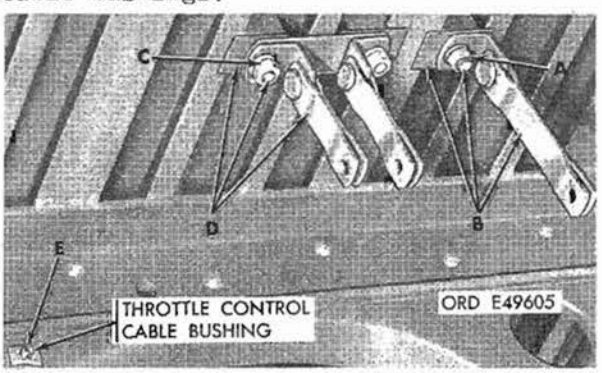
f. Removal of Handrail Assemblies. Refer to figures 158 through 160 for removal of the handrail assemblies.



A – Remove two 5/16-24 plain hexagon nuts and 5/16-inch lock washers.
B – Remove two 5/16-24 x 1-1/2 machine screws.
C – Remove tow bar support and shim.

Figure 155. Removing or installing tow bar support.

d. Removal of Transfer Linkage Hanger Assembly, Transmission Linkage Hanger Assembly, and Throttle Control Cable Bushings. Refer to figure 156 for removal of the transfer and transmission linkage hanger assemblies and throttle control cable bushings.

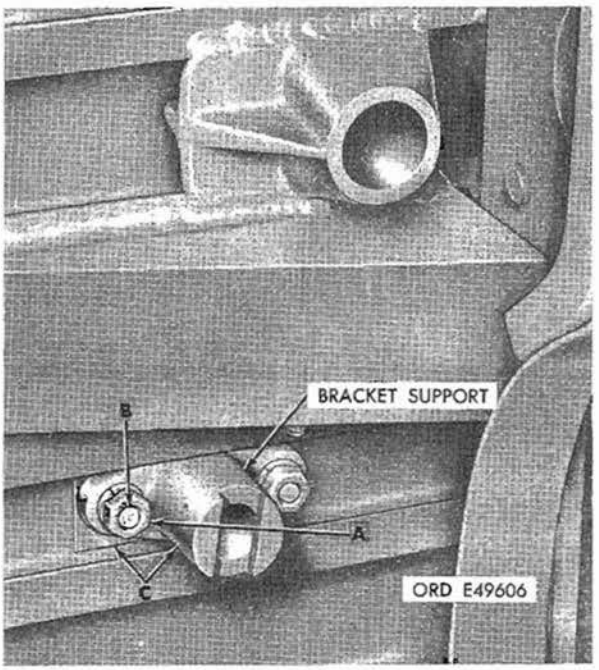


A – Remove one 5/18-18 plain hexagon nut and 5/16-inch lock washer.
B – Remove one 5/16-18 x 1-1/2 flat head machine screw, transfer linkage hanger assembly, and shim.
C – Remove two 5/16-18 plain hexagon nuts and 5/16-inch lock washers.
D – Remove two 5/16-18 x 1-1/2 flat head machine screws, transmission linkage hanger assembly, and shim.
E – Remove 1/4-inch clip and push throttle control cable bushing through cross member.

Note. One throttle control cable bushing is located on each support.

Figure 156. Removing or installing transfer and transmission linkage hanger assemblies and throttle control cable bushing.

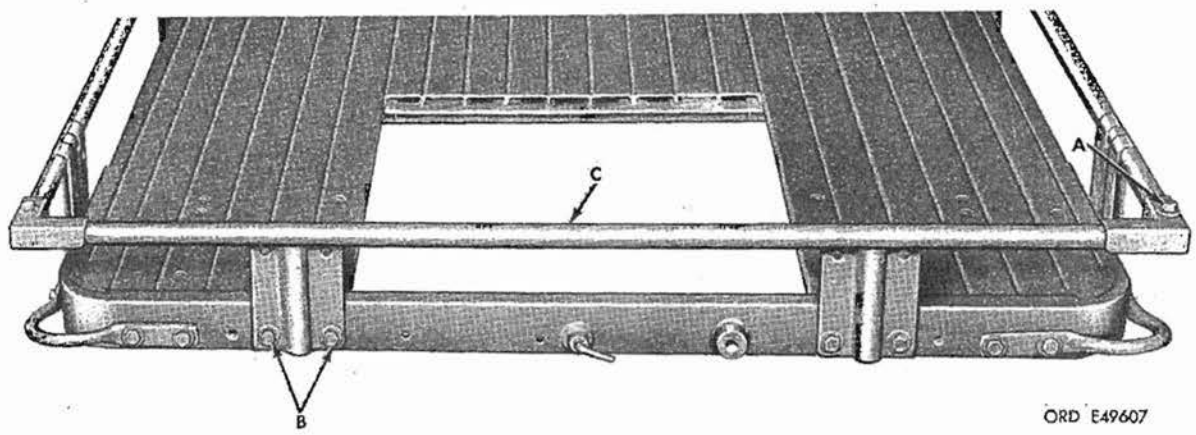
e. Removal of Anchor Pin Flanged Sleeve. Refer to figure 157 for removal of the anchor pin flanged sleeve.



A – Remove two 5/16-24 plain hexagon nuts and 5/16-inch lock washers.
B – Remove two 5/16-24 x 1/2 flat head machine screws.
C – Remove anchor pin flanged sleeve and shim.

Figure 157. Removing or installing anchor pin flanged sleeve.

f. Removal of Handrail Assemblies. Refer to figures 158 through 160 for removal of the handrail assemblies.

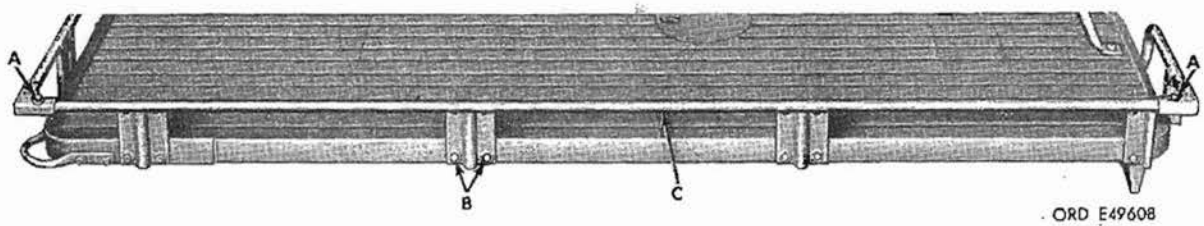


A – Remove two 3/8-24 plain square nuts, 3/8-inch lock washers, and 3/8-24 x 1-1/4 assembled washer bolts.

B – Remove four 3/8-24 x 1-1/4 assembled washer screws.

C – Remove rear handrail assembly.

Figure 158. Removing or installing rear handrail assembly.



A – Remove two 3/8-24 plain square nuts, 3/8-inch lock washers, and 3/8-24 x 1-1/4 assembled washer screws.

B – Remove seven 3/8-24 x 1-1/4 assembled washer screws.

C – Remove right handrail assembly.

Note. Repeat steps B and C to remove left handrail assembly.

Figure 159. Removing or installing right handrail assembly.

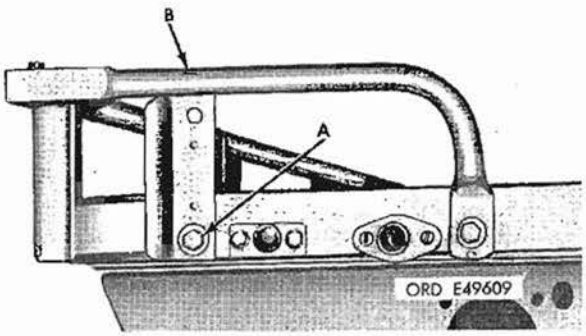


Figure 160. Instructions.

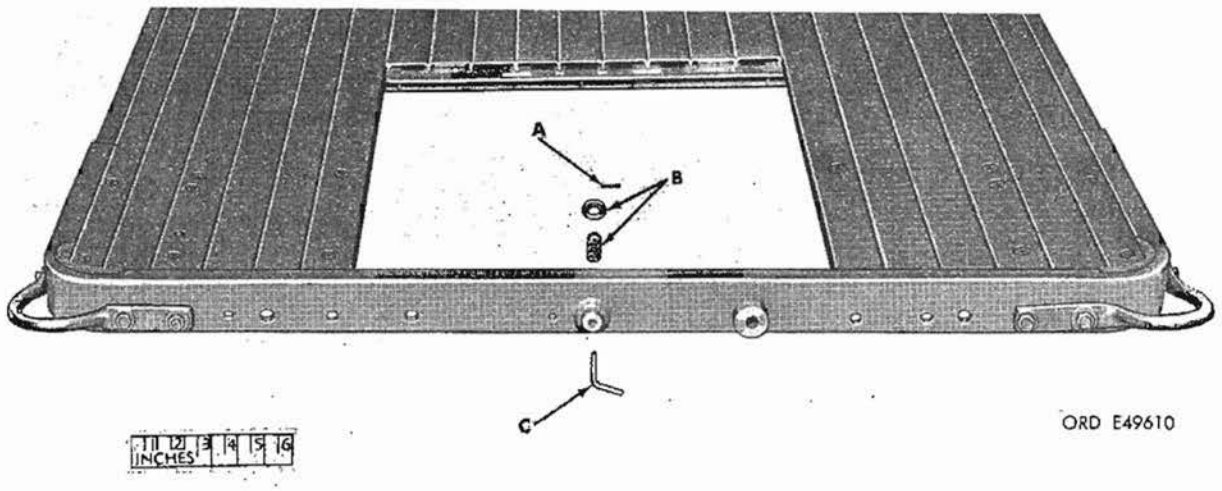
A – Remove two 3/8-24 x 1-1/4 assembled washer screws.

B – Remove front handrail assembly.

Figure 160. Removing or installing front handrail assembly.

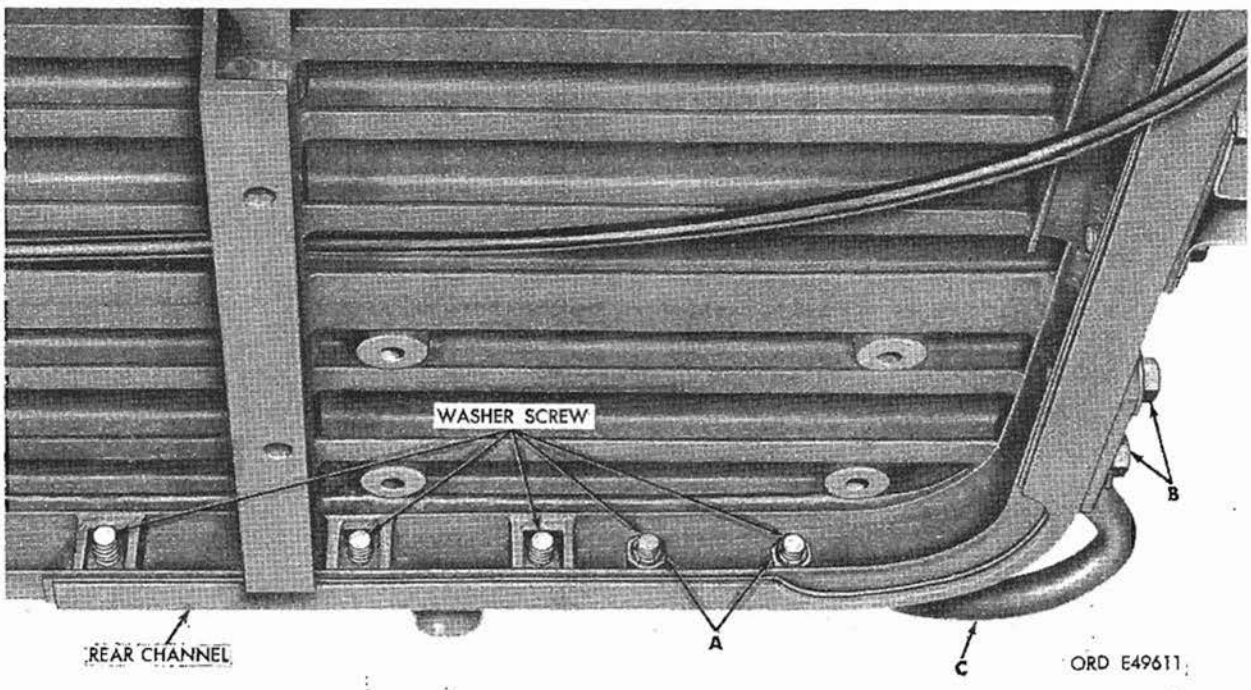
g. Removal of Engine Access Cover Lock Rod. Refer to figure 161 for removal of the engine access cover lock rod.

h. Removal of Lifting Loops. Refer to figures 162 and 163 for removal of the lifting loops.



A – Drive the spring pin out of the lock rod.
B – Remove flat washer and spring.
C – Remove lock rod.

Figure 161. Removing or installing engine access cover lock rod.

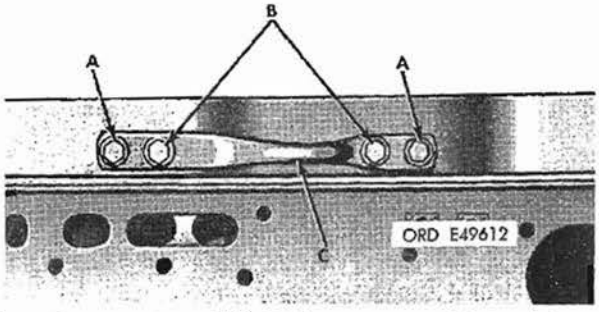


A – Remove four 3/8-24 hexagon self-locking nuts.
B – Remove four 3/8-24 x 1-1/4 assembled washer bolts.
C – Remove rear lifting loop.

Note. Remove opposite rear lifting loop in the same manner.

Figure 162. Removing or installing rear lifting loop.

i. Remove Starter Cable Metal Conduit, Guide Tube, and Handle. Refer to figures 164 through 166 for removal instructions. References made to early M274 vehicles are intended, generally, to imply vehicles with serial numbers 10,001 through 10,974 except for 10,282 and 10,954 through 10,964. However, other vehicles, in this series, have been modified to incorporate the newer parts in accordance with previously printed instructions. Therefore, M274 vehicles which have the starter cable guide tube shown in figure 165 should be considered as "early" M274 vehicles while those having the starter cable guide tube shown in figure 166 should be considered as "late" M274 vehicles.

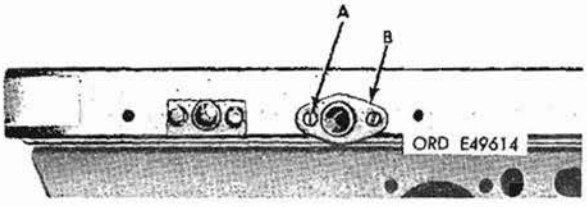


A – Remove two 3/8-24 hexagon self-locking nuts and two 3/8-24 x 3 hexagon head screws.

B – Remove two 3/8-24 hexagon self-locking nuts and two 3/8-24 x 4 hexagon head cap screws.

C – Remove front lifting loop and shim.

