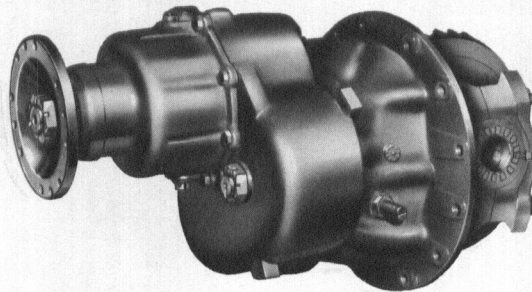


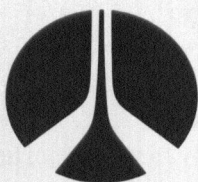
Field Maintenance Manual No. 5C

Single-Reduction Hypoid-Drive Unit

Three Gear Transfer Train
(Tapered Bearings)



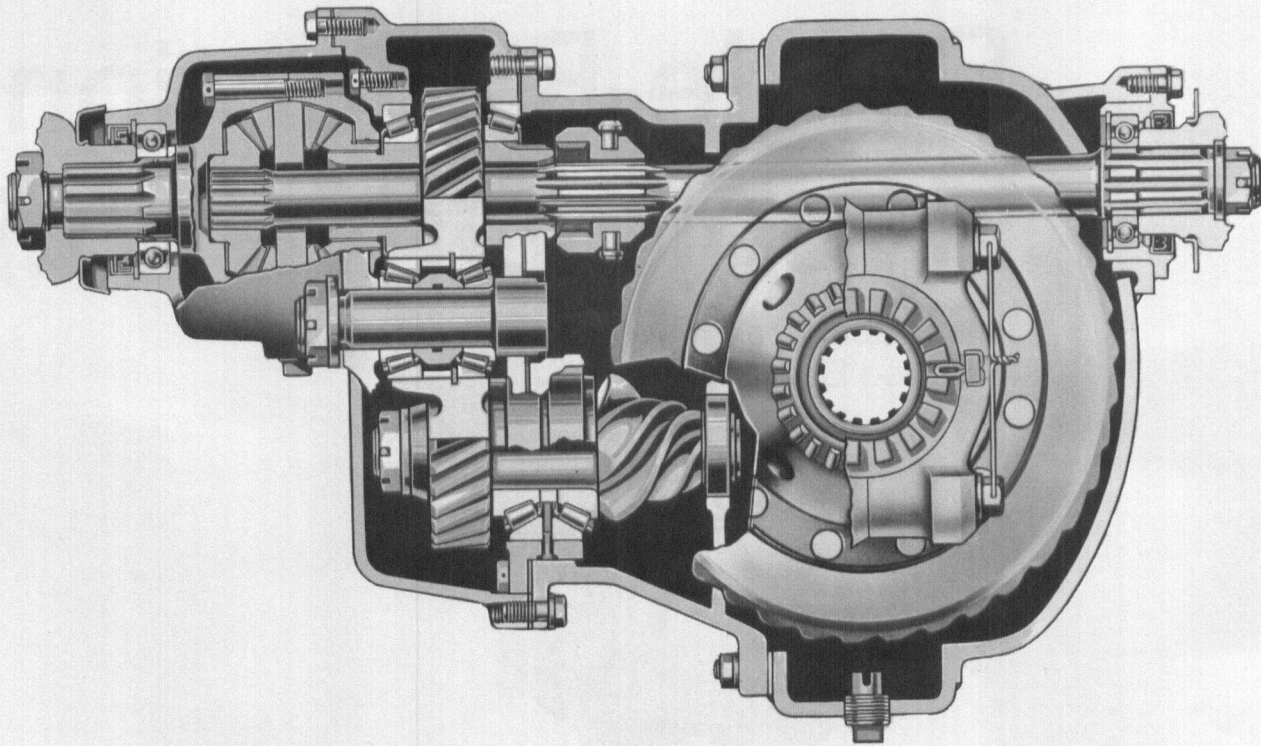
Use Only Genuine Rockwell-Standard Parts



Rockwell-Standard Group
Rockwell International

Automotive Technical Center
2445 West Maple Road
Troy, Michigan 48084

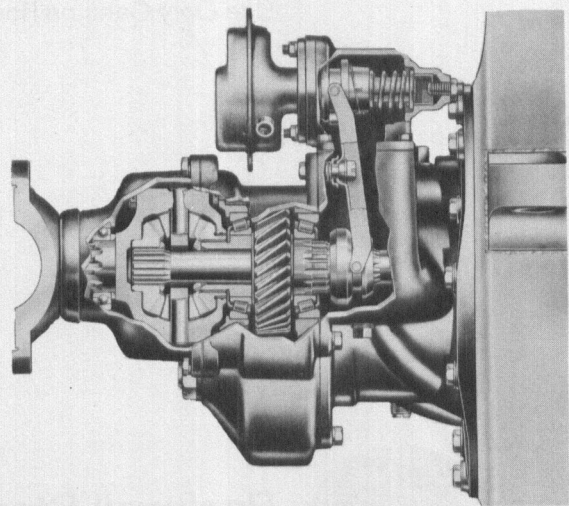
SINGLE REDUCTION DRIVE UNITS EQUIPPED WITH INTER-AXLE DIFFERENTIAL AND THROUGH DRIVE



Front Mounted Single Reduction Through Drive Units built by the Rockwell-Standard Company incorporate hypoid reduction gears and bevel type inter-axle differential gears.

