

## CHAPTER 15

### REAR SPRING SUSPENSION

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#### Section I. DESCRIPTION AND DATA

#### 278. Description

*a. General.*—Rear spring suspension system components comprise the main spring assembly, main spring seat and bearings, secondary spring assembly, torque rod assemblies, and attaching parts. Rear spring suspension components are illustrated in figure 214.

*b. Main and Secondary Springs.*—Main and secondary spring assemblies are identical. Each spring assembly consists of ten spring leaves, secured together by a center bolt and four rebound clips. Main spring is mounted on spring seat which in turn is mounted on a shaft on opposed tapered roller bearings. Secondary spring is mounted rigidly to bracket on frame side rail. Slipper ends of main spring are inserted in brackets which are integral with axle housings; secondary spring ends contact top of brackets on axle housing under heavy load conditions.

*c. Main Spring Seat.*—Main spring seat is mounted on tapered roller bearings on spring seat shaft. Tapered spring seat shaft is installed in spring seat and torque rod bracket and secured with a plain washer and safety nut. Outer end of shaft is threaded for bearing adjusting nuts, and grooved for tongue on adjusting nut lock. Spring seat inner oil seal, installed on spring seat shaft sleeve, wipes on inside of seal flange which is pressed into inner end of seat.

*d. Torque Rods.*—Six torque rod assemblies, two upper and four lower, transmit driving and braking forces of the two rear axles to the frame. Both ends of all rear torque rods are equipped with tapered end pins the same as used at axle end of front torque rods (fig. 207). End pin and bearing must be replaced as a complete assembly. Brake and vent line shield is welded to top of each upper torque rod.

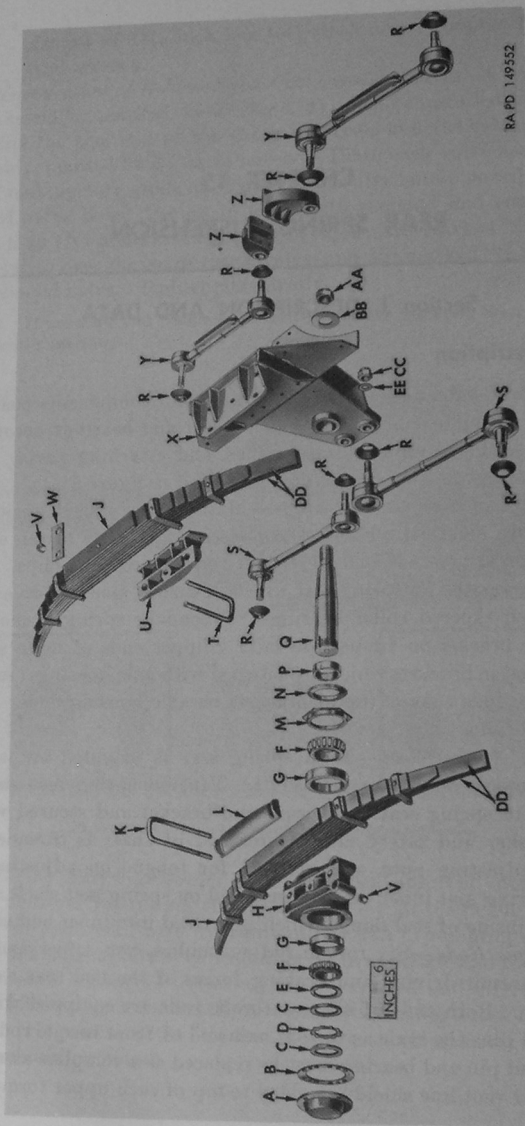


Figure 214. Rear spring suspension components.

## 279. Data

Main and secondary spring assemblies :

Overall length-----	55½ in.
Width-----	2½ in.
Number of leaves-----	10
Thickness of leaves :	
4 @-----	0.447 in.
6 @-----	0.401 in.
Total thickness-----	4.194 in.

## Section II. REBUILD OF REAR SPRING SUSPENSION COMPONENTS

### 280. General

This section contains inspection and repair procedures of rear spring suspension components which are beyond the scope of the using organization and are not contained in TM 9-819A.

Figure 214.—Continued.

A—CAP, DUST—7411375  
B—GASKET, PAPER—7411265  
C—NUT, ADJUSTING—7411379  
D—LOCK, ADJUSTING NUT—7411378  
E—WASHER, ADJUSTING NUT—7411422  
F—CONE, TAPERED ROLLER BEARING—712868  
G—CUP, TAPERED ROLLER BEARING—712869  
H—SEAT, MAIN SPRING, ASSY—7411381  
J—SPRING, MAIN AND SECONDARY, ASSY—7350470  
K—BOLT, "U", MAIN SPRING—7350471  
L—SPACER, "U" BOLT—7350468  
M—FLANGE, OIL SEAL—YT-2278050  
N—SEAL, OIL, ASSY—7411380  
P—SLEEVE—7411420  
Q—SHAFT, MAIN SPRING SEAT—7411383  
R—SEAL, DUST—7411374  
S—ROD, TORQUE, LOWER, ASSY—2277032  
T—BOLT, "U", SECONDARY SPRING—7350472  
U—SEAT, SECONDARY SPRING—7350467  
V—NUT, ¾-16—7350473  
W—SPACER—7350469  
X—BRACKET, MOUNTING—YT-2276465  
Y—ROD, TORQUE, UPPER, ASSY—7411372  
Z—BRACKET, UPPER TORQUE ROD—7411368  
AA—NUT, SAFETY, 1½-12—454335  
BB—WASHER—7411382  
CC—NUT, SAFETY, 1-14—454334  
DD—LEAF, No. 1 AND 2—7350466  
EE—WASHER—7412849

## 281. Inspection of Rear Spring Suspension Components

*Note.* Key letters noted in parentheses are in figure 214.

*a. Spring Assemblies.*—Examine main and secondary spring assemblies (J) for broken leaves, broken rebound clips, or broken center bolt. If No. 1 and 2 leaves (DD) or center bolt are broken, they may be replaced (par. 282). If rebound clips or spring leaves other than No. 1 and 2 are broken, the complete spring assembly must be replaced.

*b. Main Spring Seat Shaft.*—Examine main spring seat shaft (Q) for damaged threads or distortion. If any damage is evident, replace shaft (par. 283).

*c. Torque Rods.*—Examine upper and lower torque rod assemblies (Y and S) for distortion, damaged threads on end pins, and for loose or damaged pin and bearing assemblies. If end pin and bearing assemblies are damaged or loose, replace (par. 272*c* and *d*).

## 282. Repair of Spring Assemblies

*a. Disassembly of Spring.*—Remove nuts from four rebound clip bolts, then remove bolts and spacers. Clamp spring leaves firmly together, using one "C" clamp on each side of center bolt or using an arbor press. Remove nut from center bolt and remove bolt. Release "C" clamp or arbor press slowly to avoid personal injury.

*b. Assembly of Spring.*

- (1) Clean all dirt and corrosion from spring leaves, using a wire brush if necessary, then wash in dry-cleaning solvent or volatile mineral spirits. Coat each spring leaf with a thin film of soft graphited grease (GG); grease must cover entire contact area.
- (2) Stack spring leaves in correct order with center bolt holes alined, then compress spring leaves using "C" clamps or arbor press. Install center bolt and nut with nut at top and tighten firmly. Install rebound clip spacers and  $\frac{3}{8}$ -16 x  $3\frac{3}{8}$  bolts and secure with  $\frac{3}{8}$ -16 nuts. Tighten nuts firmly, pulling ends of rebound clips against ends of spacers. Remove "C" clamps or remove spring assembly from arbor press.

## 283. Replacement of Spring Seat Shaft

*a. Remove Shaft.*—Remove spring assemblies and main spring seat as directed in paragraph 39. Remove safety nut (AA, fig. 214) and plain washer (BB, fig. 214) securing spring seat shaft in spring seat and torque rod bracket. Install a standard  $1\frac{1}{2}$ -12 nut on inner end of spring seat shaft to prevent damaging threads; then drive on inner end of shaft with heavy hammer to loosen shaft. Remove nut from shaft and withdraw shaft from bracket.

*b. Install Shaft.*—Make sure tapered end of spring seat shaft and hole in spring seat and torque rod bracket are clean and dry. Insert tapered end of shaft into tapered hole, with groove in outer end of shaft at top. Install plain washer and 1½-12 safety nut on inner end of shaft and tighten to 650 to 700 pound-feet. Install spring seat and springs (par. 49).

## CHAPTER 16

### FRAME AND ASSOCIATED PARTS

#### Section I. DESCRIPTION AND DATA

##### 284. Description

*a. Frame.*—The frame assembly consists of right and left side members, cross members, gussets, braces, and other miscellaneous brackets, all of which are pressed steel and are riveted in place to form an assembly (fig. 215). Parts which may require frequent removal are held by bolts and self-locking nuts. In some instances several pieces are welded together to form an assembly.

*b. Bumpers.*—Bumper at front of vehicle is pressed steel channel formed into a bumper and bolted to frame with gusset plates. Two rear bumpers, one at each rear corner of frame, are formed from pressed steel and are bolted to frame side member and rear cross member.

*c. Towing Shackles.*—Four towing shackles, one at each corner of frame, are attached to brackets riveted to cross member at rear or welded to bumper gussets at front.

*d. Pintle.*—Pintle assembly is installed at center of rear cross member. Pintle shaft extends through cross member and brackets bolted to each side of cross member.

##### 285. Data

Wheelbase:	
M135, M211, M217, and M222	156 in.
M215 and M221	144 in.
Frame overall length:	
M135, M211, M217, and M222	255 in.
M215 and M221	230 in.
Width—front end	34 $\frac{1}{8}$ in.
Width—rear end	34 $\frac{1}{8}$ in.
Number of cross members	5



## Section II. REBUILD OF FRAME AND ASSOCIATED PARTS

### 286. General

Procedure for checking frame alinement and repair or straightening will depend upon the equipment available and skill of available personnel. In some instances suitable checking and straightening equipment may be available, otherwise procedures following must be used.

### 287. Checking Frame Alinement

*a. Layout Procedure.*—The most convenient method of checking frame alinement, where precision equipment is not available, is by marking on the floor all points from which measurements are to be taken. This can be done by tacking or cementing paper to the floor under each point of measurement. Use a "plumb bob" when marking each point. Points of measurement are called out on figure 216. Corresponding points on opposite side of vehicle are indicated by letter *M*. Accuracy is important if satisfactory results are to be obtained. After each point shown has been marked the vehicle should be moved away from the layout on the floor.

#### *b. Checking Layout.*

- (1) Check frame width at front and rear ends, using marks on floor (fig. 216). If widths correspond with dimensions given in paragraph 285, draw a center line full length of vehicle halfway between marks indicating width at front and rear. If frame width is not as given in paragraph 285, draw a line through points of intersection of any two pairs of equal diagonals (A, B, C, fig. 216). Center line can also be drawn through intersection of any one pair of diagonal lines of equal length and center point of either end of frame.

*Note.* If extreme front end of frame is damaged, center of front end of frame can be located from point exactly midway between radiator support bolts.

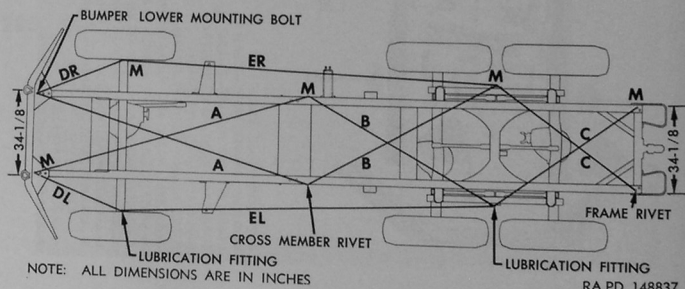


Figure 216. Method of checking frame alinement.



- (2) With center line properly laid out, measure distance from it to opposite points marked over entire length of chassis. If frame is in proper alinement, measurements should not vary more than one-eighth of an inch at any point.
- (3) To locate point at which frame is sprung, measure diagonals marked A, B, and C (fig. 216). If diagonals in each pair are within one-eighth of an inch, that part of frame included between points of measurements may be considered in alinement, and these diagonal lines should intersect within one-eighth of an inch of center line. Variations of more than one-eighth of an inch indicate misalignment.

*c. Checking Front Axle Alinement* (fig. 216).—When it has been determined that frame is properly alined, front axle alinement with frame can be checked as directed below.

- (1) Front axle is square with frame if ER equals EL, and DR equals DL.
- (2) Front axle has shifted sideways if ER is less than EL, and DR is less than DL, or vice versa.
- (3) Front axle is bent, twisted, or shifted if ER is less than EL, and DR is greater than DL, or vice versa.

## 288. Frame Repair

*a. Straightening of Frame.*—The use of heat is not recommended when straightening frames. Heat weakens structural characteristics of frame members and all straightening should be done cold. Frame members which are bent or buckled sufficiently to show strain or cracks after straightening must be reinforced or replaced.

*b. Reinforcing Frame.*—No established rules can be made on the necessity, length, or kinds of reinforcement to install on frames which are bent or broken. Reinforcements can be made with channel, angle, or flat stock. Because of problems encountered when installing channel reinforcements in frame side members, the use of angle reinforcements is recommended. Whenever possible, the reinforcement should extend full length of side member. This may, in some instances, be impractical because of the position of attaching units and existing cross members; therefore, it is necessary that the mechanic use his best judgment to suit the problems encountered. The reinforcement stock thickness should be the same as that of the member being reinforced, and the material of the reinforcement stock should be of the same tensile strength.

*c. Replacing Cross Members and Brackets.*—All cross members, brackets, or gussets that are damaged or broken off must be replaced. Cut off heads and drive out all rivets from part being replaced. Install new part and use hot rivets to secure part in place.

*d. Riveting.*—Specific rules for the spacing of rivets used in reinforcements cannot be given, as such spacing depends entirely upon the number and size of rivets used in attaching reinforcement, bracket, cross members, etc. to the portion of frame being repaired. The mechanic must use his best judgement as to the number, size, and spacing of the rivets. As a general rule rivets should be 50 to 100 percent as thick as the parts being riveted. Rivets that are to be countersunk should protrude the diameter of the rivet through the plates; rivets to be riveted to a round head should protrude twice the diameter of the rivet.

*e. Welding.*—The electric arc welding method is recommended for all frame welding. Heat generated during welding is localized and burning of material is minimized whenever this method is used. Additional advantages are that finished weld can be ground, filed, and drilled as necessary. Welding electrode should be A. W. S. class E-6012.

- (1) *Preparing frame for welding.*—Whenever inspection indicates the necessity of repairing a cracked frame, certain precautions and preparations must be observed. Namely, that a hole must be drilled at starting point of crack (fig. 217) also, crack must be ground out to obtain good weld. Shape reinforcement to fit interior or exterior of the part being repaired. The reinforcement should be of SAE 1010 or SAE 1020 steel.
- (2) *Welding instructions.*—When reinforcement has been shaped and placed in position, weld at points shown and as instructed by welding symbols in figure 218. Do not weld on fillets or

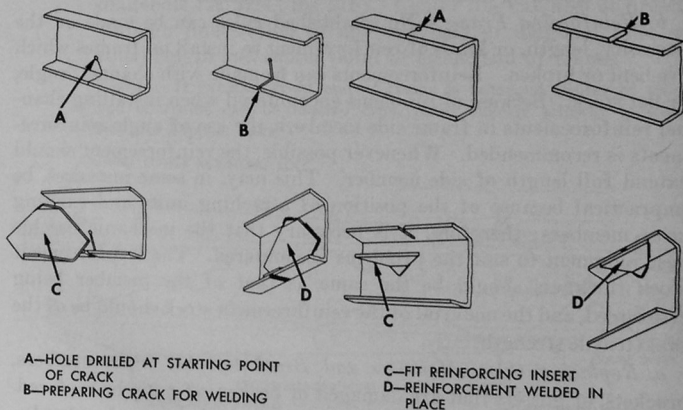


Figure 217. Method of preparing crack for welding.

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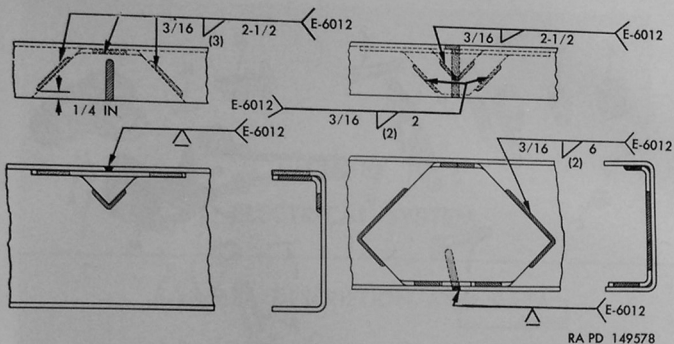


Figure 218. Method of attaching reinforcement by welding.

within one quarter of an inch of edges, since welding at these points tends to encourage development of new cracks.

## 289. Rebuild of Pintle

Note. Key letters noted in parentheses are in figure 219.

### a. Disassembly.

- (1) *Remove lubrication fittings.*—Remove lubrication fittings (L) from  $1\frac{1}{4}$  x  $3\frac{1}{8}$  bolt (R) and latch pin (K).
- (2) *Removal of lock and latch.*—Remove  $\frac{1}{8}$  x  $1\frac{1}{2}$  cotter pin (S); then remove 1-14 nut (Q). Remove bolt; then lift lock and latch assembly from pintle.
- (3) *Removal of pintle latch.*—Use arbor press to remove latch pin (K) attaching pintle latch (G) to pintle lock (J); then lift latch and latch spring (H) from pintle lock.

### b. Cleaning and Inspection.

- (1) *Cleaning.*—Immerse all parts in dry-cleaning solvent or volatile mineral spirits to loosen and remove all grease and dirt. Clean lubricant passages in pintle lock bolt and latch pin.
- (2) *Inspection.*
  - (a) *Pintle, lock, and latch.*—Inspect each of these parts for evidence of cracks, bends, excessive wear, or other damage. Replace defective parts.
  - (b) *Pintle lock bolt.*—Inspect pintle lock bolt for damage or wear. Replace if defective.
  - (c) *Latch pin.*—Inspect for damage or excessive wear. Pin must fit tight in lock, also latch must be free on pin. Replace if worn or damaged.
  - (d) *Latch spring.*—Inspect spring for broken coils and distortion. Replace if damaged.

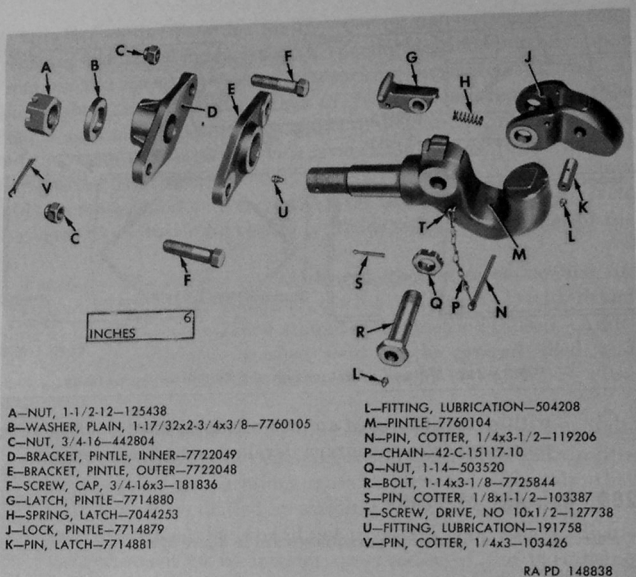


Figure 219. Disassembled view of pintle assembly and attaching parts.

c. Assembly.

- (1) *Assembly of lock and latch.*—Install latch spring (H) in pintle lock (J) with spring over boss; then install pintle latch (G) into lock with boss on latch engaging spring. Aline latch pin holes in lock and latch and use arbor press to install latch pin (K) through lock and latch.
- (2) *Installation of lock and latch.*—Position assembly of lock and latch in pintle and install 1-14 x 3 1/8 bolt (R) attaching assembly to pintle. Install 1-14 nut (Q) on bolt, but do not tighten excessively as this may restrict free movement of lock. Install 1/8 x 1 1/2 cotter pin (S) to secure nut.
- (3) *Lubrication.*—Install lubrication fittings (L) in bolt (R) and latch pin (K). Lubricate as directed on official lubrication order (LO 9-819A).

## CHAPTER 17

### ELECTRICAL SYSTEM

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#### Section I. DESCRIPTION AND DATA

#### 290. General

Information contained in this chapter covers only those electrical units which are not covered in other technical manuals. Refer to paragraph 1 for numbers of technical manuals covering electrical units.

#### 291. Description

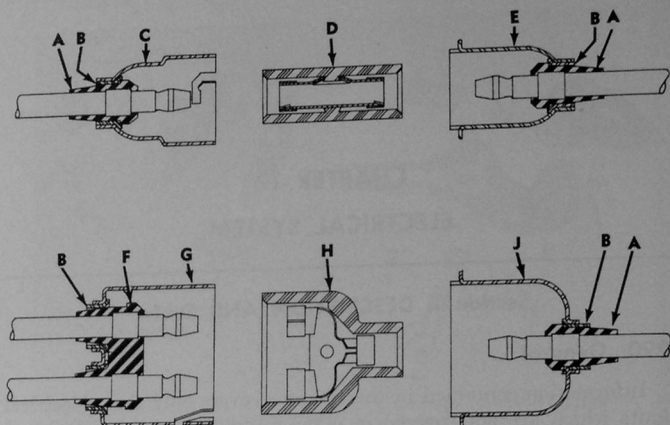
*a. Cable Connections.*—Grouped cable connections are made through multiple plug and receptacle type connectors. Single, and in some cases double, cable connections are made through bayonet type connectors which are held together by interlocking shells (fig. 220). Terminals are crimped onto end of each cable. Rubber grommet is held in place on end of cable by a metal bushing. When cable terminals are inserted into ends of sleeve and the male and female shells are locked together, the shells force the rubber grommets against ends of sleeve, providing a moisture-proof connection.

