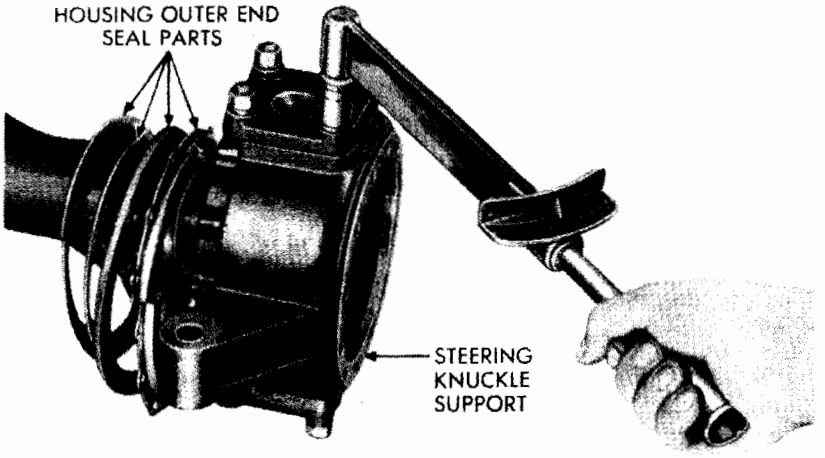


RA PD 316807

Figure 106—Checking Steering Knuckle Support Bearing Adjustment (Torque Wrench 41-W-3630)

shims as necessary to obtain correct adjustment, but be sure that the same total shim thickness is used at both the upper and lower trunnions. Shim thickness should be checked with a micrometer. Adjust each side separately.

d. Install Housing Outer End Seal.

(1) APPLY GREASE TO SEAL PARTS. Apply a coating of grease (CG) to all seals, gaskets, and retainers before assembling.

(2) POSITION GASKET ON STEERING KNUCKLE. Place outer retainer to steering knuckle support gasket on steering knuckle support.

(3) INSTALL OUTER RETAINER AND OIL SEAL. Place oil seal against outer retainer, with rubber side against retainer. Split in seal must be at right angles (90 degrees) to split in retainer. Position retainer against steering knuckle support, with split in retainer at top.

(4) INSTALL DUST SEAL AND SPRING. Fit spring seal retainer into groove in edge of dust seal and position seal against gasket.

(5) INSTALL SEAL RETAINER. Position seal retainer against dust seal, with split joint at top.

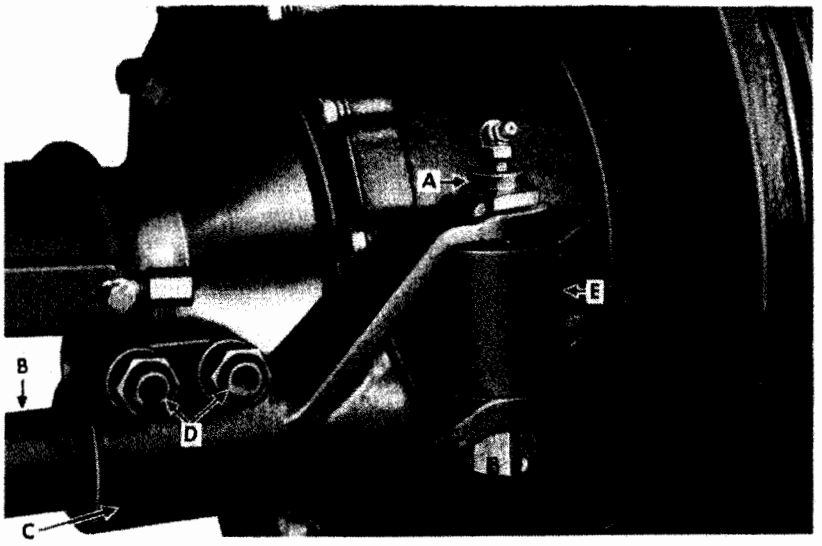
(6) INSTALL INNER RETAINER. Install lower half of inner retainer and secure with cap screws and new lock washers. Tighten cap screws finger tight. Adjust seal retainer so it will just fit inside of outer retainer. This is important to prevent retainer rubbing and scoring housing surface. Install upper half of inner retainer and secure with cap screws and new lock washers. Tighten all cap screws, drawing them up evenly.

e. Install Axle Shaft and Universal Joint Assembly. Lubricate axle shaft and universal joint assembly at point where shaft con-

tacts steering knuckle bushing and thrust washers in steering knuckle and housing outer end, using gear oil (GO). Install long axle shaft and universal joint assembly in left-hand end of axle housing, guiding splined inner shaft into differential side gear. Install short shaft assembly in right-hand end of housing.

f. Install Steering Knuckle. Place steering knuckle over outer end of axle shaft and position against steering knuckle support, using a new gasket coated with grease, between knuckle and support. Milled slot in threaded end of knuckle must be at top.

g. Install Brake Flange Plate, Inner Oil Deflector, and Brake Shoe Anchor Plate Spacer. Position brake flange plate, inner oil deflector, and brake shoe anchor plate spacer over steering knuckle



A TIE ROD YOKE BOLT
B TIE ROD
C TIE ROD YOKE
D TIE ROD YOKE CLAMP BOLTS
E STEERING KNUCKLE SUPPORT

RA PD 332879

Figure 107—Tie Rod Yoke Installed

and install 12 cap screws and new lock washers. Anchor plate spacer must be positioned with center line through any two opposite bosses horizontal.

h. Install Anchor Plate and Brake Shoe Assembly. Using six cap screws and lock washers, attach anchor plate and brake shoe assembly to anchor plate spacer and tighten cap screws securely. Install brake shoe return spring, using brake spring pliers (41-P-1579). Remove wheel cylinder clamp (41-C-1835).

i. Install Hub and Drum Assembly. Install hub and drum assembly and adjust wheel bearings.

j. Install Drive Flange. Use a new metal gasket, coated with grease, between drive flange and hub. Install drive flange over splined outer end of axle shaft and position against hub. Install drive flange cap screws with new lock washers, and tighten with torque wrench to 85-95 foot-pounds.

k. Install Tie Rod (fig. 107). Install tie rod yokes on steering knuckle supports and install tie rod yoke bolts. Install nuts on tie rod yoke bolts and draw up finger tight. It is not necessary to tighten tie rod yoke bolts, as they will have to be removed for toe-in adjustment after axle assembly is installed on vehicle. Install lubrication fittings in tie rod yoke bolts.

l. Adjust Steering Knuckle Stop Plug. Adjust steering knuckle stop plugs as directed in paragraph 44.

m. Check Tie Rod to Differential Carrier Clearance. Swing left-hand steering knuckle support against steering knuckle stop plug. Measure clearance between tie rod and rib on differential carrier. Clearance must be at least one-eighth inch.

n. Leakage Test. Install a suitable air pressure gage in axle breather hole in top of axle housing to the left of the differential. Using a suitable adapter, attach air line to one of the oil level holes in axle housing cover. Fill axle with air at a pressure of 15 pounds per square inch. Air must not escape faster than five pounds in 45 seconds. Do not apply more than 15 pounds air pressure. Remove air line and gage and install breather in housing.

o. Lubricate Axle Assembly. Fill steering knuckles and differential assembly with type and quantity of lubricant as directed in applying series 100 operator's manual covering this vehicle. Instructions for lubricating the tie rod yoke bolts will also be found in the operator's manual. Coat machined surface of housing outer ends with grease to prevent housing outer end seal from becoming damaged.