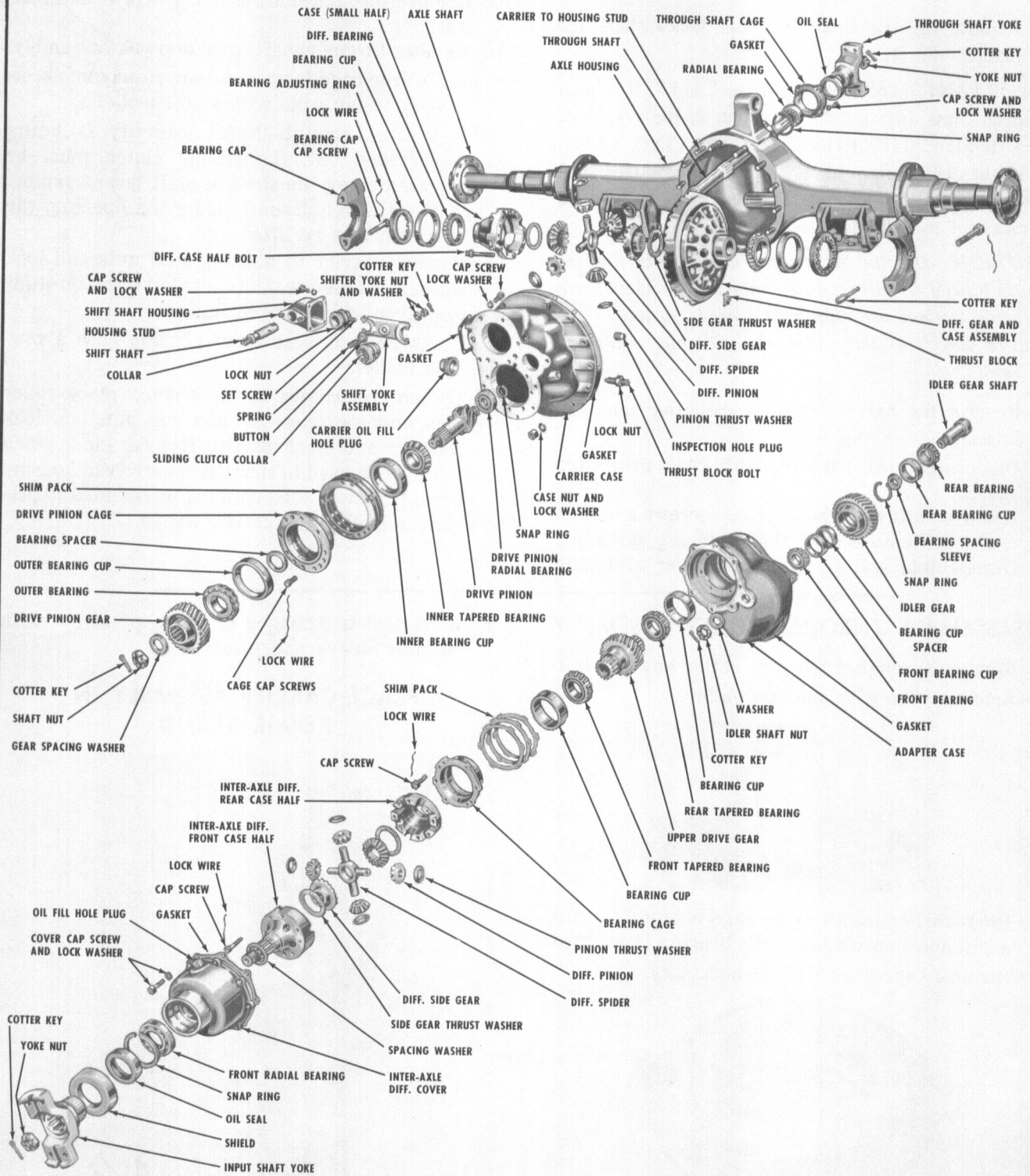
The inter-axle differential may be either engaged or disengaged by a power actuated shift unit which moves a sliding collar on the through-shaft splines.

The shift unit is controlled by a selector switch or lever within the cab of the vehicle and may be engaged or disengaged under any normal operating conditions. The inter-axle differential when engaged (unlocked) divides the engine torque between the forward and rear axles, when disengaged (locked) converts the two axles to a through drive type tandem.



The Upper Helical Gear, Idler Gear, Drive Pinion and Differential Assembly are supported by tapered bearings.

LIGHTWEIGHT TANDEM FORWARD AXLE



REMOVE AND DISASSEMBLE DRIVE UNIT

REMOVE DRIVE UNIT FROM HOUSING

A. Remove plug from bottom of axle housing and drain lubricant.

B. Remove the axle shaft stud nuts, lockwashers and tapered dowels.

IMPORTANT: To loosen the dowels, hold a 1½ inch diameter brass drift against the center of the axle shaft head, **INSIDE THE CIRCULAR DRIVING LUGS**. Strike the drift a sharp blow with a 5 to 6 pound hammer or sledge. A 1½ inch diameter brass hammer is an excellent and safe drift.