*b. Horn.*—Horn is air-operated dual diaphragm type, electrically controlled by horn button mounted in center of steering wheel. Solenoid is mounted between horn projectors, with the solenoid air outlet connected directly to the air inlet port in the horn base. Air supply line is connected to inlet port in top of solenoid. When horn circuit through solenoid is completed at the horn button, solenoid acts to admit compressed air into the horn base. Compressed air causes steel diaphragm to vibrate, producing the warning signal.

#### 292. Data

Horn:

Manufacturer.....	Delco-Remy
Horn model number.....	1919904
Solenoid model number.....	1118165
Voltage.....	24
Type.....	air-operated dual diaphragm



A—GROMMET—573005  
 B—BUSHING—572999  
 C—SHELL, FEMALE—573007  
 D—SLEEVE, ASSY—573000  
 E—SHELL, MALE—573010

F—GROMMET—573002  
 G—SHELL, FEMALE—573008  
 H—SLEEVE—7762747  
 J—SHELL, MALE—573009

RA PD 149425

Figure 220. Bayonet type cable connector components.

## Section II. REPAIR OF CABLE CONNECTIONS

### 293. Bayonet Type Connectors

#### a. Inspection.

- (1) Inspect cable terminal for corrosion and clean if necessary. Make sure terminal is securely crimped onto cable and that no wires are broken. If insulation at terminal is cracked or if bare wires are exposed, replace cable or harness assembly.
- (2) Examine grommet for evidence of hardening or deterioration. Outer end must form a moisture-proof seal against end of connector sleeve. If any damage is evident, replace grommet (*b* and *c* below).
- (3) Inspect shells for distortion and for broken ears on male shells. Replace any shell which is damaged (*b* and *c* below).

*b. Disassembly.*—Slide connector shell back on cable to expose bushing and grommet. Force bushing back off grommet, pull grommet off cable end; then remove bushing and shell.

#### c. Assembly.

- (1) To facilitate assembling grommet on cable, apply a thin coat of hydraulic brake fluid to end of cable.

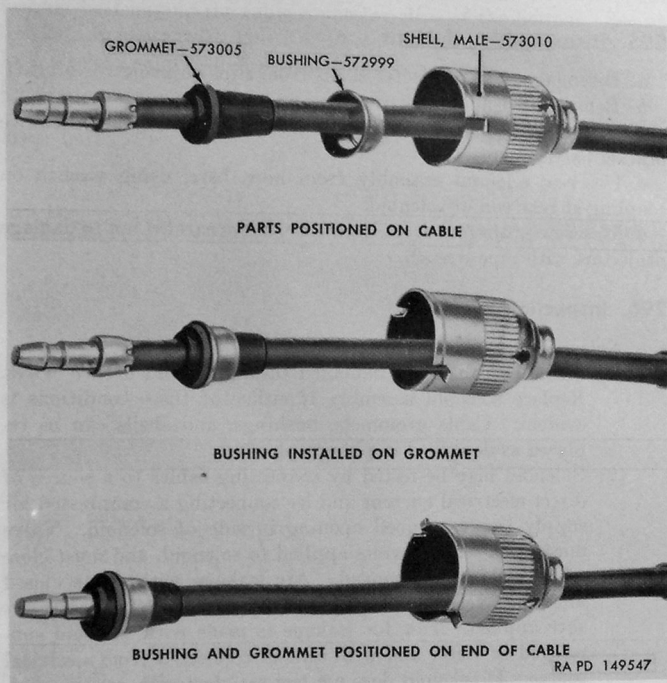


Figure 221. Installation of cable connector components.

- (2) Place connector shell, bushing, and grommet on end of cable in positions shown in upper view in figure 221.
- (3) Slide bushing against shoulder on grommet as shown in center view in figure 221.
- (4) Grip grommet and bushing between thumb and finger and pull cable back through grommet until outer end of grommet just covers outer shoulder on cable terminal as shown in lower view in figure 221.
- (5) Wipe hydraulic brake fluid off cable terminal after completing assembly.

#### 294. Multiple Plug and Receptacle Type Connectors

Refer to paragraph 1 for number of technical manual covering Scintilla multiple plug and receptacle type connectors.

## Section III. REBUILD OF HORN

### 295. Disassembly of Horn

- a.* Disengage cable connector shells from clips on projector bracket.
- b.* Remove two nuts, lock washers, and machine screws attaching projector bracket halves to horn projectors and solenoid. Remove bracket halves.
- c.* Unscrew solenoid assembly from horn base, using wrench on coupling at rear end of solenoid.
- d.* Unscrew projectors from horn base, being careful not to damage projectors with pipe wrench.

### 296. Inspection of Horn

#### *a. Solenoid.*

- (1) Examine cables for damaged insulation and broken wires. Replace solenoid assembly if either of these conditions is evident. Cable grommets, bushings, and shells can be replaced as described in paragraph 293.
- (2) Solenoid may be tested by connecting cables to a source of direct electrical current and by connecting a compressed air supply line to tapped opening in side of solenoid. Valve must open with 18 volts applied to solenoid, and must close when voltage is removed. Air leakage with valve closed must not exceed one bubble per second with 90 psi air pressure applied. Test for leakage is made with solenoid submerged in water and with unit disconnected from electrical source. If solenoid does not test satisfactorily, replace with new solenoid assembly.

*b. Projectors.*—Inspect projectors for distortion and for damaged threads. Replace if either condition exists. Inside of projectors must be clean and free of obstructions.

*c. Projector Brackets.*—Examine projector bracket halves for distortion, and check for damaged or loose cable connector clips on bracket lower half. Replace with new brackets if damaged.

*d. Horn Base.*—Do not disassemble horn base assembly. If horn is inoperative or operates improperly, and solenoid functions satisfactorily (*a* (2) above), replace horn base assembly.

### 297. Assembly of Horn

- a.* Coat threads on solenoid coupling and on projectors with plastic type gasket cement.
- b.* Thread projectors and solenoid coupling into horn base and tighten securely. Do not distort projectors when tightening.



c. Position projector bracket halves on projectors and solenoid, with bracket half having the cable connector clips at the bottom. Secure brackets in place with two No. 10 x 1 machine screws, two No. 10 lock washers, and two No. 10 machine screw nuts. Tighten screws firmly.

d. Engage cable connector shells in clips on projector bracket lower half.

## CHAPTER 18

### WINCH AND DRIVE LINE

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#### Section I. DESCRIPTION AND DATA

#### 298. Description

*a. Winch.*—The worm-gearred, jaw-clutch, drum winch assembly (fig. 222) is mounted at front of vehicle on support brackets attached to frame side members. Winch is driven by power take-off through two drive shafts. Winch is equipped with a manually-operated clutch control lever and a drum lock poppet knob (fig. 222). The clutch control lever is used to engage or disengage the jaw clutch which drives the drum. The drum lock poppet knob is used to lock the drum when winch is not being used. Winch is equipped with two brakes, the drum drag brake and the drive worm automatic brake. The drag brake consists of a flat shoe and lining assembly, spring-loaded to exert a constant drag on end of drum to prevent drum spinning when cable is being pulled off drum. The drive worm automatic brake, which sustains the load when shifting power take-off gears, consists of an external band type brake which acts on a brake disk keyed to end of drive worm.

*b. Drive System.*—The winch drive system (fig. 232) comprises two drive shafts, three universal joints, and a pilot bearing. The rear universal joint consists of a fixed yoke, which is attached to power take-off shaft by a set screw and key, and a slip yoke which is splined to rear drive shaft. Center universal joint consists of two fixed yokes which are attached to front and rear drive shafts by Woodruff keys and straight pins. Front universal joint consists of a fixed yoke, which is attached to winch drive worm by a shear pin, and a slip yoke which is splined to the front drive shaft. The two yokes of each universal joint are assembled together with a universal joint journal, four bushing type bearings, and four snap rings, with a cork seal and a metal seal retainer on each arm of the journal to retain lubricant in bearings. The pilot bearing assembly, consisting of a ball bearing mounted in a bracket attached to left front spring and lower torque rod rear bracket, supports the rear end of the front drive shaft.

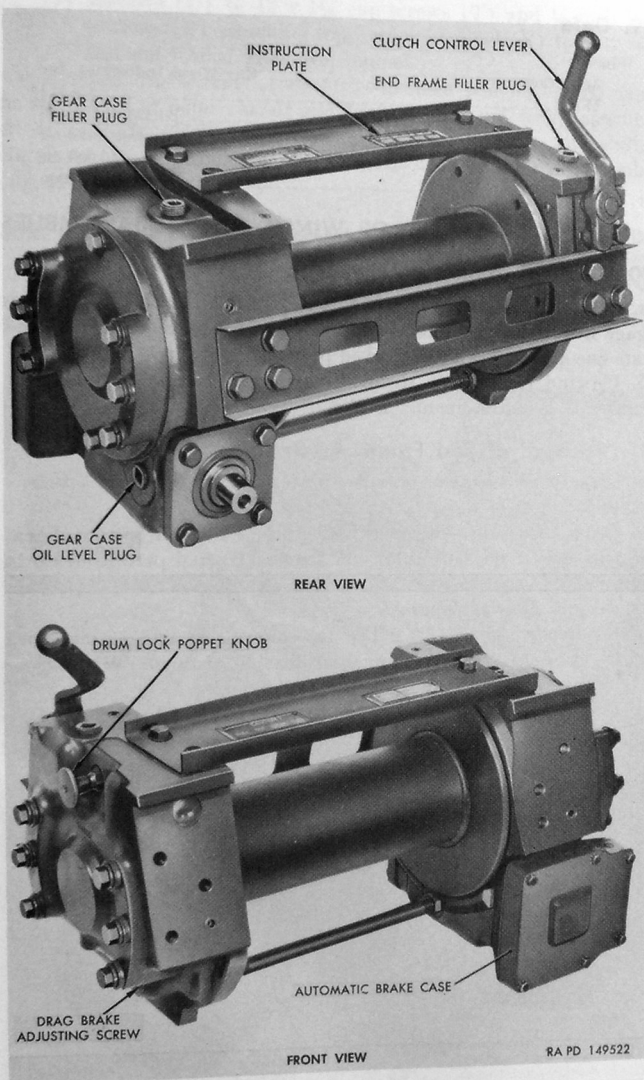


Figure 222. Front and rear views of winch assembly.

## 299. Data

Winch :  
Manufacturer----- Gar Wood Industries, Inc  
Model----- CA514  
Type----- horizontal drum  
Drive----- drive shaft from power take-off  
Capacity----- 10,000 lbs  
Cable----- 200 ft long, 1/2-in. diam

## Section II. DISASSEMBLY OF WINCH INTO SUBASSEMBLIES

### 300. Removal of Cable Assembly

a. Push clutch control lever (fig. 222) in toward winch drum to disengage drum sliding clutch. Pull out drum lock poppet knob and rotate one-quarter turn to unlocked position.

b. Unwind cable from drum; then loosen hex-socket set screw securing cable end in drum. Pull end of cable out of drum.

### 301. Removal of End Frame Assembly

*Note.* Key letters noted in parentheses are in figure 225 unless otherwise indicated.

a. *Drain Lubricant.*—Remove drain plug (TT) from bottom of gear case (SS) and from bottom of end frame (B) and permit all oil to drain.

b. *Remove Tension Channels.*

- (1) Remove six 5/8-11 x 1 1/4 cap screws (J) and 5/8-inch lock washers (H) attaching rear tension channel (W) to gear case and end frame. Remove channel.

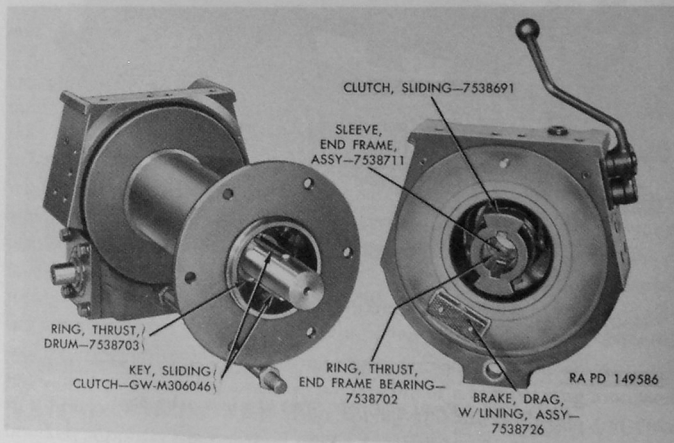


Figure 223. End frame assembly removed from drum shaft.

- (2) Remove (U)  $\frac{1}{2}$ -13 x  $\frac{1}{4}$  cap screws (T) and  $\frac{1}{2}$ -inch lock washers (U) attaching top tension channel (V) to gear case and end frame. Remove channel.

c. *Remove End Frame Assembly.*—Remove jam nut (AR) from tie rod (AU) at outer side of end frame. Pull end frame assembly off drum shaft. End frame bearing thrust ring (AS) and sliding clutch (AQ) will come off drum shaft with end frame assembly (fig. 223).

### 302. Removal of Drum Assembly

a. *Remove Sliding Clutch Keys.*—Using a sharp chisel against side of sliding clutch key (X) as close to drum shaft as possible, drive key out of shaft as shown in figure 224.

*Note.* Hit chisel sharply to obtain a good bite into side of key.

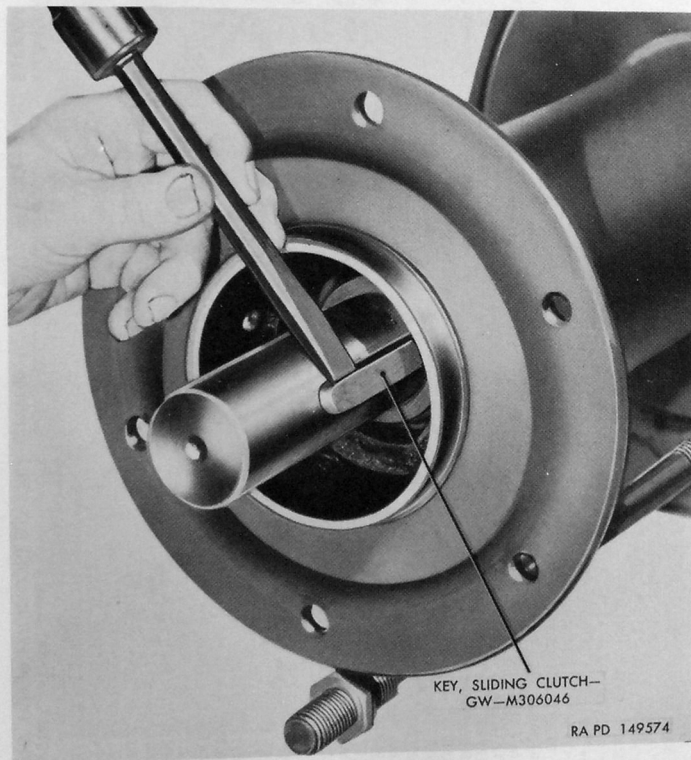
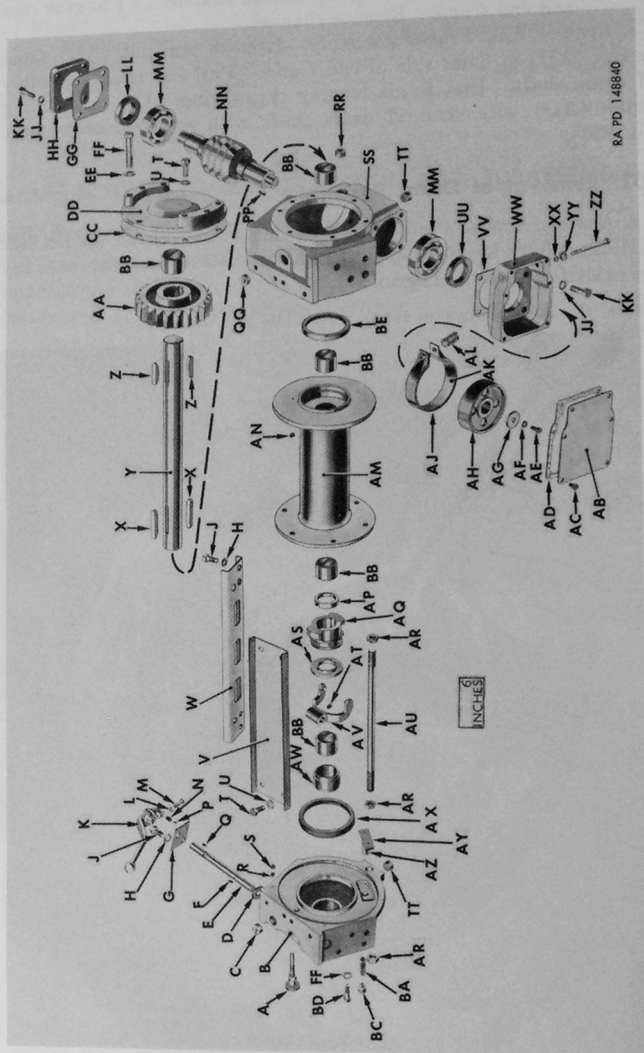


Figure 224. Removing sliding clutch keys from drum shaft.



A-KNOB, DRUM LOCK POPPET, ASSY—7538705  
 B-FRAME, END—7538700  
 C-PLUG, FILLER, END FRAME—143968  
 D-SEAL, OIL—7538695  
 E-SHAFT, SHIFTER YOKE—7538734  
 F-KEY, WOODRUFF,  $\frac{5}{32}$  X  $\frac{3}{4}$ —103906  
 G-PLATE, PAWL—7538729  
 H-WASHER, LOCK,  $\frac{5}{16}$ -IN.—121574  
 J-SCREW, CAP,  $\frac{5}{16}$ -11 X  $1\frac{1}{4}$ —180255  
 K-LEVER, CONTROL, CLUTCH—7538708  
 L-WASHER, LOCK,  $\frac{5}{16}$ -IN.—120214  
 M-SCREW, CAP,  $\frac{5}{16}$ -18 X  $1\frac{1}{4}$ —180081  
 N-SPRING, CLUTCH CONTROL, LEVER BALL—7409727  
 P-BALL, CLUTCH CONTROL LEVER—104921  
 Q-KEY, WOODRUFF,  $\frac{5}{32}$  X  $\frac{3}{4}$ —103906  
 R-SCREW, SET, SHIFTER YOKE, SHAFT LOCATING—228053  
 S-PLUG, PIPE,  $\frac{1}{8}$ -IN.—125947  
 T-SCREW, CAP,  $\frac{1}{2}$ -13 X  $1\frac{1}{4}$ —180175  
 U-WASHER, LOCK,  $\frac{1}{2}$ -IN.—120384  
 V-CHANNEL, TENSION, TOP—GW-305162  
 W-CHANNEL, TENSION, REAR—GW-304465  
 X-KEY, SLIDING CLUTCH—GW-M306046  
 Y-SHAFT, DRUM—7538692  
 Z-KEY, DRUM SHAFT—GW-M-306047  
 AA-GEAR, DRUM SHAFT—7538688  
 BB-BEARING, BUSHING TYPE—7538696  
 CC-GASKET, GEAR CASE COVER—7538737  
 DD-COVER, GEAR CASE—7538698  
 EE-WASHER, LOCK,  $\frac{5}{16}$ -IN.—131139  
 FF-SCREW, SPECIAL,  $2\frac{1}{4}$ -IN. LONG—7538710  
 GG-GASKET, BEARING CAP—7538728  
 HH-CAP, BEARING—7538732  
 JJ-WASHER, LOCK,  $\frac{1}{2}$ -IN.—120384  
 KK-SCREW, CAP,  $\frac{1}{2}$ -13 X  $1\frac{1}{4}$ —180179  
 LL-SEAL, OIL—7538704  
 MM-BEARING, BALL—700638  
 NN-WORM, DRIVE—7538707  
 PP-KEY, WOODRUFF,  $\frac{3}{16}$  X  $\frac{3}{4}$ —106751  
 QQ-PLUG, FILLER, GEAR CASE—143968  
 RR-PLUG, OIL LEVEL, GEAR CASE—143968  
 SS-CASE, GEAR—7538699  
 TT-PLUG, DRAIN—143968  
 UU-SEAL, OIL—500694  
 VV-GASKET, AUTOMATIC BRAKE CASE—7538728  
 WW-CASE, AUTOMATIC BRAKE—7538697  
 XX-GASKET, "O" RING—7538682  
 YY-WASHER, PLAIN,  $\frac{7}{16}$ -IN.—120388  
 ZZ-SCREW, CAP, ADJUSTING,  $\frac{3}{8}$ -24 X 4—180331  
 AB-COVER, AUTOMATIC BRAKE CASE—7538701  
 AC-SCREW, W/EXT-TEETH LOCK WASHER,  $\frac{5}{16}$ -18 X  $\frac{5}{8}$ —  
 187527  
 AD-GASKET, AUTOMATIC BRAKE CASE COVER—7538736  
 AE-SCREW, CAP,  $\frac{5}{16}$ -24 X  $\frac{3}{4}$ —181595  
 AF-WASHER, LOCK,  $\frac{5}{16}$ -IN.—120214  
 AG-WASHER, PLAIN,  $\frac{3}{8}$ -IN.—5277972  
 AH-DISK, AUTOMATIC BRAKE—7538892  
 AJ-BAND, AUTOMATIC BRAKE, W/LINING, ASSY—7538731  
 AK-LINING, AUTOMATIC BRAKE BAND—7538730  
 AL-SPRING, ADJUSTING, AUTOMATIC BRAKE—5277992  
 AM-DRUM, ASSY—7538690  
 AN-SCREW, SET, HEX-SOCKET,  $\frac{1}{4}$ -13 X  $\frac{5}{8}$ —222589  
 AP-RING, THRUST, DRUM—7538703  
 AQ-CLUTCH, SLIDING—7538691  
 AR-NUT, JAM—124852  
 AS-RING, THRUST, END FRAME BEARING—7538702  
 AT-SCREW, SET,  $\frac{3}{4}$ -16 X  $\frac{1}{2}$ —223080  
 AU-ROCK, TIE—7538735  
 AV-YOKE, SHIFTER, CLUTCH—7538723  
 AW-SLEEVE, END FRAME—GW-304419  
 AX-SEAL, OIL—7538694  
 AY-LINING, DRAG BRAKE—7358727  
 AZ-BRAKE, DRAG, W/LINING, ASSY—7538726  
 BA-SPRING, DRAG BRAKE—7538712  
 BC-SCREW, ADJUSTING DRAG BRAKE—7538733  
 BD-SCREW, SPECIAL,  $1\frac{3}{4}$ -IN. LONG—7538709  
 BE-SEAL, OIL—7538693

Figure 225. Winch assembly components.