REAR AXLE DESCRIPTION AND DATA—BANJO TYPE

Differential	
Type	4 pinion - Hypoid gear
Bearings	Hyatt barrel
Number	KA-11820-Z
Pinion Shaft Bearings	
Inner make	Hyatt roller
Number	U-1306-TAM
Outer make	New Departure
Number	ND-5310-A

CHAPTER 9

BANJO TYPE REAR AXLES

Section II

DIFFERENTIAL AND CARRIER ASSEMBLY

80. DESCRIPTION.

a. The differential is a four-pinion high-traction, Hypoid gear type, assembled in a two-piece case. The differential side bearings are barrel type and take thrust as well as radial loads. Bearings are supported in machined supports in carrier, and thrust loads are taken against adjustable rings threaded into supports and housing caps. The pinion shaft is straddle mounted with an inner straight roller bearing and an outer double row ball bearing. The differential and case, and pinion shaft and bearings are mounted in a carrier which is mounted as an assembly in axle housing (fig. 125).

81. REMOVAL.

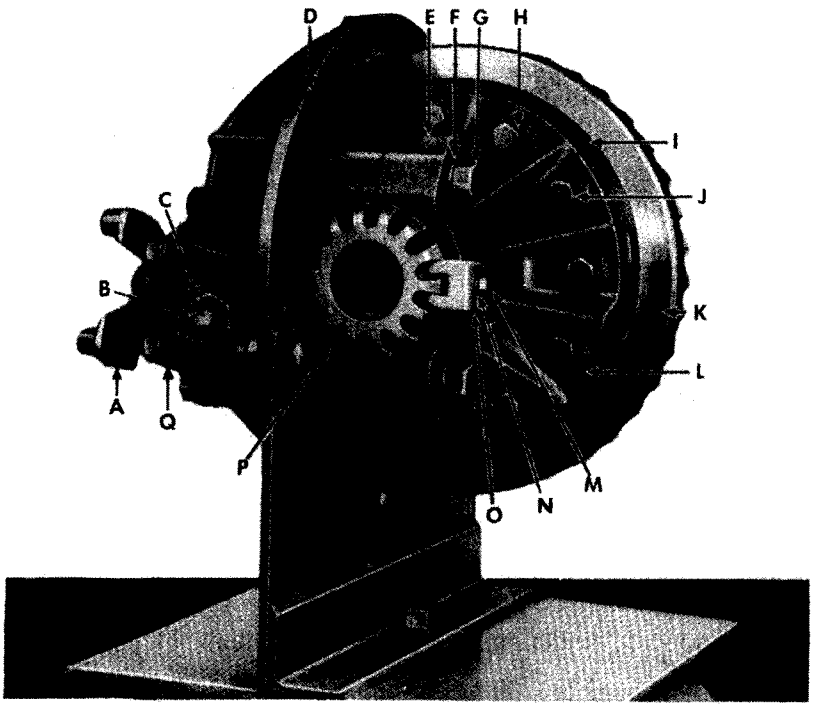
a. **Preliminary Instructions.** The differential and carrier are removed as an assembly. The following procedures may be accomplished with axle housing mounted in vehicle after respective propeller shafts have been disconnected as described in applying series-100 operator's manual.

b. **Remove Axle Shafts.** Remove cap screws and lock washers which attach axle shaft flange on hub. If cap screws are locked with tangs which are integral with lock plate, pry tangs away from heads of cap screws; then remove cap screws and lock plate. Install two 7/16-inch cap screws in tapped holes located in axle drive flange. Proceed to tighten cap screws alternately until axle shaft is loose. Pull axle shaft away from hub and remove gasket.

c. **Drain Differential.** Place a grease receptacle in position under axle. Remove drain plug and one cap screw, located at lowest point of cover. Allow lubricant to drain thoroughly from differential.

d. **Remove Differential Cover.** Remove 10 cap screws and lock washers which attach cover to axle housing, then remove cover and gasket.

DIFFERENTIAL AND CARRIER—BANJO TYPE AXLE



A PROPELLER SHAFT PINION DRIVE FLANGE
B THRUST PAD BOLT
C LOCK NUT
D DIFFERENTIAL CARRIER
E DIFFERENTIAL SIDE BEARING CAP
F LOCK WASHER
G BEARING CAP BOLT
H LOCK WASHER
I DIFFERENTIAL CASE
J DIFFERENTIAL CASE TO RING GEAR CAP SCREW
K DRIVE GEAR
L DIFFERENTIAL COVER
M CAP SCREW
N LOCK WASHER
O ADJUSTING NUT LOCK
P DIFFERENTIAL SIDE BEARING ADJUSTING NUT
Q OIL SEAL RETAINER

RA PD 307449

Figure 120—Differential Assembly Mounted in Stand

e. **Remove Differential and Carrier Assembly.** Remove 10 carrier to axle housing bolts and lock washers. Withdraw assembly from housing.

82. **DISASSEMBLY** (fig. 125).

a. **Mount Carrier Assembly.** Mount assembly in a suitable stand (fig. 120) or in a vise. Install soft metal jaws in vise to prevent damage to carrier flange.

b. **Remove Differential Case and Ring Gear.**

(1) REMOVE RING GEAR THRUST PAD. The ring gear thrust pad

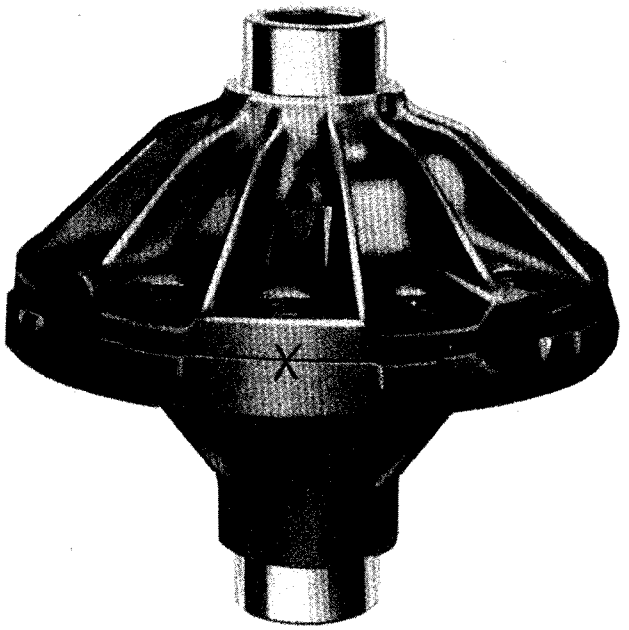
must be removed before differential case and ring gear can be removed. After loosening lock nut, remove ring gear thrust pad from carrier.

(2) LOOSEN RING GEAR BOLTS. Insert a bar in pinion drive flange to prevent pinion gear from revolving. Loosen ring gear to differential case bolts sufficiently to facilitate the disassembly of ring gear and carrier case after the assembly is removed from the carrier.

(3) REMOVE ADJUSTING NUT LOCKS (fig. 120). Remove two cap screws and lock washers, one at each differential carrier bearing cap, which secure adjusting nut locks on bearing caps. Remove both adjusting nut locks.

(4) REMOVE DIFFERENTIAL BEARING CAPS. Remove four cap screws and lock washers which attach bearing caps to differential carrier. Remove two differential adjusting nuts. Caps and carrier must be marked with punch or chisel to insure installation in their original position. Carefully pull bearing caps away from carrier, one at a time. Tap side of bearing cap with a soft hammer to assist removal. Do not damage bearing cap dowels during removal.