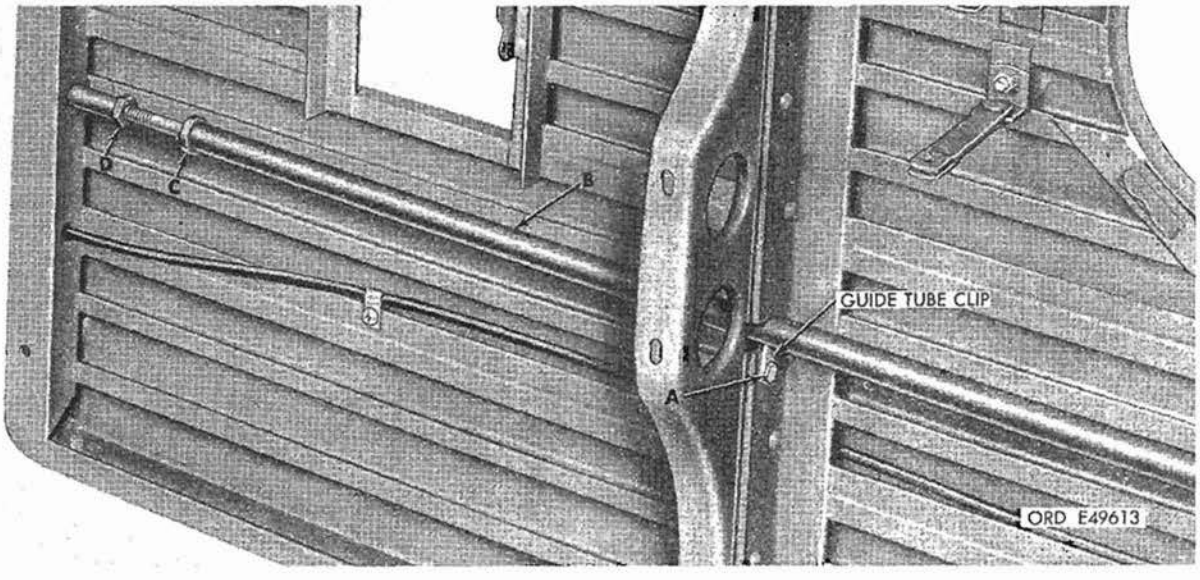
Figure 163. Removing or installing front lifting loop.



A – On M274, remove two 1/4-20 hexagon self-locking nut and 1/4-20 x 3/4 cross-recessed pan head machine screws.

B – Remove starter cable tube and handle.

Figure 165. Removing or installing starter cable tube and handle – early M274.



A – Remove 1/4-20 plain hexagon nut, 1/4-inch lock washer, 1/4-inch flat washer, and 1/4-20 x 1 hexagon head cap screw.

Note. Remove same parts from second support.

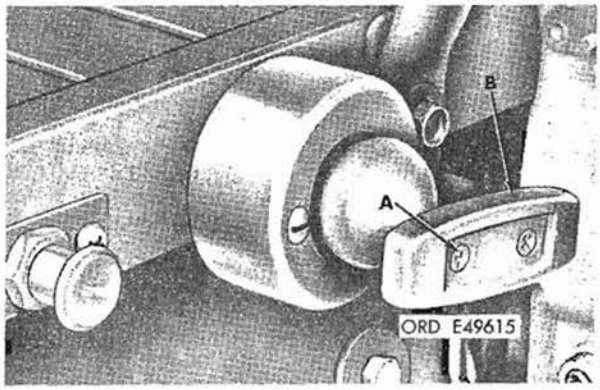
B – Slide starter cable metal conduit to the rear out of holes in supports.

C – Remove 1/4-20 plain hexagon nut.

D – Remove cable adjusting stop.

Note. On the early M274, remove helical compression spring.

Figure 164. Removing or installing starter cable metal conduit.

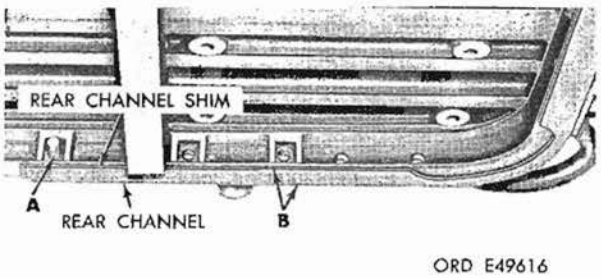


A — On M274A1, remove two 1/4-20 hexagon self-locking nuts, 1/4-inch flat washers, and 1/4-20 x 2 oval head machine screws.

B — Remove starter cable handle.

Figure 166. Removing or installing starter cable handle — late M274 and M274A1, and M274A2.

j. Removal of Rear Channel and Shim. Refer to figure 167 for removal of the rear channel and shim.



A — Remove one 3/8-24 x 1-1/4 assembled washer bolt.

B — Remove rear channel and shim.

Note. Remove rear channel on opposite side in the same manner.

Figure 167. Removing or installing rear channel and shim.

Section IV. CLEANING, INSPECTION, AND REPAIR

83. Cleaning

Clean all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts with a stiff bristle brush that has been dipped in the cleaning agent. Steam or water may be used to remove heavy accumulations of mud or dirt.

Note. It is important that the left tube assembly, left rear support, left front tube assembly, tube, and precleaner assembly be absolutely clean, as these parts are used as an air intake tube for the engine air cleaner.

84. Inspection

a. Platform, Frame, and Related Parts.

Note. The key letters shown below refer to figure 168.

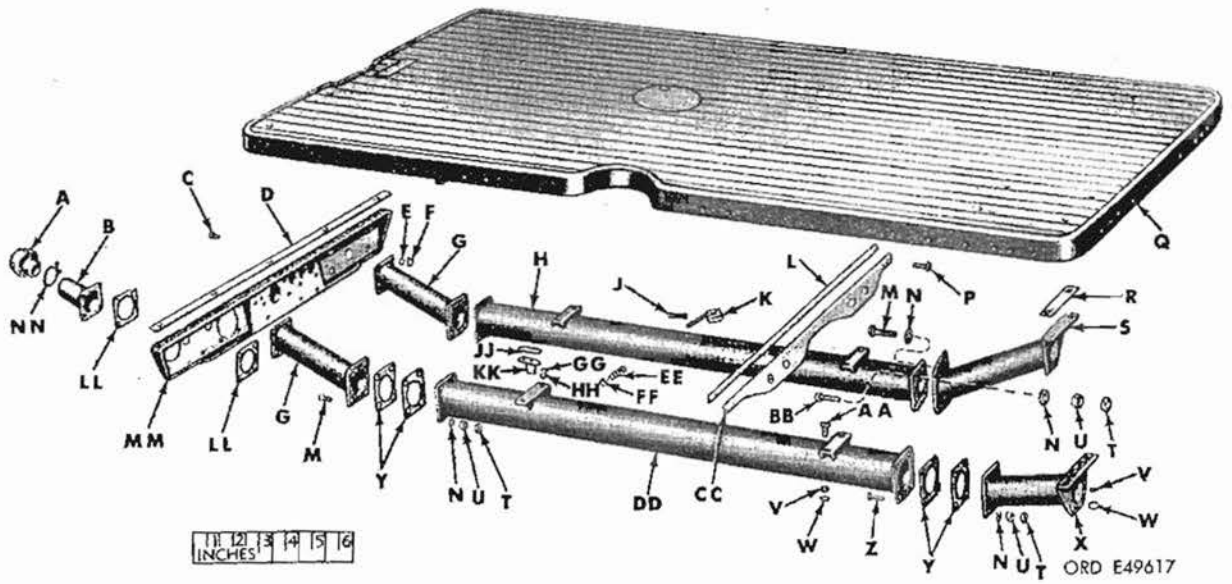
(1) Inspect right and left tube assemblies (H and DD), right and left rear supports (S and X) and right and left front tube assemblies for bends, cracks, deep dents, or gouges, or any other damage. Inspect all flanges for cracked or broken welds, distortion, elongated mounting holes, or any other defects.

(2) Inspect front tube assembly (G) for bends, cracks, broken or cracked welds or other damage. Inspect precleaner assembly (A) and tube (B) for bends, cracks, or broken or cracked welds.

(3) Inspect the supports (MM) for cracks, distortion, or other damage. Inspect rivets (P) securing supports to platform for looseness or signs of stress. If necessary to replace support, refer to paragraph 84.

(4) Inspect stowage seat hook assemblies (K) for straightness or binding action in left tube assembly.

(5) Inspect all brackets, hanger assemblies, and mounting clips, for straightness, cracks, or damaged threads.



A – Precleaner assembly – 8336344
B – Tube – 7966930
C – ~~3/8-24 x 1 hexagon head cap screw – 120647~~ *
D – Shim – 94537-692023
E – ~~3/8-inch lock washer – 96906-35338-46~~ *
F – ~~3/8-24 plain hexagon nut – 96906-35690-625~~ *
G – ~~Front tube assembly~~
~~– 8336063 (M274)~~ *
~~– 65909-933613 (M274A1)~~
H – ~~Right tube assembly~~
~~– 8336055 (M274)~~ *
~~– 65909-933613 (M274A1)~~
J – ~~Cotter pin – 96906-24665-295~~ *
K – Stowage seat hook assembly – 8336033
L – Shim – 94537-692036
M – 7/16-20 x 3-1/2 hexagon head cap screw – 96906-35928-97
N – ~~7/16-inch lock washer – 96906-35338-28~~ *
P – Rivet – 94537-815090
Q – ~~Platform assembly~~
~~– 8716896 (M274)~~ *
~~– 65909-961873 (M274A1)~~
R – Shim – 94537-692078
S – ~~Right rear support – 8336065~~ *
T – 7/16-20 stamped nut – 107824
U – ~~7/16-20 plain hexagon nut – 5333811~~ *
V – ~~Flat washer – 446213~~ *
W – ~~3/8-16 self-locking hexagon nut – 442827~~ *
X – ~~Left rear support assembly – 8336064~~ *
Y – Gasket – 7045737
Z – 7/16-20 x 3-3/4 hexagon head cap screw – 181681 (M274A1 only)
AA – 3/8-16 x 1-1/4 hexagon head cap screw – 96906-35291-62
BB – 7/16-20 x 4 hexagon head cap screw – 96906-35298-99
CC – Support – 94537-692034
DD – ~~Left tube assembly~~
~~– 8336054 (M274)~~ *
~~– 65909-933594 (M274A1)~~
EE – Helical compression spring – 7966610
FF – ~~Flat washer – 96906-15795-214~~ *
GG – 5/16-inch lock washer – 96906-35338-26
HH – 5/16-24 plain hexagon nut – 96906-35690-525
JJ – Plate – 94537-914792
KK – Anchor pin flanged sleeve
– 7760067 (M274)
– 65909-927224 (M274A1)
LL – Gasket – 7966799
MM – Support assembly
– 8336058 (M274)
– 65909-928160 (M274A1)
NN – Hose clamp – 502922

Figure 168. Platform, frame, and related parts – exploded view.

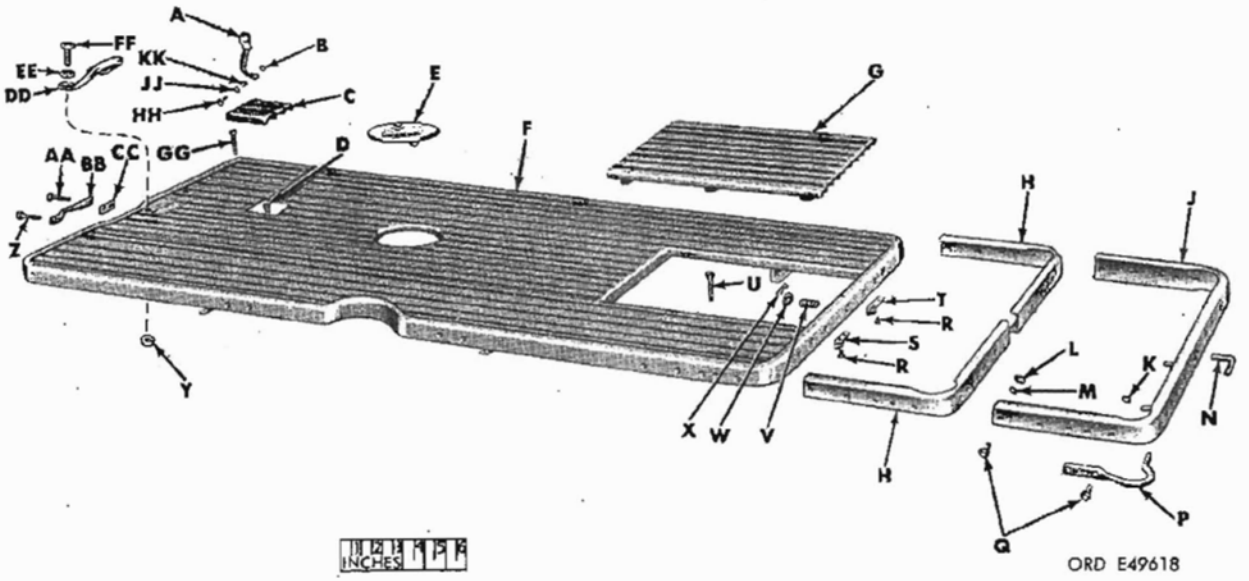
b. Platform Assembly.

Note. The key letters shown below refer to figure 169 except where otherwise indicated.

(1) Inspect platform (F) for breaks in welds between platform, deep dents, or flatness. Inspect threads of nuts around inside edge of platform for damage.

(2) Inspect rear lifting loops (P), front lifting loop (BB), and guard assembly (DD) for bends or broken welds.

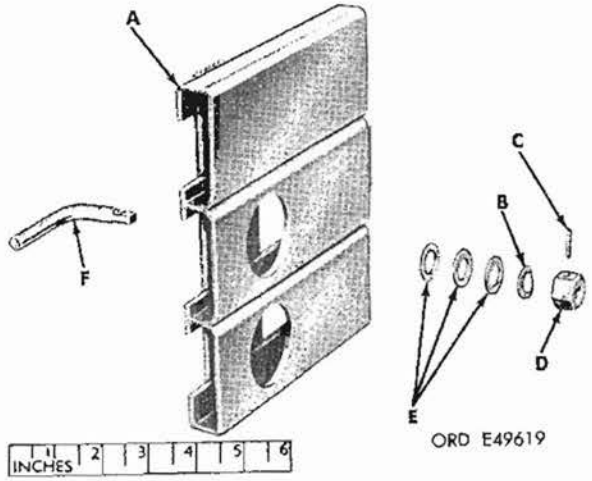
(3) Inspect steering access lid assembly (C and figs. 170 and 171), gun mount opening cover assembly (E and figs. 172 and 173), and engine access cover assembly (G and figs. 174 and 175) for broken or damaged parts.