Side of key will be damaged, but can be smoothed up with a fine cut mill file. Remove both sliding clutch keys (X) in same manner.

*b. Remove Drum Thrust Ring.*—Slide drum thrust ring (AP) off end of drum shaft.

*c. Remove Drum Assembly.*—Slide drum assembly (AM) off end of drum shaft. If drum does not readily slide off shaft, edges of keyways may have been slightly raised when removing keys. Dress down edges of keyways with a fine-cut mill file; then slide drum off shaft.

### Section III. REBUILD OF END FRAME ASSEMBLY

#### 303. Disassembly of End Frame

*Note.* Key letters noted in parentheses are in figure 225.

*a.* Lift drag brake with lining assembly (AZ) and drag brake spring (BA) out of end frame. Remove drag brake adjusting screw (BC) from end frame.

*b.* Move clutch control lever (K) out to engaged position, then disengage sliding clutch (AQ) from clutch shifter yoke (AV) and remove sliding clutch. Lift end frame bearing thrust ring (AS) and end frame sleeve (AW) and bushing type bearing (BB) out of end frame.

*c.* Loosen  $\frac{5}{16}$ -18 x  $1\frac{1}{4}$  cap screw (M) clamping clutch control lever (K) to clutch shifter yoke shaft. Spread lever slightly; then lift lever off shaft, at the same time removing clutch control lever ball (P) and clutch control lever ball spring (N) as shown in figure 230. Remove  $\frac{5}{32}$  x  $\frac{3}{4}$  Woodruff key (Q) from shaft.

*d.* Using a  $\frac{3}{16}$ -inch hex set screw wrench, remove socket-head  $\frac{1}{8}$ -inch pipe plug (S) from end frame to gain access to clutch shifter yoke shaft locating set screw (R). Using a  $\frac{5}{32}$ -inch hex set screw wrench, remove set screw from end frame.

*e.* Using a  $\frac{3}{16}$ -inch hex set screw wrench, loosen  $\frac{3}{8}$ -16 x  $\frac{1}{2}$  set screw (AT) securing clutch shifter yoke (AV) on clutch shifter yoke shaft (E). Withdraw shaft from end frame far enough to permit removing clutch shifter yoke (AV) from shaft; then remove  $\frac{5}{32}$  x  $\frac{3}{4}$  Woodruff key (F) from shaft and remove shaft from end frame.

*f.* Remove  $\frac{5}{8}$ -11 x  $1\frac{1}{4}$  cap screw (J) and  $\frac{5}{8}$ -inch lock washer (H) attaching pawl plate (G) to end frame and remove plate.

*g.* Remove drum lock poppet knob assembly (A) by unscrewing retaining nut from end frame.

*h.* Do not remove end frame oil seal (AX) or shifter yoke shaft oil seal (D) from end frame unless replacement is necessary as indicated by inspection (par. 304*b*).



### 304. Cleaning, Inspection, and Repair of End Frame Components

*Note.* Key letters noted in parentheses are in figure 225.

*a. Cleaning.*—Wash all parts except drag brake with lining assembly (AZ) in dry-cleaning solvent or volatile spirits. Blow out all tapped holes, clutch shifter yoke shaft bore, and interior of end frame with compressed air. Wipe all small parts dry.

#### *b. Inspection.*

- (1) *End frame.*—Examine end frame (B) for evidence of cracks or damaged threads in tapped holes. Replace end frame if any damage is evident. Examine end frame oil seal (AX) and shifter yoke shaft oil seal (D) in end frame for evidence of worn or deteriorated seal lip or other damage. Replace seals if damaged (*c* below).
- (2) *End frame sleeve assembly.*—Check bushing type bearing (BB) in end frame sleeve (AW) for wear (par. 355). Replace bearing (*c* below) if worn beyond specified limits.
- (3) *Thrust rings.*—Check drum thrust ring (AP) and end frame bearing thrust ring (AS) for wear by measuring thickness of rings. If not within limits listed in paragraph 355, replace with new parts.
- (4) *Sliding clutch.*—Examine sliding clutch (AQ) for visible wear or damage. Check for burred edges on clutch lugs and file smooth as necessary.
- (5) *Clutch shifter yoke.*—Examine clutch shifter yoke (AV) for evidence of distortion or for wear on lugs which engage sliding drum clutch. Replace with new part if any damage is evident.
- (6) *Drum lock poppet knob.*—Examine drum lock poppet knob assembly (A) for damaged tapered inner end, weakened spring, or damaged threads on retaining nut. Replace with new assembly if damaged in any way.
- (7) *Springs.*—Check clutch control lever ball spring (N) and drag brake spring (BA) for free length and compression (par. 355). Replace with new parts if not within specified limits.
- (8) *Drag brake.*—Examine drag brake with lining assembly (AZ) for damaged or worn lining. If lining is oil soaked or worn down close to rivet heads, replace lining (*c* below).

#### *c. Repair.*

- (1) *Oil seal replacement.*—To replace either the end frame oil seal (AX) or the clutch shifter yoke shaft oil seal (D), pry old seal out of end frame. Clean all old sealing compound out of oil seal bore in end frame. Coat outside diameter of

new oil seal case with plastic type gasket cement before installing. Either oil seal must be installed with the seal lip pointing inward. Press end frame oil seal (AX) in until seal case is flush with end frame; press shifter yoke shaft oil seal (D) in until it bottoms in end frame.

- (2) *End frame sleeve bearing replacement.*—To replace bushing type bearing (BB) in end frame sleeve (AW), press old bearing out of sleeve. Press new bearing in until centered in sleeve. Use extreme care when installing bearing not to damage inside surface, as bearing is designed to provide proper inside diameter when pressed into place and is not finished after installation. Any burs formed on edge of bearing during installation must be scraped off.
- (3) *Drag brake lining replacement.*—Drive old rivets out of drag brake with lining assembly (AZ) and remove drag brake lining (AY). Position new lining on brake shoe and secure with two new  $9/64 \times 1/2$  tubular rivets. Make sure lining is tight against shoe and that rivets are properly upset.

### 305. Assembly of End Frame

*Note.* Key letters noted in parentheses are in figure 225 unless otherwise indicated.

a. Insert shifter yoke shaft (E) through oil seal (D) into end frame (B).

*Note.* End of shaft having set screw hole opposite keyway must be inserted in end frame.

Push shaft through far enough to install Woodruff key (F) and tap key into keyway. Figure 226 shows shaft in place with Woodruff key installed. Pull shaft out as far as Woodruff key permits, position clutch shifter yoke (AV), with  $3/8$ -16  $\times$   $1/2$  set screw (AT) removed, in end frame with ends of yoke pointing away from end frame.

b. Insert shaft through shifter yoke with Woodruff key in shaft entering keyway in shifter yoke. Aline set screw hole in shifter yoke with hole in shaft, install  $3/8$ -16  $\times$   $1/2$  set screw (AT) and tighten firmly, using a  $3/16$ -inch hex set screw wrench.

c. Sight down set screw hole in end frame and aline locating groove in shifter yoke shaft (E) with set screw hole in end frame. Figure 226 illustrates set screw hole in end frame and locating groove in shaft. Install shifter yoke shaft locating set screw (R) in end frame and tighten firmly, using a  $5/32$ -inch hex set screw wrench. Check action of clutch shifter yoke shaft; dog point on locating set screw must engage groove in shaft to locate shaft longitudinally, but must permit free radial movement of shaft. Install  $1/8$ -inch pipe plug (S) in end frame over locating set screw and tighten firmly, using a  $3/16$ -inch hex set screw wrench.

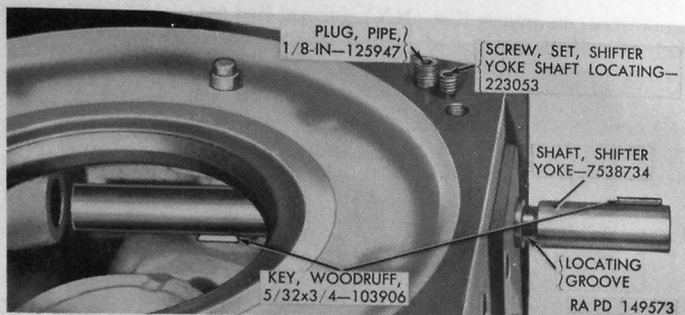


Figure 226. Clutch shifter yoke shaft and Woodruff keys installed.

d. Place pawl plate (G) over end of shifter yoke shaft (E) and attach to end frame with one  $\frac{5}{8}$ -11 x  $1\frac{1}{4}$  cap screw (J) and  $\frac{5}{8}$ -inch lock washer (H).

e. Insert drum lock poppet knob assembly (A) into end frame, thread retaining nut into end frame, and tighten firmly. Position knob in released position with lugs on knob engaging shallow notches in retaining nut.

f. Tap  $\frac{5}{32}$  x  $\frac{3}{4}$  Woodruff key (Q) into keyway in outer end of shifter yoke shaft (E). Place clutch control lever (K) on shaft with Woodruff key in shaft entering keyway in lever. Do not tighten  $\frac{5}{16}$ -18 x  $1\frac{1}{4}$  cap screw (M) in clutch control lever at this time. Clutch control lever ball and spring (P and N), and drag brake with lining assembly (AZ), drag brake spring and adjusting screw (BA and BC) will be installed at time winch is assembled from subassemblies.

## Section IV. REBUILD OF GEAR CASE AND AUTOMATIC BRAKE

### 306. Disassembly of Automatic Brake

Note. Key letters noted in parenthesis are in figure 225, unless otherwise indicated.

a. Remove six  $\frac{5}{16}$ -18 x  $\frac{5}{8}$  screws with external-teeth lock washers (AC) attaching automatic brake case cover (AB) to automatic brake case (WW). Remove automatic brake case cover and gasket (AB and AD).

b. Remove  $\frac{3}{8}$ -24 x 4 adjusting cap screw (ZZ),  $\frac{7}{16}$ -inch plain washer (YY), and "O" ring gasket (XX). Remove automatic brake band with lining assembly (AJ) and automatic brake adjusting spring (AL) from automatic brake case (WW).

c. Remove  $\frac{5}{16}$ -24 x  $\frac{3}{4}$  cap screw (AE),  $\frac{5}{16}$ -inch lock washer (AF), and  $\frac{3}{8}$ -inch plain washer (AG) securing automatic brake disk (AH) on drive worm (NN). Using a suitable jaw type puller in manner

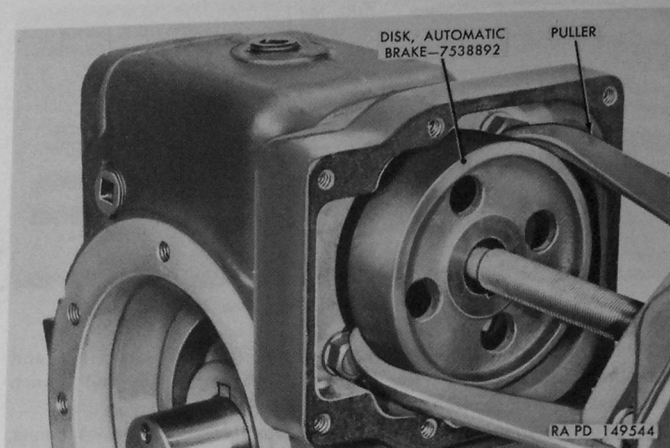


Figure 227. Using puller to remove automatic brake disk.

shown in figure 227, pull automatic brake disk off drive worm. Remove Woodruff key (PP) from drive worm.

d. Remove four  $\frac{1}{2}$ -13 x  $\frac{3}{4}$  cap screws (KK) and  $\frac{1}{2}$ -inch lock washers (JJ) attaching automatic brake case (WW) to gear case (SS). Remove automatic brake case (WW) and automatic brake case gaskets (VV). Note number of gaskets used so the same number may be installed at assembly.

### 307. Disassembly of Gear Case

*Note.* Key letters noted in parenthesis are in figure 225.

a. Remove four  $\frac{1}{2}$ -13 x  $\frac{3}{4}$  cap screws (KK) and  $\frac{1}{2}$ -inch lock washers (JJ) attaching bearing cap (HH) to gear case (SS). Remove bearing cap and oil seal assembly (HH and LL) and bearing cap gaskets (GG). Note number of gaskets used so the same number may be used at assembly.

b. Remove two  $\frac{1}{2}$ -13 x  $1\frac{1}{4}$  cap screws (T) and  $\frac{1}{2}$ -inch lock washers (U) attaching gear case cover (DD) to gear case. If the six  $2\frac{3}{4}$ -inch long special screws (FF) were not left off when winch was removed from vehicle and mounting brackets removed, remove special screws and  $\frac{9}{16}$ -inch lock washers (EE). Remove gear case cover (DD) and gear case cover gaskets (CC). Note number of gaskets used so the same number may be used at assembly.

c. Using a heavy hammer and hardwood block against one end of drive worm (NN), or using an arbor press, force drive worm out of

gear case (SS). One ball bearing (MM) will remain on drive worm and the other ball bearing will remain in gear case. Remove ball bearing (MM) from drive worm and from gear case, using a suitable bearing puller.

*d.* Remove drum shaft gear and drum shaft (AA and Y) from gear case. Do not remove drum shaft gear (AA) from drum shaft (Y) unless replacement of one of the parts is necessary as indicated by inspection (par. 308*b*).

*e.* Loosen jam nut (AR) which is against gear case (SS). Unscrew tie rod (AU) from gear case (SS).

### 308. Cleaning, Inspection, and Repair of Gear Case and Automatic Brake Components

*Note.* Key letters noted in parentheses are in figure 225 unless otherwise indicated.

*a. Cleaning.*—Wash all parts except automatic brake band and lining assembly (AJ) in dry-cleaning solvent or volatile mineral spirits. Blow ball bearings and gear case dry with compressed air. Wipe all other parts dry.

#### *b. Inspection.*

- (1) *Gear case.* Examine gear case (SS) for cracks and for damaged threads in tapped holes. Either of these conditions require replacing with new part. Check bushing type bearing (BB) in gear case for damage and for wear (par. 355). If bearing is damaged or is worn beyond specified limits, replace bearing (*c* below).
- (2) *Gear case cover.*—Examine bushing type bearing (BB) in gear case cover (DD) for damage and for wear (par. 355). If bearing is damaged or is worn beyond specified limits, replace bearing (*c* below).
- (3) *Drum shaft and gear.*—Inspect drum shaft (Y) for distortion and for wear at bearing contact surfaces (par. 355). If damaged in any way or if worn beyond specified limits, replace shaft (*c* below). Examine drum shaft gear (AA) for scored or broken teeth. If any damage is evident, replace gear (*c* below).
- (4) *Drive worm.*—Examine drive worm (NN) for scored or otherwise damaged threads. Also check for damaged threads in automatic brake end and for elongated shear pin hole in drive end. If any damage is evident, replace with new part.
- (5) *Ball bearings.*—Examine ball bearings (MM) for evidence of damaged balls or races. Rotate bearings to detect roughness. If any damage is evident, replace with new bearings. If bearings are satisfactory, coat with oil to prevent rusting prior to installation.

- (6) *Automatic brake band and lining assembly.*—Inspect automatic brake band with lining assembly (AJ) for damaged or worn lining. If lining is damaged or worn down close to rivet heads, replace lining (*c* below). Check for damaged threads in nut which is welded to upper end of band. If threads are damaged, replace band and lining assembly.
- (7) *Automatic brake disk.*—Examine automatic brake disk (AH) for scored or rough braking surface. If any damage is evident, replace with new part.
- (8) *Automatic brake case and oil seal.*—Inspect automatic brake case (WW) for damaged threads in tapped holes. Any damage necessitates replacement with new part. Examine oil seal (UU) in brake case for damaged or deteriorated sealing lip. If any damage is evident, replace oil seal (*c* below).
- (9) *Bearing cap and oil seal.*—Examine oil seal (LL) in bearing cap (HH) for damaged or deteriorated sealing lip. If any damage is evident, replace oil seal (*c* below).
- (10) *Automatic brake adjusting spring.*—Check automatic brake adjusting spring (AL) for free length and compression (par. 355). If not within specified limits, replace with new part.
- (11) *Tie rod.*—Examine tie rod (AU) for damaged threads or distortion. If only slightly bent, tie rod can be straightened. If badly bent or if threads are damaged, replace tie rod.
- (12) *Gaskets.*—Any gaskets which were damaged during disassembly must be discarded and new gaskets obtained for assembly. Make sure number of gaskets used at each point is the same as the number removed at time of disassembly.

*c. Repair.*

- (1) *Gear case bearing replacement.*—Press old bushing type bearing (BB) out of gear case (SS), using care not to damage bearing bore in case. Carefully press new bearing into place, using care not to damage inside surface of bearing. Proper inside diameter of bearing is provided when bearing is pressed into place and no finishing is necessary. Scrape off any burrs which may have formed on edge of bearing during installation.
- (2) *Gear case cover bearing replacement.*—Using a punch or chisel at one of the notches in hub of gear case cover (DD), collapse bushing type bearing (BB) at one side and remove bearing from cover. Use extreme care not to damage bearing bore in cover. Carefully press new bearing into cover until edge of bearing is flush with edge of bearing bore.

Scrape off any burrs which may have formed on edge of bearing during installation.

- (3) *Drum shaft or drum shaft gear replacement.*—To replace either the drum shaft (Y) or the drum shaft gear (AA), press shaft out of gear with an arbor press. Make sure drum shaft keys (Z) are fully seated and secure in shaft. Position gear on shaft with side of gear having notches in hub down and with keyways in gear alined with keys in shaft. Press gear onto shaft, using an arbor press, to dimension shown in figure 228.

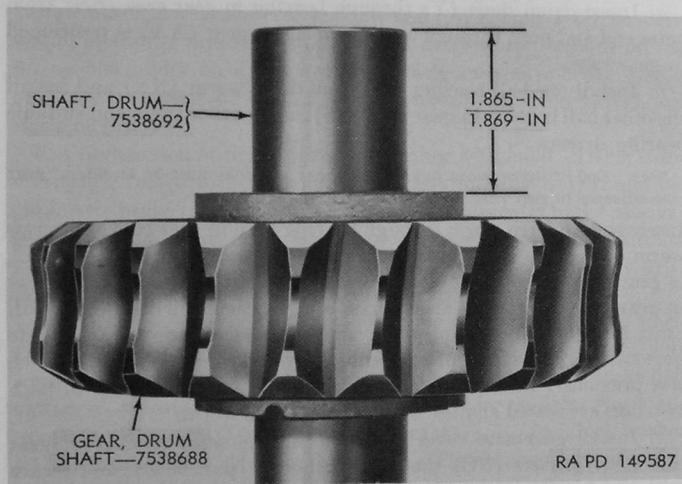


Figure 228. Drum shaft gear installed on drum shaft.

- (4) *Automatic brake band lining replacement.*—Punch rivets out of automatic brake band with lining assembly (AJ) and remove automatic brake band lining (AK) from band. Clean all dirt and corrosion from band. Position new lining inside of brake band. Lining should not extend beyond center of end rivet holes in band more than one-half inch. Spread band to slightly larger than normal diameter while installing brake lining to assure good band-to-lining contact. Using brake band as a template, and using a conventional brake relining machine, drill nine  $\frac{9}{64}$ -inch diameter holes in lining, countersink holes to a depth of one-eighth of an inch with a  $\frac{3}{8}$ -inch drill; then install and upset nine  $\frac{9}{64} \times \frac{9}{32}$  tubular rivets.

- (5) *Automatic brake case or bearing cap oil seal replacement.*— Press old oil seal (UU or LL) out of automatic brake case (WW) or bearing cap (HH). Clean all traces of sealing compound out of seal bore. Coat outside of new oil seal case with plastic type gasket cement. Press oil seal into brake case or bearing cap, with lip of seal pointing toward gear case side.

### 309. Assembly of Gear Case

*Note.* Key letters noted in parentheses are in figure 225.

a. Insert drum shaft (Y) through bearing in gear case (SS) from outer end and push through until drum shaft gear (AA) is positioned in gear case.

b. Install one ball bearing (MM) on drive worm (NN) and install the other ball bearing in gear case (SS), using arbor press and suitable bearing drivers.

*Note.* End of drive worm having the shear pin hole must be at side of gear case adjacent to gear case oil level plug (RR).

Insert end of drive worm through bearing bore in gear case and screw worm over drum shaft gear until end of drive worm enters bearing in gear case and bearing on drive worm is positioned at bearing bore in gear case. Using an arbor press and a bearing driver which will exert force on ball bearing inner and outer races, press bearing into gear case, at the same time pressing drive worm into bearing which was previously installed in gear case. Make sure inner race of both bearings are seated against shoulders on drive worm.

c. Install gear case cover (DD), using the same number of gear case cover gaskets (CC) that were removed (par. 307b), and secure with two  $\frac{1}{2}$ -13 x  $1\frac{1}{4}$  cap screws (T) and  $\frac{1}{2}$ -inch lock washers (U), applying plastic type gasket cement to cap screw threads before installing. Tighten cap screws firmly. If the six  $2\frac{3}{4}$ -inch long special screws (FF) were removed at time of disassembly, coat threads with plastic type gasket cement and install with  $\frac{9}{16}$ -inch lock washer (EE) on each cap screw.

d. Position bearing cap gasket (GG) on gear case, using same number of gaskets that were removed (par. 307a). Install bearing cap and oil seal assembly (HH and LL) on drive worm, using a piece of thin shim stock wrapped around drive worm to guide oil seal lip over shoulder on drive worm. Position bearing cap against gear case. Coat threads of four  $\frac{1}{2}$ -13 x  $1\frac{3}{4}$  cap screws (KK) with plastic type gasket cement; then attach bearing cap to gear case with the four cap screws and  $\frac{1}{2}$ -inch lock washers (JJ). Tighten cap screws firmly.

e. Install one jam nut (AR) on each end of tie rod (AU) and run nuts down to end of threads. Coat threads at end of tie rod having



the shortest threads with plastic type gasket cement; then thread this end of tie rod into tapped hole in bottom of gear case. Turn tie rod into gear case several turns; then tighten jam nut against gear case.