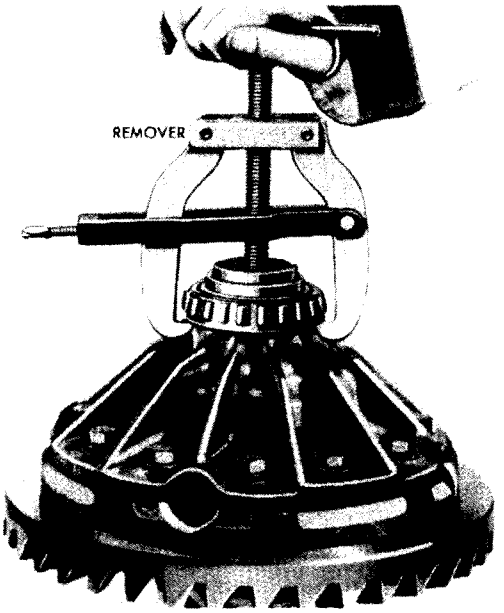
(5) REMOVE DIFFERENTIAL AND RING GEAR ASSEMBLY. Carefully withdraw differential case and ring gear assembly from differential carrier. At the same time, differential side bearing cups must be removed to prevent damage.



RA PD 307453

Figure 121—"X' Mark on Differential Case

DIFFERENTIAL AND CARRIER—BANJO TYPE AXLE



RA PD 316850

Figure 122—Differential Side Bearing Removal (Remover 41-R-2378-30 and Adapter 41-A-18-293)

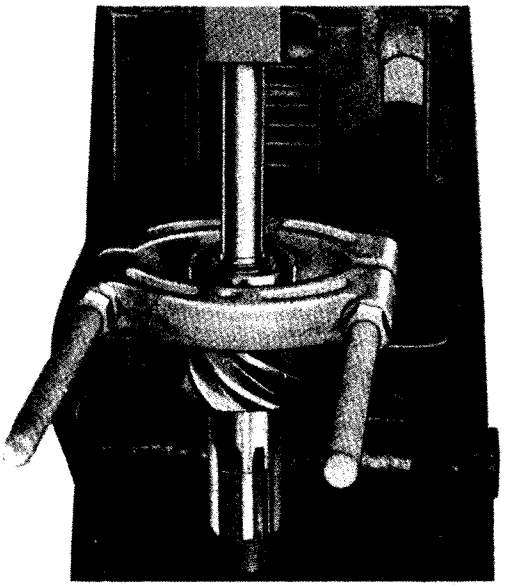


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Figure 123—Pinion Inner Bearing Removal (Press Plates 41-P-2905-60)

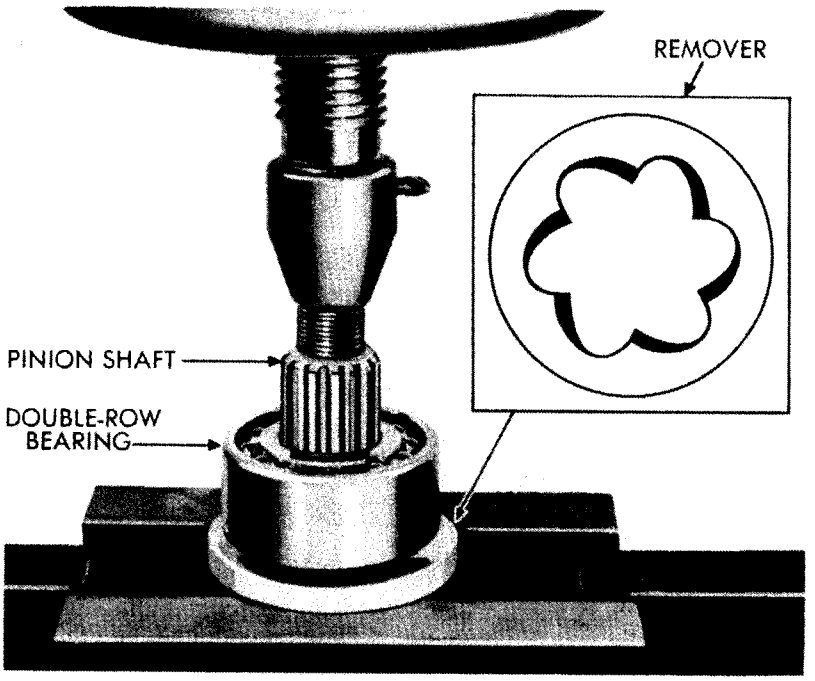

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Figure 124—Pinion Outer Bearing Removal (Remover 41-R-2367-550)

c. **Disassemble Differential Case and Ring Gear.**

(1) REMOVE RING GEAR FROM DIFFERENTIAL CASE. Place assembly on bench, and examine differential case and cover. Ascertain that an "X" mark is clearly visible (fig. 121) on both halves of the cover. If "X" mark is not legible, make a new mark. It is essential that mark be legible before disassembling case. Stand assembly on end to prevent damage to side bearings. Remove 12 cap screws and lock washers which attach ring gear to differential case and cover and remove ring gear.

(2) DISASSEMBLE DIFFERENTIAL CASE. Separate differential case and cover. Remove two differential side gears, pinion spider, four pinion washers, and four pinions. Remove two differential side gear thrust washers.

(3) REMOVE DIFFERENTIAL SIDE BEARING. The differential side bearing cone and roller assemblies, one on each side of case, are press fit. Install remover (41-R-2378-30) and adapter (41-A-18-293) and remove each bearing and inner race (fig. 122). These tools differ slightly to the one illustrated, but are installed in the same manner.

The puller must be adjusted to the inner race to prevent damage to bearing or cage.

d. Remove Drive Pinion Assembly. Remove six cap screws and lock washers which attach drive pinion oil seal retainer to carrier. Position brass drift against inner end of drive pinion. Strike brass drift sharply with a hammer until drive pinion and bearing assembly is forced out of differential carrier. Remove drive pinion oil seal retainer gasket.

e. Disassemble Drive Pinion Assembly.

(1) REMOVE PROPELLER SHAFT FLANGE. Clamp propeller shaft flange securely in vise. Remove cotter pin which secures propeller shaft flange nut. Apply a few drops of penetrating oil on threads. Allow penetrating oil sufficient time to take effect, then remove nut, washer, and propeller shaft flange and oil seal retainer from drive pinion.

(2) REMOVE OIL SEAL FROM RETAINER. Place oil seal retainer in a vise. Remove oil seal and packing, using drift and hammer.

(3) REMOVE PINION INNER BEARING. Remove pinion inner bearing lock. With press plates (41-P-2905-60) located under bearing as shown in figure 123, press pinion out of bearing.

(4) REMOVE PINION OUTER BEARING (double row type). Position remover (41-R-2367-550) over pinion gear (fig. 124). Install remover and pinion assembly in a press. Teeth of gear must clear support under remover when pinion is pressed from bearing.

83. CLEANING, INSPECTION, AND REPAIR.

a. Cleaning. Each part must be cleaned and dried thoroughly to facilitate inspection. Remove all lubricant. The exterior of differential carrier must be cleaned thoroughly, using steam and a wire brush.

(1) FLUID. Immerse parts in dry-cleaning solvent until cleaned, and dry with compressed air.

(2) CLEAN BEARINGS. Remove bearings from fluid. Strike larger side of bearing flat against a wooden block to dislodge dirt accumulation. Dry with compressed air, directing air stream across rollers or balls. Do not spin bearings.

b. Inspection. Whenever available, the Magna-Flux method should be applied to all steel parts, except ball or roller bearings, especially on ground or highly finished surfaces.