A – Spring loaded cylinder fastener – 7966498
B – 1/4-20 plain hexagon nut – 96906-35690-405
C – Steering access lid assembly – 8716889 (M274) – 65909-954281 (M274A1)
D – 5/16-24 x 7/8 machine screw – 96906-35193-85
E – ~~Gun mount opening cover assembly – 94537-699620 (M274) – 65909-962065 (M274A1)~~
F – ~~Platform – 94537-699210 (M274) – 65909-961872 (M274A1)~~
G – Engine access cover assembly – 7966719 (M274) – 65909-962087 (M274A1)
H – ~~Shim – 94537-699068~~
J – ~~Channel – 94537-699255~~
K – 3/8-24 hexagon self-locking nut – 503351
L – 3/8-24 plain square nut – 213537
M – 3/8-inch lock washer – 96906-35335-7
N – Lock rod – 65909-952950
P – Rear lifting loop – 8716891
Q – 3/8-24 x 1-1/4 assembled washer bolt – 8716890
R – Rivet – 94537-815440
S – Catch – 94537-692051
T – Catch – 94537-815684
U – 3/8-16 x 3-3/8 machine screw – 192444
V – Spring – 65909-664555
✱ W – ~~Flat washer – 96906-15795-212~~
X – Pin – 96906-9048-073
Y – 3/8-16 self-locking hexagon nut – 442827 (M274A1 only)
Z – 3/8-24 x 3 hexagon head cap screw – 96906-35292-70
AA – 3/8-24 x 4 hexagon head cap screw – 96906-35292-74
BB – Front lifting loop – 8716893
CC – Shim – 8336438
✱ DD – ~~Guard assembly – 65909-954246 (M274A1 only)~~
EE – 3/8-inch flat washer – 96906-15795-214 (M274A1 only)
FF – 3/8-16 x 3-1/2 hexagon head bolt – 96906-35291-72 (M274A1 only)
GG – 3/8-16 x 3-3/8 machine screw – 192444
HH – 1/4-20 x 5/8 hexagon head cap screw – 96906-35291-5
JJ – 3/8-inch flat washer – 96906-15795-210
KK – 1/4-inch lock washer – 96906-35337-25

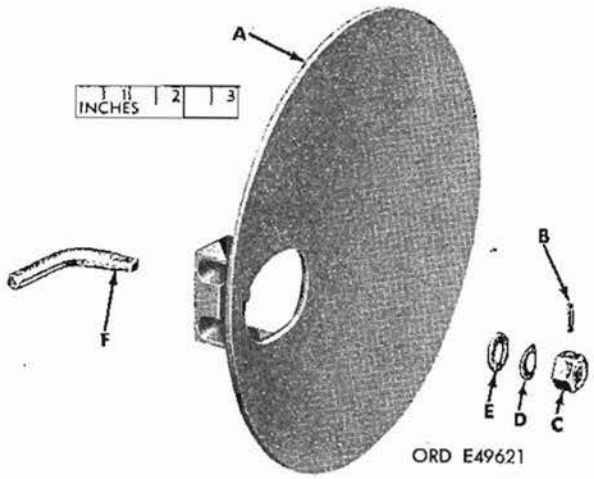
Figure 169. Platform assembly – exploded view.

✱ Superseded by Ch. 1-12 18



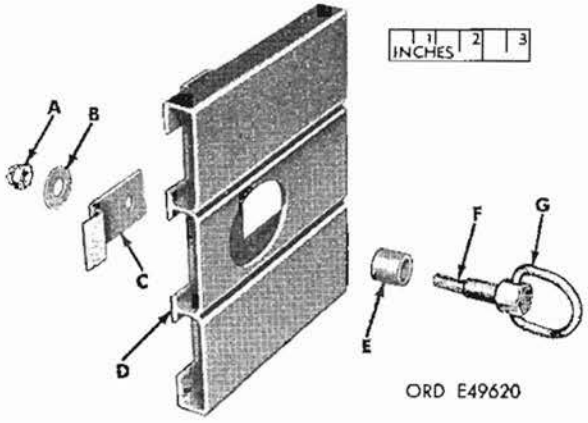
A – Steering access lid – 65909-693372
B – Spring tension washer – 8329984
C – Spring pin – 585921
D – Rod lock – 7966721
E – Flat washer – 120393
F – Lock rod – 7966720

Figure 170. Steering access lid assembly – M274 – exploded view.



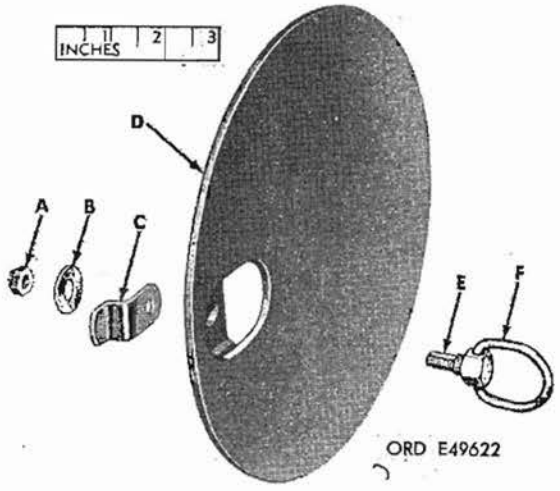
A – Cover – 65909-699619
B – Spring pin – 585921
C – Rod lock – 7966721
D – Spring tension washer – 8329984
E – Flat washer – 120393
F – Lock rod – 7966720

Figure 172. Gun mount opening cover assembly – M274 – exploded view.



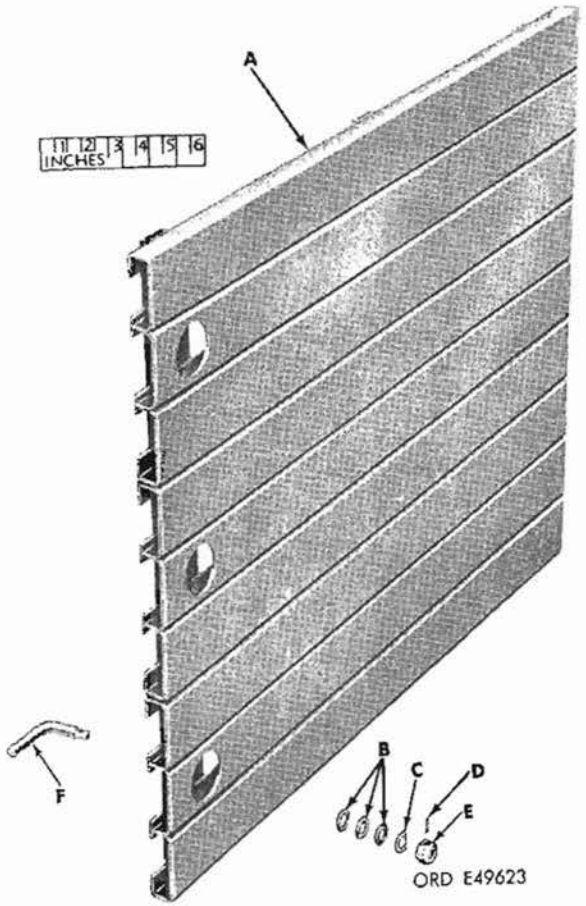
A – Nut – 443334
B – Washer – 96906-15795-212
C – Latch – 65909-961969
D – Lid – 65909-954282
E – Spacer – No Number
F – Pin – 65909-954284
G – "D" ring – 65909-954285

Figure 171. Steering access lid assembly – M274A1 – exploded view, and M274A2.



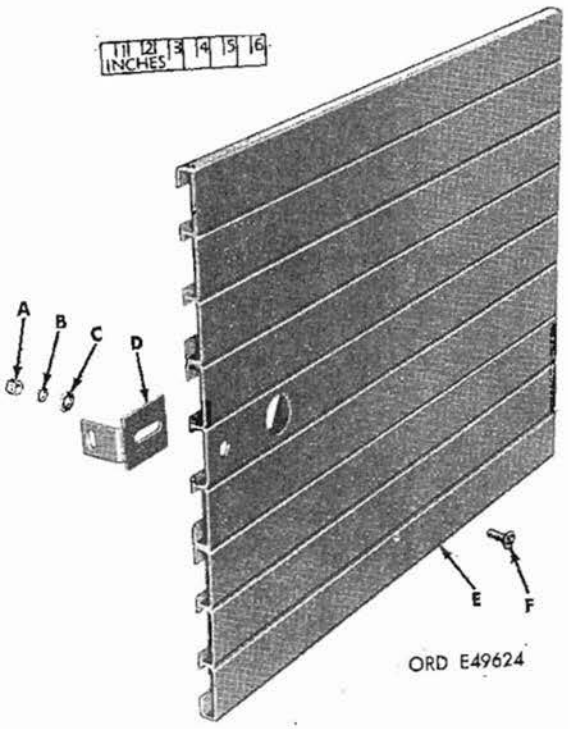
A – Nut – 443334
B – Washer – 96906-15795-212
C – Latch – 65909-962063
D – Cover – 7045601
E – Pin – 65909-955257
F – "D" ring – 65909-954285

Figure 173. Gun mount opening cover assembly – M274A1 – exploded view, and M274A2.



A – Cover – 65909-698832
B – Flat washer – 120393
C – Spring tension washer – 8329984
D – Spring pin – 585921
E – Rod lock – 7966721
F – Lock rod – 7966720

Figure 174. Engine access cover assembly – M274 – exploded view.



A – Nut – 96906-35690-505
B – Washer – 96906-35338-26
C – Washer – 96906-15795-212
D – Bracket – 65909-962084
E – Cover – 65909-962083
F – Screw – 96906-35192-84

Figure 175. Engine access cover assembly – M274A1 – exploded view, and M274A2.

c. Handrail Assembly.

Note. The key letters shown below refer to figure 176.

Inspect the handrail assembly for bends, cracks, or broken welds. Inspect the corner fittings on the rear handrail assembly (G) and front handrail assembly (C) for straightness.

d. Starter Cable Handle, Rope, and Related Parts.

Note. The key letters shown below refer to figure 177.

Inspect starter cable handle (H) for damage. Inspect starter cable tube (B) and cable guide (F) for damage. Inspect rope for cuts or other damage.

85. Repair

Caution: Magnesium parts must be welded by the inert-gas metal-arc welding process (TM 9-237). Do not use ordinary welding procedures.

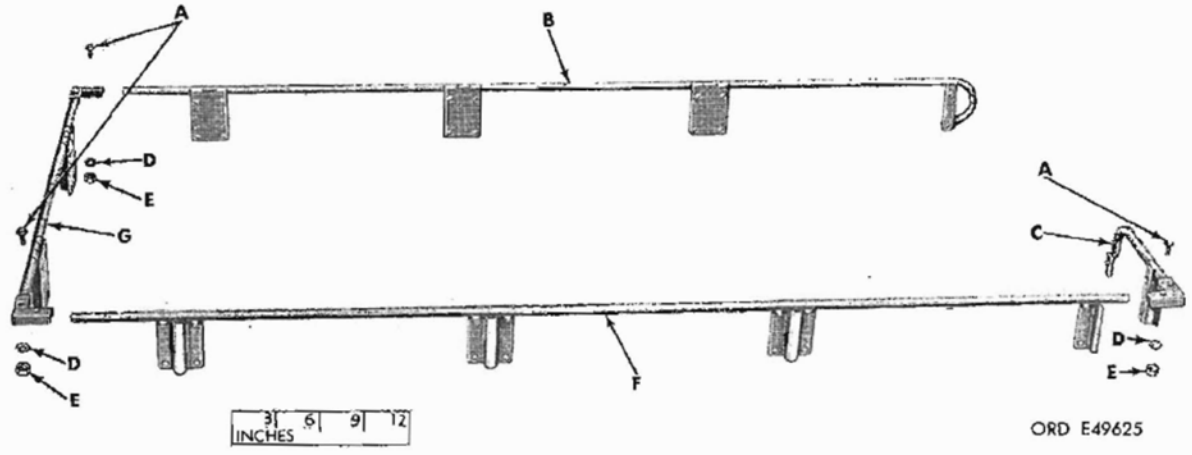
a. Platform, Frame, and Related Parts.

(1) Tube assemblies, rear supports, and front tube assemblies having minor dents may be straightened. Broken or cracked welds at flanges may be repaired by welding. Parts having deep dents, gouges or damaged flanges should be replaced.

(2) The front support assembly should be straightened if bent. Minor cracks or broken welds may be repaired by welding. Replace support assembly if it cannot be repaired.

(3) Supports having cracks or broken welds may be repaired by welding. Tighten or replace loose rivets. If the support is beyond repair, drill out old rivets from platform. Position shim and new support on under side of platform with the flange of the support extending forward. Secure with 1/4 x 11/16 round head rivets.

Note. The tube assemblies, rear supports, front tube assemblies, and platform supports are subject to severe stress, particularly when the vehicle is operating in rough terrain. If any damage exists that may cause failure to any of these parts, they should be replaced.

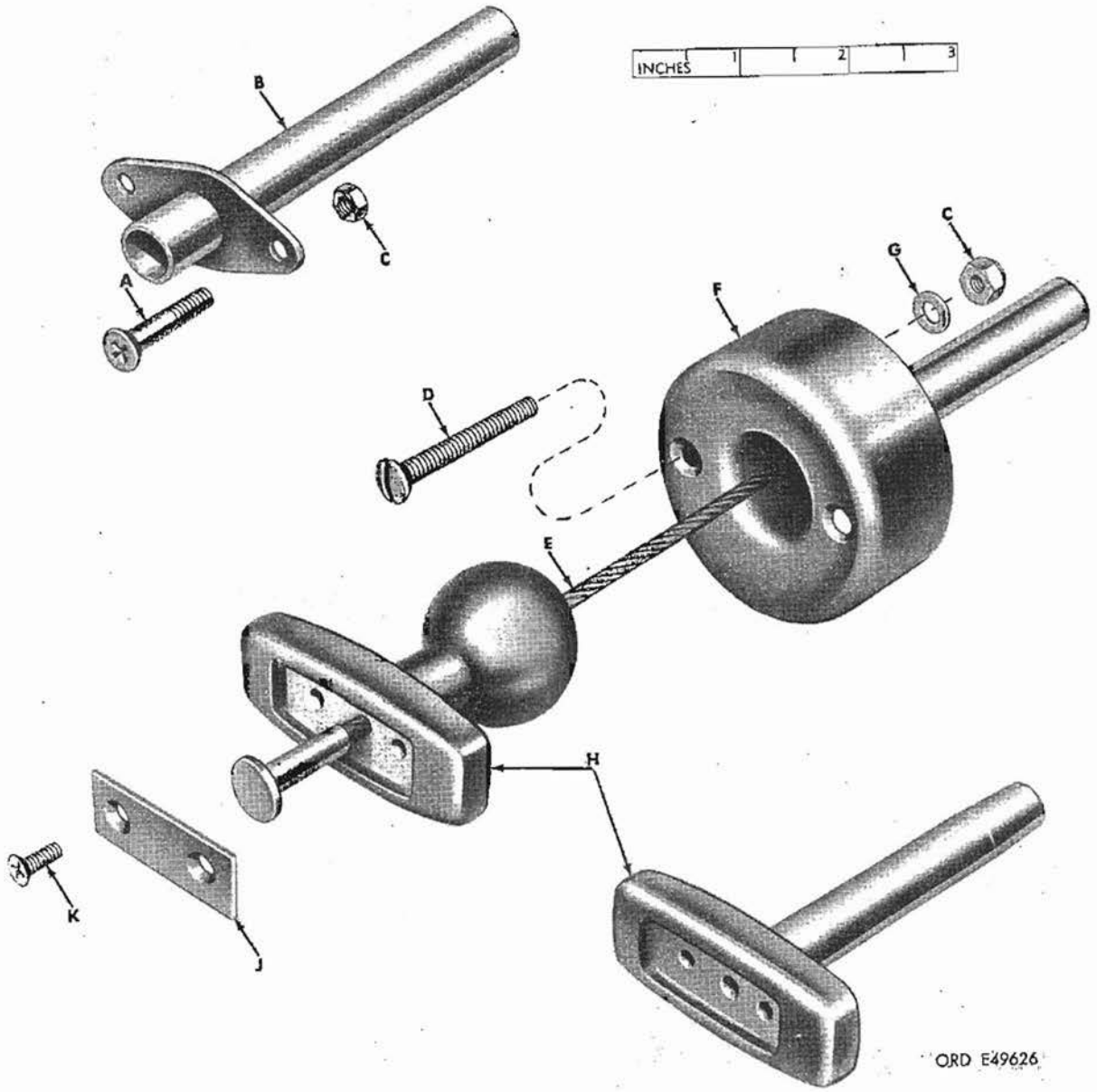


A – 3/8-24 x 1-1/4 assembled washer bolt – 8716890
B – Left handrail assembly – 8716895
C – Front handrail assembly – 7045717
D – 3/8-inch lock washer – 96906-35335-7
E – 3/8-24 plain square nut – 450510
F – Right handrail assembly – 8716894
G – Rear handrail assembly – 7966723

Figure 176. Handrail assembly – exploded view.

b. Platform Assembly.