### 310. Assembly of Automatic Brake

*Note.* Key letters noted in parentheses are in figure 225.

a. Place automatic brake case gaskets (VV) on gear case, using the same number of gaskets that were removed (par. 306*d*). Coat threads of four  $\frac{1}{2}$ -13 x  $1\frac{3}{4}$  cap screws (KK) with plastic type gasket cement. Install automatic brake case and oil seal (WW and UU) on drive worm, wrapping thin shim stock around drive worm to guide oil seal lip over shoulder on drive worm. Attach automatic brake case to gear case with the four  $\frac{1}{2}$ -13 x  $1\frac{3}{4}$  cap screws (KK) and  $\frac{1}{2}$ -inch lock washers (JJ).

b. Check action of drive worm by turning with hand. Drive worm must turn freely with no binding. If any binding is felt, add one automatic brake case gasket (VV) between automatic brake case and gear case and again check action of drive worm. Add additional gaskets if required to relieve binding. Tap on both ends of drive worm each time gasket is added before checking action.

c. Tap  $\frac{3}{16}$  x  $\frac{3}{4}$  Woodruff key (PP) into keyway in drive worm (NN); then install automatic brake disk (AH) on drive worm, with keyway in brake disk engaging key in drive worm. Drive brake disk onto drive worm until it bottoms against shoulder on drive worm and secure in place with  $\frac{3}{8}$ -inch plain washer (AG),  $\frac{5}{16}$ -inch lock washer (AF), and  $\frac{5}{16}$ -24 x  $\frac{3}{4}$  cap screw (AE). Tighten cap screw firmly.

d. Install automatic brake band with lining assembly (AJ) over brake disk with end having nut at top, inserting automatic brake adjusting spring (AL) between lower end of brake band and brake case as brake band is slid into place. Place  $\frac{7}{16}$ -inch plain washer (YY) and "O" ring gasket (XX) over  $\frac{3}{8}$ -24 x 4 adjusting cap screw (ZZ), insert cap screw up through brake case, adjusting spring, and lower end of brake band and thread into nut which is welded to upper end of brake band. Using a long drift in shear pin hole in drive worm to turn drive worm, tighten adjusting screw until worm cannot be easily turned in reverse direction. Final adjustment must be made under load after winch is installed on vehicle.

e. Position automatic brake case cover gasket (AD) and automatic brake case cover (AB) on automatic brake case (WW) and attach with six  $\frac{5}{16}$ -18 x  $\frac{5}{8}$  screws with external-teeth lock washers. Tighten screws firmly.

## Section V. REBUILD OF DRUM ASSEMBLY

### 311. Cleaning and Inspection

*Note.* Key letters noted in parentheses are in figure 225.

*a.* Thoroughly clean all grease, dirt, and corrosion from exterior and interior of drum assembly (AM).

*b.* Examine drum for cracks or distortion and replace with new drum assembly if these conditions are evident.

*c.* Examine oil seal (BE) in gear case end of drum for damage or deterioration. Replace oil seal (par. 312*a*) if either of these conditions is evident.

*d.* Check bushing type bearings (BB) in drum for damage and for wear (par. 355). If worn beyond specified limits, replace bearings (par. 312*b*).

### 312. Repair of Drum

*Note.* Key letters noted in parentheses are in figure 225.

*a. Oil Seal Replacement.*—Pry oil seal (BE) out of drum. Thoroughly clean seal seat in drum. Press new seal into drum, with seal lip pointing inward, until side of seal is flush with end of drum.

*b. Bearing Replacement.*—Press bushing type bearing (BB) out of each end of drum, using suitable bearing driver, and being careful not to damage bearing bores in drum. Press new bearings into place with suitable bearing driver and arbor press, using extreme care not to damage inside diameter of bearings. Proper inside diameter of bearings is provided when bearings are pressed into place and no finishing is necessary. Scrape off any burrs which may have formed on edges of bearings during installation.

## Section VI. ASSEMBLY OF WINCH FROM SUBASSEMBLIES

### 313. Installation of Drum Assembly

*Note.* Key letters noted in parentheses are in figure 225.

*a.* Place drum assembly (AM) over drum shaft (Y) with end of drum having oil seal next to gear case, carefully guiding shaft through bearings in drum. Push drum all the way onto shaft until oil seal is in place on hub of gear case.

*b.* Place drum thrust ring (AP) over end of drum shaft with notches facing outward and alined with keyways in shaft.

*c.* Turn drum to position the clutch lugs inside of drum directly over the keyways in drum shaft. Install one sliding clutch key (X) in keyway in drum shaft, using a thick chisel as a wedge between clutch lug in drum and key to force inner end of key down into keyway. Drive outer end of key down, using a brass rod and hammer.

File off any burrs which may have formed on edges of key with a fine cut mill file. Blow out all filings with compressed air. Install sliding clutch key in opposite side of drum shaft in the same manner, then check action of sliding clutch (AQ) over shaft and keys. Sliding clutch must slide freely. If any binding is evident, dress off edges of keys with a fine cut mill file until free action is obtained.

### 314. Installation of End Frame Assembly

*Note.* Key letters noted in parentheses are in figure 225.

a. Position gear case, drum shaft, and drum assembly with tie rod at top. Place sliding clutch (AQ) and end frame bearing thrust ring (AS) on end of drum shaft in position shown in figure 229.

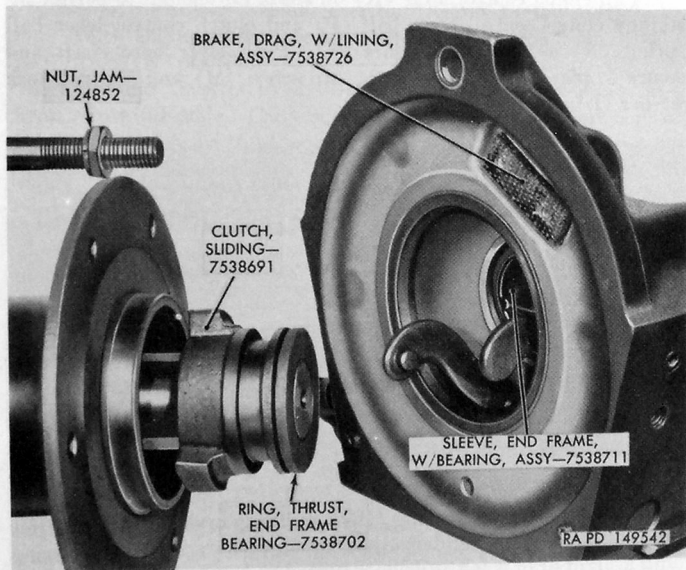


Figure 229. Installing end frame and components on drum shaft.

b. Place end frame sleeve (AW) and bushing type bearing (BB) in end frame with groove in sleeve over dowel in end frame. Position drag brake and lining assembly in depression in end frame (fig. 229).

c. Swing clutch control lever (K) to move ends of clutch shifter yoke as far as possible out of inner side of end frame as shown in figure 229. With parts positioned as shown, lift end frame assembly and engage lugs on clutch shifter yoke in groove in sliding clutch; then push end frame onto drum shaft, at the same time guiding end

of tie rod into hole in end frame. Make sure notches in end frame bearing thrust ring (AS) align with sliding clutch keys (X) to permit end frame to go all the way on.

d. Turn the assembly over, then place top tension channel (V) on end frame and gear case and attach with four  $\frac{1}{2}$ -13 x  $1\frac{1}{4}$  cap screws (T) and  $\frac{1}{2}$ -inch lock washers (U). Do not tighten cap screws until rear tension channel is installed (e below).

e. Place rear tension channel (W) on end frame and gear case and attach each end with three  $\frac{5}{8}$ -11 x  $1\frac{1}{4}$  cap screws (J) and  $\frac{5}{8}$ -inch lock washers (H). Tighten cap screws firmly; then tighten top tension channel attaching cap screws. Turn jam nut (AR) on tie rod out against end frame; then install other jam nut on outer end of tie rod. Tighten nuts against both sides of end frame.

f. Pull clutch control lever (K) off shaft far enough to permit installing clutch control lever ball (P) and clutch control lever ball spring (N) as shown in figure 230. Push lever onto shaft and secure in place with  $\frac{5}{16}$ -18 x  $1\frac{1}{4}$  cap screw (M) and  $\frac{5}{16}$ -inch lock washer (L).

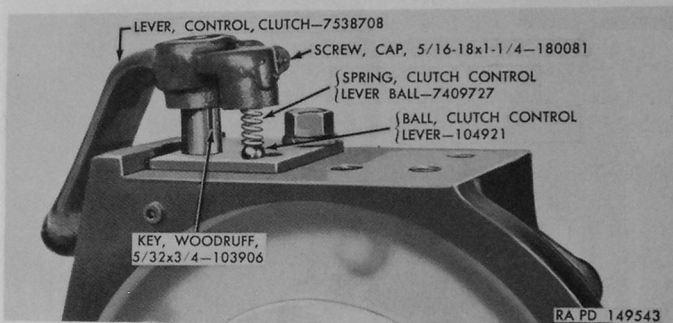


Figure 230. Installation of clutch control lever, spring, and ball.

g. Install drag brake spring (BA) and drag brake adjusting screw (BC) in end frame. Tighten adjusting screw against adjusting spring until a slight drag is felt as drum is turned by hand. Final adjustment must be made after winch is installed on vehicle as directed in TM 9-819A.

h. Install drain plugs (TT) into bottom of end frame and gear case and tighten securely. Add lubricant to end frame and gear case as directed on Lubrication Order 9-819A.

### 315. Installation of Cable Assembly

a. Winch cable must be installed after winch assembly is installed on vehicle. Coat cable with used engine oil before winding on drum.

b. Insert end of cable through hole in drum and secure in place by tightening  $\frac{1}{2}$ -13 x  $\frac{5}{8}$  hex-socket screw (AN, fig. 225) firmly against cable.

c. Connect other end of cable to a load, preferably another vehicle, to keep cable taut while winding on drum. Leave all controls in neutral and brake released on vehicle being used as a load.

d. Make sure drum lock poppet knob at winch is pulled out and turned to disengaged position.

e. Pull clutch control lever outward away from drum to engaged position.

f. Place transfer lever in "DOWN-NEUTRAL" position and apply parking brake. Place transmission control lever in "N" (neutral) position and start engine.

g. Lower the power take-off lever to "DOWN-FORWARD" position. With engine idling, move transmission control lever to "F-2 LOW RANGE" position.

h. Use hand throttle to accelerate engine to not over one-third throttle to wind cable. Cable should be guided to make sure coils on each layer of cable are tight together.

i. After cable is completely wound on drum, place transmission control lever in "N" (neutral) position. Pull out drum lock poppet knob and turn one-quarter turn; then release knob to lock drum. Insert cable chain through one front towing shackle and place chain hook in other front towing shackle.

## Section VII. REBUILD OF WINCH DRIVE SYSTEM

### 316. General

Winch drive system is removed from the vehicle as a complete assembly and disassembled into subassemblies as directed in TM 9-819A. The procedures contained in this section cover disassembly, cleaning, inspection, and assembly of the universal joint assemblies, and inspection of the pilot bearing assembly and drive shafts. The component parts of all three universal joint assemblies are identical except for the yokes, and procedures contained herein apply to either of the three universal joint assemblies. Disassembled view of winch drive system components is shown in figure 232.

### 317. Disassembly of Universal Joint

*Note.* Key letters noted in parentheses are in figure 232 unless otherwise indicated.

a. Grip one yoke of universal joint in a vise and remove four snap rings (A) securing bushing type bearings (B) in yokes.

b. Remove 90-degree lubrication fitting (F) from journal (E).

*c.* Support one yoke in vise jaws; then strike other yoke with hammer as shown in left view, figure 231 to remove one bushing type bearing. Turn yoke over and strike on opposite side to remove opposite bearing. Remove yoke from which bearings were removed from journal.

*d.* Install soft metal jaw protectors in vise; then support ends of journal on vise jaws as shown in right view, figure 231. Strike yoke with hammer as shown to remove one bushing type bearing; then turn yoke over and strike opposite side to remove opposite bearing.

*e.* Remove journal (E) from yoke; then remove cork seals (C) and seal retainers (D) from journal.

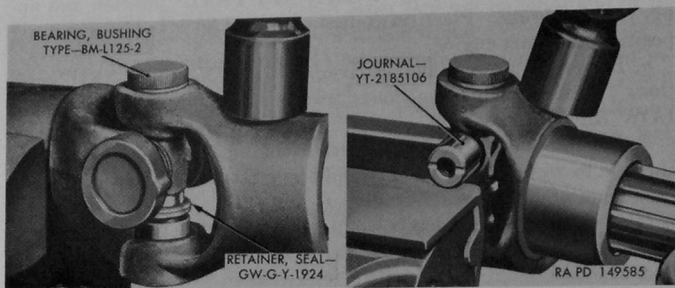


Figure 231. Disassembly of winch drive system universal joint.

### 318. Cleaning, Inspection, and Repair of Drive Line Components

*Note.* Key letters noted in parentheses are in figure 232.

*a. Cleaning.*—Cork seals (C), seal retainers (D), shear pin (H), and  $\frac{5}{16} \times 2$  straight pin (X) should be discarded and new parts obtained for assembly. Wash all other parts, including pilot bearing assembly (S) and front and rear drive shafts (N and V) in dry-cleaning solvent or volatile mineral spirits. Make sure lubricant passages through journals (E) are open, and that all old lubricant is removed from inside of bushing type bearings (B).

*b. Inspection.*

- (1) *Journals and bearings.*—Check inside diameter of bushing type bearings (B) and outside diameter of arms on journal (E) for wear (par. 356). If worn beyond specified limits, replace with new parts.
- (2) *Yokes.*—Examine shear pin hole through hub of front fixed yoke (G) for elongation. If hole is worn, new hole may be drilled as directed in *c* below. Examine set screw hole in rear fixed yoke (U) for damaged threads. Replace yoke if threads are damaged. Check fit of slip yoke (J) on front

and rear drive shafts (N and V). Slip yokes must slide freely on shafts, but backlash between yoke and shaft splines must not be excessive (par. 356). If backlash is excessive, check grooves in slip yoke and teeth on drive-shaft for wear (par. 356) and replace parts as required.

- (3) *Drive shafts*.—Check front and rear drive shafts (N and V) for run-out. If run-out is excessive (par. 356) replace shaft. Fit of shaft splines in slip yoke is checked in (2) above.
- (4) *Pilot bearing*.—Hold pilot bearing case and rotate inner race by hand to check for roughness or looseness in bearing. Check set screw holes in bearing inner race for damaged threads. If rough action, looseness, or damaged threads are evident, replace pilot bearing assembly.

*c. Repair*.—If shear pin hole in front fixed yoke (G) is elongated ((2) above), a new hole can be drilled at right angle to the old hole. Hole must be drilled exactly on centerline and square with bore of yoke. Using a drill press, drill and ream a 0.312 to 0.314-inch diameter hole, with centerline of hole one-half inch in from end of yoke hub. Old holes should be plugged to prevent installing shear pin in worn holes.

### 319. Assembly of Universal Joint

*Note.* Key letters noted in parentheses are in figure 232.

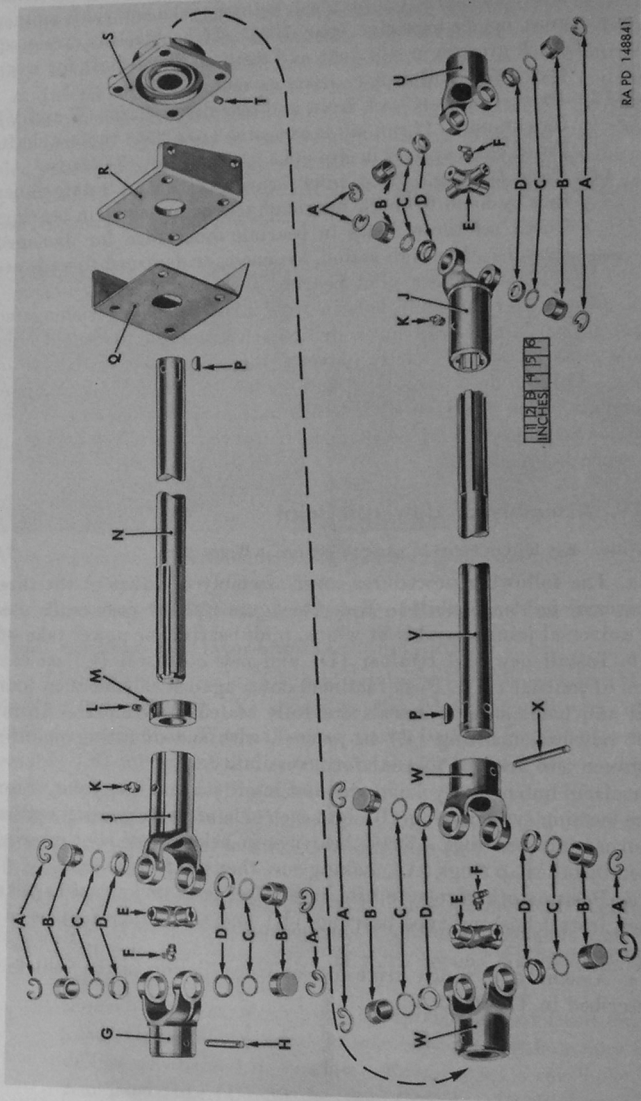
*a.* The following procedures cover assembly of either of the three universal joint assemblies. Refer to figure 232 for yoke to be used in universal joint assembly at winch, pilot bearing, or power take-off.

*b.* Install new seal retainer (D) and new cork seal (C) on each arm of journal (E). Push retainers down against shoulders on journal and make sure cork seals are fully seated in retainers. Install 90° lubrication fitting (F) in journal, with end of fitting pointing between two arms of journal for accessibility.

*c.* Grip hub of one yoke in vise and insert journal into yoke. Start one bushing type bearing (B) into each side of yoke, guiding ends of journal into bearings. Drive bearings in below snap ring grooves; then install snap rings (A), making sure they are fully seated.

*d.* Position other yoke in vise, insert free ends of journal in yoke; then install bushing type bearings (B) and snap rings (A) as in *c* above.

*e.* Assembly of winch drive line and installation in the vehicle is described in TM 9-819A.





A—RING, SNAP—DT-BB-9754  
 B—BEARING, BUSHING TYPE—BM-L-12S-2  
 C—SEAL, CORK—7365355  
 D—RETAINER, SEAL—GW-6-Y-1024  
 E—JOURNAL—YT-2185106  
 F—FITTING, LUBRICATION, 90-DEG—504207  
 G—YOKE, FIXED—BM-L-12-SYR-20-2  
 H—PIN, SHEAR—7412755  
 J—YOKE, SLIP—BM-L-12-SYS-20  
 K—FITTING, LUBRICATION, STRAIGHT—504208  
 L—SCREW, SET, HEX-SOCKET—426374

M—STOP, FRONT DRIVE SHAFT—7411760  
 N—SHAFT, DRIVE, FRONT—7412758  
 P—KEY, WOODRUFF,  $\frac{1}{4}$  X 1—113782  
 Q—SHIELD, PILOT BEARING—YT-2285374  
 R—BRACKET, PILOT BEARING—7412753  
 S—BEARING, PILOT, ASSY—7412751  
 T—SCREW, SET, HEX-SOCKET—7412752  
 U—YOKE, FIXED—BM-L-12-SYR-20-1  
 V—SHAFT, DRIVE, REAR—7412759  
 W—YOKE, FIXED—BM-L-12-SYR-20-13  
 X—PIN, STRAIGHT,  $\frac{5}{16}$  X 2—142535

Figure 232. Winch drive system components.

## CHAPTER 19

### CAB AND ASSOCIATED PARTS

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#### Section I. DESCRIPTION AND DATA

#### 320. Description

*a. General.*—Cab consists of an open-top structure enclosing driver's compartment. Cab is all-steel construction, except glass and paulins, and is assembled from several subassemblies into a complete unit. Subassemblies include cowl and dash unit, sides, rear panel, floor panel, doors, windshield, and paulins. Design of cab facilitates replacement of subassemblies, using only standard common tools. Weather protection and driver comfort is provided by windshield, doors, cowl ventilators, roof paulin, and rear curtain. Equipment also includes two windshield wipers, one inside and two outside rear-view mirrors. Components of cab are illustrated in figures 233, 234, 235, and 238.

*b. Panels.*—Basic cab is composed of floor pan and sills, back panel, cowl, and side panels. The above panel assemblies are bolted together to form a major assembly, and other cab items such as doors, windshield, seats, etc., are assembled to this basic unit. Since each panel assembly is bolted in place, they can be replaced separately whenever necessary.

*c. Doors.*—Cab door consists of a frame assembly to which is assembled frame and glass, regulator, door lock and remote control, check arm, and handles. Door is designed so that it can be adjusted horizontally or vertically whenever necessary; also, each of the components can be readily replaced.

*d. Windshield.*—Windshield consists of two inner frame and glass assemblies hinged at top to outer frame assembly. Outer frame is hinged to cab cowl by means of bolts and hinge brackets. Each inner frame assembly can be adjusted independently of the other; also, complete windshield assembly can be hinged forward.

*e. Windshield Wipers.*—Two windshield wipers, mounted at top of each inner frame, are air-operated type, and are controlled by a single valve mounted at left of instrument panel. Valve is pressure-regulat-

ing type; therefore, wiper speed is not affected by fluctuations in system air pressure.