CAUTION: Do not hit the circular driving lugs on the shaft head — this may cause the lugs to shatter and splinter. Do not use chisels or wedges to loosen the shaft or dowels — this will damage the hub, shaft and oil seal.

C. Remove the axle shaft from the drive unit and housing.

D. Disconnect the forward and rear propeller shafts.

E. Remove shift shaft housing cap screws and lock washers. Remove shift shaft housing assembly.

F. Disassemble and remove shift lever attaching

nut, button, lever, cup and spring. Body fit bolt should not be removed.

G. Remove through-shaft cage cap screws and lock washers.

H. Remove through-shaft, cage and yoke assembly.

1. To free cage from case bore it may be necessary to tap yoke with a soft mallet.

2. While through-shaft assembly is being threaded out, the sliding clutch must be eased along the shaft at shift lever opening. When through-shaft clears the opening, the clutch may be lifted out.

J. Remove carrier to housing stud nuts and lock washers. Loosen two top nuts but leave on studs to prevent carrier from falling.

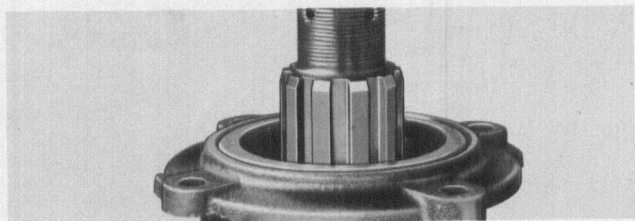
K. Break carrier loose from housing with a rawhide mallet.

L. To remove carrier from housing, place roller jack under carrier. Remove top nuts and lock washers and work carrier free. A small pinch bar may be used to straighten carrier in housing bore. However, the end must be rounded to prevent indenting the carrier flange.

DISASSEMBLE THROUGH-SHAFT ASSEMBLY

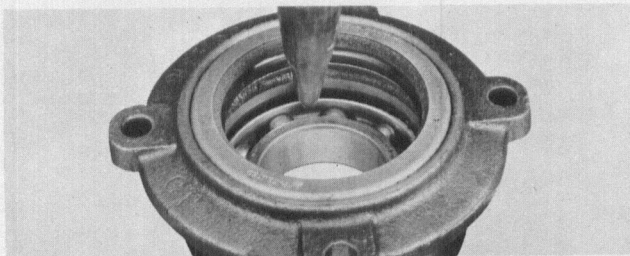
A. Remove through-shaft yoke cotter key and nut.

B. Remove yoke with suitable puller.



C. Press through-shaft from cage assembly, using a suitable sleeve against the bearing inner race.

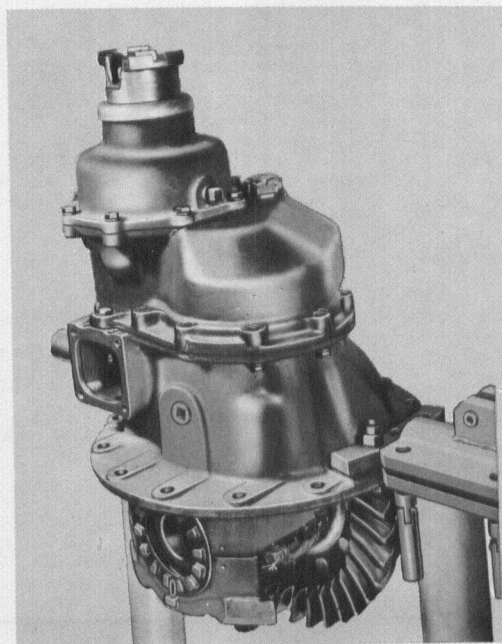
D. Remove cage snap ring, if necessary.



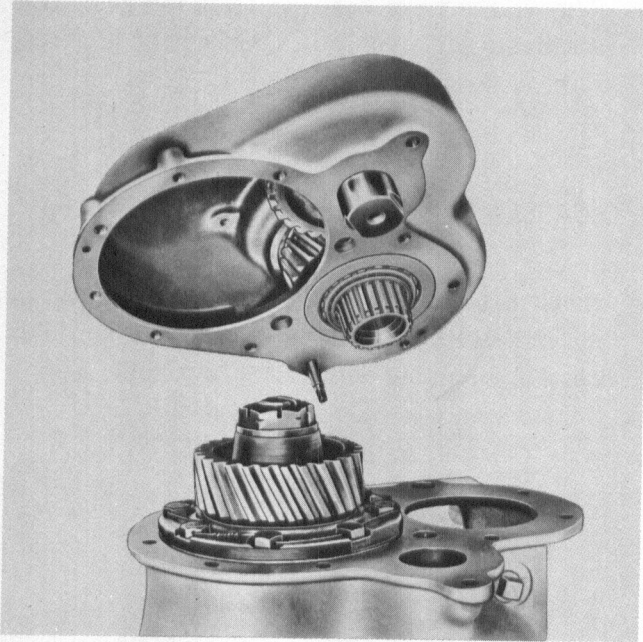
E. Tap radial bearing out of bore from seal end. Care must be taken not to damage seal.