(1) Straighten platform if bent. Reweld any broken welds between platform. Small holes may be repaired by welding. Minor thread damage to nuts may be corrected by using a tap.



A – 1/4-20 x 3/4 cross-recess pan head machine screw – 160541 (early M274)
B – Tube – 8336116 (early M274)
* C – ~~1/4-20 self-locking hexagon nut – 503267~~
* D – ~~1/4-20 x 2 oval head machine screw – 134444 (late M274 and M274A1)~~
* E – ~~Wire rope assembly~~
~~– 8730512 (early M274)~~
~~– 8764703 (late M274)~~
~~– 65909-924041 (M274A1)~~
* F – ~~Starter cable guide – 7045713 (late M274 and M274A1)~~
* G – ~~Washer – 96906-15795-210 (M274A1)~~
* H – Starter cable handle
– 7966976 (M274)
~~– 65909-923836 (M274A1)~~
* J – ~~Plate – 65909-923831~~
K – No. 8-32 x 7/16 flat head machine screw – 96906-35192-41

Figure 177. Starter cable handle, rope, and related parts – exploded view.

* Superseded by Ch. 1 – Par. 18

(2) Straighten rear lifting loops, front lifting loop, or guard if bent. Broken welds may be repaired by welding.

(3) Covers and lid may be straightened if bent. Replace damaged lock parts as required. If necessary to replace any lock catches, drill out old rivet, position new catch with rivet holes alined and secure with lock catch rivets.

(4) Replace starter cable handle, rope or related parts if any damage exists. If any of the parts, in figure 177, that are indicated for the early M274 require replacement, all of the parts for the early M274 should be replaced by the parts for the late M274. Refer to figure 188 for related parts that would require replacement at the same time.

c. Handrail Assembly. Straighten bent handrail assemblies. Minor cracks or broken welds may be repaired by welding. Replace damaged handrail assemblies.

86. Torque Wrench Specifications

Fig. No.	Ref. letter	Location	Torque lb-ft
168	M and Z	Tube assemblies to axle housings ---	35-45
	W	Front and rear supports to platform	20-30
	C	Front tube assemblies to front support assembly	20-30

Section V. ASSEMBLY OF FRAME AND BODY

87. General

The instructions on the assembly of the frame and body are almost identically the reverse of those covering disassembly. Therefore, the following assembly procedure, for the most part, will be referenced to the illustrations appearing under disassembly. When this occurs, the instructions appearing with each referenced illustration should be performed in the reverse order from which they are given. For example, callout letters A, B, C, D, and E indicate the sequence of the disassembly steps provided with figure 142. Assembly may be accomplished by performing these steps in reverse order; i.e., E, D, C, B, and A.

88. Assembly of Body Assembly

a. Install Rear Channel and Shim. Refer to figure 167 and reverse the sequence of instructions.

b. Install Starter Cable Metal Conduit and Handle. Refer to figures 164 through 166 and reverse the sequence of illustrations and instructions.

c. Install Lifting Loops. Refer to figures 162 and 163 and reverse the sequence of illustrations and instructions.

d. Install Handrail Assemblies. Refer to figures 159 through 161 and reverse the sequence of illustrations and instructions.

e. Install Anchor Pin Flanged Sleeve. Refer to figure 158 and reverse the sequence of instructions.

f. Install Transfer Linkage Hanger Assembly, Transmission Linkage Hanger Assembly, and Throttle Control Cable Bushing. Refer to figure 157 and reverse the sequence of instructions.

g. Install Tow Bar Bracket and Support. Refer to figures 155 and 156 and reverse the sequence of illustrations and instructions.

h. Assemble and Install Steering Access Lid Assembly, Gun Mount Opening Cover Assembly, and Engine Access Cover Assembly - M274A1. *Refer to figures 151 through 154 and reverse the sequence of illustrations and instructions.

*and M274A2.

i. Assemble and Install Steering Access Lid Assembly, Gun Mount Opening Cover Assembly, and Engine Access Cover Assembly - M274. Refer to figures 147 through 150 and reverse the sequence of illustrations and instructions.

Note. The flat washers provide adjustment of the locks in the platform. If lock is too tight, remove flat washers as necessary. If lock is too loose, add flat washers as necessary.

89. Assembly of Frame Assembly

Note. In assembling the support assemblies and tube assemblies to the body and axles it may be found convenient to tighten the assemblies fingertight. After parts are in place, tighten bolts and nuts to torque specified in paragraph 86.

a. Install Support Assembly. Refer to figures 144 through 146 and reverse the sequence of illustrations and instructions.

b. Install Front Tube Assemblies and Precleaner Assembly. Refer to figures 142 and 143 and reverse the sequence of illustrations and instructions.

Note. Install tube assemblies with smaller flanged end against support assembly and opposite end pointing downward.

c. Install Left and Right Rear Supports. Refer to figure 141 and reverse the sequence of instructions.

Note. Install left and right rear supports with the large flanged end against the mounting brackets and the opposite end pointing downward.

d. Install Left and Right Tube Assemblies. Refer to figures 139 and 140 and reverse the sequence of illustrations and instructions.

Note. Install stowage seat hook assemblies with hooked ends at outer side of left tube assembly. Install tube assemblies with welded brackets positioned at the nearest end of tube toward rear end of platform.

Section VI. INSTALLATION OF FRAME AND BODY

90. Installation of Frame and Body and Axle Housing Assemblies

Refer to figures 137 and 138 and reverse the sequence of illustrations and instructions. Tighten all bolts and nuts to the torque specified in paragraph 86.

91. Installation of Accessories and Related Parts on Frame and Body

a. Refer to figures 135 and 136 and reverse the sequence of instructions to install the choke control mounting plate and choke control and cable assembly.

b. Refer to figure 134 and reverse the sequence of instructions to install the choke conduit clamps.

c. Install brake flexible linkage as directed in TM 9-~~8034-20.~~ *

d. Install engine and starter rope pulley housing as directed in TM 9-~~8034-20.~~ *

e. Install ignition switch and cable as directed in TM 9-~~8034-20.~~ *

f. Install transmission and range control rod linkages as directed in TM 9-~~8034-20.~~ *

g. Install throttle cables and connect choke cable as directed in TM 9-~~8034-20.~~ *

h. Install starter rope as directed in TM 9-~~8034-20.~~ *

i. Install brake and shift lever support assembly as directed in TM 9-~~8034-20.~~ *

j. Install steering gear assembly, support, shaft, and wheel as directed in TM 9-~~8034-20.~~ *

k. Install driver's footrest assembly as directed in TM 9-2320-213-10.

l. Install driver's seat spring loaded cylinder fastener as directed in TM 9-~~8034-20.~~ *

m. Install driver's seat as directed in TM 9-2320-213-10.

n. Install fuel tank and line as directed in TM 9-~~8034-20.~~ *

o. Install air cleaner as directed in TM 9-~~8034-20.~~ *

p. Install mufflers as directed in TM 9-~~8034-20.~~ *

q. Install engine guard as directed in TM 9-~~8034-20.~~ *

* 2320-213-20.

CHAPTER 7
MISCELLANEOUS COMPONENTS

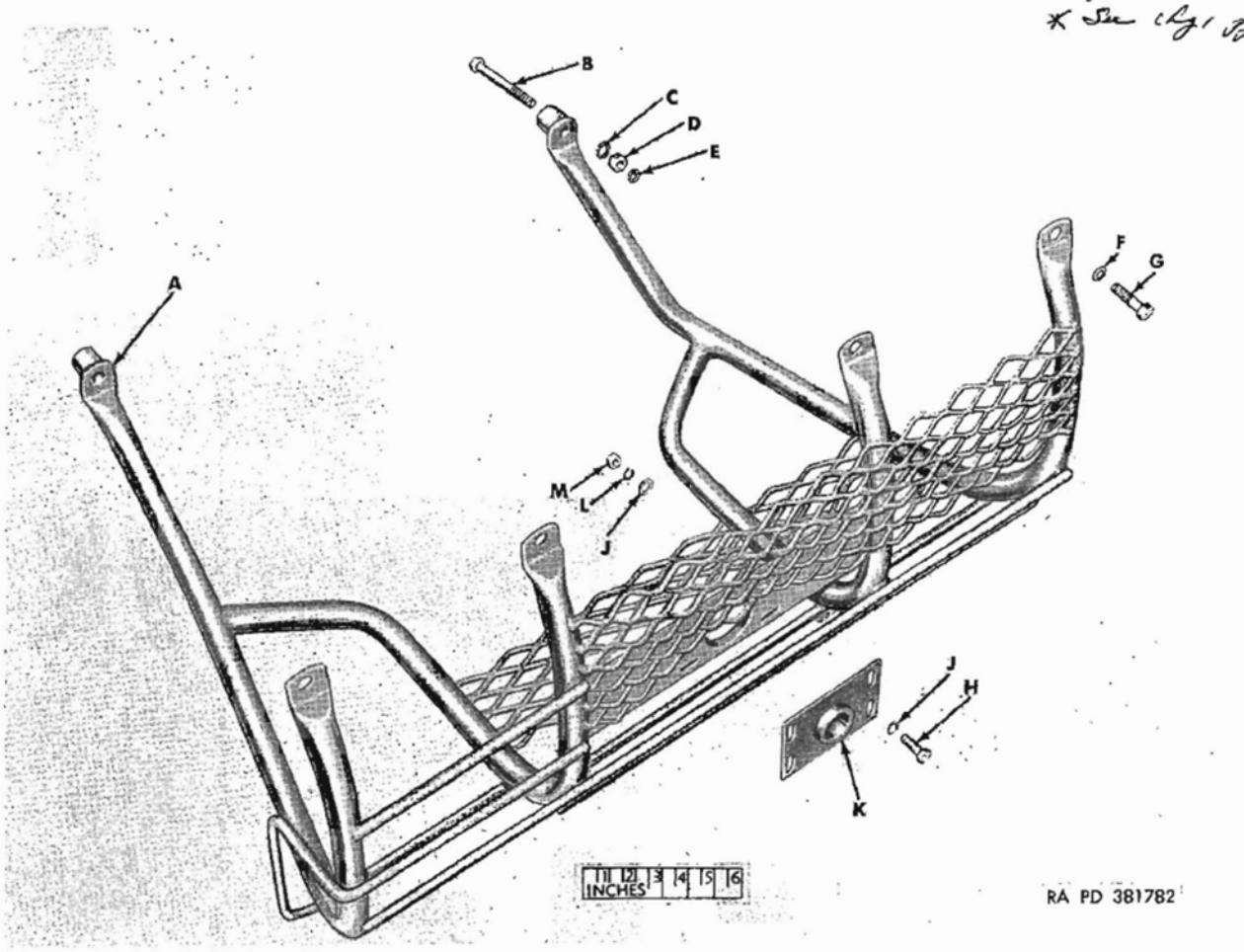
Section I. ENGINE GUARD

92. Description

a. General. The engine guard consists essentially of a welded assembly of tubing, rods, plates, and expanded metal. A plate attached to the guard provides a support for the hand crank.

b. Differences ~~Between~~ Among Models. The rear of the engine guard on the M274 is secured by two of the bolts supporting the transmission and axle assembly. The rear of the engine guard on the M274A1 is hooked onto brackets bolted to the transmission and axle assembly.* In ad-

* See Ch 1 33 20



A – Engine guard – 8687002
B – 7/16-20 x 4-1/2 hexagon head machine bolt – 187612
C – 7/16-inch lock washer – 120383
D – 7/16-20 plain hexagon nut – 120370
E – 7/16-20 hexagon stamped nut – 107824
F – 3/8-inch lock washer – 96906-35337-27
G – 3/8-24 x 7/8 hexagon head cap screw – 96906-35292-59
H – 5/16-24 x 7/8 machine bolt – 96906-35292-33
J – Flat washer – 96906-15795-212
K – Plate – 8336337
L – 5/16-inch lock washer – 96906-35338-26
M – 5/16-24 plain hexagon nut – 96906-35690-525

Figure 178. Engine guard assembly – M274 – exploded view.

dition, the hand crank is stored on the M274A1 engine guard.

93. Removal and Disassembly

a. Removal. Refer to TM 9-~~8034-20~~ 2320-213-20 for instructions covering removal of the engine guard.

b. Disassembly.

(1) On M274, remove four 5/16-24 plain hexagon nuts, 5/16-inch lock washers, flat washers, and 5/16-24 x 7/8 machine bolts and remove plate.