(1) PROCEDURE.

Part to Inspect	Inspect for	Remedy
Axle shafts	Cracked shaft	Replace
	Distorted splines	Replace
	Worn holes in flange	Replace
	Excessive flange run-out	Replace
	Bent condition	Replace

POWER TRAIN, CHASSIS AND BODY, GMC 2½-TON 6 x 6 TRUCK

Part to Inspect	Inspect for	Remedy
Propeller shaft	Damaged	Replace
flange	Worn splines	Replace
Oil seal		Replace
Outer pinion bearing	Balls scored or cracked	Replace bearing assembly
Bearing cup	Cracked or pitted	Replace bearing assembly
Bearing cone	Cracked or pitted	Replace bearing assembly
Pinion drive gear	Splines damaged	Replace
	Teeth broken or chipped	Replace assembly
Differential carrier assembly	Bolt holes worn	Replace carrier
	Distortion	Replace carrier
Differential carrier bearing cap	Threads damaged	Replace carrier
Differential case and cover	Dowels damaged	Replace dowels
	Thrust surfaces worn or scored	Replace assembly
	Excessive run-out	Repair
Differential side bearings	Pitted, scored, or broken rollers	Replace bearing assembly
Cup	Scored or cracked	Replace bearing assembly
Cone	Scored or cracked	Replace bearing assembly
Differential pinions	Teeth chipped or broken	Replace with new set
Differential side gears	Distorted splines	Replace with new set
	Chipped or broken teeth	Replace with new set
Thrust washers		Replace
Adjusting nut	Damaged threads	Replace
Bolts	Damaged threads	Replace
Lock washers		Always replace
Gaskets		Always replace
Thrust screw pad	Worn	Replace

(2) INSPECTION OPERATIONS.

(a) Drive Pinion Bearings. Rotate each bearing slowly by hand. Make a visual inspection for defects listed in subparagraph (1). Do not spin bearings while dry. If no defects are noted, dip bearings in lubricant (GO) and wrap in clean cloth.

(b) Differential Side Bearings. Inspect side bearings for worn or chipped rollers, or distorted cage. Rotate by hand to check for roughness.

(c) Gears. Inspect ring gear and drive pinion teeth. Note if teeth are chipped, broken, or if cracks are evident. Examine pinion teeth and fit of pinion on spider (0.004-0.008 in. clearance). Inspect differential side gear teeth and check fit of hubs in differential case and cover (0.002-0.006 in.)

(d) Differential Case. Be certain that case and cover are cleaned centers. If suitable centers are not available, install differential case side bearings on case and cover. Install case and bearing assembly in differential carrier. Adjust bearings snug enough to assure a true reading when taken with dial indicator. Position and attach dial indicator on carrier flange. Adjust dial indicator to gear face of differential case. Rotate assembly and note readings. If reading exceeds 0.002 inch (new limits), machine ring gear face of case (subpar. c below).

(e) Axle Shafts. Examine splined ends of shaft for distortion, cracked, or worn splines. If any of these conditions are evident, the axle shaft must be replaced with new part.

(f) Axle Shaft and Flange Run-out. Install axle shaft assembly in lathe centers. Position a dial indicator and check shaft run-out. If run-out exceeds 0.0625 inch, replace shaft with new part. After shaft run-out is checked, re-position dial indicator, and check axle flange run-out. If run-out exceeds 0.003 inch, replace axle shaft with new part. The Magna-Flux process is recommended to detect any minute cracks or fractures.

c. Repair.

(1) DIFFERENTIAL CASE RUN-OUT. Place assembled differential case in lathe. Remove sufficient metal from ring gear face of case to correct excessive run-out. The metal must be cut on a true plane, removing just enough metal to bring run-out within correct limits (0.002 in.). After differential case has been machined, remove burrs and clean assembly thoroughly.

84. ASSEMBLY.

a. Preliminary Instructions. All parts must be cleaned thoroughly. Lubricate all parts with grease prior to assembly, and always use new lock washers. All bolts must be closely examined and re-