F. If oil seal is damaged or worn, press out with suitable sleeve and discard.

PLACE CARRIER ASSEMBLY IN REPAIR STAND

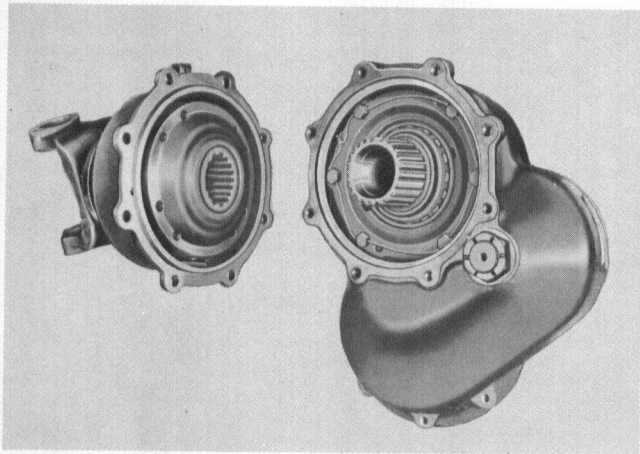


REMOVE ADAPTER CASE AND INTER-AXLE DIFFERENTIAL ASSEMBLY



- A. Remove the adapter case to carrier lock washers and cap screws.
- B. Separate the assemblies and remove the gasket.

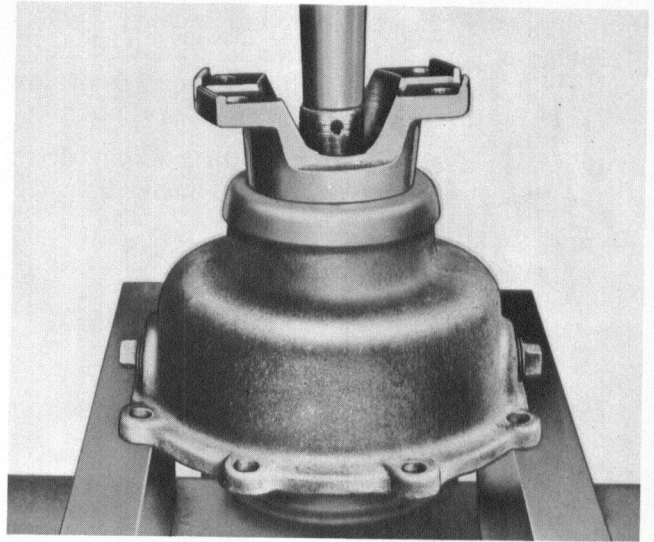
REMOVE INTER-AXLE (3rd) DIFFERENTIAL ASSEMBLY



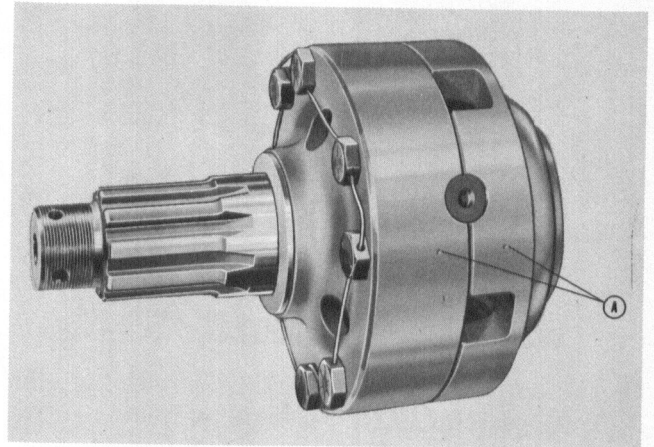
Remove the inter-axle differential cover cap screws and lock washers and lift the assembly from the adapter case.

DISASSEMBLE INTER-AXLE (3rd) DIFFERENTIAL ASSEMBLY

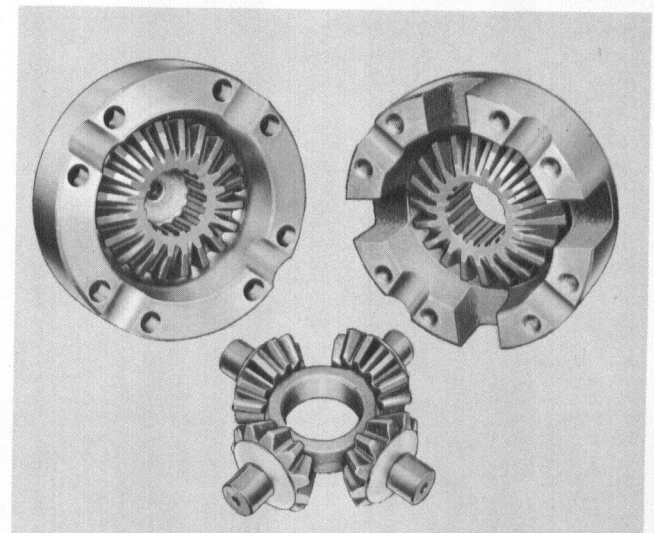
- A. Remove input shaft cotter key, nut and washer using a suitable holder for flange or yoke.