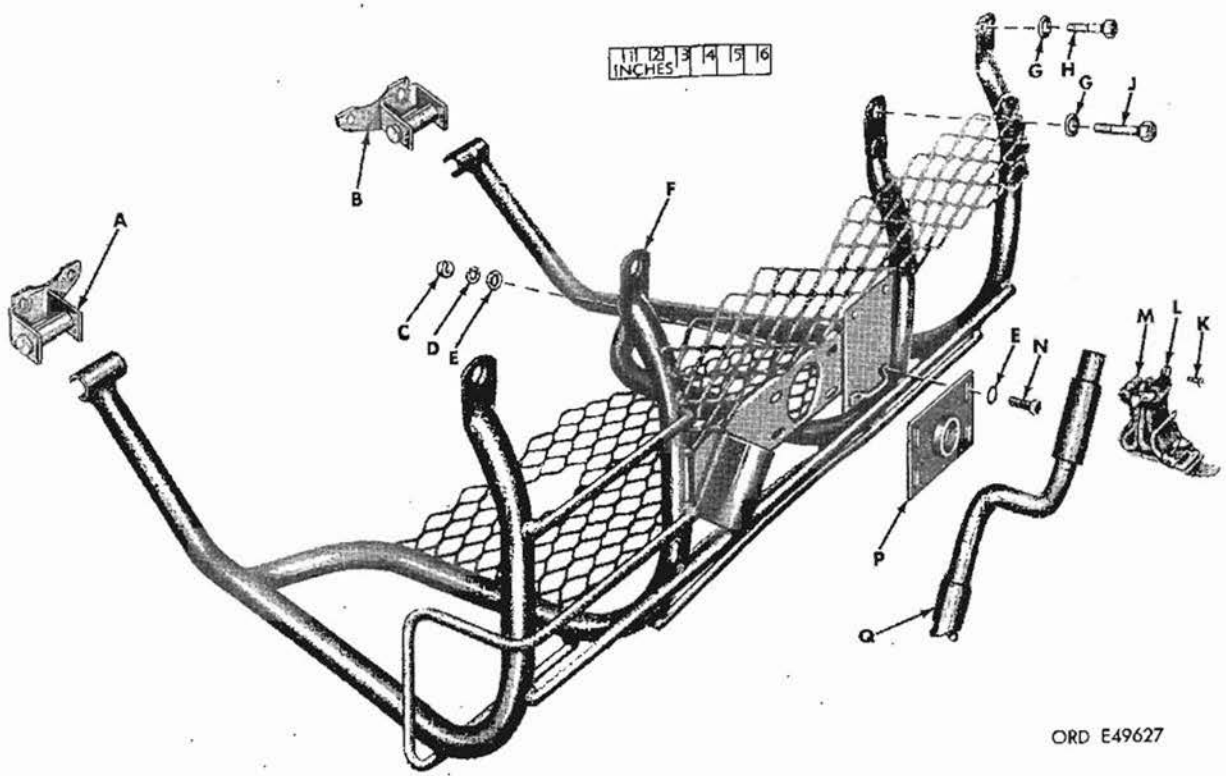
(2) On M274A1, loosen strap assembly and remove hand crank. Remove four screws and remove strap assembly and two loops. Remove four 5/16-24 plain hexagon nuts, 5/16-inch lock washers, flat washers, and 5/16-24 x 7/8 machine bolts and remove plate.

94. Cleaning, Inspection, and Repair

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove crust with a stiff bristle brush after dipping it in cleaning agent.

b. Inspection. Inspect engine guard (A, fig. 178 and F, fig. 179) for bent elements and cracked or broken welds. Inspect hand crank (Q, fig. 179) on M274A1, for damage.

c. Repair. Straighten any bent parts. Weld any parts of guard as required.



A – Left bracket assembly – 65909-924222
B – Right bracket assembly – 65909-924225
C – 5/16-24 plain hexagon nut – 96906-35690-525
D – 5/16-inch lock washer – 96906-35338-26
E – Flat washer – 96906-15795-212
F – Engine guard – 65909-9543000
G – 3/8-inch lock washer – 96906-35336-27
H – 3/8-24 x 1 hexagon head cap screw – 120647
J – 3/8-24 x 1-1/2 hexagon head cap screw – 120677
K – Screw – 155937
L – Loop – 7697591
M – Strap assembly – 65909-928467
N – 5/16-24 x 7/8 machine bolt – 96906-35292-33
P – Plate – 8336337
Q – Hand crank – 8336133

Figure 179. Engine guard assembly – M274A1 – exploded view.

ATTN: SEE CH 1 - 22 21 for fig. 179.1 added.

95. Assembly and Installation

Superseded by Ch 1-Pg 20

a. ~~On M274, position plate on front of engine guard and secure with four 5/16-24 x 7/8 machine bolts, flat washers, 5/16-inch lock washers, and 6/16-24 plain hexagon nuts.~~

b. On M274A1, position plate on front of engine guard and secure with four 5/16-24 x 7/8 machine bolts, flat washers, 5/16-inch lock washers, and 5/16-24 plain hexagon nuts. Position strap assembly and two loops on guard and secure with four screws. Place hand crank in holder and secure with the strap assembly.

c. On M274A2 install the engine guard as directed in the TM 9-2320-213-20.

Section II. DRIVER'S SEAT ASSEMBLY

96. Description

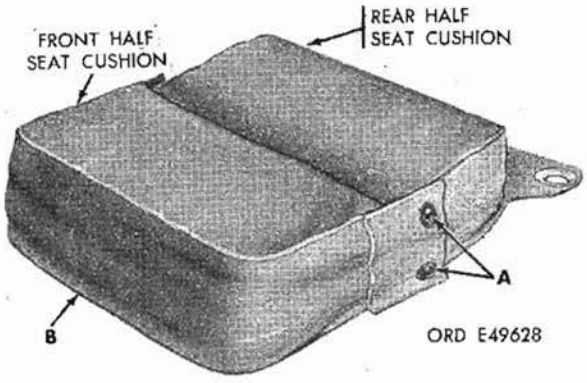
a. General. The driver's seat assembly consists of a two piece vehicular seat cushion assembly and a seat back rest assembly with two legs. The legs go through two grommets in a flap on the rear half vehicular seat cushion assembly and into holes in the platform.

b. Differences ~~Between~~ Among Models. The seat back rest assembly on the M274A1 has an ~~envelope assembly~~ publication bag for stowage. M274A2

97. Removal and Disassembly

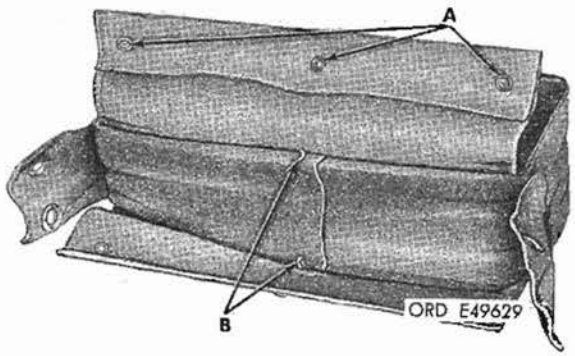
a. Removal. Refer to TM 9-2320-213-10 and remove the driver's seat assembly in accordance with that portion of the stowage instructions.

b. Disassembly. Refer to figures 180 through 183 for disassembly of the driver's seat assembly.



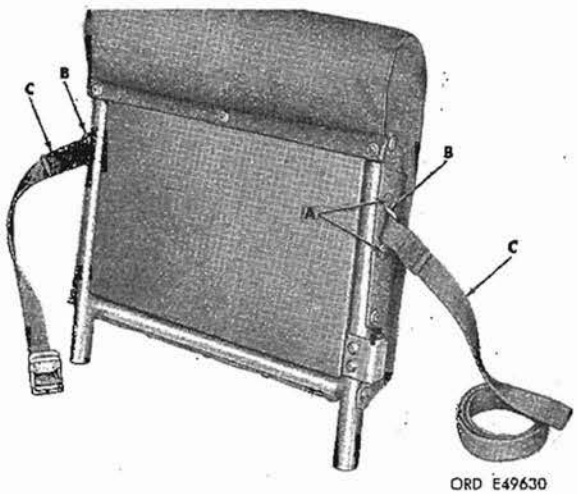
A – Turn four fasteners to a vertical position.
B – Pull front half seat cushion from rear half seat cushion.

Figure 180. Separating or connecting front and rear half seat cushion.



A – Separate the three snap fasteners.
B – Remove two clips and pull pad from cover assembly.

Figure 181. Disassembling or assembling vehicular seat cushions (front or rear).



A – Remove four thread forming tapping screws.
B – Remove two footman loops.
C – Remove straps from loops.

Figure 182. Removing or installing straps.

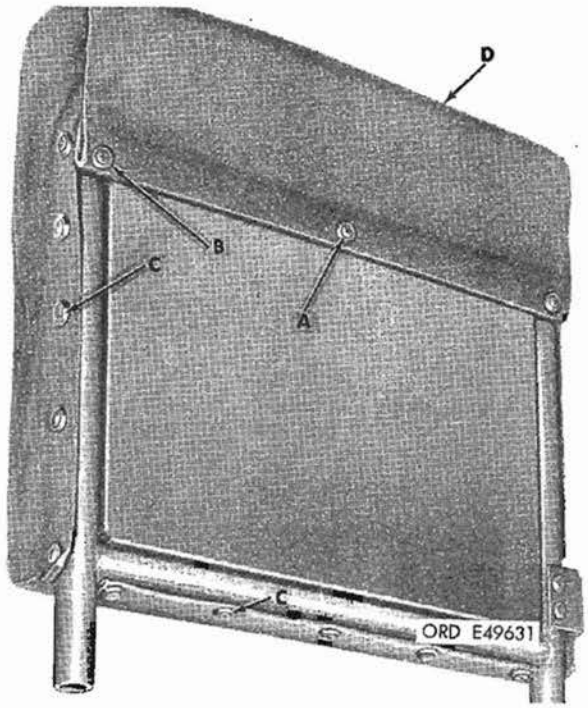


Figure 183. Instructions.

A – Remove three thread forming tapping screws and No. 10 finishing washers.

B – Remove reinforcement.

C – Remove 11 thread forming tapping screws and No. 10 finishing washers.

D – Remove cover assembly.

Figure 183. Removing or installing seat back rest cover assembly.

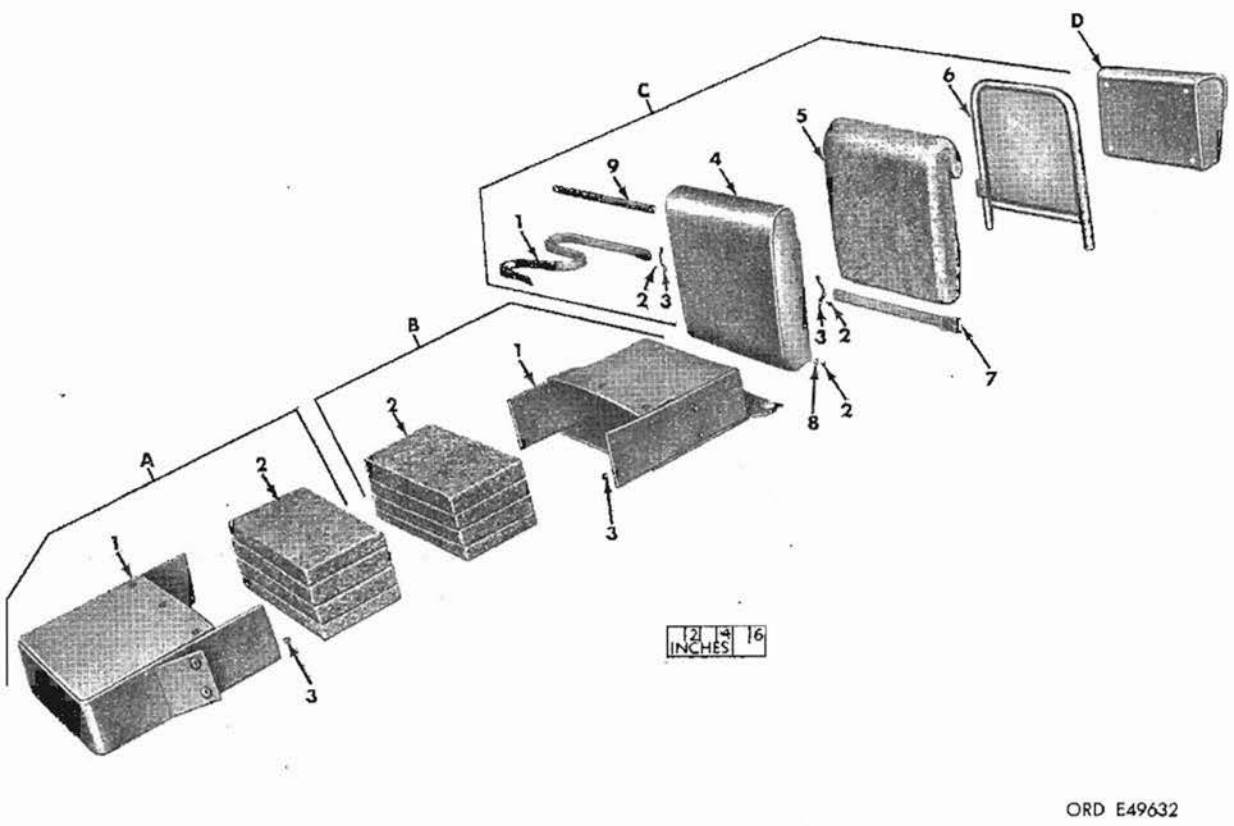


Figure 184. Driver's seat assembly – exploded view.

98. Inspection and Repair

Note. The key letters shown below refer to figure 184.

a. Inspection. Inspect cover assemblies (A-1, B-1, and C-4) for open seams or tears in canvas. Inspect pads (A-2, B-2, and C-5) for completeness and resiliency and for mold or other fungus growth. Inspect fasteners on cover assemblies for damage. Inspect straps (C-1 and C-7) for cuts or damage to buckles. Inspect back (C-6) for straightness or broken welds. Inspect socket on back, for spring loaded cylinder fastener, for damage or loose rivets.

b. Repair. Replace damaged fasteners or grommets in cover assemblies. If seams have opened or canvas has been torn, sew or patch as necessary. Replace cut or damaged straps. Straighten or weld damaged back. Tighten or replace rivets holding cylinder fastener socket.

99. Assembly and Installation

a. Assembly. Refer to figures 180 through 183 and reverse the sequence of illustrations and instructions.

b. Installation. Refer to TM 9-2320-213-10 for instructions covering unstowing of the driver's seat assembly.

A – Front half vehicular seat cushion – 8686975
- 1 – Cover assembly – 8686974
- 2 – Pad – 8336281
- 3 – Clip – 7697531 (M274)
  – 8336280 (M274A1)

B – Rear half vehicular seat cushion – 8686976
- 1 – Cover assembly – 8686979
- 2 – Pad – 8336281
- 3 – Clip – 7697531 (M274)
  – 8336280 (M274A1)

C – ~~Seat back rest assembly – 8686978 (M274) – 65909-962140 (M274A1)~~ *
- ~~1 – Webbing strap – 547617 (M274) – 8336415 (M274A1)~~
- 2 – Thread forming tapping screw – 111687 (M274) – 445563 (M274A1)
- 3 – Footman loop – 7697591
- 4 – Cover assembly – 8686977
- 5 – Pad – 8336282
- 6 – Back – 94537-699056 (M274) – 65909-962094 (M274A1)
- 7 – Leather strap – 592636 (M274) Webbing strap – 8336416 (M274A1)
- 8 – No. 10 finishing washer – 140241 (M274) – 140252 (M274A1)
- 9 – Reinforcement – 94537-699427 (M274) – 65909-962181 (M274A1)

* D – Envelope assembly – 65909-962257 (M274A1 only)

Figure 184 – Continued.

* Superseded by Ch. 1 Sep 72

Section III. FOOTREST ASSEMBLY AND RELATED PARTS

100. Description

a. General. The footrest assembly is a tubular framework which serves, not only as a footrest for the driver, but as a support for the accelerator, clutch, and brake controls. The footrest is mounted to the body and, for shipping purposes, may be removed and stowed under the body.

b. Differences Between Models. The footrest assembly on the M274 has one clamping bolt and a clip for storing the hand crank. The footrest assembly on the M274A1 has two clamping bolts and a wire screen is welded to the tubular framework.