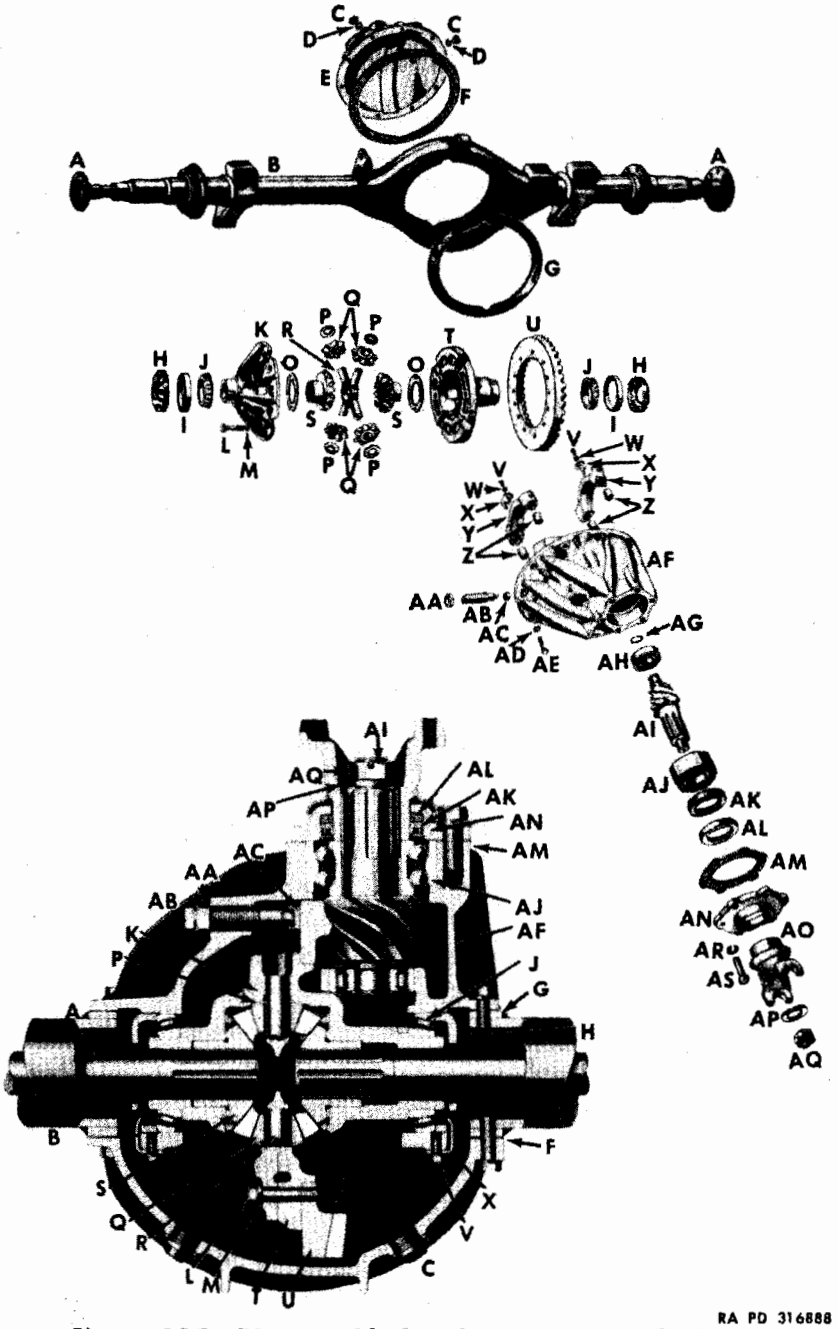


Figure 125—Disassembled and Cross Sectional Views of Banjo Type Rear Axle

DIFFERENTIAL AND CARRIER—BANJO TYPE AXLE

A AXLE SHAFT
B HOUSING ASSEMBLY
C PLUG
D PLUG GASKET
E AXLE HOUSING COVER
F GASKET
G DIFFERENTIAL CARRIER GASKET
H DIFFERENTIAL SIDE BEARING ADJUSTING NUT
I DIFFERENTIAL SIDE BEARING CUP
J DIFFERENTIAL SIDE BEARING CONE
K DIFFERENTIAL CASE COVER
L DIFFERENTIAL COVER CAP SCREW
M LOCK WASHER
O DIFFERENTIAL SIDE GEAR THRUST WASHER
P PINION GEAR THRUST WASHER
Q DIFFERENTIAL PINION GEARS
R DIFFERENTIAL SPIDER
S DIFFERENTIAL SIDE GEARS
T DIFFERENTIAL CASE
U RING GEAR
V ADJUSTING NUT LOCK BOLT
W LOCK WASHER
X ADJUSTING NUT LOCK
Y DIFFERENTIAL SIDE BEARING CAP
Z DOWELS
AA LOCK NUT
AB DRIVE GEAR THRUST SCREW
AC THRUST PAD
AD LOCK WASHER
AE DIFFERENTIAL CARRIER TO AXLE HOUSING CAP SCREW
AF DIFFERENTIAL CARRIER
AG DRIVE PINION INNER BEARING LOCK
AH DRIVE PINION INNER BEARING
AI DRIVE PINION
AJ DRIVE PINION OUTER BEARING
AK OIL SEAL
AL DUST SEAL
AM GASKET
AN OIL SEAL RETAINER
AO PROPELLER SHAFT FLANGE
AP WASHER
AQ NUT
AR LOCK WASHER
AS CAP SCREW

RA PD 3168888

Legend for Figure 125

placed if bent or threads are stripped or crossed. Adjustments must be carefully made to insure efficient and continuous operations. Use of a suitable stand or vise is recommended to hold differential carrier during assembly operations. Refer to figure 125.

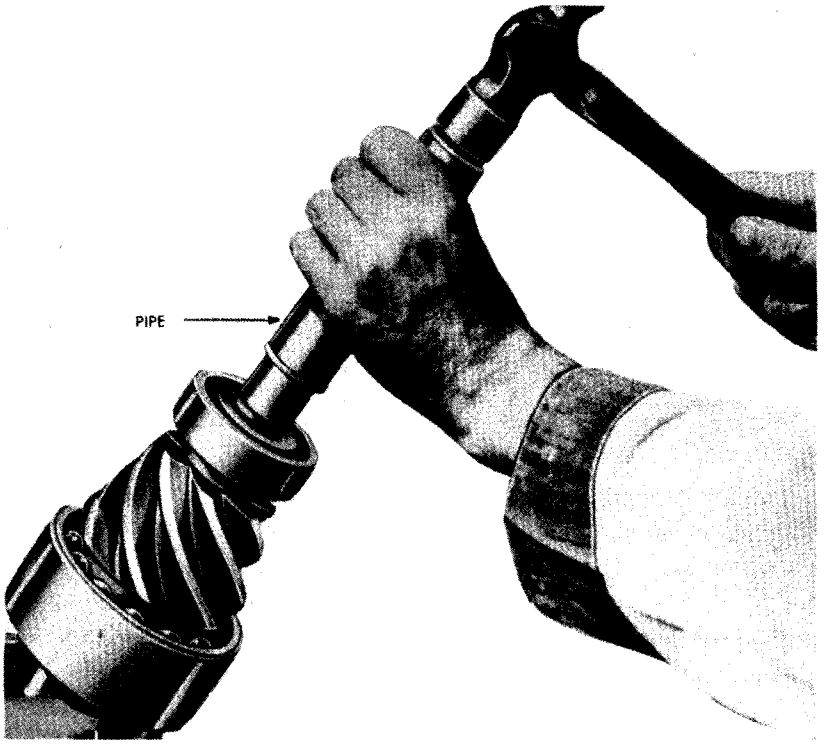
b. Assemble Drive Pinion and Bearings. If inspection indicated that drive pinion is to be replaced, it will also be necessary to install a new ring gear, as these are serviced in matched sets.

(1) INSTALL DRIVE PINION OUTER BEARING (double row type). Lubricate bearing with ball and roller bearing grease (BR). Place bearing over splined end of drive pinion. The extended portion of bearing inner race must be toward the gear and seated against heel of gear. Place a driver over splined end of shaft and drive bearing in place or use arbor press when available.

(2) INSTALL DRIVE PINION INNER BEARING. Lubricate inner bearing with universal gear lubricant (GO). Place bearing on press plate positioned in press with chamfered side of inner race toward pinion. Place drive pinion on top of bearing and press drive pinion into bearing until bearing seats against shoulder on pinion shaft.

(3) INSTALL INNER BEARING LOCK RING. Secure drive pinion in a vise. Install lock ring on inner end of shaft, using a piece of pipe (fig. 126).

(4) INSTALL OIL SEAL AND PACKING IN RETAINER. Place felt packing in retainer, making certain that packing seats evenly. Immerse oil seal in warm engine oil until leather is soft and pliable. Coat outside circumference of oil seal body with a thin layer of aviation type cement. Place oil seal in retainer with lip of oil seal toward inner face of retainer. Use a block of wood to drive oil seal into retainer (fig. 127). After seal is installed, make certain that face of seal is flush with face of retainer. Remove all excess cement from face of seal and retainer.



RA PD 332881

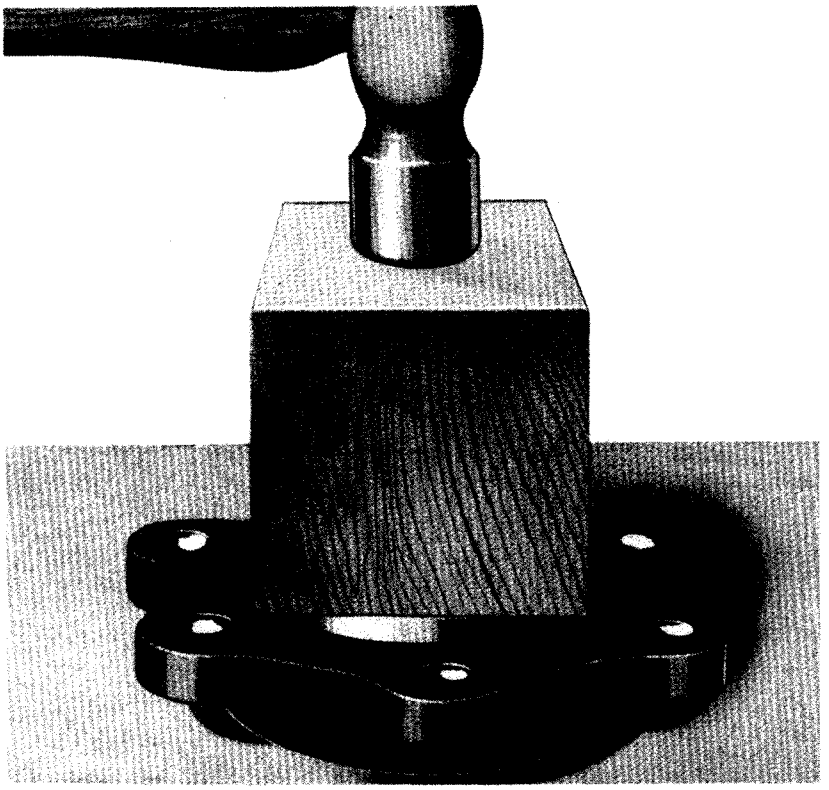
Figure 126—Inner Bearing Lock Ring Installation

(5) INSTALL SEAL RETAINER ON PROPELLER SHAFT FLANGE. Place seal retainer over end of propeller shaft flange. Position retainer carefully to avoid dislocating oil seal installed in retainer.