*f. Roof Paulin and Rear Curtain.*—Roof paulin is one-piece type which serves as cab roof. Paulin is secured to windshield header panel by a bead which slides into a retaining channel. Roof paulin is secured by a lashing rope to roof and side panels, also to hooks on back panel. Rear curtain is one-piece type with rear window. Curtain is attached to top bow by means of screws and washers. Top bow legs fit into sockets at rear corner of cab and are held by ring nut at each side. Curtain lashing rope threads through loops in side of curtain and engages hooks on rear panel.

*g. Seats.*—Cab is equipped with two seats, one driver and one companion. Driver's seat is adjustable in fore and aft direction, while companion seat is held in fixed position. Both seats are easily replaced, and no tools are required to remove or install driver's seat. Companion seat is supported by risers attached to floor pan and back panel. Seat back is hinged to lay forward on seat, also seat can be tilted up against seat back. Latch, attached to back panel, is used to hold seat back and seat in upright position.

### 321. Data

#### *a. Windshield Wiper Motor.*

Make----- Trico  
Type----- air  
Model----- 22193-ZQ

#### *b. Windshield Wiper Blade.*

Number----- L-778-42ZQ  
length----- 12 in.

## Section II. GENERAL REBUILD OF CAB

### 322. General Repair

*a. General.*—Cab is of all metal construction with exception of seat cushions, roof paulin, back curtain, and door glass. Repair is limited to straightening, dinging, patching, stitching, riveting, and welding operations, in addition to replacement of parts and subassemblies. Operations as outlined in this section are based on the assumption that cab has been removed from the chassis. However, many replacement operations can be performed when cab is on chassis, such as roof paulin, roof panels, rear curtain, roof bow, seats, and seat cushions. When replacing individual components of cab assembly, parts adjacent to the component being replaced should not be moved out of position further than necessary to permit replacement of the component to assure proper alinement after installation.

*b. Repair of Cab Panels.*

- (1) *Patching and welding.*—Prepare the hole or break for patching by trimming off all curled edges with a cutting torch or by any other suitable method. Do not cut away more metal than is necessary to make a smooth flat surface upon which to place the patch.
- (2) *Patch preparation.*—Cut a patch of the same thickness as the part to which it is to be applied. Patch must be of sufficient size to overlap at least one inch all around the hole or break.
- (3) *Patch application.*—Position the patch over the hole or break, making sure that patch and weld will not affect function of part to be repaired, nor interfere with other parts of vehicle. Tack weld patch to panel at several evenly spaced points. On the opposite side of panel, run a continuous fillet weld all around the patch or the hole, depending on which side patch is placed. Use shielded arc for welding; if electric welding equipment is not available, gas welding may be used.
- (4) *Paint application.*—After welding is completed, chip away all slag resulting from welding and then apply paint. Refer to TM 9-2851 for painting and methods of painting.

*c. Repair of Cab Paulin and Rear Curtain.*

- (1) *General.*—When patching tears or holes in cab paulin or rear curtain, cut a patch from No. 8 duck or from an old paulin. Patch must be large enough to extend well beyond the edges of the tear or hole. Edges of patch and hole should be turned under and several rows of stitches should be applied around the edges of the patch and edges of hole. All stitching must be made with a minimum of four stitches per inch. Reinforcements of extra thicknesses of duck must be used at points subject to tension. Metal grommets must be installed at all points where lashing ropes pass through roof paulin or rear curtain.
- (2) *Waterproofing.*—When new material is used for patching cab paulin or rear curtain, or if the paulin or curtain have lost their water-repellent qualities, the material should be treated with a suitable waterproof, weatherproof, and mildew-resistant compound. Follow instructions on the compound container for applying.

**323. Replacement of Cab Paulin, Roof Panels, Rear Curtain, and Bow**

*Note.* Key letters noted in parentheses are in figure 233 unless otherwise indicated.

*a. General.*—The cab paulin, roof panels, rear curtain, and roof bow can be replaced as stated in the following subparagraphs. The sequence of procedures for replacing these components are listed in logical sequence.

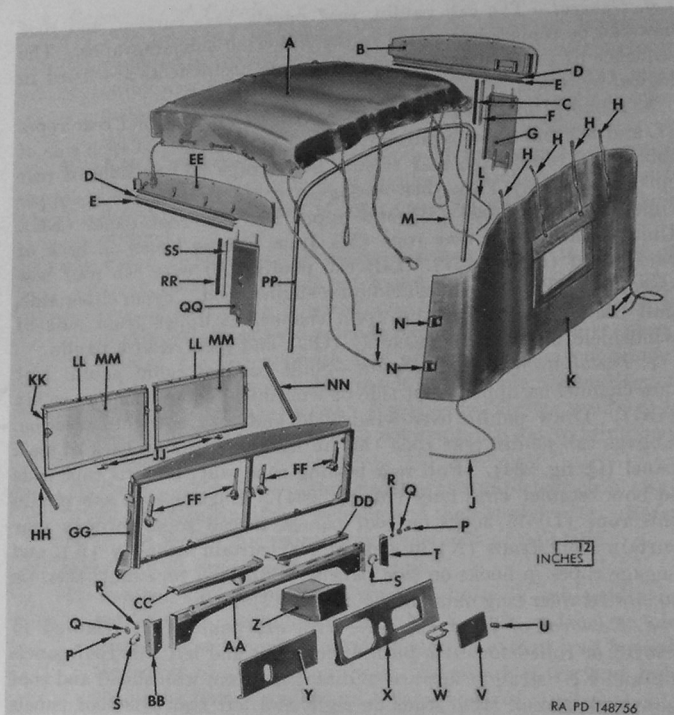
*b. Removal of Cab Paulin.*—Untie cab paulin side and rear ropes (L and M) from bow retainer ring nuts (M, fig. 234) at each side of cab. Pull ropes from rear curtain loop straps (N) in sides of rear curtain assembly (K), then disengage ropes from hooks on upper right side roof panel (B) and upper left side roof panel (EE). Unhook cab paulin rear rope (M) from lashing hooks on back of back panel (Q, fig. 234). Lift cab paulin (A) over cab roof bow assembly (PP) and windshield onto engine hood. From either side, pull bead of canvas paulin from channel at upper front side of windshield outer frame assembly (GG) and then remove paulin.

*c. Installation of Cab Paulin.*—Slide bead of cabin paulin (A) into channel on upper front side of windshield outer frame assembly (GG). Draw paulin over windshield and roof bow into position. Engage cab paulin rear rope (M) in lashing hooks on back of back panel (Q, fig. 234). Pull rear lashing rope taut; then tie rope ends to bow retainer ring nuts (M, fig. 234). Engage each cab paulin side rope (L) in hooks on roof panels, thread ropes through rear curtain loop straps (N) in ends of rear curtain assembly (K), and engage ropes in hooks on side panels. Pull each rope taut; then tie to bow retainer ring nuts (M, fig. 234).

*d. Removal of Roof Panels.*—With cab paulin (A) removed (*b* above) or rolled forward, push upper right and left side roof panels (B and EE) straight upward to disengage from windshield and roof bow anchors and from studs on right and left rear side roof panels (G and QQ). Lift each roof rear side panel straight upward to disengage studs from right and left side panels (J and Y, fig. 234).

*e. Installation of Roof Panels.*—Insert studs of right and left rear side roof panels (G and QQ) into right and left side panels (J and Y, fig. 234). Engage roof upper right and left side panels (B and EE) to anchors on windshield outer frame assembly (GG) and cab roof bow assembly (PP) and over studs of roof side panels.

*f. Removal of Rear Curtain and Roof Bow.*—With cab paulin (A) removed (*b* above) or rolled forward, and upper right and left side roof panels (B and EE) and right and left side roof panels (G and QQ) removed (*d* above), untie cab paulin rear rope (M) from each bow retainer ring nut (M, fig. 234). Disengage rear curtain rope (J) from hooks at inside of back panel (Q, fig. 234). Loosen both bow retainer ring nuts (M, fig. 234) and remove bow retaining screw from each leg of roof bow; then pull cab roof bow assembly (PP), with rear curtain assembly (K) straight upward out of roof bow retainers



- A—PAULIN, CAB—7410694  
 B—PANEL, ROOF, UPPER RIGHT SIDE—YT-2279109  
 C—SEAL, REAR, RIGHT WINDOW—7410726  
 D—RETAINER, DOOR GLASS UPPER SEAL—YT-2280711  
 E—SEAL, UPPER, DOOR GLASS—7410725  
 F—RETAINER, RIGHT WINDOW REAR SEAL—YT-2280707  
 G—PANEL, ROOF, RIGHT REAR SIDE—YT-2279160  
 H—STRAP, REAR CURTAIN—7410706  
 J—ROPE, REAR CURTAIN—YT-2280313  
 K—CURTAIN, REAR, ASSY—7410693  
 L—ROPE, SIDE, CAB PAULIN—YT-2280309  
 M—ROPE, REAR, CAB PAULIN—YT-2280310  
 N—STRAP, LOOP, REAR CURTAIN—7410709  
 P—BOLT, SPECIAL,  $\frac{5}{8}$ -18 X  $1\frac{7}{8}$ —7410701  
 Q—WASHER, SPACING—YT-2266216  
 R—NUT,  $\frac{5}{8}$ -18—442803  
 S—NUT, RING, CAB LIFTING—7410647  
 T—HINGE, RIGHT LOWER, OUTER FRAME, ASSY—7410699

Figure 233. Instrument boards, windshield, and cab covering components.

(L, fig. 234). Remove 11 screws which retain back curtain to roof bow and remove curtain from bow.

*g. Installation of Rear Curtain and Roof Bow.*—Position upper edge of rear curtain assembly (K) over top of cab roof bow assembly (PP) and secure with eleven screws. Insert legs of roof bow down through roof bow retainers (L, fig. 234) and install stop screw in each leg of bow below bow retainers, then raise bow until stop screws contact retainers. Tighten bow retainer ring nuts (M, fig. 234). Install roof panels (*e* above) and cab paulin (*e* above).

## 324. Replacement of Seats and Cushions

*Note.* Key letters noted in parentheses are in figure 235.

### *a. Driver's Seat.*

- (1) *Removal and disassembly.*—Loosen wing nut on driver's seat lock bolt assembly (R) at rear of driver's seat frame (W); then swing lock bolt forward and downward. Raise and tilt seat forward and while retaining seat in this position, disengage driver's seat support (S) from driver's seat support bracket (T) on cab floor pan; then remove driver's seat from cab. Remove nuts from four studs which attach driver's seat support (S) to driver's seat left and right adjuster assemblies

*Figure 233.—Continued.*

U—KNOB, COMPARTMENT DOOR—CV-3674709  
V—DOOR, COMPARTMENT, ASSY—YT-2280772  
W—HINGE, COMPARTMENT DOOR, ASSY—YT-2259208  
X—PANEL, INSTRUMENT, RIGHT, ASSY—YT-2277795  
Y—PANEL, INSTRUMENT, LEFT, ASSY—YT-2277802  
Z—COMPARTMENT, INSTRUMENT BOARD, ASSY—YT-2266252  
AA—BAR, CROSS, WINDSHIELD—YT-2267239  
BB—HINGE, LEFT LOWER, OUTER FRAME, ASSY—7410700  
CC—DUCT, DEFROSTER, LEFT—YT-2280776  
DD—DUCT, DEFROSTER, RIGHT—YT-2280775  
EE—PANEL, ROOF, UPPER LEFT SIDE—YT-2279110  
FF—ARM, ADJUSTING, WINDSHIELD—7373327  
GG—FRAME, OUTER, WINDSHIELD, ASSY—7410695  
HH—ARM, SUPPORT, WINDSHIELD, LEFT—YT-2281283  
JJ—HANDLE, WINDSHIELD INNER FRAME, ASSY—7373330  
KK—WEATHERSTRIP, WINDSHIELD, INNER FRAME—7410667  
LL—FRAME, INNER, WINDSHIELD, ASSY—7410696  
MM—GLASS, WINDSHIELD—YT 2280793  
NN—ARM, SUPPORT, WINDSHIELD, RIGHT—YT-2281282  
PP—BOW, CAB ROOF, ASSY—7410664  
QQ—PANEL, ROOF, LEFT REAR SIDE—YT-2279161  
RR—SEAL, REAR, LEFT WINDOW—7410727  
SS—RETAINER, LEFT WINDOW REAR SEAL—YT-2280706

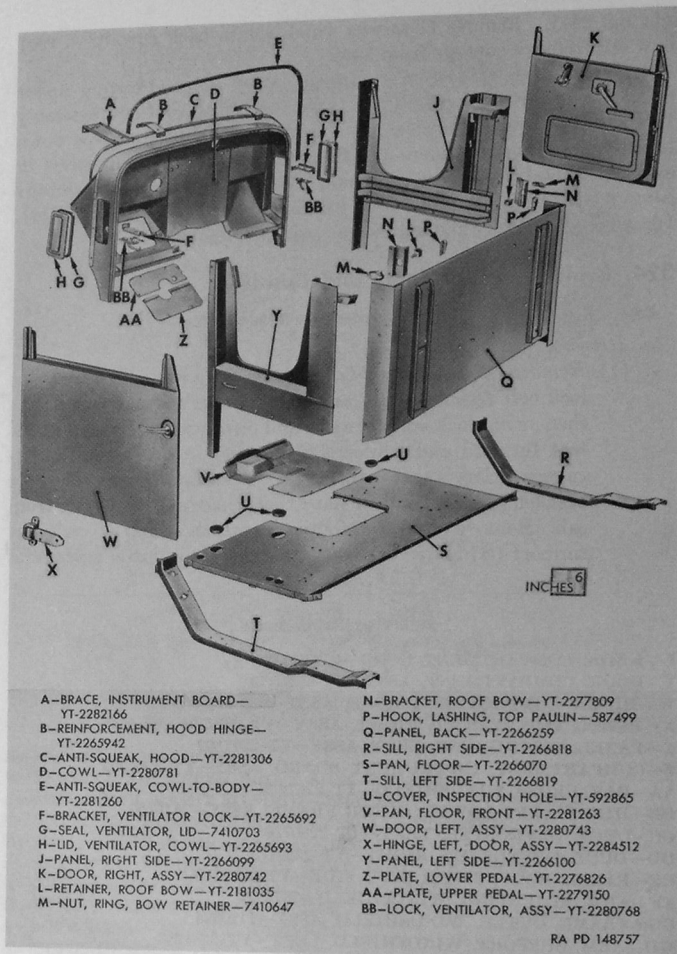


Figure 234. Cab cowl, doors, floor, and panel components.

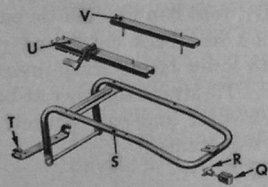
(U and V). Remove nuts from four studs which attach adjusters to driver's seat frame (W) and remove adjusters from seat frame. If adjusters have been bent or if they fail to function properly, replace with new assemblies.

(2) *Assembly and installation.*—Attach driver's seat left and right adjuster assemblies (U and V) to driver's seat frame





12  
INCHES



- A—COVER, CUSHION, DRIVERS, ASSY—7410603
- B—COVER, BACK CUSHION, DRIVERS, ASSY—7410602
- C—COVER, CUSHION, COMPANION SEAT, ASSY—7410601
- D—PAD, COMPANION SEAT CUSHION, ASSY—YT-2267203
- E—PAD, JUTE, COMPANION SEAT CUSHION—YT-2279199
- F—SPRING, COMPANION SEAT CUSHION, ASSY—YT-2266299
- G—COVER, BACK CUSHION, COMPANION SEAT, ASSY—7410600

- H—PAD, BACK CUSHION, COMPANION SEAT, ASSY—YT-2267204
- J—FRAME, BACK, COMPANION SEAT—YT-2267228
- K—BRACKET, HINGE, COMPANION SEAT, RIGHT—YT-2280361
- L—RISER, RIGHT, COMPANION SEAT—YT-2280399
- M—BRACKET, HINGE, COMPANION SEAT, LEFT—YT-2280362
- N—FRAME, COMPANION SEAT BOTTOM—YT-2267237
- P—RISER, LEFT, COMPANION SEAT—YT-2280396
- Q—BRACKET, DRIVERS SEAT LOCK BOLT, ASSY—YT-2280754
- R—BOLT, LOCK, DRIVERS SEAT, ASSY—7410599
- S—SUPPORT, DRIVERS SEAT—YT-2280358
- T—BRACKET, DRIVERS SEAT SUPPORT—YT-2280356
- U—ADJUSTER, LEFT, DRIVERS SEAT, ASSY—AFG-4319-LH
- V—ADJUSTER, RIGHT, DRIVERS SEAT, ASSY—AFG-3218-RH
- W—FRAME, DRIVERS SEAT—YT-2280745
- X—SPRING, DRIVERS SEAT CUSHION, ASSY—YT-2280331
- Y—PAD, DRIVERS SEAT BACK CUSHION, ASSY—YT-2280318
- Z—PAD, JUTE, DRIVERS SEAT CUSHION—YT-2280317
- AA—PAD, DRIVERS SEAT CUSHION, ASSY—YT-2280316

RA PD 148750

Figure 235. Cab seat components.

(W) with four  $\frac{5}{16}$ -24 nuts. Attach driver's seat support (S) to seat adjusters with four  $\frac{5}{16}$ -24 nuts. Position driver's seat in cab, with driver's seat support (S) engaged in driver's seat support bracket (T). At rear of seat, swing driver's seat lock bolt assembly (R) upward into engagement with bracket on driver's seat support (S). Tighten wing nut firmly.

b. *Driver's Seat Cushions.*

- (1) *Removal and disassembly.*—Raise seat cushion from driver's seat frame (W) to remove. Untie cover hold-down strap at back of driver's seat frame; then pull strap from grommet in seat back frame. Lift driver's back cushion cover assembly (B) and driver's rest back cushion pad assembly (Y) straight up from driver's seat frame (W) to remove. Untie straps at back of seat back cover; then pull driver's seat back cushion pad assembly (Y) from cover. Untie lacing cord at bottom of seat cushion; then disengage cord from hooks on bottom of driver's seat cushion spring assembly (X). Remove driver's cushion cover assembly (A) from springs and padding.
- (2) *Assembly and installation.*—Position driver's cushion cover assembly (A) on driver's seat cushion pad assembly (AA) and driver's seat cushion jute pad (Z) and driver's seat cushion spring assembly (X). Engage lacing cord in hooks on bottom of spring assembly, pull cord taut, and tie. Insert driver's seat back cushion pad assembly (Y) in driver's back cushion cover assembly (B), fold flap up, and tie outer lacing straps to loops. Position seat back cover and pad on driver's seat frame (W) with lower lacing strap inserted through grommet in seat frame. Tie straps together at back of seat frame to hold seat back cover and pad securely in place. Position seat cushion in seat frame.

c. *Replacement of Companion Seat and Risers.*

- (1) *Removal.*—Remove six cap screws and nuts which attach companion seat right and left hinge brackets (K and M) to companion seat right and left risers (L and P). Lift seat from risers and remove seat from cab. Remove four cap screws and nuts which attach seat left riser to floor pan and back panel, and remove five cap screws and nuts which attach seat right riser to floor pan, side panel, and back panel; then remove risers from cab.
- (2) *Installation.*—Install companion seat right riser (L) to floor pan, side panel, and back panel, using five cap screws and nuts. Install companion seat left riser (P) to floor pan and back panel, using four cap screws and nuts. Position companion seat on seat risers. Install three cap screws and nuts which

attach each companion seat right and left hinge bracket (K and M) to risers.

*d. Companion Seat Cushions.*

- (1) *Removal and disassembly.*—Pull bottom of seat back cushion forward and upward. Slide seat back cushion to side to disengage bead on cushion from metal channel on companion seat back frame (J). Raise companion seat bottom frame (N) to vertical position. Disengage seat spring latches by tapping with hammer. Lower companion seat bottom frame (N) to horizontal position. Lift seat cushion from seat bottom frame. Untie lacing cord at bottom of seat cushion, disengage cord from hooks on companion seat cushion spring assembly (F) and lift companion seat cushion cover assembly (C) from companion seat cushion pad assembly (D) companion seat cushion jute pad (E), and spring assembly. Untie lacing cord at back of seat back cushion, pull cord from loops in cover, then lift companion seat back cushion pad assembly (H) from companion seat back cushion cover assembly (G).
- (2) *Assembly and installation.*—Position companion seat back cushion pad assembly (H) in companion seat back cushion cover assembly (G), thread cord through loops, pull cord taut, and tie. Position companion seat cushion cover assembly (C) over companion seat cushion pad assembly (D), companion seat cushion jute pad (E), and companion seat cushion spring assembly (F), and engage loops of cord in hooks on spring bottom. Pull cord taut and tie. Position seat cushion and companion seat bottom frame (N), raise seat cushion and frame to vertical position and engage latches by tapping with hammer; then lower seat to horizontal position. Holding seat back cushion upside down, engage bead on seat back cushion in metal channel on companion seat back frame (J). Slide bead fully into channel; then lower cushion into place.

### 325. Replacement of Back Panel

*a. General.*—The back panel (Q, fig. 234) can be removed from the cab regardless of whether cab is on chassis or removed from chassis. However, in either instance, the cab paulin, rear curtain, roof top and side panels, roof bow, companion seat and driver's seat, parking brake and bracket, and transfer and power take-off control levers and bracket must be removed from cab before removing the back panel.

*b. Removal of Back Panel.*

- (1) Remove the cab paulin (A, fig. 233), rear curtain assembly (K, fig. 233), roof upper right and left side panels (B and EE,

fig. 233), right and left rear side roof panels (G and QQ, fig. 233), cab roof bow assembly (PP, fig. 233) as directed in paragraph 323. Remove driver's seat and support, and companion seat and brackets as directed in paragraph 324. Remove parking brake lever and bracket and transfer and power take-off control levers with bracket from cab.