101. Removal and Disassembly

a. Removal. Refer to TM 9-2320-213-10 for instructions covering the removal of the footrest assembly.

b. Disassembly. Refer to TM 9-~~8034~~-2320-213-20 for instructions covering the disassembly of the footrest assembly and related parts.

102. Cleaning, Inspection, and Repair

Note. The key letters shown below refer to figure 185.

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts with a stiff bristle brush that has been dipped in the cleaning agent.

b. Inspection.

(1) Inspect footrest assembly (A) for bent, dented, or otherwise damaged tubing or brackets and for broken welds.

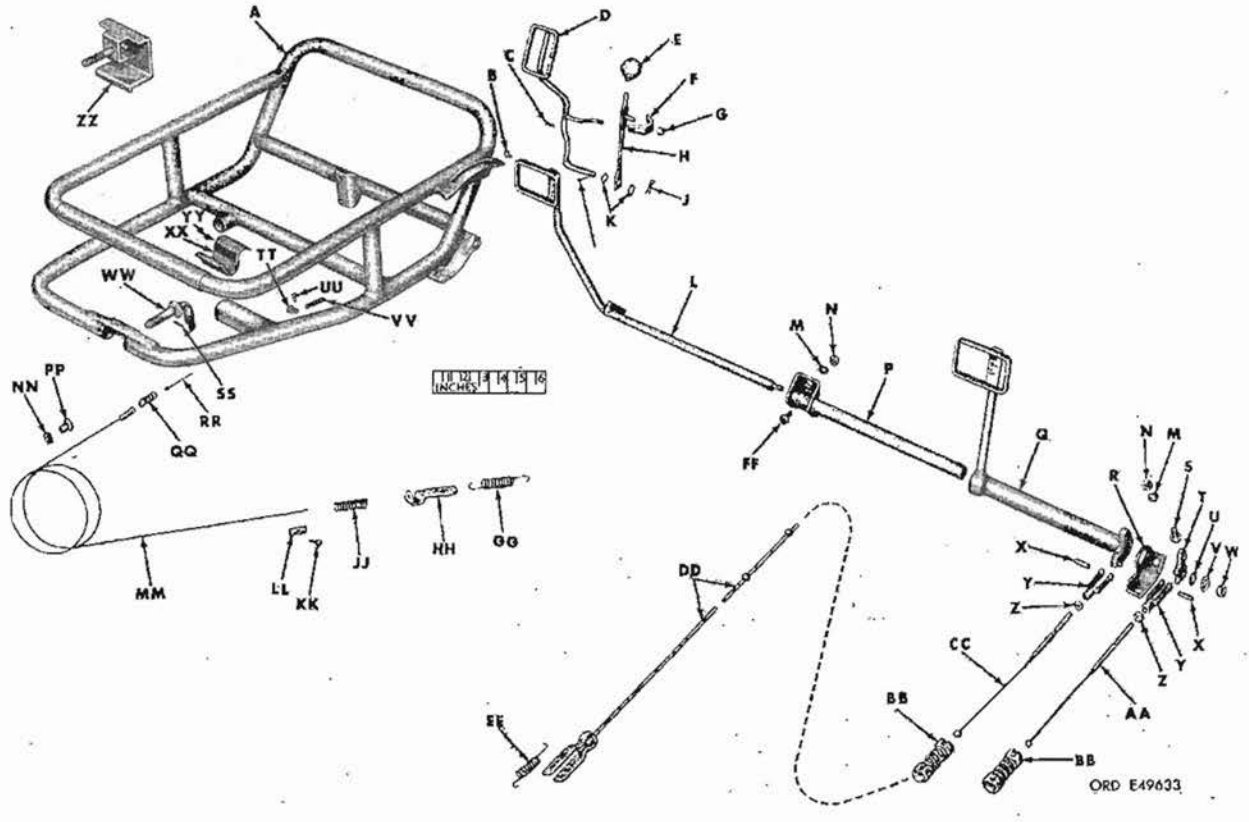


Figure 185. Footrest assembly and related parts — exploded view.

(2) Inspect the accelerator pedal assembly (D), clutch pedal assembly (L), brake pedal assembly (Q), brake pedal bracket and bushing assembly (P), and hand throttle lever assembly (H) for bends, dents, or broken welds.

(3) Inspect support (R), clutch pedal lever (T), and rod end clevis (Y) for bends or cracks. Inspect threads and spring pin holes in clevises for damage.

(4) Inspect clutch flexible linkage (AA), brake flexible linkage (CC), and throttle control cable (RR) for kinks or damage to ball end and threaded end. Inspect quick disconnect wire rope couplings (BB) and quick disconnect connector (QQ) for corrosion or damaged sleeves or springs.

(5) Inspect spring tension clip (F) for bends or cracks. Be sure it is of proper shape and strength to prevent the hand throttle lever from slipping on the sector because of vehicle vibration.

c. Repair. Straighten bent tubes on footrest and weld cracked or broken welds. Straighten or weld damaged pedal assemblies or lever assembly. Use a tap or die to repair damaged threads in clevises and linkage.

103. Assembly and Installation

a. Assembly. Refer to TM 9-8034-20 for assembly of the footrest assembly and related parts.

b. Installation. Refer to TM 9-2320-213-10 for installation of the footrest assembly.

A – ~~Footrest assembly~~ – ~~7966715 (M274)~~ – ~~65909-962149 (M274A1)~~ *
B – ~~No. 10 flat washer – 96906-15795-208~~ *
C – 3/16 x 31/64 headed straight pin – 138082 (M274 only)
D – ~~Accelerator pedal assembly~~ – ~~7966664 (M274)~~ – ~~65909-922919 (M274A1)~~ *
E – Throttle lever knob – 8687091
F – Spring tension clip – 7966773
G – ~~5/16-24 hexagon self-locking nut~~ * ~~96906-20365-524C~~
H – Hand throttle lever assembly – 7966772
J – ~~3/32 x 3/4 cotter pin – 121222~~ *
K – ~~3/8-inch flat washer – 96906-15795-214~~ *
L – ~~Clutch pedal assembly~~ – ~~7966613 (M274)~~ – ~~65909-933626 (M274A1)~~ *
M – 5/16-inch lock washer – 96906-35338-26
N – 5/16-inch plain hexagon nut – 96906-35690-525
P – ~~Brake pedal bracket and bushing assembly – 7966939~~ *
Q – ~~Brake pedal assembly – 7045694~~ *
R – Support – 7966935
S – 5/16-24 x 11/16 hexagon head cap screw – 123480
T – Clutch pedal lever – 7966615
U – 5/16-inch flat washer – 96906-15795-212
V – 5/16-inch lock washer – 96906-35338-26 (M274 only)
W – 5/16-24 plain hexagon nut – 96906-35690-525 (M274)
5/16-24 hexagon self-locking nut – 442826 (M274A1)
X – ~~Spring pin – 7380079~~ *
Y – Rod end clevis – 116383
Z – 1/4-28 plain hexagon nut – 96906-35690-425
AA – ~~Clutch flexible linkage – 7055672~~ *
BB – Quick disconnect wire rope coupling – 7966855
CC – ~~Brake flexible linkage – 7966497~~ *
DD – ~~Flexible linkage assembly~~ – ~~7966938 (M274)~~ – ~~65909-923506 (M274A1)~~ *
EE – Spring – 7371011
FF – 5/16 x 3 machine bolt – 96906-35292-32
GG – Spring – 7966651 (M274) – 641727 (M274A1)
HH – Link – 94537-914869 (M274) – 65909-927289 (M274A1)
JJ – Spring – 7049713
KK – Screw – 153411
LL – Wire block – 65909-927287
MM – ~~Rear throttle control cable – 65909-925099~~ *
NN – Sheet spring nut – 445176
PP – Sleeve bushing – 8336159
QQ – Quick disconnect connector – 7966665
RR – ~~Front throttle control cable – 7966825 (M274) – 65909-925098 (M274A1)~~ *
SS – 0.125 x 7/8 spring pin – 96906-9048-104
TT – Clip – 120520 (M274 only)
UU – No. 10 x 3/8 thread forming tapping screw – 163210 (M274 only)
VV – Conduit – 94537-906843 (M274 only)
WW – ~~Footrest clamping bolt – 8336288~~ *
XX – Clip – 908482 (M274 only)
YY – Screw – 24617-9404740 (M274 only)
ZZ – ~~Bracket and clamp screw assembly – 65909-962139 (M274A1 only)~~ *

Figure 185 – Continued. * Superseded by Ch. 1-Pg 22 & 23.

Section IV. PROPELLER SHAFT

104. Description

The propeller shaft is the tubular type with universal joint at each end. The rear end has a splined yoke assembly which slides onto the splined drive pinion in the transmission. The front end has a yoke which bolts to the companion flange and brake drum. Universal joints are of the Cardan type.

105. Removal and Disassembly

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal and disassembly of the propeller shaft.

106. Cleaning, Inspection, and Repair

Note. The key letters shown below refer to figure 186.

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Remove hard crusts from shaft with a stiff bristle brush that has been dipped in the cleaning agent. Dry parts, except bearings, with dry compressed air.

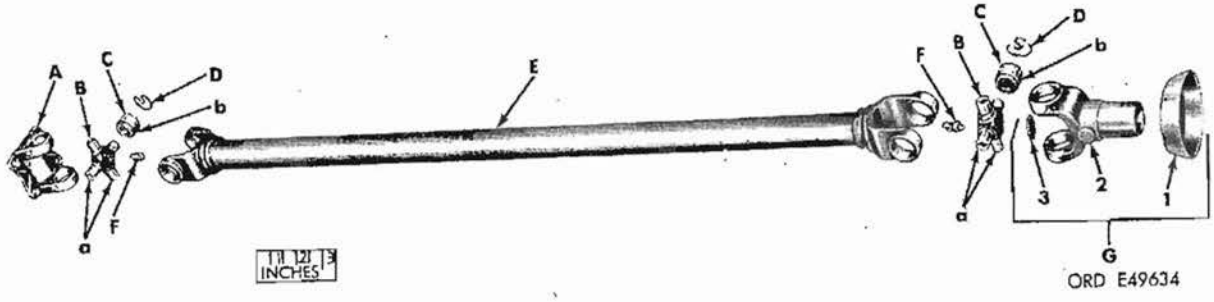
Caution: Bearings must not be dried or spun with compressed air. Refer to TM 9-214 for care and maintenance of bearings.

b. Inspection. Inspect shaft (E) for straightness or dents. Inspect yoke (A) and yoke assembly (G) for distortion. Inspect splines in yoke (G-2) for burs, nicks, or scratches. Inspect bearing assemblies (C) and journals (B) for roughness and against limits specified in repair and rebuild standards (par. 107).

c. Repair. Minor nicks or burs on splines in the yoke may be removed with a fine mill file. Use a crocus cloth to remove any roughness in journal surfaces.

107. Repair and Rebuild Standards

a. General. Refer to paragraph 23.



A – Yoke – 7993028
B – Journal – 7966738
C – Bearing assembly – 7966733
D – Retaining ring – 8333675
E – Shaft – 65909-120120 (M274)
– 65909-923572 (M274A1)
F – Lubrication fitting
– 504207 (M274)
– 96906-15001-4 (M274A1)
G – Yoke assembly – 7966735
1 – Shield – 7966745
2 – Yoke – 7966736
3 – Plug – 7739743

Figure 186. Propeller shaft assembly – exploded view.

b. Propeller Shaft Assembly.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
186	a	Diameter of journal bearing ----------	0.5055 to 0.5060	0.505
	b	Inside diameter of bearing assembly ---	0.5062	*
	a-b	Fit of journals in bearings ----------	0.0002L to 0.0007L	0.0012L

108. Assembly and Installation

Refer to TM 9-~~8034-20~~ 2220-213-20 for assembly and installation of the propeller shaft.

Section V. BRAKE AND SHIFT LEVER SUPPORT ASSEMBLY

109. Description

The brake and shift lever support assembly consists of the support assembly together with the handbrake lever assembly, transmission gear shift lever, and range gear shift lever. Complete assembly is mounted on front support assembly.

110. Removal and Disassembly

Refer to TM 9-~~8034-20~~ 2220-213-20 for removal and disassembly of the brake and shift lever support assembly.

111. Cleaning, Inspection, and Repair

Note. The key letters shown below refer to figure 187.

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner and dry with compressed air.

b. Inspection.

(1) Inspect handbrake lever assembly (C) for straightness or dents. Make sure the teeth of the ratchet and pawl are not damaged. Inspect the bore of the lever to the limits specified in repair and rebuild standards (par. 112). Inspect latch spring for breaks or being stretched out of shape.

(2) Inspect transmission gear shift lever (D) for dents or cracks. Inspect the bore to the limits specified in repair and rebuild standards (par. 112).

(3) Inspect support assembly (H) for cracks or broken welds. Inspect the shafts to the limits specified in repair and rebuild standards (par. 112).

(4) Inspect bores of gear shift lever brackets (J and M) and lever pivot block (S) to the limits specified in repair and rebuild standards (par. 172). Inspect bracket pins for looseness and to limits specified in repair and rebuild standards (par. 172).

(5) Inspect range gear shift lever (K) for dents or cracks. Inspect bore in lever, headed straight pin (L), and bore in lever block to the limits specified in repair and rebuild standards (par. 172).

c. Repair. Replace latch spring on handbrake lever assembly if it is stretched out of shape. Cracks or broken welds in support assembly may be welded.