(6) INSTALL PROPELLER SHAFT FLANGE AND RETAINER ON DRIVE PINION. Clamp propeller shaft flange in a vise. Insert splined end of drive pinion in propeller shaft flange. Place washer over threaded end of drive pinion, then install propeller shaft flange nut.

Tighten nut to 160-280 foot-pounds. Aline slot in nut with cotter pin hole, then insert and bend cotter pin.

c. **Install Drive Pinion.** Aline gasket on differential carrier. Differential carrier must be thoroughly cleaned before installing pinion assembly. Insert pinion assembly into carrier. Carefully aline outer bearing in carrier aperture. Place a hardwood or soft metal block on outer end of pinion, then strike with a hammer until assembly is forced into and seated correctly in carrier. Make certain that inner



RA PD 332882

Figure 127—Pinion Shaft Oil Seal Installation in Retainer

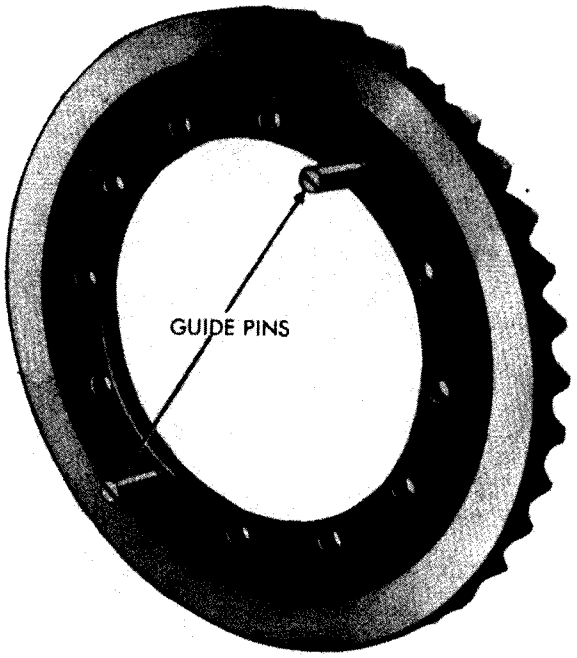
bearing is properly alined with carrier inner bearing boss before finally seating assembly. Install six retainer to carrier cap screws, with new lock washers. Use torque wrench and tighten screws to 160-180 foot-pounds.

d. **Assemble Differential and Ring Gear.**

(1) POSITION DIFFERENTIAL CASE AND RING GEAR. Clean case, cover, and ring gear thoroughly. Cut heads off two old differential case to ring gear cap screws. Taper shank of screws slightly, then

cut screw driver slots in screws. The two screws are to be used as guide pins to facilitate installation of ring gear on differential case. Install guide pins on ring gear (fig. 128). Install differential case on ring gear.

(2) INSTALL PINION AND SIDE GEARS. Install a new differential side gear thrust washer on each differential side gear. Apply lubricant on thrust washer and on inside thrust surface of differential case. Place side gear and thrust washer in differential case. When inspection indicates the necessity of replacing any of the differential gears, a complete new set must be used.



RA PD 307435

Figure 128—Ring Gear Guide Pins

(3) ASSEMBLE DIFFERENTIAL CASE. Apply lubricant on differential spider. Place four spider pinion gears and four new washers on spider. Place spider, gear, and washer assembly in differential case. Install lubricated thrust washer and differential side gear on spider assembly. Place differential cover on case. The "X" marks on case and cover must aline correctly before fully seating cover on case and ring gear guide pins. Install 10 differential case cap screws and new lock washers. Tighten cap screws alternately until ring gear is flush against differential case flange. Remove both guide pins and install and tighten two additional cap screws and lock washers.

Final tightening of ring gear cap screws is accomplished as described in subparagraph e (3).

(4) INSTALL DIFFERENTIAL CASE SIDE BEARINGS. Install differential side bearing race and roller assemblies on differential case and cover using replacer (41-R-2391-60) and arbor press. Bearing inner races must seat solidly on differential case.

e. Install Differential and Ring Gear.

(1) INSTALL DIFFERENTIAL IN CARRIER. Clean bearing cap dowels thoroughly. Place one of the bearing caps in its respective place according to marking. Install two cap screws and lock washers securing bearing cap in position. Tighten cap screws sufficiently to hold bearing cap in place. Place cup on differential side bearing race and roller assembly, then insert differential in place in carrier. Install and secure bearing cap on opposite side of carrier after cup is installed on race and roller assembly as described above. Make certain that ring gear teeth are in mesh with pinion. Tighten bearing cap screws until lock washers just start to flatten, and at the same time ascertain that cups on differential side bearings are alined correctly.

(2) INSTALL DIFFERENTIAL SIDE BEARING ADJUSTING NUTS (fig. 129). Position differential adjusting nuts. Turn adjusting nuts counterclockwise until nut threads "click" on bearing cap threads; then turn adjusting nuts clockwise into place. Use wrench (41-W-874) as shown in figure 129. If wrench is not available use a bar or screw driver. During this operation, tighten nuts alternately until both nuts are threaded in carrier and cap assembly equally.

(3) TIGHTEN RING GEAR CAP SCREWS. Secure propeller shaft flange with a suitable bar. Tighten differential case to ring gear cap screws alternately to 85-95 foot-pounds torque.

f. Adjust Drive Pinion and Ring Gear Backlash. A dial indicator (41-I-100) must be used to check differential ring gear and pinion backlash adjustment. The adjustment of the differential and pinion is performed progressively. It is essential that the differential assembly be revolved a number of times before each indicator reading is taken to be certain that bearings have been alined and seat properly after each adjustment has been made. The adjustment is performed in the following manner:

(1) REMOVE ALL BACKLASH FROM RING GEAR AND PINION. Back off adjusting nut on the side of the case which carries ring gear, then tighten adjusting nut on the opposite side. Make each change in small steps, revolving gear each time. Continue until all backlash between ring gear and pinion is removed.

(2) ALINE DIFFERENTIAL SIDE BEARINGS. Back off nut on side opposite ring gear approximately two notches, stopping with nut in position to permit lock to engage slots in nut. Tighten adjusting nut at ring gear side of case solidly to seat bearings. Proper seating

of bearings is not assured unless nut is drawn up solidly. Back off same nut until free of bearing, then tighten enough to eliminate all play in bearings.

(3) PRE-LOAD BEARINGS. After nut on ring gear side of differential has been brought up to the point where all play has been removed from bearings, tighten nut one to two more notches to preload bearings, stopping at a position where lock will engage notches in nut.