- (2) Remove all cap screws which attach back panel (Q, fig. 234) to right and left side panels (J and Y, fig. 234), floor pan (S, fig. 234), companion seat right and left risers (L and P, fig. 235), roof bow brackets (N, fig. 234), bow retainer ring nut (M, fig. 234), roof bow retainer (L, fig. 234), and cab right and left side sills (R and T, fig. 234). If operation is performed when cab is on chassis, remove four cap screws which attach cab to rear mounting springs and remove cab rear center mounting cap screw; then remove cab back panel by forcing panel back from side panels.

*c. Back Panel Installation.*

- (1) Position back panel (Q, fig. 234) to back of cab, making sure ends of side panels enter between flange on back panel and guide straps welded to inner side of back panel.
- (2) Attach back panel to right and left side panels (J and Y, fig. 234), using 23 cap screws and nuts.
- (3) Attach back panel to floor pan (S, fig. 234) using 14 cap screws and nuts.
- (4) Attach back panel to right and left side sills (R and T, fig. 234), using four cap screws and nuts.
- (5) Attach back panel to companion seat right and left risers (L and P, fig. 235), using four cap screws and nuts.
- (6) Attach back panel to roof bow brackets (N, fig. 234), using four cap screws and nuts.
- (7) Attach parking brake lever bracket to back panel, using four cap screws and nuts.
- (8) Attach transfer and power take-off control lever bracket to back panel, using three cap screws and nuts.
- (9) Install driver's and companion seats (par. 324), and install roof bow, rear curtain, roof side and top panels, and cab paulin (par. 323).

### 326. Replacement of Side Panels

*Note.* Key letters noted in parentheses are in figure 234 unless otherwise indicated.

*a. General.*—In order to replace right or left side panel (J or Y) on cab, it is first necessary to remove the following cab components: cab paulin, roof panels, and rear curtain and cab roof bow (par. 323); driver's seat (par. 324); doors (par. 331); tool box, running boards,

tail pipes, and heat shield; and complete windshield assembly with lower hinges (par. 334).

*b. Removal of Side Panels.*—Remove cap screws and nuts which attach back panel (Q) to floor pan (S), companion seat right and left risers (L and P, fig. 235), right and left side sills (R and T), transfer control lever bracket, and to side panel which is being replaced. Remove cap screws, nuts, and washers which attach side panel to floor pan (S), cowl (D), instrument panel, and windshield cross bar (AA, fig. 233). Remove side panel by forcing back panel (Q) back and

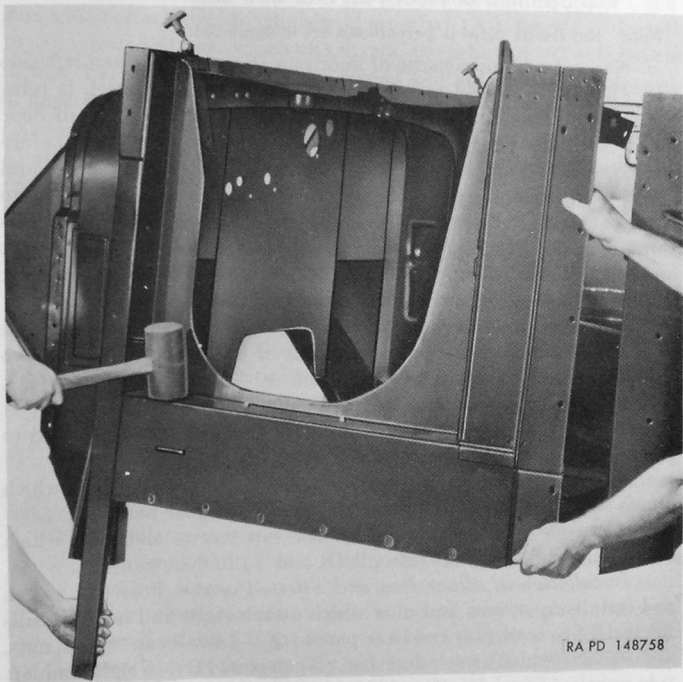


Figure 236. Removing cab side panel.

away from side panel; then pull out bottom of side panel until lower reinforcement on inside of side panel clears front corner of floor pan (S); then with rubber mallet drive cab side panel (fig. 236) down and away from windshield cross bar. Remove side panel.

*c. Installation of Side Panels.*—Position side panel to side of cab and insert upper front corner of panel under end flange of windshield cross bar (AA, fig. 233); then with small pry bar to guide side panel at windshield cross bar, and with a rubber mallet, drive side panel

up and into position against floor pan and cowl. Install back panel (Q) to side panel (par. 325c (2)). Install cap screws, nuts, and washers which attach side panel to floor pan (S), cowl (D), instrument panel, and windshield cross bar (AA, fig. 233). Install door (par. 331); install complete windshield assembly with lower hinges (par. 334); install driver's seat (par. 324); install roof bow with rear curtain, roof panels and cab paulin (par. 323); and install running boards, tail pipes, and heat shield on cab.

### 327. Replacement of Floor Pan and Cab Sills

*Note.* Key letters noted in parentheses are in figure 234.

*a. General.*—Floor consists of floor pan (S) and right and left side sills (R and T) bolted together. Floor pan, of sheet steel, is reinforced by steel channels which are spot welded to under side of floor pan. Seats and risers must be removed from cab (par. 324) before removing floor pan. Also remove transfer shift control levers and bracket by removing cap screws and nuts which attach bracket to back panel, and disconnect electrical wiring harness which passes through floor. Position cab on its back to permit removal of floor pan and sills. Brace or support cab in such a manner that cab will not become out of alinement while making replacement.

*b. Removal of Cab Floor Pan and Sills.*—Remove cap screws and nuts which attach each cab sill to front of cowl (D). Remove two cap screws and nuts which attach each cab sill to back panel (Q). Remove all cap screws, nuts, and washers which attach floor pan (S) to back panel (Q), to right and left side panels (J and Y), and to cowl (D); then remove floor pan and sills.

*c. Disassemble Floor Pan.*—Remove six cap screws and nuts which attach each right and left side sill (R and T) to floor pan (S).

*d. Assemble Floor Pan.*—Install six cap screws and nuts which attach each right and left side sill (R and T) to floor pan (S).

*e. Installation of Floor Pan and Sills.*—Position floor pan to cab and install cap screws and nuts which attach right and left side sills (R and T) to cowl (D) and back panel (Q). Install cap screws, nuts, and washers which attach floor pan (S) to cowl (D), to right and left side panels (J and Y), and to back panel (Q). Tip cab to upright position; then install wiring harness through floor pan. Install seats (par. 324); then install transfer shift control levers and bracket to floor pan (S) and back panel (Q) with cap screws and nuts.

### 328. Replacement of Cowl

*Note.* Key letters noted in parentheses are in figure 234 unless otherwise indicated.

*a. General.*—The cowl assembly, which includes two side ventilator assemblies, can be replaced by first removing generator-regulator, air

cleaner, instrument panels with instruments, and necessary air lines and vent lines from cab, providing they had not been removed previously.

*b. Removal of Cowl Assembly.*—Remove cap screws and nuts which attach cowl (D) to floor pan (S), right and left side sills (R and T), right and left side panels (J and Y), and windshield cross bar (AA, fig. 233); then remove cowl assembly and cowl-to-body antisqueak (E).

*c. Installation of Cowl Assembly.*—Position cowl (D) and cowl-to-body antisqueak (E) to front of cab. Install 13 cap screws and nuts which attach cowl to windshield cross bar (AA, fig. 233). Install 10 cap screws and nuts which attach cowl to right and left side panels (J and Y), and install seven cap screws and nuts which attach cowl to floor pan (S). Install right and left instrument panel assemblies (X and Y, fig. 233) with instrument to cab right and left side panels (J and Y) with five cap screws and nuts, and to windshield cross bar (AA, fig. 233) with seven cap screws and nuts. Install air cleaner, generator-regulator, air lines, and vent lines on cowl.

*d. Cowl Ventilators.*

- (1) *General.*—Cowl ventilators, one on each side of cowl, are controlled by handle at each ventilator. The ventilator lid, lid bracket, and hinge are of sheet metal and are welded together in a unit assembly. Each ventilator lid assembly is attached to cowl with four screws, nuts, and washers. The control link assembly connecting ventilator lid bracket and lock lever is attached with two nuts and washers. Ventilator lid can be set in three open positions. A rubber seal is cemented around inner side of lid with synthetic rubber cement to seal ventilator.
- (2) *Ventilator removal.*—Remove nut from each end of ventilator control link and disengage link from bracket on lid and lock lever. Remove four screws, nuts, and washers which attach ventilator lid hinge to cab cowl, and then remove cowl ventilator lid (H). Remove two cap screws which attach ventilator lock assembly (BB) to ventilator lock bracket (F); then remove lock assembly. Remove three cap screws and nuts which attach ventilator lock bracket (F) to cowl and remove lock bracket from cowl.
- (3) *Disassemble ventilator lock.*—Remove nut and washer which retains ventilator lock control lever to lock handle; then remove lever and handle.
- (4) *Assemble ventilator lock.*—Insert ventilator lock handle through lock bracket, lock plate, and lock lever; then install  $\frac{3}{8}$ -inch internal-teeth lock-washer and  $\frac{3}{8}$ -24 nut on control handle. Tighten nut firmly.

(5) *Ventilator installation.*

*Note.* Right ventilator lock assembly (BB) is installed under ventilator lock bracket (F) which in turn is installed with flanged edge facing upward. The left ventilator lock assembly and bracket is installed in opposite manner.

Install each ventilator lock bracket (F) to cowl with three cap screws and nuts. Attach ventilator lock assembly (BB) to bracket, using two cap screws. Install ventilator lid and hinge to cowl using four screws, nuts, and washers. Engage ends of control link in bracket on lid and in lever on lock, and secure link with two nuts and external-teeth lock washers. Tighten nuts after making necessary adjustments mentioned in (6) below.

- (6) *Ventilator adjustment.*—The upward and downward adjustment of ventilator lock assemblies is obtained by shifting ventilator lock bracket (F) up or down after loosening three cap screws which attach bracket to cowl. The desired tightness or fit of cowl ventilator lid (H) and ventilator lid rubber seal to cowl (D) is obtained by loosening two cap screws which attach ventilator lock assembly (BB) to ventilator lock bracket (F) and shifting lock assembly inward or outward. After making these adjustments, tighten cap screws and nuts firmly.

### 329. Sheet Metal

Replacement information covering sheet metal components of vehicle, such as hood, hood-to-cowl extension panels, fenders, fender skirts, running boards, and brush guard is contained in TM 9-819A.

## Section III. REBUILD OF CAB DOORS

### 330. General

Following text covers removal, installation, and adjustment of cab door assembly; also replacement of components such as frame and glass, regulator, lock and remote control, etc.

### 331. Replacement of Cab Door

*Note.* Key letters noted in parentheses are in figure 238 unless otherwise indicated.

*a. Removal.*—Remove arm pivot pin (J). Remove three  $\frac{5}{16}$ -24 x  $\frac{3}{4}$  cap screws (H) with external-teeth lock washer (H) attaching two hinges to each door; then remove door assembly.

*Note.* Door assembly can also be removed by driving out pin between two halves of hinge or by removing two screws with external-teeth lock washer attaching hinge to cab.



b. *Installation.*—Position door assembly and attach each hinge to door with three  $\frac{5}{16}$ -24 x  $\frac{3}{4}$  screws with external-teeth lock washers. Install arm pivot pin (J).

c. *Adjustment.*—Provision for horizontal and vertical adjustment is provided and should be made whenever door is installed, or at any other time as required.

- (1) *Horizontal adjustment.*—Loosen three screws which attach each hinge to door; then shift door forward or rearward, as required. When correct position is obtained, tighten screws securely.
- (2) *Vertical adjustment.*—Loosen two screws which attach each hinge to cab, then shift door up or down as required. When correct position is obtained, tighten screws securely.

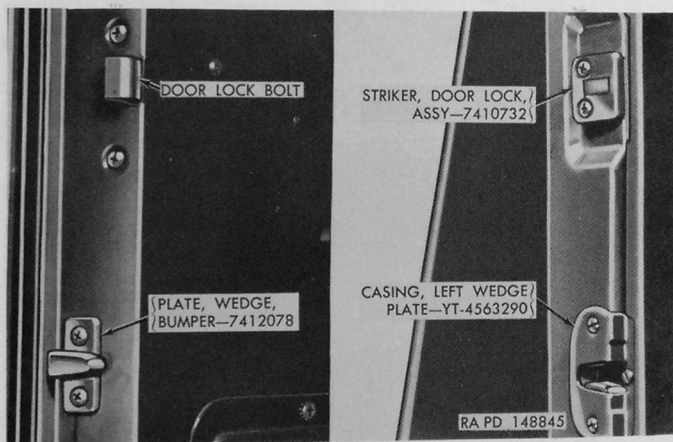


Figure 237. Cab door lock striker and wedge plate adjustments.

- (3) *Door lock striker adjustment.*—Loosen two screws attaching door lock striker assembly (fig. 237) to cab; then move striker in or out as required. Tighten screws firmly; then close door to determine if looseness, rattling, or improper latching have been corrected. Repeat adjustment procedure, if necessary.
- (4) *Door wedge plate adjustment.*—To properly position bumper wedge plate (fig. 237) loosen two screws attaching plate to door. Close door which will move plate up or down and properly locate plate in wedge plate casing. Open door carefully so as not to move wedge plate; then tighten two screws securely. Close and open door several times, noting

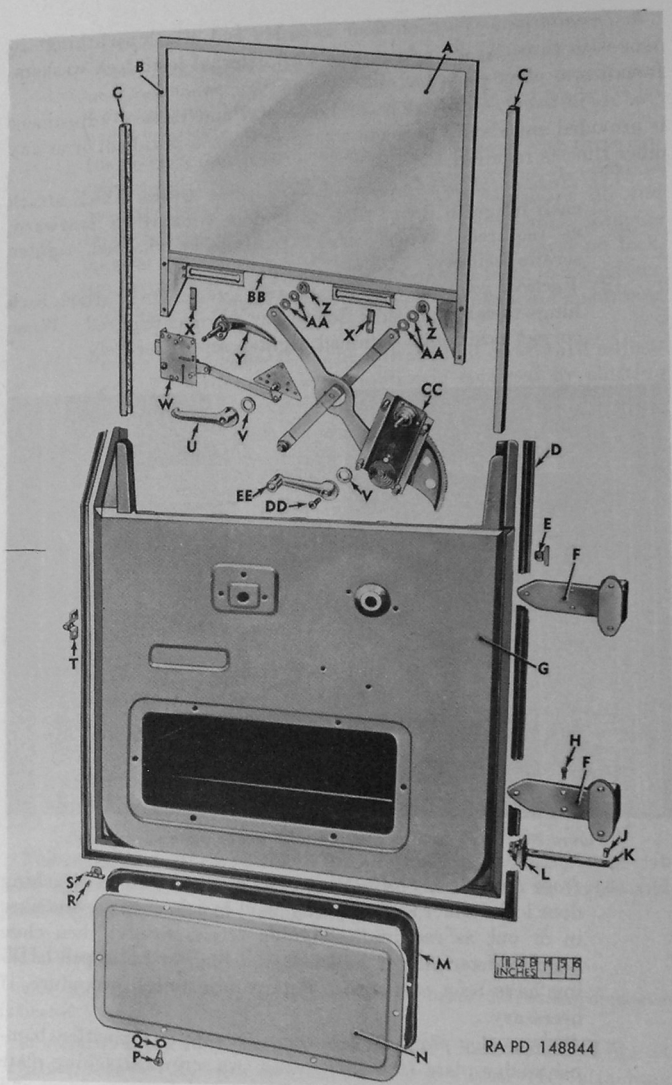


Figure 238. Cab door components.

if wedge plate is properly centered. Repeat adjustment procedure, if necessary.

### 332. Replacement of Cab Door Components

Note. Key letters noted in parentheses are in figure 238.

a. *General.*—Following operations can be performed either with door installed or removed, whichever is the more practical.

b. *Removal of Door Frame and Glass.*

- (1) *Remove door panel plate.*—Remove six screws and lock washers attaching door panel plate (N) to inside of door, then remove panel plate and panel plate weatherstrip (M).

Figure 238.—Continued.

- A—GLASS, WINDOW—YT-2266258
- B—{ FRAME, LEFT, W/GLASS—7410711
- { FRAME, RIGHT, W/GLASS—7410710
- C—CHANNEL, RUN, GLASS—7410633
- D—WEATHERSTRIP, DOOR—7410734
- E—CLIP, WEATHERSTRIP—7373283
- F—{ HINGE, LEFT DOOR, ASSY—YT-2284512
- { HINGE, RIGHT DOOR, ASSY—YT-2284511
- G—{ PANEL, LEFT DOOR,—YT-2280729
- { PANEL, RIGHT DOOR—YT-2280728
- H—SCREW, CAP, W/EXT-TEETH LOCK WASHER,  $\frac{5}{16}$ -24 X  $\frac{3}{4}$ —425640
- J—PIN, PIVOT, ARM—7410720
- K—ARM, CHECK, ASSY—7410629
- L—RETAINER, CHECK ARM—7410712
- M—WEATHERSTRIP, PANEL PLATE—YT-2280719
- N—PLATE, DOOR PANEL—YT-2266094
- P—SCREW, TAPPING, CROSS-RECESS, NO 14-10 X  $\frac{3}{4}$ —162077
- Q—WASHER, LOCK, EXT-TEETH,  $\frac{1}{4}$ -IN.—121753
- R—SCREW, TAPPING, CROSS-RECESS, NO 6-18 X  $\frac{3}{4}$ —161790
- S—CLIP, WEATHERSTRIP—7410634
- T—PLATE, WEDGE, BUMPER—7412078
- U—HANDLE, REMOTE CONTROL—7410713
- V—SPACER, FIBRE—YT-2280643
- W—{ CONTROL, REMOTE, LEFT LOCK, ASSY—7410636
- { CONTROL, REMOTE, RIGHT LOCK, ASSY—7410635
- X—STOP, GLASS FRAME—YT-2280376
- Y—HANDLE, ASSY—7410715
- Z—FASTENER, REGULATOR ARM—7410638
- AA—WASHER, LEATHER—7410719
- BB—{ CHANNEL, LEFT SASH, ASSY—7410632
- { CHANNEL, RIGHT SASH, ASSY—7410631
- { REGULATOR, LEFT WINDOW, ASSY—7410723
- { REGULATOR, RIGHT WINDOW, ASSY—7410722
- CC—{
- DD—SCREW, CROSS-RECESS,  $\frac{1}{4}$ -20 X  $\frac{1}{2}$ —160515
- EE—HANDLE, REGULATOR, ASSY—7410714

- (2) *Remove door frame stops.*—Lower the frame assembly and remove two screws with external-teeth lock washers attaching two glass frame stops (X) to frame.
- (3) *Disconnect regulator.*—Press regulator arm fastener (Z) from stud on both regulator arms; then remove leather washers (AA) and pull regulator arm studs from slot in frame lower channel.
- (4) *Remove frame and glass.*—Lift frame and glass assembly straight up to complete removal.

*c. Installation of Door Frame and Glass.*

- (1) *Position door frame and glass.*—Position door frame and glass assembly into channels with flat side of frame lower channel toward inside of door. Push frame and glass assembly down until lower channel slots are opposite regulator arm studs.
- (2) *Connect regulator arms.*—Install one new leather washer (AA) on each regulator arm stud; then position arm studs through slots in frame lower channel. Install another new leather washer (AA) on each of the regulator arm studs. Secure arms to frame by installing a regulator arm fastener (Z) to each of the arm studs.
- (3) *Install frame stops.*—Install two glass frame stops (X) to frame lower channel, using two No. 8-32 x  $\frac{1}{2}$  screws with external-teeth lock washers at each stop.
- (4) *Install door panel plate.*—Position door panel plate (N) and panel plate weatherstrip (M) over opening in door panel and secure with six No. 14-10 x  $\frac{3}{4}$  cross-recess tapping screws (P) and  $\frac{1}{4}$ -inch external-teeth lock washers (Q).

*d. Replacement of Window Glass.*

- (1) *Remove door frame and glass.*—Remove door frame and glass assembly as directed in *b* above.
- (2) *Remove glass.*—Remove four screws and nuts attaching frame lower channel to frame side channels. Remove lower channel. Remove glass and filler from frame channel. Be sure that channel is cleaned of all glass and filler.
- (3) *Install door glass.*—Install a piece of filler 63-inches long on top and two sides of glass. Install glass and filler into frame, using rubber mallet, if necessary, to seat glass properly. Install a piece of filler 25 inches long at bottom of glass. Install frame lower channel and secure with four No. 6-32 x  $\frac{5}{16}$  screws and No. 8-32 sleeve nuts.
- (4) *Install door frame and glass.*—Install door frame and glass assembly as directed in *c* above.

*e. Replacement of Glass Run Channel.*

- (1) *Remove door frame and glass.*—Remove door frame and glass assembly as directed in *b* above.
- (2) *Remove run channel.*—Use chisel to cut rivet near top of channel, then remove glass run channel (C) from guide in door.
- (3) *Install run channel.*—Coat channel in door and outside of run channel with rubber cement. Install run channel in guide channel and secure with rivet near top of channel.
- (4) *Install door frame and glass.*—Install door frame and glass assembly as directed in *c* above.

*f. Removal of Window Regulator.*

- (1) *Remove door panel plate.*—Remove door panel plate as directed in *b*(1) above.
- (2) *Disconnect regulator.*—Disconnect regulator from door frame as directed in *b*(3) above; then lift frame and glass assembly to top so that regulator assembly can be removed.
- (3) *Remove regulator.*—Remove  $\frac{1}{4}$ -20 x  $\frac{1}{2}$  cross-recess screw (DD), then pull regulator handle assembly (EE) and fibre spacer (V) from regulator. Remove four screws and external-teeth lock washers attaching regulator to door inside panel. Remove right or left window regulator assembly (CC) through opening in door inside panel.