- B. Press inter-axle differential assembly from cover.



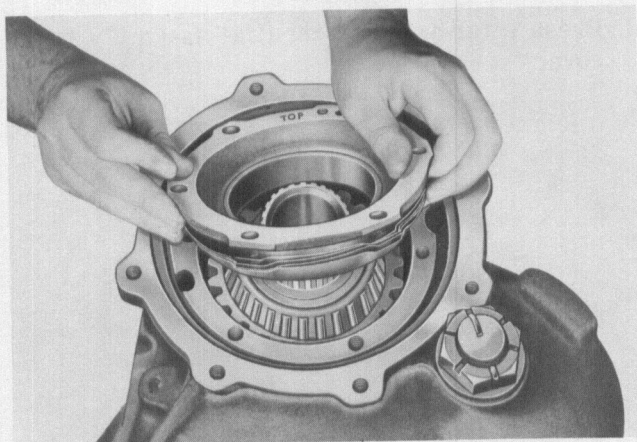
- C. If original identification marks are not clear, mark the differential case halves with a punch or chisel for correct alignment on reassembly.



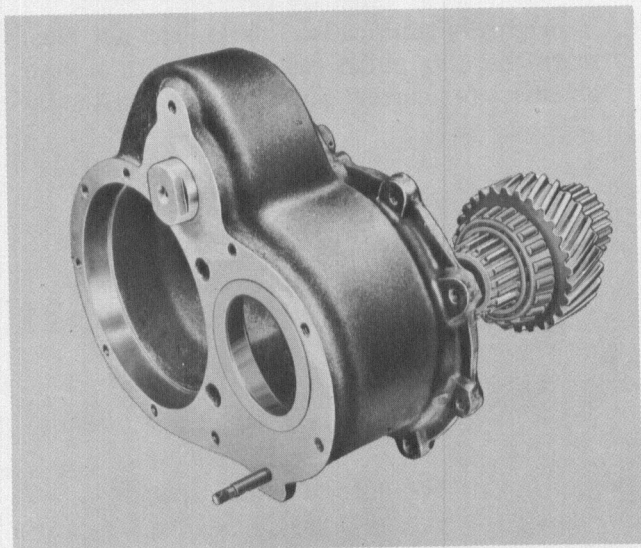
- D. Disassemble case halves and remove spider, spider pinions, side gears and thrust washers. Do not remove the radial bearing from the case unless replacement is necessary.
- E. If it is necessary to replace the bearing, drive the oil seal from the cover and remove the snap ring and bearing.

DISASSEMBLE THE ADAPTER CASE ASSEMBLY

- A. Cut the lockwire and remove the cap screws from the bearing cage.
- B. Insert two (2) cap screws in the puller holes and tighten to remove cage.



- C. Lift off cage and shim pack. Be sure to keep the shim pack intact for reassembly.

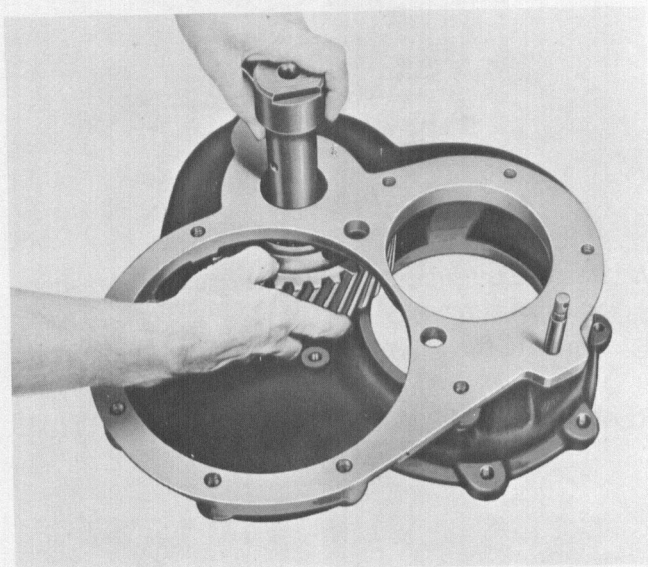


- D. At the rear of the adapter case, tap the helical gear assembly with a rawhide mallet and remove assembly at front of the case.