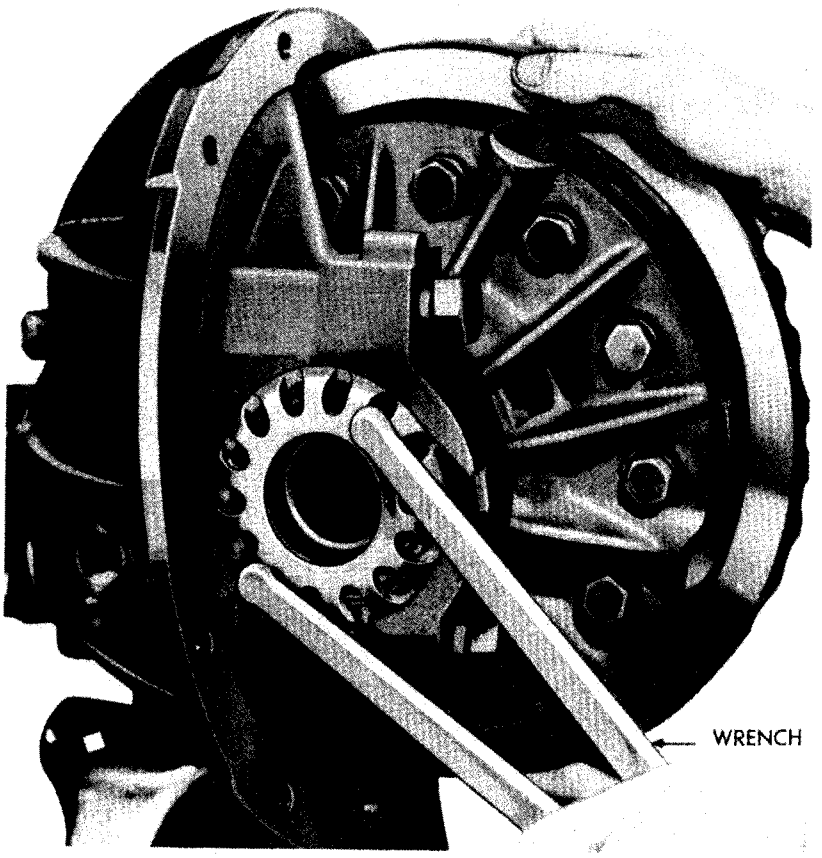
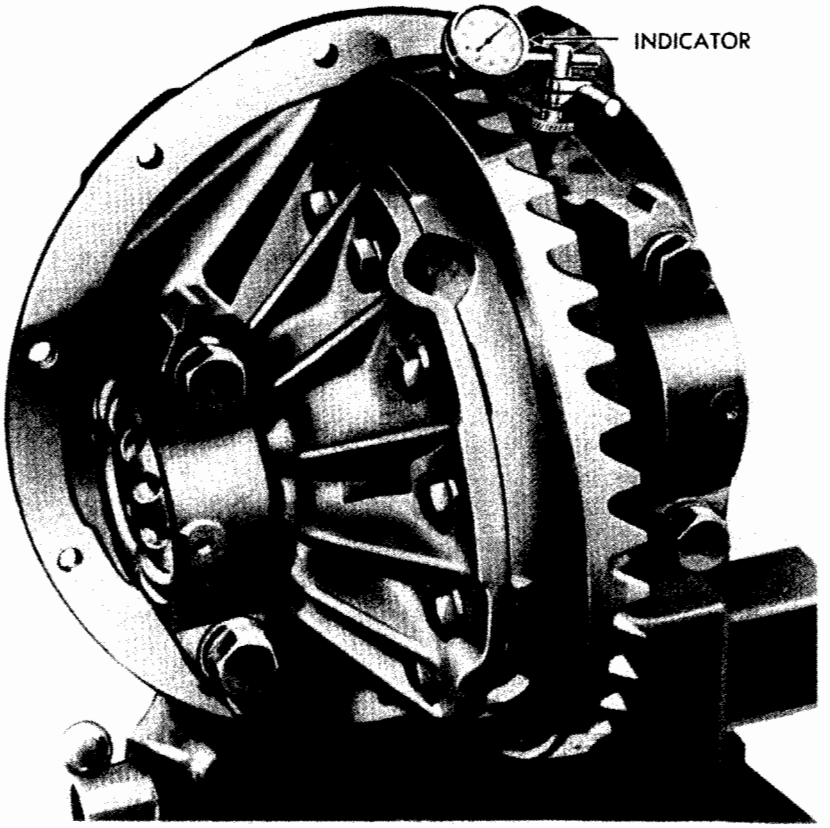


Figure 129—Ring Gear and Pinion Backlash Adjustment (Wrench 41-W-874)

(4) INSTALL DIAL INDICATOR. Position and secure dial indicator (41-I-100) as shown in figure 130.

(5) CHECK RING GEAR AND PINION BACKLASH. Backlash should be 0.005-0.008 inch. Oscillate ring gear slightly and note dial indicator reading. If indicator reading is less than 0.005 inch, loosen

adjusting nut on opposite side of ring gear one notch. Revolve ring gear a number of times to assure alinement of bearings. If indicator reading exceeds 0.008 inch, loosen adjusting nut on ring gear side one notch, then tighten opposite nut one notch. Revolve gear a number of times to aline bearings and take another reading. After backlash has been adjusted, tighten differential carrier bearing cap screws with a torque wrench (130 - 160 ft lb torque). Recheck backlash with dial indicator.



RA PD 316831

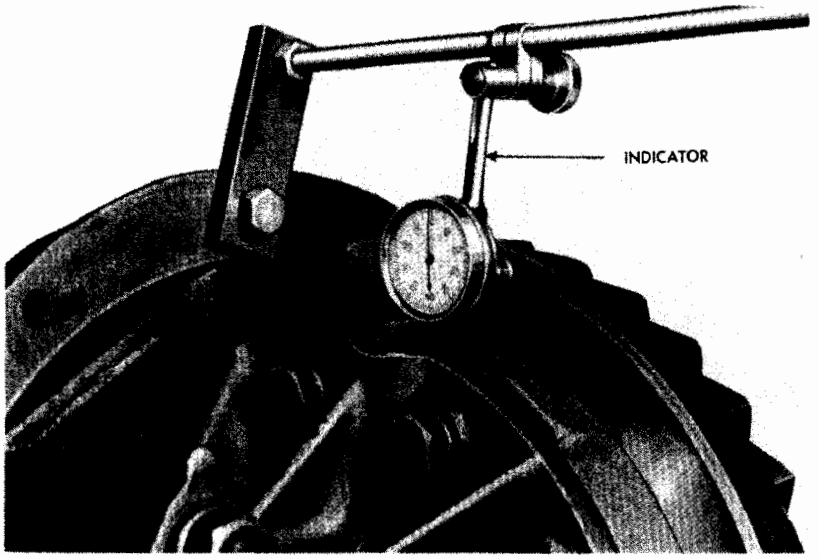
Figure 130—Ring Gear and Pinion Backlash Measurement (Indicator 41-I-100)

(6) CHECK RING GEAR RUN-OUT (fig. 131). Readjust dial indicator and check ring gear run-out. Ring gear run-out limit is 0.004 inch (new limits).

(7) INSTALL DIFFERENTIAL DRIVE GEAR THRUST SCREW (thrust pad). Thread lock nut on drive gear thrust screw and install screw in differential carrier until thrust pad is against gear. Revolve differential and ring gear and at the same time note any variations in

the amount of contact of thrust pad against gear. Adjust thrust pad at point of maximum contact to ring gear. Tighten drive gear thrust screw until it contacts ring gear lightly; then back off screw one-twelfth of a turn and tighten lock nut as shown in figure 132.