*g. Installation of Window Regulator.*

- (1) *Position regulator.*—Position right or left window regulator assembly (CC) on inside of door panel with handle stem through opening. Install four No. 12-32 x  $\frac{1}{2}$  cross-recess screws with external-teeth lock washers. Tighten screws. Install fibre spacer (V), window regulator handle assembly (EE) and secure with  $\frac{1}{4}$ -20 x  $\frac{1}{2}$  cross-recess screw (DD) and  $\frac{1}{4}$ -inch lock washer.
- (2) *Connect regulator arms.*—Install one new leather washer (AA) on each regulator arm stud; then position studs through slots in frame lower channel. Install another new leather washer (AA) on each of the regulator arm studs. Secure arms to frame by installing a regulator arm fastener (Z) to each of the arm studs.
- (3) *Install door panel plate.*—Install door panel plate as directed in *c*(4) above.

*h. Removal of Lock and Remote Control.*

- (1) *Remove door panel plate.*—Remove door panel plate as directed in *b*(1) above.
- (2) *Remove door handles.*—Remove screw and lock washer attaching remote control handle (U) at inside of door; then remove handle and fibre spacer (V). Remove two screws and

lock washers attaching handle assembly (Y) to outside of door, then pull handle from lock.

- (3) *Remove lock and remote control.*—Crank window up until against stops, then lower approximately two inches. Remove three screws and lock washers at door lock, also remove three screws attaching right or left lock remote control assembly (W) to inner panel. Remove lock remote control assembly through opening in door inner panel.

*i. Installation of Lock and Remote Control.*

- (1) *Install lock and remote control.*—Position lock remote control assembly on inside of door panel with lock through opening in edge of door and remote control handle stud through opening in door inside panel. Install six No. 12-32 x  $\frac{1}{2}$  cross-recess screws with external-teeth lock washers attaching assembly to door and tighten screws securely.
- (2) *Install door handles.*—Install handle assembly (Y) at outside of door and secure with two No. 10-32 x  $\frac{1}{2}$  cross-recess screws and No. 10 lock washers. At inside of door, install fibre spacer (V) and remote control handle (U). Secure handle with one  $\frac{1}{4}$ -20 x  $\frac{7}{8}$  cross-recess screw and  $\frac{1}{4}$ -inch lock washer.
- (3) *Install door panel plate.*—Install door panel plate as directed in c(4) above.

*j. Removal of Check Arm and Retainer.*

- (1) *Remove door panel plate.*—Remove door panel plate as directed in b(1) above.
- (2) *Remove check arm and retainer.*—Remove arm pivot pin (J) attaching arm to bracket. Remove two screws and lock washers attaching check arm retainer (L) to door at inside of door panel.

*k. Installation of Check Arm and Retainer.*

- (1) *Installation.*—Insert check arm assembly (K) through opening and position check arm retainer (L) against bracket. Secure retainer with two No. 10-24 x  $\frac{1}{2}$  cross-recess screws and No. 10 lock washers. Install arm pivot pin (J) attaching arm to bracket.
- (2) *Installation of door panel plate.*—Install door panel plate as directed in c(4) above.

*l. Weatherstrip Replacement.*

- (1) *Removal.*—Remove screws; then remove six weatherstrip clips (E and S). Use knife or other similar tool to remove weatherstrip. Thoroughly clean weatherstrip contact surface on door.
- (2) *Installation.*—Apply rubber cement to metal surface of cab door, also to contact surface of door weatherstrip (D) and

permit to dry a few minutes. Carefully install door weatherstrip (D) to cab door and be sure that it is properly located. Secure with six weatherstrip clips (E and S) using No. 6-18 x  $\frac{3}{4}$  cross-recess tapping screws.

*m. Handle Replacement.*

- (1) *Removal.*—At remote control handle (U) and regulator handle assembly (EE), remove screw and lock washer retaining each handle; then pull handle to remove; also remove fibre spacers (V). At handle assembly (Y), remove two screws and lock washers; then pull handle to remove from lock.
- (2) *Installation.*—Install fibre spacer (V); then position remote control handle (U) or regulator handle assembly (EE) to their respective units. Secure remote control handle with one  $\frac{1}{4}$ -20 x  $\frac{7}{8}$  cross-recess screw and  $\frac{1}{4}$ -inch lock washer, or regulator handle with one  $\frac{1}{4}$ -20 x  $\frac{1}{2}$  cross-recess screw and  $\frac{1}{4}$ -inch lock washer. Position handle assembly (Y) into lock; then secure with two No. 10-32 x  $\frac{1}{2}$  cross-recess screws and No. 10 external-teeth lock washers.

## Section IV. REBUILD OF WINDSHIELD ASSEMBLY

### 333. General

Windshield consists of two inner frame and glass assemblies hinged to an outer frame. Each inner frame assembly is independent of the other and can be adjusted or replaced without disturbing the opposite one. Entire assembly can be positioned as desired (TM 9-819A) or replaced as instructed in paragraph 334b.

### 334. Replacement of Windshield Components

*Note.* Key letters noted in parentheses are in figure 233 unless otherwise indicated.

*a. General.*—Following paragraphs provide repair and replacement instructions of windshield assemblies or components. In most instances these instructions are applicable when windshield is installed or removed from vehicle.

*b. Replacement of Windshield (Complete).*

- (1) *Removal.*—Remove cab top paulin as directed in paragraph 323. Remove windshield wiper blades (*e*(1) below) and wiper motors (*e*(2) below). Remove wiper motor air hose by removing six screws and clips. Remove  $\frac{5}{8}$ -18 nut (R) and washer from two  $\frac{5}{8}$ -18 x  $1\frac{7}{8}$  special bolts (P); then remove two bolts and washers. Lift complete windshield assembly from lower hinge on cab.
- (2) *Installation.*—Locate complete windshield assembly on cab with frame hinges on outside of lower hinges. Insert special

bolts through hinges from the outside, using 1½-inch outside diameter plain washer between hinge halves, and install plain washer and nut. Do not tighten nut excessively, since this would prevent proper windshield raising or lowering. Refer to TM 9-819A for method of adjusting, particularly if new assembly is being installed. Install wiper motors (*e*(3) below) and windshield wiper blades (*e*(4) below). Install wiper motor air hose and secure with six clips.

*c. Replacement of Windshield Frame and Glass.*

- (1) *Removal.*—Remove windshield wiper blade (*e*(1) below) and wiper motor (*e*(2) below). Unlock windshield inner frame handle assembly (JJ) and open inner frame sufficiently to remove two screws and two spring type washers attaching windshield adjusting arms (FF) to each side of inner frame. Support frame and glass assembly while seven cap screws with lock washers attaching inner frame hinge to windshield outer frame assembly (GG) are removed; then remove inner frame and glass assembly.
- (2) *Installation.*—Install weatherstrip in groove on outside of inner frame hinge. Position frame and glass in outer frame and install seven No. 10-32 x ½ screws with external-teeth lock washers attaching inner frame hinge to outer frame. Screws should only be installed fingertight until frame and glass is centered in opening; then tighten screws securely. Open frame sufficiently to connect windshield adjusting arms (FF) to each side of frame, using special washer between arm and frame; then secure each arm with one ¼-28 x ½ screw. Close frame and lock with handle. Install wiper motor (*e*(3) below) and windshield wiper blade (*e*(4) below).

*d. Replacement of Windshield Glass.*

- (1) *Removal.*—Remove individual windshield inner frame assembly (LL) and windshield glass (MM) as an assembly (*b* above). Remove upper hinge from frame by sliding hinge endwise. Remove nut, lock washer, and screw, also two screws and lock washers at upper corner of frame. Remove frame upper channel. Remove windshield glass (MM) and seal from frame channel; then clean channel thoroughly.
- (2) *Installation.*—Install a piece of seal 98 inches in length around edge of glass, then trim end to proper length. Install windshield glass (MM) and seal into windshield inner frame (LL), using rubber mallet if necessary to seat glass properly. Position frame upper channel, being sure that hinge edge is toward outside of frame. Install one No. 10-32 x 7/8 screw, No. 10 internal-teeth lock washer, and No. 10-32 crown nut, and two No. 8-32 x 7/16 screws and No. 8 internal-teeth lock



washers at upper corners of frame. Install upper hinge to frame by sliding hinge over formed upper channel. Install frame and glass assembly as directed in *c*(2) above.

*e. Replacement of Windshield Wiper Blade and Motor.*

- (1) *Removal of wiper blade.*—Pull wiper arm away from windshield, then swing lower end of blade outward and upward until free of wiper arm.
- (2) *Removal of wiper motor.*—Remove wiper blade as directed in (1) above. Remove nut attaching wiper arm to wiper motor shaft; then pull arm from shaft. Disconnect air hose from wiper motor. Remove two screws attaching wiper motor to windshield frame; then remove wiper motor assembly.
- (3) *Installation of wiper motor.*—Position wiper motor to rear of windshield frame with shaft through opening in frame. Install two No. 10-32 x  $\frac{7}{8}$  cross-recess screws with external-teeth lock washers and tighten screws securely. Install wiper arm on motor shaft, making sure arm is correctly positioned for wiping arc; then install and tighten wiper arm retaining nut. Connect air hose to wiper motor.
- (4) *Installation of wiper blade.*—Pull wiper arm away from windshield, then position blade parallel with arm and with blade hook pointing toward wiper motor, engage blade hook with arm. Swing upper end of blade outward and downward into position.

*f. Rebuild of Windshield Wiper Motor.*—Refer to TM 9-1819B for rebuild of windshield wiper motors.

*g. Replacement of Windshield Weatherstrip and Seal.*

- (1) Weatherstrips used between upper hinge of inner frames and outer frame are  $\frac{1}{4}$ -inch round sponge rubber 35 inches in length. Partially open windshield and lock at adjusting arms. Loosen seven screws attaching inner frame upper hinge to outer frame, which will permit inner frame to be lowered sufficiently to replace seal. Tighten seven screws securely and close windshield.
- (2) Windshield inner frame weatherstrip (KK) is one piece specially formed to fit in groove at sides and bottom of frame. To replace, partially open windshield and lock at adjusting arms. Pull weatherstrip from frame, then use wire brush to thoroughly clean groove in frame. Position weatherstrip around frame with corners properly located; then force weatherstrip into frame groove using narrow blunt tool.
- (3) Seals of rubber weatherstrip, 11 $\frac{1}{2}$ -inches long, are used at vertical edges of windshield outer frame to provide seal

between windshield and cab door. To replace, open cab door; then pull or lift seal from retainer. Clean retainer thoroughly; then slide new seal into place in retainer.

- (4) Seal of sponge rubber is used across bottom of outer frame to provide seal between windshield frame and cowl. To replace, tilt complete windshield forward into lowered position (TM 9-819A) to expose seal. Remove seal and clean windshield lower frame of all rubber and sealing compound. Apply rubber cement to seal and frame then permit to dry until tacky. Install seal in frame. Close windshield which will hold seal firmly in place until cement is dry.

## CHAPTER 20

### CARGO BODY

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#### Section I. DESCRIPTION AND DATA

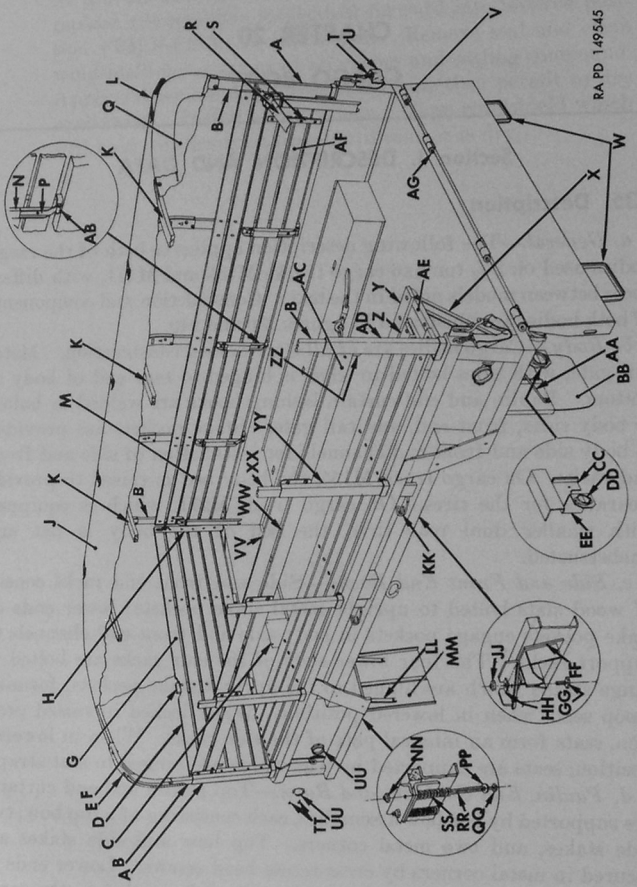
#### 335. Description

*a. General.*—The following description applies to both of the cargo bodies used on 2½-ton 6x6 cargo trucks M135 and M211, with differences between models noted in the text. Construction and components of both bodies are illustrated in figures 239 and 240.

*b. Body.*—Cargo bodies are of all steel welded construction. Metal tail gate, with steps bolted to edge, is hinged to rear end of body at bottom. Paulin and end curtain lashing hooks are welded or bolted to body sides, front end, and tail gate. Stake pockets are provided in body side and front end channels for installation of side and front end racks. On cargo truck M135, the body bed is raised to provide clearance for the tires. On cargo truck M211, which is equipped with smaller dual rear tires, the bed of the body is flat and unobstructed.

*c. Side and Front End Racks.*—Side and front end racks consist of wood slats bolted to upright metal stake pockets; lower ends of stake pockets engage pockets in body side and front end channels to support racks. The four lower slats of the side racks are bolted to hinge straps which are hinged to the upright stake pockets, forming troop seats when in lowered position. When locked in raised position, seats form an integral part of the side racks. When in lowered position, seats are supported by legs which are hinged to seat straps.

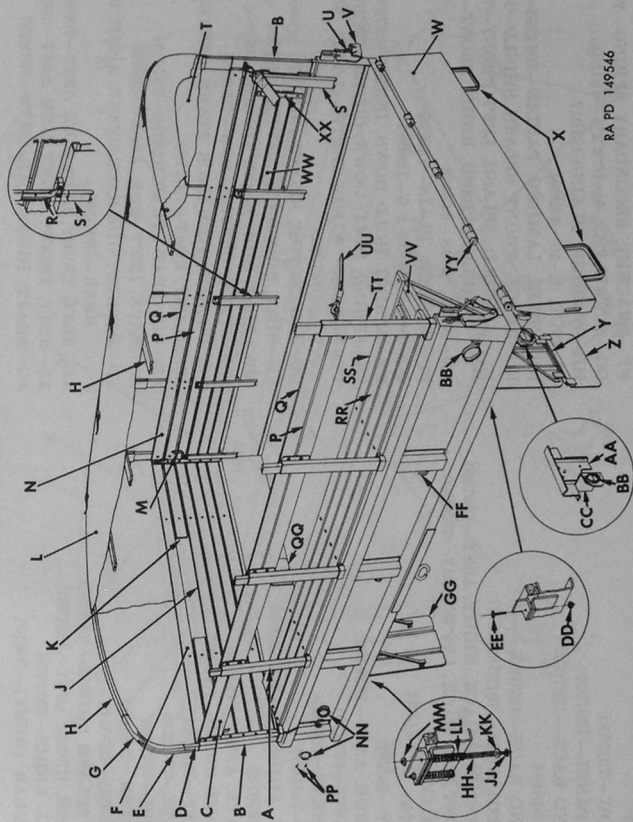
*d. Paulin, End Curtains, and Bows.*—Top paulin and end curtains are supported by five bow assemblies, each consisting of a top bow, two side stakes, and two metal corners. Top bow and side stakes are secured in metal corners by cross-recess head screws. Lower ends of side stakes are inserted into the side rack stake pockets. On cargo truck M211, all bow assemblies are interchangeable. On cargo truck M135, the two end bows are longer than the three center bows due to the raised wheelhouses, and are not interchangeable. None of the bow assemblies are interchangeable between models. End curtains are reinforced and equipped with metal grommets for lashing ropes.



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A-POCKET, SIDE RACK STAKE, LEFT FRONT AND RIGHT REAR-7397966  
 B-STAKE, END, BOW-7372781  
 C-COVER, FRONT PANEL-7397989  
 D-SLAT, FRONT END RACK-7397983  
 E-CORNER, BOW-540404  
 F-POST, FRONT END RACK-7370126  
 G-RACK, FRONT END, ASSY-7372787  
 H-CHANNEL, FRONT END RACK, RIGHT, ASSY-7397991  
   CHANNEL, FRONT END RACK, LEFT, ASSY-7397990  
 J-PAULIN, TOP-7411556  
 K-BOW, TOP-7372780  
 L-STRAP, ROLL UP-545558  
 M-RACK, RIGHT SIDE, ASSY-7529475  
 N-LEG, SEAT, SHORT-7372791  
 P-HINGE, STRAP, SEAT-7061094  
 Q-CURTAIN, END-7411557  
 R-STRAP, SAFETY, ADJUSTABLE-545546  
 S-ANGLE, SEAT-7370149  
 T-CHAIN, TAIL GATE, ASSY-7411555  
 U-COVER, TAIL GATE CHAIN-7061088  
 V-GATE, TAIL, ASSY-7370211  
 W-STEP, TAIL GATE-7370210  
 X-LEG, SEAT, LONG-7372790  
 Y-SLAT, SEAT, OUTER-7061092  
 Z-SLAT, SEAT, INNER-7370148  
 AA-BRACE, REAR SPLASH SHIELD-7397979  
 BB-SHIELD, SPLASH, REAR, ASSY-7397987  
 CC-BRACKET, TAIL LIGHT-7372776  
 DD-REFLECTOR, REAR (RUBY)-5061101  
 EE-BRACKET, REAR REFLECTOR-7372775  
 FF-BRACKET, SECONDARY SPRING-YT-2277394  
 GG-SCREW, CAP,  $\frac{3}{4}$ -16 x  $2\frac{1}{4}$ -181833  
 HH-WASHER, PLAIN-131017  
 JJ-NUT,  $\frac{3}{4}$ -16-442804  
 KK-HOOK, LASHING, PAULIN-7064246-P  
 LL-BRACE, FRONT SPLASH SHIELD-7411552  
   SHIELD, SPLASH, LEFT FRONT-7372797  
 MM-SHIELD, SPLASH, RIGHT FRONT-7370201  
 NN-NUT,  $\frac{5}{8}$ -18-442803  
 PP-WASHER, PLAIN-130999  
 QQ-BOLT,  $\frac{5}{8}$ -18 x 9-188956  
 RR-SPRING, HOLD DOWN, INNER-7372792  
 SS-SPRING, HOLD DOWN, OUTER-7372793  
 TT-SCREW, W/EXT-TEETH LOCK WASHER,  $\frac{1}{4}$ -20 x  $\frac{1}{2}$ -7412828  
 UU-REFLECTOR, FRONT (AMBER)-5061102  
 VV-SLAT, SIDE RACK, UPPER-7397994  
 WW-SLAT, SIDE RACK, LOWER-7397995  
 XX-STAKE, CENTER, BOW-7372784  
 YY-POCKET, SIDE RACK STAKE, CENTER-7397998  
 ZZ-CLAMP, SEAT-7372788  
 AB-PIN, SEAT STRAP HINGE-7370134  
 AC-RACK, LEFT SIDE, ASSY-7529275  
 AD-POCKET, SIDE RACK STAKE, RIGHT FRONT AND LEFT REAR-7397997  
 AE-SEAT, TROOP, LEFT SIDE, ASSY-7061090  
 AF-SEAT, TROOP, RIGHT SIDE, ASSY-7061091  
 AG-SHAFT, HINGE, TAIL GATE-7373205

Figure 239. M135 cargo body components.



RA PD 149546

A—POCKET, SIDE RACK STAKE, CENTER—7370384  
 B—POCKET, SIDE RACK STAKE, LEFT FRONT AND RIGHT REAR—7397996  
 C—RACK, LEFT SIDE, ASSY—7370381  
 D—STAKE, BOW—7372781  
 E—STRAP, ROLL UP—545558  
 F—RACK, FRONT END ASSY—7370377  
 G—CORNER, BOW—540404  
 H—BOW, TOP—7370394  
 J—SLAT, FRONT RACK, LONG—7370378  
 K—SLAT, FRONT RACK, SHORT—7370419  
 L—PAULIN, TOP—8328220  
 M—CLAMP, SEAT—7372788  
 N—RACK, RIGHT SIDE, ASSY—7370380  
 P—SLAT, SIDE RACK, LOWER—7397995  
 Q—SLAT, SIDE RACK, UPPER—7397994  
 R—HINGE, STRAP, SEAT—7061094  
 S—LEG, SEAT—7372790  
 T—CURTAIN, END—8845032  
 U—CHAIN, TAIL GATE, ASSY—7411555  
 V—COVER, TAIL GATE CHAIN—7061088  
 W—GATE, TAIL, ASSY—7370381  
 X—STEP, TAIL GATE—7370210  
 Y—ROD, HINGE, REAR SPLASH SHIELD—7370372  
 Z—SHIELD, REAR SPLASH, LOWER, ASSY—7370371  
 AA—BRACKET, TAIL LIGHT—7370385  
 BB—REFLECTOR, REAR (RUBY)—506101  
 CC—BRACKET, REAR REFLECTOR—7372775  
 DD—NUT,  $\frac{3}{4}$ —16—442804  
 EE—SCREW, CAP,  $\frac{3}{4}$ —16 x 2 $\frac{1}{4}$ —181833  
 FF—HOOK, LASHING, PAULIN—7064246-P  
 GG—{ SHIELD, SPLASH, LEFT FRONT—7370426  
       SHIELD, SPLASH, RIGHT FRONT—7370389  
 HH—SPRING, HOLD DOWN, INNER—7372732  
 JJ—BOLT,  $\frac{3}{4}$ —18 x 9—188956  
 KK—WASHER, PLAIN—130999  
 LL—SPRING, HOLD DOWN, OUTER—7372793  
 MM—NUT,  $\frac{3}{4}$ —18—442803  
 NN—REFLECTOR, FRONT (AMBER)—506102  
 PP—SCREW, W/EXT-TEETH LOCK WASHER,  $\frac{1}{4}$ —20 x  $\frac{1}{2}$ —7412828  
 QQ—COVER, FRONT PANEL—7397999  
 RR—SLAT, SEAT, INNER—7370148  
 SS—SLAT, SEAT, OUTER—7061092  
 TT—POCKET, SIDE RACK STAKE, RIGHT FRONT AND LEFT REAR—7397997  
 UU—STRAP, SAFETY, ADJUSTABLE—545546  
 VV—SEAT, TROOP, LEFT SIDE, ASSY—7370383  
 WW—SEAT, TROOP, RIGHT SIDE, ASSY—7370383  
 XX—ANGLE, SEAT—7370149  
 YY—SHAFT, HINGE, TAIL GATE—7373205

Figure 240. M211 cargo body components.