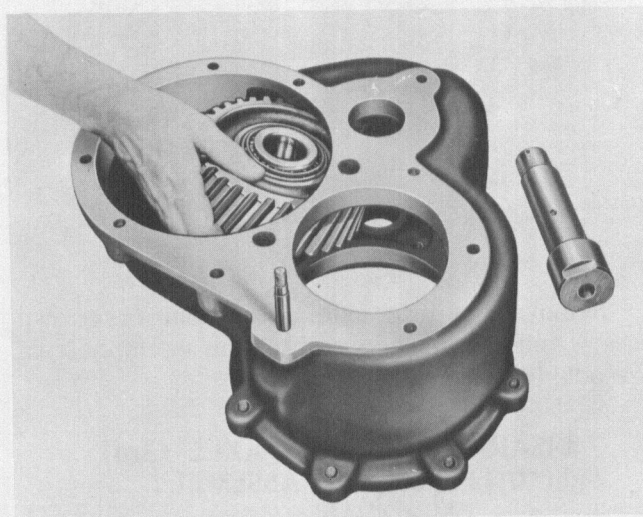
- E. If replacement is necessary, remove the bearing cups from cage and adapter case.
- F. Remove the taper bearings from the gear with a suitable puller only if replacement is necessary.

DISASSEMBLE IDLER GEAR AND SHAFT ASSEMBLY

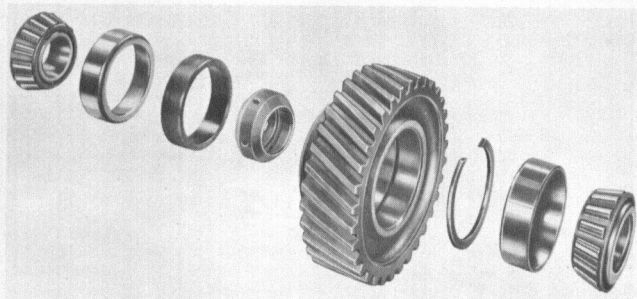
- A. Remove idler gear shaft cotter key, nut and spacing washer (flats are provided on idler shaft for holding while removing nut).



- B. Remove idler gear shaft.



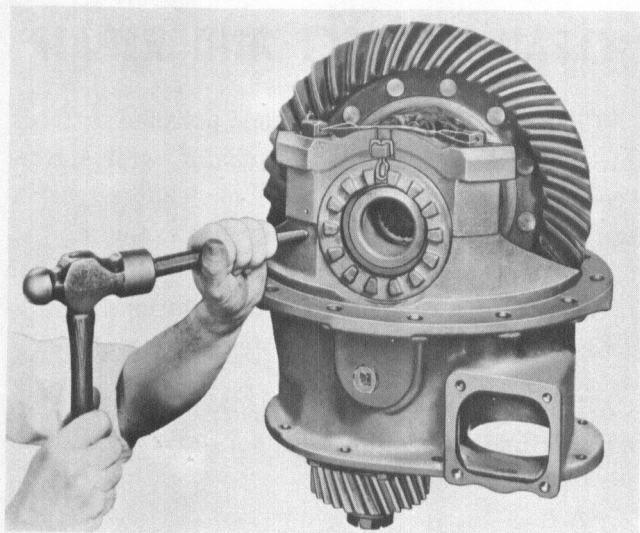
- C. Slide out idler gear and bearing assembly.



- D. Remove tapered bearings. For complete disassembly tap out cups, remove hardened bearing spacer, or spacers, and bearing cup spacer.

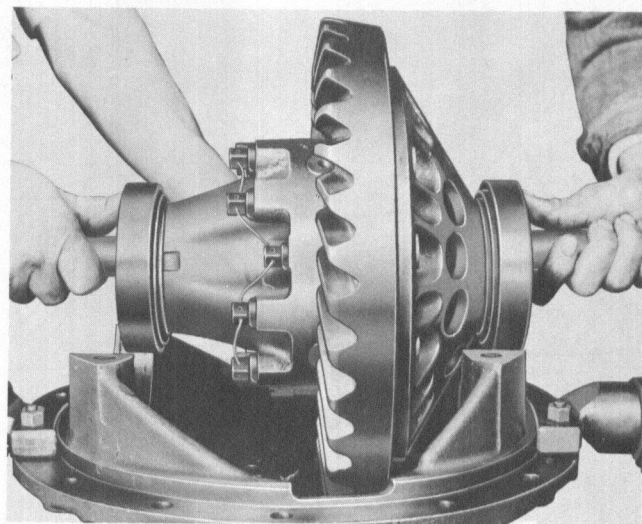
REMOVE DIFFERENTIAL AND GEAR ASSEMBLY

- A. With the carrier still in an upright position, loosen jam nut and back off thrust block adjusting screw, allowing the thrust block to drop.
- B. Rotate the carrier 180° and bring the drive gear to an upright position.
- C. Check and record the backlash. This information will be needed in reassembly unless a new gear set is used.