(8) INSTALL DIFFERENTIAL ADJUSTING NUT LOCKS. Position and secure each adjusting nut lock with a cap screw and a lock washer.



RA PD 316849

Figure 131—Ring Gear Run-out Measurement (Indicator 41-I-100)

85. INSTALLATION.

a. Preliminary Instructions. Before installing differential carrier in the axle housing, examine mating surfaces of carrier and housing. Ascertain that surfaces are free from scratches and burrs. It is essential that housing is thoroughly cleaned. New gaskets and lock washers must be used. The cap screws securing the differential carrier to the axle housing are stamped "H" on the head and must not be used to attach axle cover.

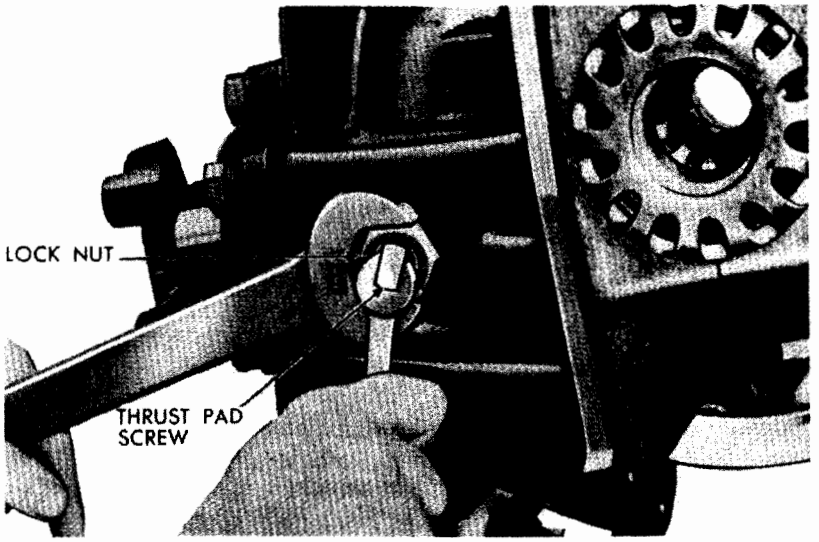
b. Position Differential Carrier Gasket. Place gasket on carrier mating surface of axle housing, make certain that holes in gasket and housing are in alinement.

c. Position Carrier Assembly. Position differential carrier assembly on axle housing with cap screw holes alined correctly.

d. Install Differential Carrier to Housing Cap Screws. Differential carrier to housing cap screws, with "H" stamped on head, are

of two different lengths. The long cap screws are installed at the top and bottom and two short ones are installed at each side. Install screws, using new lock washers, and tighten to 60-70 foot-pounds.

e. **Install Axle Housing Cover.** Aline axle housing cover gasket. The covers used on front and rear axles are the same. When installing cover on a rear axle, make certain that filler hole marked



RA PD 307436

Figure 132—Ring Gear Thrust Pad Adjustment

"Rear oil level" is below axle center line, or installed so that lettering is upright. Position cover and install cap screws, using new lock washers, and tighten cap screws securely.

f. **Install Axle Shafts.** Install a new gasket over end of shaft. Position and hold gasket in place on axle shaft flange. Insert splined end of shaft into place, guiding splines into differential side gear. Aline holes in axle flange with holes in hub. Install cap screws, with new lock washers, and tighten to 70-80 foot-pounds.

g. **Fill Differential with Lubricant.** Remove lower filler plug in housing cover and fill with lubricant as directed in applying series-100 operator's manual.

CHAPTER 9

BANJO TYPE REAR AXLES

Section III

REAR AXLE HOUSING INSPECTION AND REPAIR

86. INSPECTION AND REPAIR.

a. Cleaning. Before a thorough and efficient inspection can be performed on the axle housing, the housing must be cleaned thoroughly inside and out. Use dry-cleaning solvent.

b. Inspection.

Part to Inspect	Inspect for	Remedy
Differential carrier and cover, and axle housing mating surfaces	Nicks and deep scratches	Hone surfaces
Torque rod brackets	Distortion or worn	Install new housing
Brake flange	Damaged	Repair
Pillow block support	Bent	Straighten
Axle breather hole threads	Stripped threads	Repair
Bolt hole threads	Cross threading	Repair
Housing outer end threads	Cross threads	Repair
Axle housing	Distorted or bent condition	Replace
Axle housing wheel bearing oil deflector	Distorted or bent condition	Replace

c. Repair.

(1) AXLE HOUSING CARRIER AND COVER GASKET SURFACES. Whenever inspection indicates that axle housing cover or differential carrier gasket surface is nicked or scratched, the scratches must be removed with a suitable hone.

(2) BRAKE FLANGE. Whenever outer edges of brake flange are burred, remove with a file or a grinder. Dust shields must seat solidly in position.

(3) PILLOW BLOCK SUPPORT. A bent or twisted pillow block support may be straightened by first heating the support, then straightening with suitable tools. After support is straightened, check pillow block to support bolt holes for alinement.

(4) AXLE BREATHER HOLE THREADS. Whenever inspection indicates that axle breather holes are crossed-threaded, the threads must be cleaned, using a ⅛-inch taper pipe thread Am. Nat. Std. tap. If

HOUSING INSPECTION AND REPAIR—BANJO REAR AXLE

threads are stripped, counterbore hole sufficiently to remove old threads and assure a clean surface. Then braze hole until closed completely. After metal has cooled, grind off surplus metal and drill a new hole, using 11/32-inch drill. Use ⅛-inch taper pipe thread Am. Nat. Std. tap.

(5) AXLE HOUSING DIFFERENTIAL CARRIER AND COVER BOLT HOLE THREADS. Crossed threads are cleaned with tap. Apply sufficient cutting oil during operation to assure clean threads. After procedure is completed, clean housing thoroughly.

(6) AXLE HOUSING OUTER END THREADS. A thread restoring file is used whenever hub bearing adjusting nut housing threads are damaged or cross-threaded. If a threading die is available (2⅛—16 Am. Nat. thread), use die to clean threads.

(7) REPLACE REAR AXLE HOUSING WHEEL BEARING OIL DEFLECTOR. Pry oil deflector off axle housing with a screw driver. Install new deflector and drive into place with a suitable driver.

CHAPTER 9

BANJO TYPE REAR AXLES

Section IV

REAR AXLE FITS AND TOLERANCES

87. REAR AXLE FITS AND TOLERANCES.

a. Fits and Tolerances.

(1) AXLE SHAFT.

Diameter—differential end	1.6445-1.6345 in.
Number of splines	10
Shaft flange run-out—not to exceed	0.003 in.
Shaft run-out at center—not to exceed	0.0625 in.

(2) DIFFERENTIAL.

Bearing adjustment	Bearing adjusting nuts
Gear to pinion backlash	0.005-0.008 in.
Gear run-out—not to exceed	0.002 in.
Case run-out—not to exceed	0.002 in.

(3) CLEARANCE.

Between pinion and spider	0.004-0.008 in.
Between side gear and case	0.002-0.006 in.

(4) DIFFERENTIAL GEAR THRUST WASHERS.

New limits	0 062-0.058 in.

(5) PINION SHAFT ADJUSTMENT.

Bearing adjustment	Bearing must turn with no perceptible end play. Tighten nut to 160-280 ft lb torque

(6) DRIVE GEAR THRUST BLOCK.

Block to gear clearance	0.005-0.007 in.
Block thickness	0.1865-0.1885 in.