112. Repair and Rebuild Standards

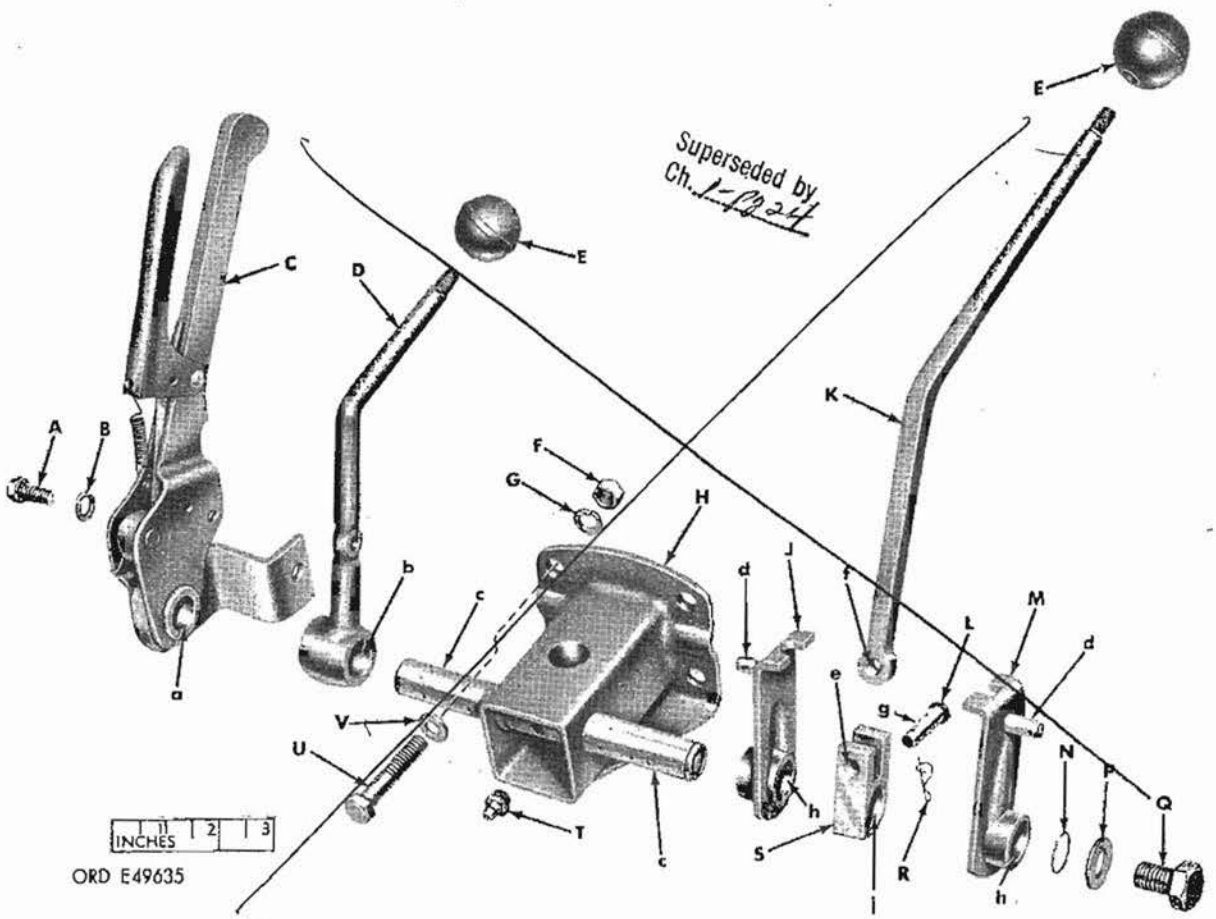
a. General. Refer to paragraph 23.

b. Brake and Shift Lever Support Assembly.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
187	a	Inside diameter of bore in handbrake lever assembly	0.756 to 0.760	0.765
	b	Inside diameter of bore in transmission gear shift lever	0.749 to 0.751	0.760
	c	Diameter of shafts on support assembly	0.746 to 0.748	0.740
	a-c	Fit of lever on shaft	0.008L to 0.014L	0.025L
	b-c	Fit of lever on shaft	0.001L to 0.005L	0.020L
	d	Diameter of pins on gear shift lever brackets	0.3089 to 0.3094	0.308
	e	Inside diameter hole in lever pivot block	0.3115 to 0.3135	0.314
	f	Inside diameter bore in range gear shift lever	0.3115 to 0.3135	
	g	Diameter of headed straight pin	0.3105 to 0.312	0.309
	e-g	Fit of block on pin	0.005T to 0.003L	0.005L
	f-g	Fit of lever on pin	0.005T to 0.003L	0.005L
	h	Inside diameter of bore in gear shift lever brackets	0.750 to 0.755	0.760
	h-c	Fit of bracket on shaft	0.002L to 0.009L	0.020L
	j	Inside diameter of bar in lever pivot block	0.749 to 0.751	0.755
	j-c	Fit of block on shaft	0.001L to 0.005L	0.015L

113. Assembly and Installation

Refer to TM 9-~~8034-20~~ 2220-213-20 for assembly and installation of the brake support lever assembly.



A – 3/8-16 x 5/8 hexagon head cap screw – 96906-35291-57
B – 3/8-inch lock washer – 96906-35337-27
C – Handbrake lever assembly – 7966769
D – ~~Transmission gear shift lever – 7966634~~ *
E – ~~Shift lever knob – 7697491 (M274)~~ – ~~8687091 (M274A1)~~ *
F – 3/8-24 plain hexagon nut – 96906-35690-625
G – 3/8-inch lock washer – 96906-35338-46
H – ~~Support assembly~~ – 8336039 (M274) – 65909-933709 (M274A1)
J – Gear shift lever bracket – 7966671 (M274) * – 65909-927459 (M274A1)
K – Range gear shift lever – 7966633 (M274) – 65909-927458 (M274A1)
L – ~~Headed straight pin – 590929 (M274)~~ – ~~7966676 (M274A1)~~
M – ~~Gear shift lever bracket – 7966671 (M274)~~ * – ~~65909-927446 (M274A1)~~
N – Retaining ring – 583039 (M274 only)
P – ~~1/2-inch flat washer – 120396 (M274A1 only)~~ *
Q – ~~1/2-20 x 5/8 hexagon head bolt – 65909-933809 (M274A1 only)~~ *
R – Clip – 8332074
S – Lever pivot block – 8336176
T – Lubrication fitting – 96906-15003-1
U – 3/8-24 x 2-1/2 hexagon head cap screw – 120640
V – 7/16-inch flat washer – 120388

Figure 187. Brake and shift lever support assembly – exploded view.

* Superseded by Ch. 1-CR25

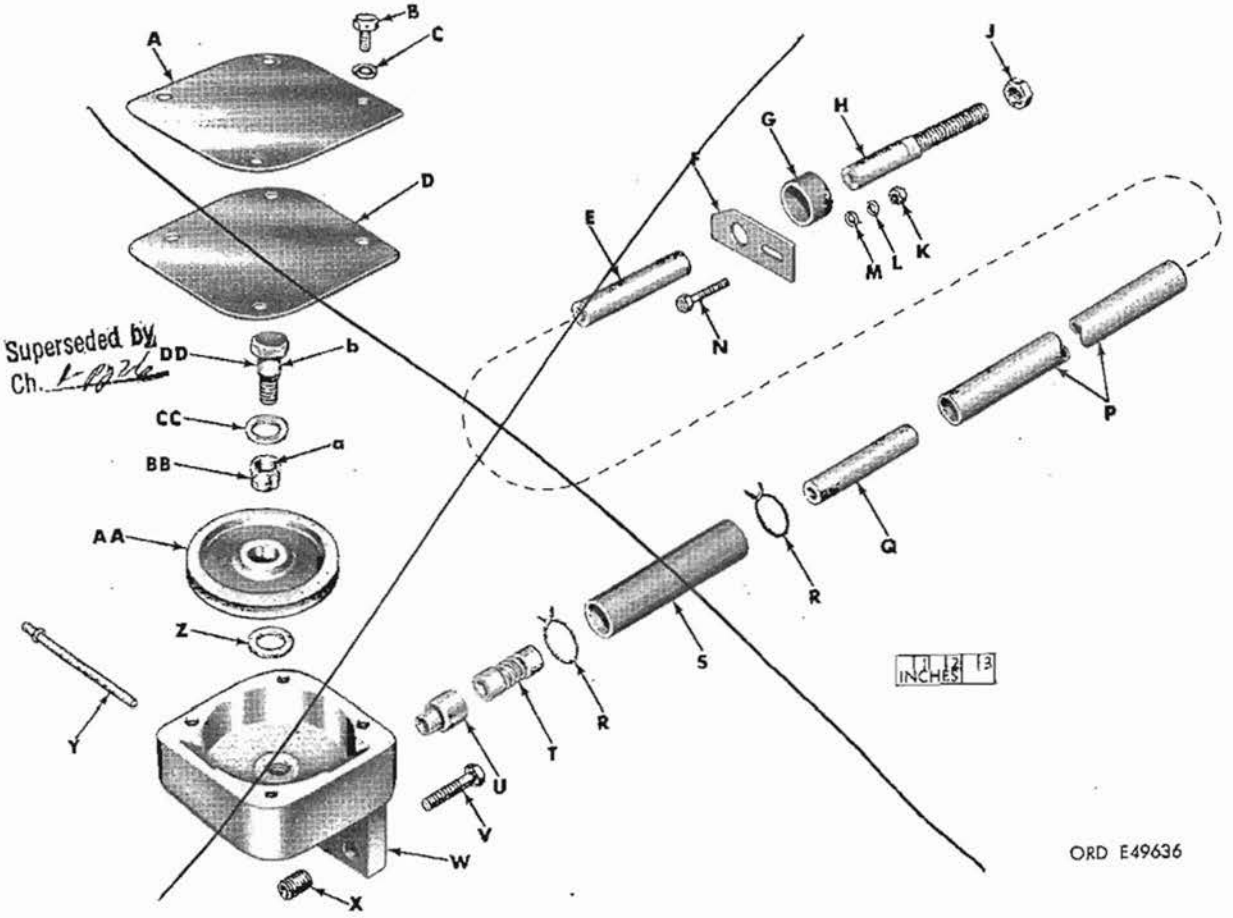
Section VI. STARTER CABLE PULLEY AND RELATED PARTS

114. Description

The starter cable pulley consists of a grooved pulley enclosed in a housing secured on the rear face of the right support tube assembly. The metal conduit encloses the cable under the platform. The pulley serves only as an idler, to change the axial direction of the cable 90 degrees from across the vehicle to lengthwise of the vehicle.

Wear Limits

65
60
40
25L
20L
08
14
09
05L
05L
60
20L
0.755
15L



Superseded by Ch. 1-1926

A – Cover – 8336115
B – ~~1/4-20 x 1/2 hexagon head cap screw – 120706~~
C – 1/4-inch lock washer – 96906-35338-25
D – Gasket – 8336114
E – Sleeve bushing – 7045715 (late M274 and M274A1)
Spring – 8336121 (early M274)
F – Clip – 7045633
G – Dust and moisture seal boot – 7045655 (late M274 and M274A1)
H – Cable adjusting stop – 7045660 (late M274 and M274A1)
J – 1/2-13 plain hexagon nut – 96906-35691-802 (late M274 and M274A1)
K – 1/4-20 plain hexagon nut – 96906-35690-405
L – 1/4-inch lock washer – 96906-35337-25
* M – ~~1/4-inch flat washer – 96906-15795-210~~
N – 1/4-20 x 1 hexagon head cap screw – 96906-35291-8

* P – ~~Metal conduit~~
– 8336122 (early M274)
– 7045654 (late M274 and M274A1)
Q – End plug – 65909-924639 (M274A1)
* R – ~~Hose clamp – 7045633~~
* S – ~~Rubber tubing – 80244-33-T-244~~
T – Quick disconnect – 7966837
U – Bushing – 8336112
* V – ~~3/8-24 x 1 3/4 hexagon head cap screw – 120668~~
* W – ~~Pulley housing – 8687094 (M274)~~
– 8336105 (M274A1)
X – Insert – 452724
Y – Guide – 94537-911646 (M274)
– 65909-933951 (M274A1)
* Z – ~~3/8-inch flat washer~~
AA – ~~Pulley – 65909-911235 (M274)~~
– ~~65909-933948 (M274A1)~~
BB – Sleeve bearing – 8687088
CC – 1/2-inch flat washer – 8687087
DD – Shoulder bolt – 8336125

Figure 188. Starter cable pulley and related parts – exploded view.

* Superseded by Ch. 1-1926 + 27

115. Removal

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal and partial disassembly of the starter cable pulley. Refer to paragraph 82i for removal of the metal conduit and for the explanation of the "early" and "late" M274 vehicle designation.

116. Cleaning, Inspection, and Repair

Note. The key letters shown below refer to figure 188.

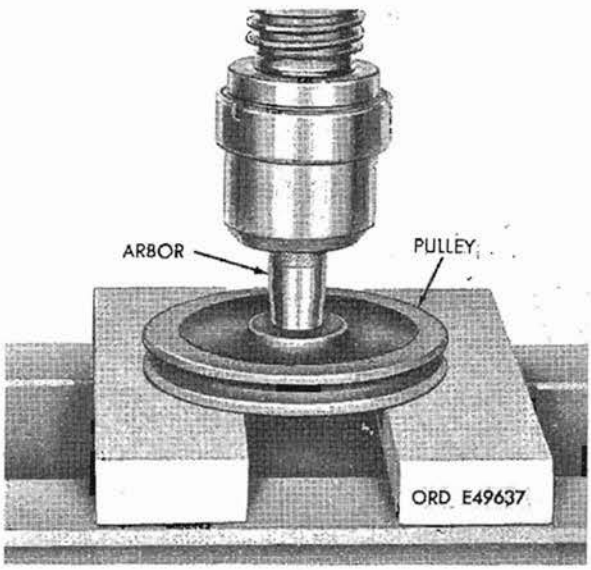
a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner and dry with compressed air.

b. Inspection. Inspect pulley housing (W) for cracks or damaged threads in mounting hole. Inspect bushing (U) and insert (X) in housing for looseness or damage. Inspect sleeve bearing (BB) in pulley (AA) to the limits specified in repair and rebuild standards (par. 117). Inspect shoulder bolt to the limits specified in repair and rebuild standards (par. 117). Inspect cover (A) for flatness. Inspect pulley for burs or nicks.

c. Repair. Cracks in pulley housing may be welded. Damaged threads may be corrected with a tap. Remove burs or nicks from pulley with a fine mill file. If sleeve bearing (BB) in pulley (AA) is beyond limits specified, remove bearing as shown in figure 189 and install a new bearing by reversing the removal procedure. If bushing (U) and insert (X) require replacement, remove these parts as instructed in figure 190 and install new parts by reversing the removal procedure. If any of the parts for the early M274 vehicle, in figure 188, require replacement, replace all parts for the early M274 with all the parts for late M274. Refer to paragraph 85 for related parts that would require replacement at the same time.

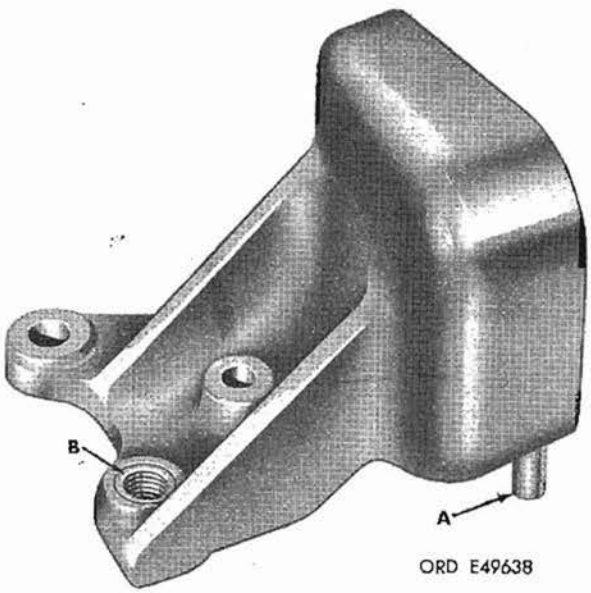
117. Repair and Rebuild Standards

a. General. Refer to paragraph 23.



Press sleeve bearing from pulley.

Figure 189. Removing or installing sleeve bearing.



A – Pull bushing from housing.

B – Remove insert from housing.

Figure 190. Removing or installing bushing and insert.

b. Starter Cable Pulley.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
188	a	Inside diameter of sleeve bearing	0.499 to 0.500	0.504
	b	Diameter of shoulder bolt	0.495 to 0.497	0.490
	a-b	Fit of bearing on bolt	0.002L to 0.005L	0.014L

118. Installation

Refer to TM 9-~~8034=20~~ 2320-213-20 for partial assembly and installation of the starter cable pulley. Refer to paragraph 88b for installation of the metal conduit.