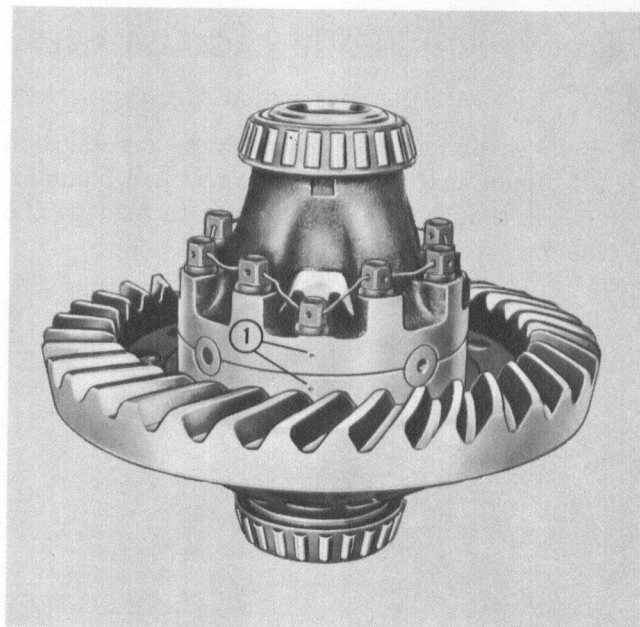
- D. Center punch one differential carrier leg and bearing cap to identify in reassembly.
- E. Cut the lockwire and remove the leg cap screws and cotter key.
- F. Remove the bearing adjusting ring and the carrier leg.

- G. Repeat steps E and F for removal of carrier leg on the opposite side.



- H. Lift out the differential and gear assembly.

DISASSEMBLE DIFFERENTIAL CASE AND GEAR ASSEMBLY

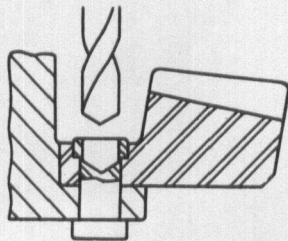


- A. If original identification marks are not clear, mark the differential case halves with a punch or chisel for correct alignment on reassembly.
- B. Remove the lockwire and cap screws and separate the case halves.

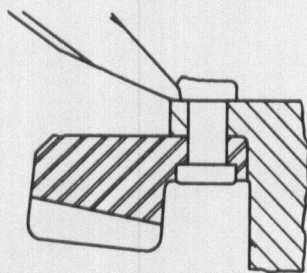
CARE AND MAINTENANCE

- C. Remove spider, spider pinions, side gears and thrust washers.

RIGHT



WRONG

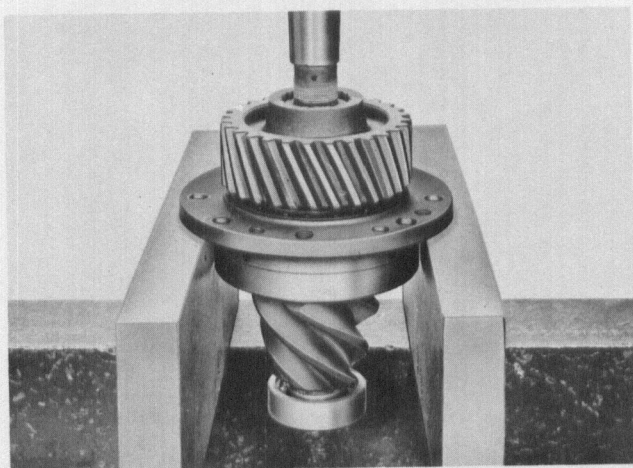


- D. If gear is to be replaced for any reason, remove rivets and separate gear from case.

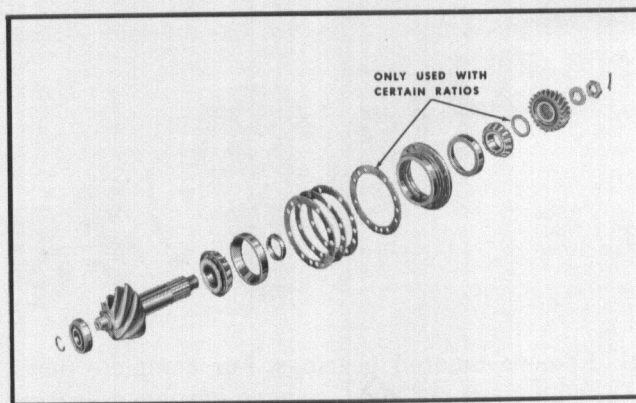
1. Carefully center-punch rivets in center of head.
 2. Use drill $\frac{1}{32}$ " smaller than body of rivet to drill through head.
 3. Press out rivets.
- E. If necessary to replace differential bearings, remove with a suitable puller.

REMOVE PINION AND CAGE ASSEMBLY

- A. Cut lock wire. Remove pinion cage cap screws.
- B. Remove pinion cage assembly by tapping end of pinion shaft with a brass bar and hammer. (Care should be exercised not to damage the pinion radial bearing.)
- C. Remove pinion cotter key, nut and washer.



- D. Press pinion shaft through cage and bearings.



- E. Remove gear (and gear spacer where employed).
- F. Remove outer bearing from cage.
- G. Remove bearing spacer from pinion shaft.
- H. If necessary, remove the pinion inner thrust bearing and the end radial bearing with a suitable puller.
- I. If necessary to replace pinion bearing cups, remove with a suitable puller (if cups are in good condition, do not disturb).

PREPARE FOR REASSEMBLY CLEAN, INSPECT AND REPAIR

Clean parts having ground and polished surfaces, such as gears, bearings and shafts, with solvent type cleaners such as emulsion cleaners, carbon tetrachloride or petroleum solvents excluding gasoline. Do not clean these parts in a hot solution tank or with water and alkaline solutions such as sodium hydroxide, orthosilicates or phosphates.