Top paulin has reinforced metal grommets at sides and hemmed tunnel at each end for lashing ropes, with leather reinforcements used at each corner. End curtains and top paulin are not interchangeable between models.

### 336. Data

#### a. Cargo Truck M135.

Inside body width.....	80 in.
Width—center to center of stake pockets.....	85 $\frac{5}{32}$ in.
Inside body length.....	147 in.
Inside body height.....	14 in.
Width between wheelhouses.....	48 $\frac{1}{2}$ in.
Height between wheelhouses.....	8 $\frac{1}{4}$ in.
Height—floor to paulin bow at center.....	60 in.

#### b. Cargo Truck M211.

Inside body width.....	88 in.
Width—center to center of stake pockets.....	91 $\frac{3}{32}$ in.
Inside body length.....	147 in.
Inside body height.....	14 in.
Height—floor to paulin bow at center.....	60 in.

## Section II. REBUILD OF CARGO BODY

### 337. General

The following instructions do not contain detailed step-by-step procedures on body repair. Since the nature and extent of damage to the body will vary, no definite repair procedure can be established. Successful repair of body will depend to a great extent upon the use of proper welding equipment and material, and upon the ability of the welder. As a general rule, except for major repairs removal of the body from the chassis is not necessary. Since the following instructions are only general in nature, they will apply to the cargo body used on both the M135 and the M211.

### 338. Straightening

Steel parts can be repaired by straightening, brazing, or welding; however, badly damaged parts should be replaced. Heat should not be used when straightening parts of the body. Heat weakens the structural characteristics of metal; therefore, all straightening should be done with parts cold. Any part buckled or bent sufficiently to show strains or cracks after straightening should be replaced or reinforced.

### 339. Patching and Welding

a. *Preparation.*—Prepare the hole or break for patching by trimming off all curled edges with a cutting torch.



*b. Equipment.*—Electric welding equipment should be used exclusively in the repair of the body. Use shielded arc method; the heat of the weld is localized and burning of the material is minimized with this method. In the event electric welding equipment is not available, gas welding or brazing may be used.

*c. Welding Materials.*—Welding rods of electrode classification No. E-6012 A. W. S. (American Welding Society) should be used. When patching the body, the patch should be of the same thickness as the panel to which the patch is being applied.

*d. Safety Precautions.*—Welding or cutting should not be undertaken in areas where fire is forbidden, nor should work of this nature be performed near inflammable materials unless proper precautions are taken to prevent fire. During operation in an inadequately ventilated place, the fumes, suffocating gases, and toxic gases generated in the welding process, or the reduction of oxygen in the air, may overcome the operator. For this reason, welding should not be attempted in such places unless adequate forced ventilation is provided.

*e. Preparing Patch.*—Cut a patch of the same material and thickness as the panel to which the patch is to be applied. The patch must be of sufficient size to overlap at least two inches all around the hole. Form patch to fit contour of mating part.

*f. Applying Patch.*—Position patch over hole and tack weld patch to one side of panel or part at several evenly spaced points. On the other side of the panel or part, run a continuous fillet weld all around the edge of the hole. When welding body panels, patch can be applied to the inside or outside of the panel. The edges of the fracture inside the body should be hammered smooth to fit against the patch and then welded solidly to patch. All slag must be chipped off and the area primed and painted in accordance with TM9-2851.

### **340. Repair of Wood Parts**

*a. General.*—Wood parts can be repaired by gluing and splicing with wood or metal cleats. Use only waterproof glue. When splicing cleats are used, make sure cleats do not affect function of repaired part or cause interference with adjacent or mating parts. Parts which are subjected to considerable strain should not be repaired, but should be replaced with new parts. If fabricated wood parts are not available, new parts can be made using any suitable kiln-dried hard wood. Cut to size and mark location of holes, using the old part as template. If old part is too badly damaged to use as a template, fabricate a new part (*b* below).

*b. Fabricating New Parts.*

- (1) Cut wood to as near correct size and shape as possible by comparison with or by measurement of the same part on another vehicle.
- (2) Position new part, making sure other parts are correctly aligned, and temporarily fasten in place with "C" clamps.
- (3) Using mating parts as templates, mark location of holes or drill through holes in mating parts. Bolt new part in place, using same size bolts used for attaching same part on other vehicles.

*c. Painting Wood Parts.*—New wood parts must be sealed, primed, and painted in accordance with applicable instructions in TM 9-2851.

### **341. Repair of Top Paulin and End Curtains**

*a. General.*—When patching tears or holes in top paulin or end curtains, cut a patch from No. 8 duck or from an old paulin. Patch must be large enough to extend well beyond the edges of the tear or hole. Edges of patch and hole should be turned under, and several rows of stitches should be applied around the edges of the patch and edges of hole. All stitching must be made with a minimum of four stitches per inch. Reinforcements of leather of extra thicknesses of duck must be used at points subjected to tension. Leather reinforcements at each corner must be riveted as well as stitched. Metal grommets must be installed at all points where lashing ropes pass through paulin or end curtains. Roll-up strap buckles are riveted to leather pads and the leather pads are stitched to the paulin.

*b. Waterproofing.*—When new material is used for patching top paulin or end curtains, or if the paulin or curtains have lost their water-repellent qualities, the material should be treated with a suitable waterproof, weatherproof, and mildew-resistant compound. Follow instructions on the compound container for applying.

## CHAPTER 21

### REPAIR AND REBUILD STANDARDS

#### 342. General

The repair and rebuild standards included herein give the minimum, maximum, and key clearances of new parts. 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).

*Note.* All dimensions are in inches unless otherwise indicated.

#### 343. Transfer Assembly

##### a. Input Shaft Components.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
241	A	Outside diameter of input shaft gear bearing.	2.1035 to 2.1040
241	B	Inside diameter of input shaft gear bore.	2.106 to 2.107
241	C	Width of fork groove in sliding gear	0.337 to 0.342

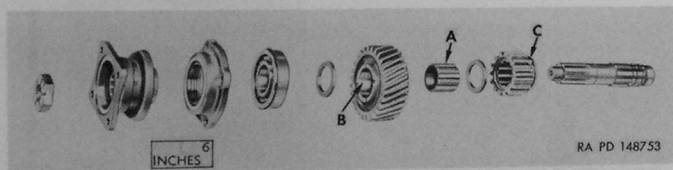


Figure 241. Repair and rebuild standard points of measurement for transfer input shaft components

##### b. Front Axle Output Shaft Components.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
<b>Front axle output shaft gear:</b>			
242	A	Inside diameter of bore.....	1.8550 to 1.8560
242	B	Width of fork groove.....	0.384 to 0.389
242	C	Outside diameter of front axle output shaft at gear.	1.8520 to 1.8530
242	A-C	Fit of gear on shaft.....	0.002L to 0.004L

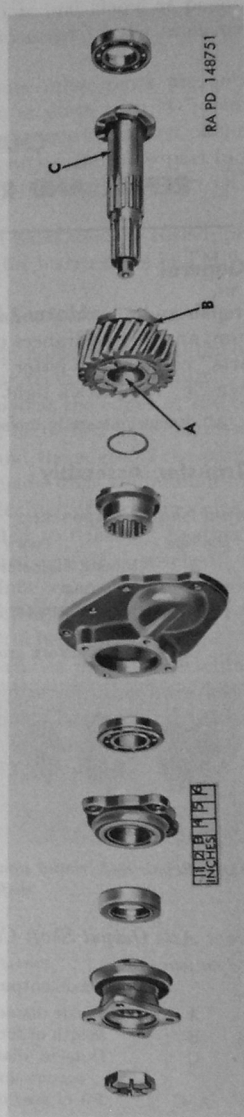


Figure 242. Repair and rebuild standard points of measurement for transfer front axle output shaft components.

### c. Shifting Mechanism.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
243	A	Poppet ball spring:	
		Free length-----	2 (max.)
		Working load when compressed to $1\frac{1}{4}$ -----	30 to 34 lb.
243	B	Shifter shaft front spring:	
		Free length-----	$4\frac{13}{16}$
		Working load when compressed to $1\frac{29}{32}$ -----	20 to 24 lb.
243	C	Shifter shaft rear spring:	
		Free length-----	$3\frac{1}{16}$
		Working load when compressed to $1\frac{1}{16}$ -----	10 to 14 lb
243	D	Front axle shifter shaft:	
		Outside diameter at front axle shifter fork-----	0.8710 to 0.8725
243	E	Outside diameter at pilot (rear) end-----	0.7445 to 0.7465
243	F	Sliding gear shifter shaft OD of shaft-----	0.7465 to 0.7475
		Front axle shifter fork:	
243	G	Inside diameter of bore-----	0.8745 to 0.8755
243	H	Width of fork pad-----	0.339 to 0.349
H, fig. 243 B, fig. 242		Fit of shifter fork in front Axle output shaft gear groove-----	0.035L to 0.050L
243	J	Sliding gear shifter fork: Width of fork pad-----	0.323 to 0.328
J, fig. 243 C, fig. 241		Fit of shifter fork in rear Sliding gear groove-----	0.009L to 0.019L

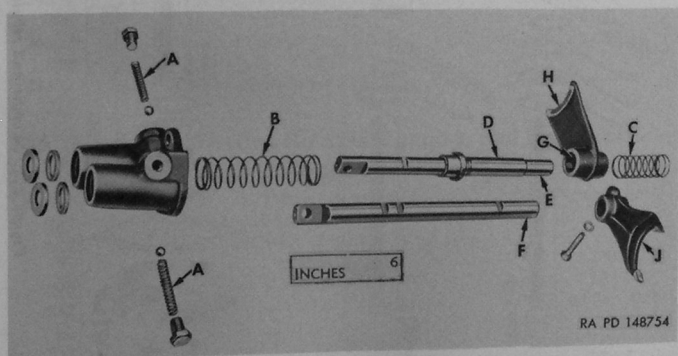


Figure 243. Repair and rebuild standard points of measurement for transfer shifting mechanism.

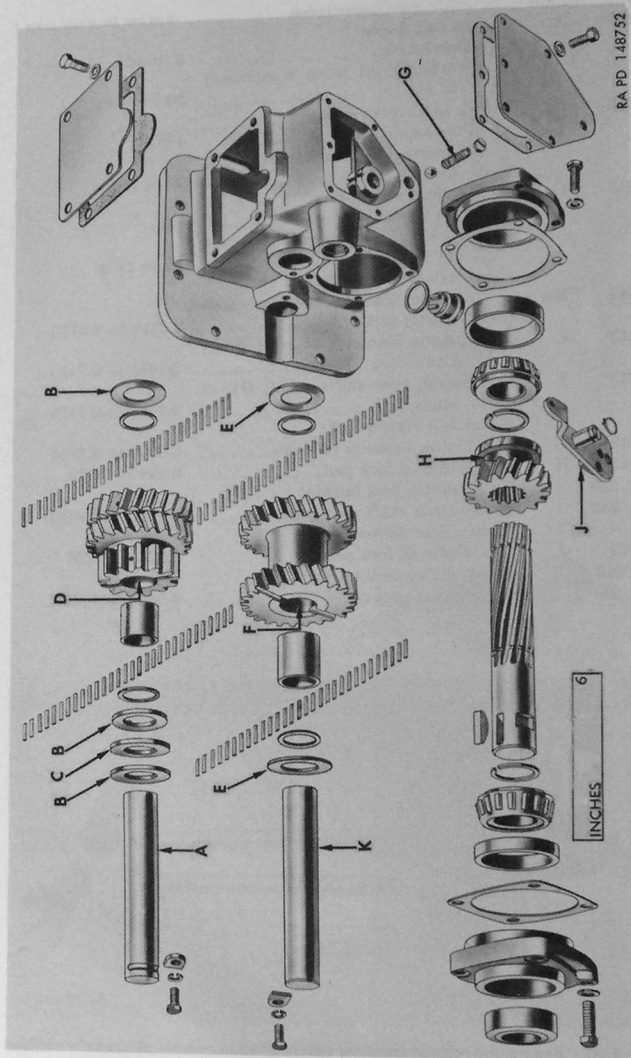


Figure 244. Repair and rebuild standard points of measurement for power take-off components.

### 344. Power Take-Off Assembly

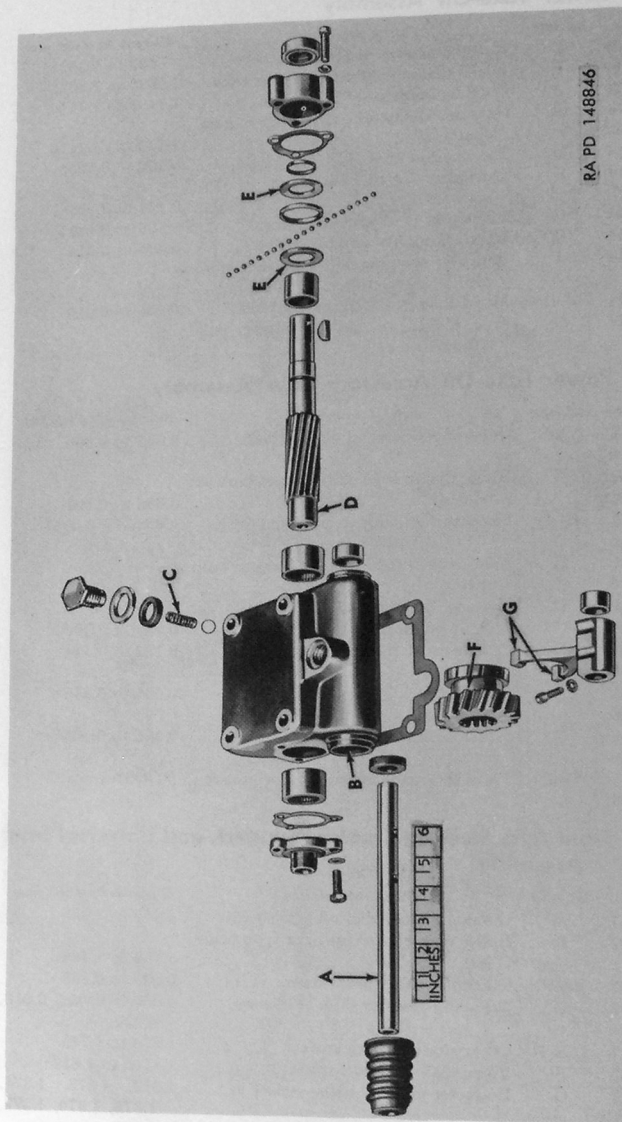
Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
244	D	Inside diameter of idler gear bore	1.3620 to 1.3625
244	F	Inside diameter of reverse gear bore	1.3620 to 1.3625
244	A	Outside diameter of idler shaft	1.1105 to 1.1110
244	K	Outside diameter of reverse gear shaft	1.1105 to 1.1110
244	B	Thickness of idler gear thrust washers	0.120 to 0.125
244	E	Thickness of reverse gear thrust washers	0.120 to 0.125
244	C	Thickness of idler gear spacer	0.176 ot 0.181
244	H	Width of groove in sliding gear	0.505 ot 0.515
244	J	Width of shoe on shifter plate assembly	0.500
244	J-H	Fit of shoe in sliding gear groove	0.005 to 0.015
244	G	Free length of shifter detent ball spring	1 $\frac{1}{16}$

### 345. Power Take-Off Accessory Drive Assembly

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
245 & 246	A	Outside diameter of shifter shaft	0.685 to 0.686
245 & 246	B	Inside diameter of shifter shaft bore in housing	0.688 to 0.690
245 & 246	B-A	Fit of shifter shaft in housing bore	0.002L to 0.005L
245 & 246	C	Free length of shifter poppet ball spring	1 $\frac{1}{16}$
245 & 246	D	Outside diameter of drive shaft at front bearing	0.9995 to 1.000
245 & 246	E	Thickness of thrust washer	0.122 to 0.124
245 & 246	F	Width of fork groove in sliding gear	0.505 to 0.515
245 & 246	G	Width of shifter fork pads	0.495 to 0.505
245 & 246	G-F	Fit of fork pads in sliding gear groove	0.020L (max)

### 346. Front Axle Steering Knuckle, Support, and Universal Joint Assembly

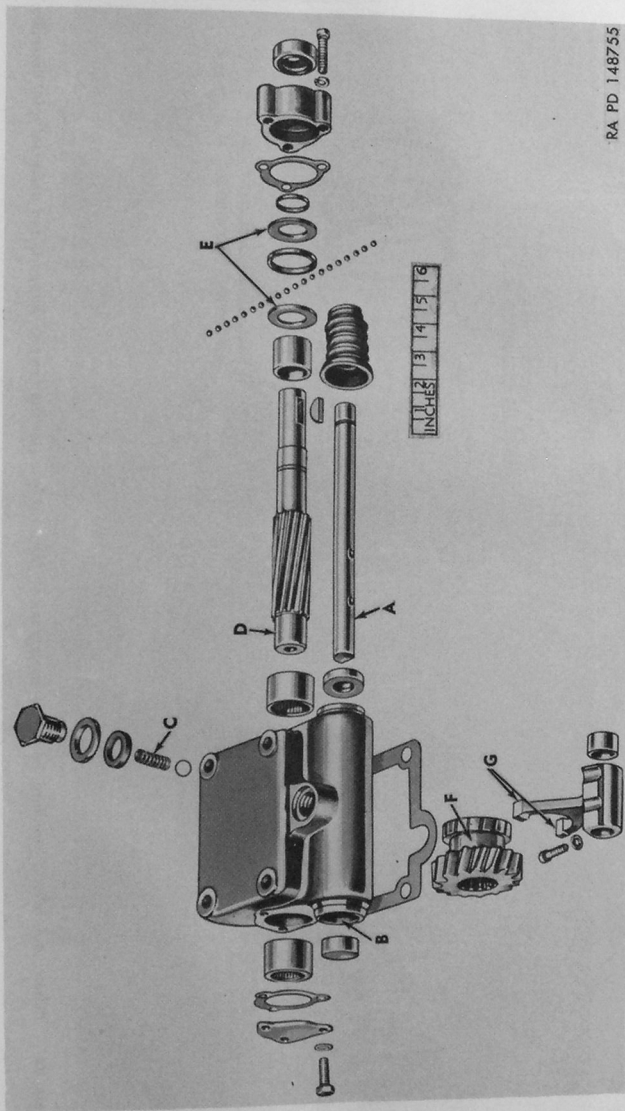
Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts
247	A	Outside diameter of oil seal sleeve	3.245 to 3.255
247	B	Indise diameter of bushing type bearing	1.786 to 1.788
247	C	Thickness of thrust washers	0.155 to 0.157
247	D	Trunnion bearing shim thickness	0.002, 0.005, 0.010, 0.020
247	E	Outer shaft bearing surface	1.770 to 1.772
247	F	Inner shaft oil seal surface	1.8115 to 1.8125
247	G	Diameter of outer balls—select fit	1.372, 1.373, 1.374, 1.375, 1.376, 1.377, 1.378.
247	H	Diameter of center ball	1.2495 to 1.2505



RA PD 148846

Figure 245. Repair and rebuild standard points of measurement for accessory drive used on tank trucks.





RA PD 148755

Figure 246. Repair and rebuild standard points of measurement for accessory drive used on dump truck.

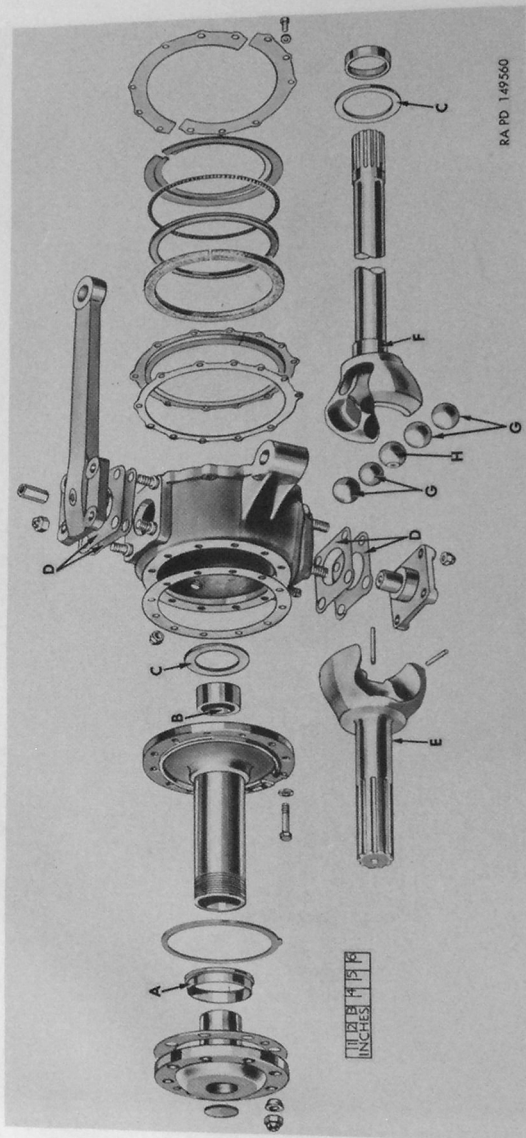


Figure 247. Repair and rebuild standard points of measurement for front axle steering knuckle, support, and universal joint assembly.