Section VII. TOW BAR

119. Description

The tow bar is of tubular all welded construction. When in use, it is secured to the tow bar bellcrank by a clevis pin installed through holes in the bellcrank and the rear end of the tow bar. When not in use, it is stowed beneath the body in the support and tow bar bracket.

120. Removal

Refer to TM 9-2320-213-10 for removal of the tow bar. Refer to paragraph 82c for removal of the tow bar bracket and support.

121. Cleaning, Inspection, and Repair

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner and dry with compressed air.

b. Inspection. Inspect the tow bar (C, fig. 191) for dents or cracks. Inspect welds for breaks. Inspect the clevis pin hole to the limits specified in repair and rebuild standards (par. 122). Inspect support and tow bar bracket for dents or broken welds.

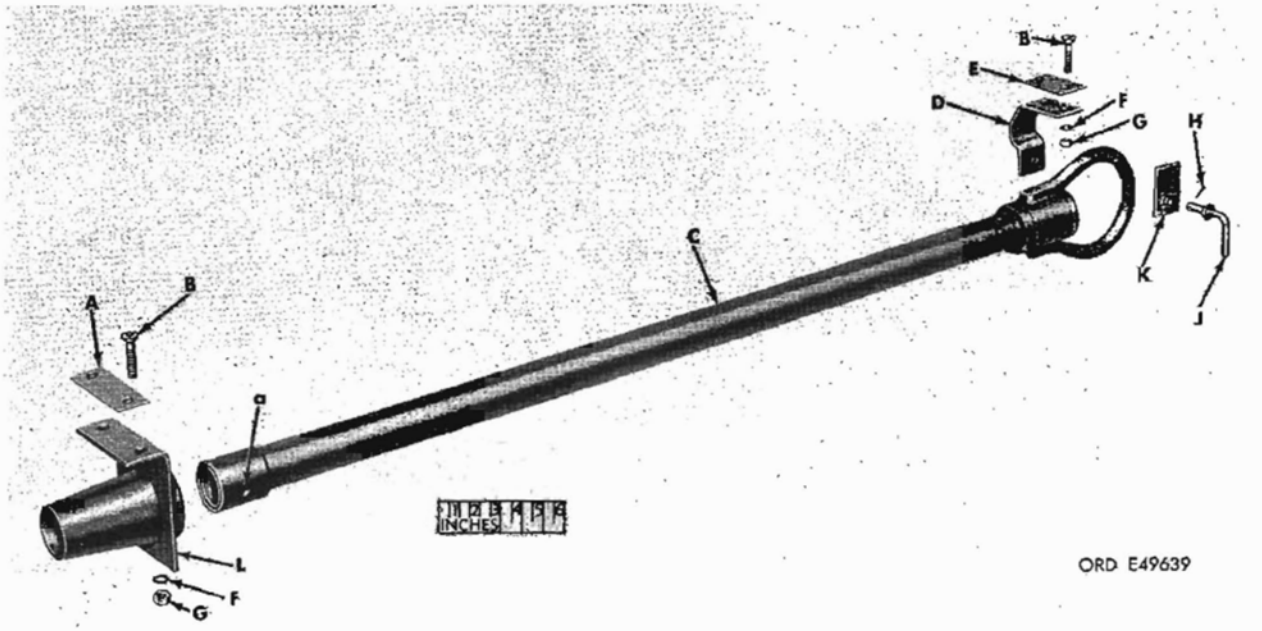
c. Repair. Straighten or weld damaged tow bar. Straighten or weld damaged support or tow bar bracket.

122. Repair and Rebuild Standards

a. General. Refer to paragraph 23.

b. Tow Bar.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
191	a	Inside diameter of clevis pin hole --------	0.497 to 0.507	0.510
		Fit of tow bar on clevis pin ----------	0.001L to 0.016L	0.0256



A – Shim – 8336359
B – ~~5/16-24 x 1-1/2 machine screw~~ – * 96906-35193-88
C – Tow bar – 8336026
D – ~~Tow bar bracket – 8696999~~ *
E – Shim – 8336358
F – ~~5/16-inch lock washer – 96906-35338-26~~ *
G – 5/16-24 plain hexagon nut – 96906-35690-525
* H – ~~Cotter pin – 121222~~
J – Locking hook bolt – 8686998
K – Plate – 7049686
L – Support – 8336289

Figure 191. Tow bar and related parts – exploded view.

* Superseded by Ch. 1-02 28

123. Installation

Refer to TM 9-2320-213-10 for installation of the tow bar. Refer to paragraph 88g for installation of the two bar bracket and support.

Section VIII. FUEL TANK

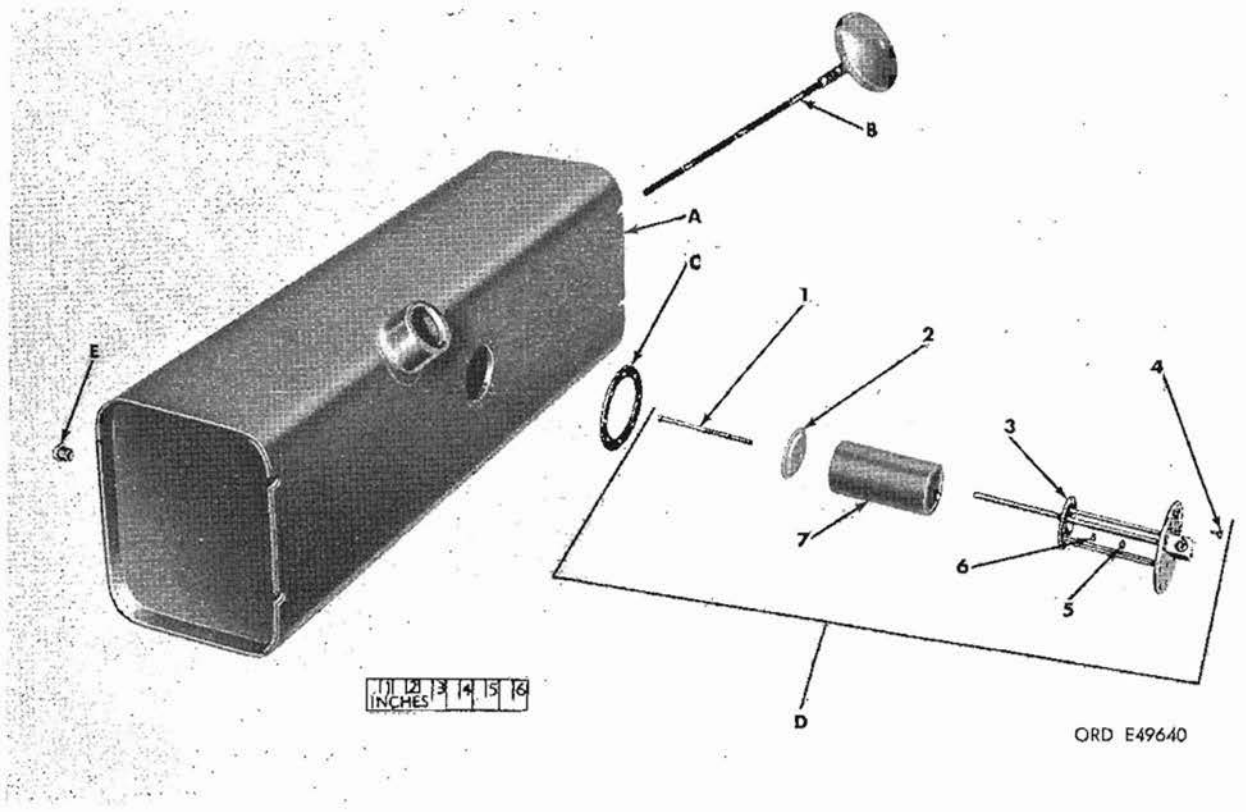


Figure 192. Fuel tank, fuel filter, and related parts — exploded view.

124. Description

The fuel tank consists of a welded and soldered tank, together with a filter assembly and gage rod.

125. Removal and Disassembly

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal and disassembly of the fuel tank.

126. Cleaning, Inspection, and Repair

Note. The key letters shown below refer to figure 192.

a. Cleaning. Wash all parts in dry-cleaning solvent or mineral spirits paint thinner. Use a stiff bristle brush to remove accumulations of dirt or grease from the fuel tank.

b. Inspection. Inspect fuel tank (A) for dents, leaks, or breaks in the welds or soldered joints. Inspect gage rod (B) for bends or other damage. Make sure the cap fits securely on the filter neck. Inspect the filter element (D-7) for dirt or damage.

Warning: Inspect fuel tank in daylight or use a vapor-resistant light.

c. Repair.

Warning: Prepare fuel tank to remove any explosion hazard. Refer to TM 9-237 and TB ORD 1047.

Repair tank by welding in accordance with TM 9-237 as necessary. Straighten bent gage rod.

127. Assembly and Installation

Refer to TM 9-~~8034-20~~ 2320-213-20 for assembly and installation of the fuel tank.

A – Fuel tank – 8336101
B – ~~Gage rod – 7966575 (M274)~~ ✱
~~– 65909-923669 (M274A1)~~
C – Gasket – 7966662
D – ~~Filter screen assembly – 7966969 (M274)~~
~~Filter assembly – 65909-933506 (M274A1)~~
~~1 – No. 10-24 x 4 round head machine bolt – 455268 (M274)~~ ✱
~~No. 10-24 x 4 round head screw – 7351317 (M274A1)~~
2 – End plate – 8686940
3 – Cover plate – 65909-934092
4 – Assembled washer screw – 96906-35208-40
5 – No. 10-24 plain hexagon nut – 120361
✱ 6 – ~~No. 10 lock washer – 96906-35337-43~~
✱ 7 – ~~Fluid pressure filter element – 7351316 (M274)~~
Filter element – 65909-933504 (M274A1)
E – 1/4-inch brass pipe plug – 127951

Figure 192 – Continued.

✱ Superseded by Ch. 1-2328

Section IX. WHEELS AND TIRES

128. Description

The wheels are permanent mold castings of magnesium alloy. They are of the drop center type, 10 x 5.50F, and are fastened to studs in the wheel hubs by self-locking nuts. The tires are special, light weight, military type, 7.50-10 with non-directional tread. Inner tubes are used.

129. Removal

Refer to TM 9-~~8034-20~~ 2320-213-20 for removal of the tires and wheels.

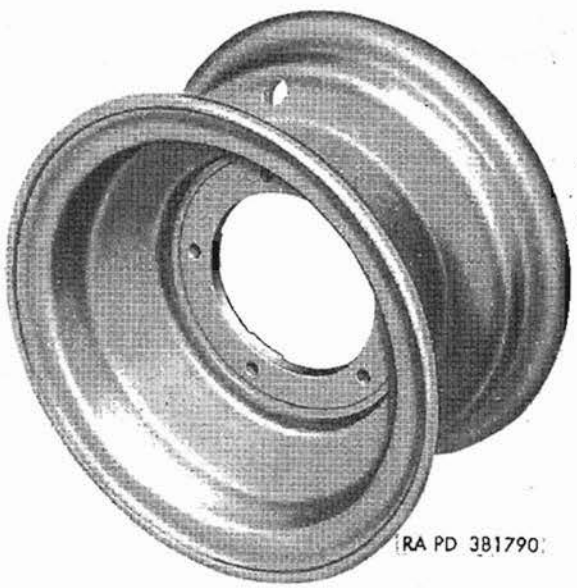


Figure 193. Wheel

130. Inspection and Repair

a. Inspection. Inspect wheels for bends or cracks. Inspect edges of the rims for burs or nicks. The edges must be concentric with the hub. Refer to TM 9-1871 for instructions for inspection tires and tubes.

b. Repair. Minor bends in the wheel may be straightened. Use a fine mill file to remove burs or nicks from rims. Refer to TM 9-1871 for repairing tires and tubes.

131. Installation

Refer to TM 9-~~8034-20~~ 2320-213-20 for installation of the tire and wheels.

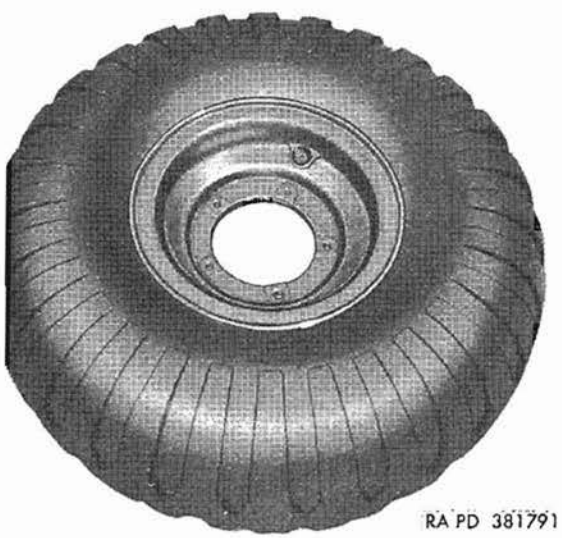


Figure 194. Tire mounted on wheel.

ATTN: SEE CH 2 for Chapter 8 added.

APPENDIX
REFERENCES

The following list of publications consists of all publications cited in this manual. For a complete list of publications generally applicable to the materiel covered herein, refer to the pertinent organizational maintenance manual and the publication indexes in the DA Pam 310 series.

a. Vehicle.

TRUCK, UTILITY: 1/2-ton, 4 x 4, M274 (2320-049-4804) and M274A1 (2320-064-6373): and M274A2 (2320-074-1167)

Lubrication Order	LO 9-2320-213-12
Operator's Manual	TM 9-2320-213-10
Organizational Maintenance Manual	TM 9-~~8034-20~~ 2320-213-20

b. Ordnance Maintenance.

Care and Maintenance of Ball and Roller Bearings	TM 9-214
Cleaning and Preserving of Installed Metal Fuel Tanks	TB ORD 524
Cleaning and Preserving of Reclaimed Vehicular Fuel Tanks	TB ORD 322
Elimination of Combustibles from Interior of Metal or Plastic Gasoline and Diesel Fuel Tanks	TB ORD 1047
Engine Assembly (Model AO-53 and AO-53-1) and Clutch	TM 9-7101-35
The Army Equipment Record Systems and Procedures	TM 38-750
Tires and Tubes, Repair and Rebuild of Pneumatic: Field and Depot Maintenance	TM 9-1871
Welding Theory and Application	TM 9-237

c. Repair Parts and Special Tools Lists.

DS + GS ~~Organizational~~ Maintenance Repair Parts and Special Tools List	~~TM 9-2320-213-20P~~
Field Maintenance Repair Parts and Special Tools List	TM 9-2320-213-34P

d. Forms.

DA Form 2028, Recommended Changes to DA Technical Manuals, Parts Lists, or Supply Manuals

* b. Organ., DS + GS maint for Engine Assy. (model AO-42) and clutch - TM 5-2805-213-14.

a. Organ., DS + GS maint Repair Parts for Eng Assy. (model AO-42) TM 5-2805-213-24P.

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9-357
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NG: State AG (3)

USAR: None.

For explonation of abbreviations used, see AR 320-50.

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