CAUTION: Exercise care to avoid skin rashes, fire hazards and inhalation of vapors when using solvent type cleaners.

ROUGH PARTS

Rough parts such as differential carrier casting and adapter case may be cleaned in hot solution tanks with mild alkali solutions providing these parts are not ground or polished. The parts should remain in the tank long enough to be thoroughly

cleaned and heated. This will aid the evaporation of the cleaning solution and the rinse water.

CAUTION: *Exercise care to avoid skin rashes and inhalation of vapors when using alkali cleaners.*

Parts cleaned in solution tanks or with alkali cleaners should be thoroughly rinsed after cleaning to remove all traces of alkali.

COMPLETE ASSEMBLIES

Completely assembled axles may be steam cleaned, on the outside only, to facilitate initial removal and disassembly, provided all openings are closed. Breathers, vented shift units, and all other openings should be tightly covered or closed to prevent the possibility of water entering the assembly.

DRYING

Parts should be thoroughly dried immediately after cleaning. Use soft, clean, lintless absorbent paper towels or wiping rags free of abrasive material such as lapping compound, metal filings or contaminated oil. Bearings should never be dried by spinning with compressed air.

CORROSION PREVENTION

Parts that have been cleaned, dried, inspected and are to be immediately reassembled should be coated with light oil to prevent corrosion. If these parts are to be stored for any length of time, they should be treated with a good RUST PREVENTIVE and wrapped in special paper or other material designed to prevent corrosion.

INSPECT

It is impossible to overstress the importance of careful and thorough inspection of drive unit parts prior to reassembly. Thorough visual inspection for indications of wear or stress, and the replacement of such parts as are necessary will eliminate costly and avoidable drive unit failure.

- A. Inspect all bearings, cups and cones, including those not removed from parts of the drive unit,

and replace if rollers or cups are worn, pitted or damaged in any way. Remove parts needing replacement with a suitable puller or with a press. Avoid the use of drifts and hammers. They may easily mutilate or distort component parts.

- B. Inspect hypoid gears for wear or damage. Gears which are worn, ridged, pitted or scored, should be replaced. When necessary to replace either the pinion or gear of hypoid set, the entire gear set should be replaced.
- C. Inspect the differential assembly for the following:
 1. Pitted, scored or worn thrust surfaces of differential case halves, thrust washers, spider trunnions and differential gears. Thrust washers must be replaced in sets. The use of a combination of old and new washers will result in premature failure.
 2. Wear or damage to the differential pinion and side gear teeth. Always replace differential pinions and side gears in sets.
- D. Inspect axle shafts for signs of torsional fractures or other indication of impending failure.

REPAIR

- A. Replace all worn or damaged parts. Hex nuts with rounded corners, all lock washers, oil seals and gaskets should be replaced at the time of overhaul.

Use only genuine Rockwell-Standard replacement parts for satisfactory service. For example, using gaskets of foreign material generally leads to mechanical trouble due to variations in thickness and the inability of certain materials to withstand compression, oil, etc.

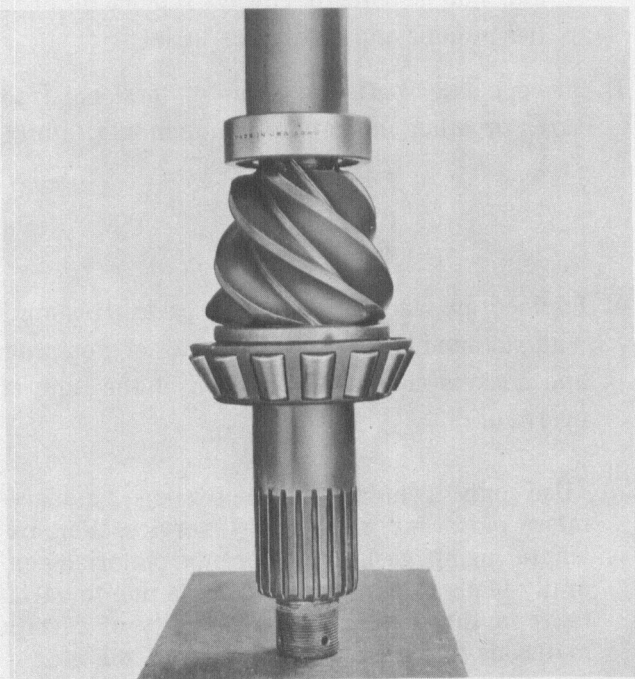
- B. Remove nicks, mars and burrs from machined or ground surfaces. Threads must be clean and free to obtain accurate adjustment and correct torque. A fine mill file or India stone is suitable for this purpose. Studs must be tight prior to reassembling the parts.

- C. When assembling component parts use a press where possible.
- D. Tighten all the nuts to the correct torque (see torque limits following service instructions). Use soft iron locking wire to prevent possibility of wire breakage.
- E. The burrs, caused by lock washers, at the spot face of stud holes of cages and covers should be removed to assure easy reassembly of these parts.

REASSEMBLE CARRIER

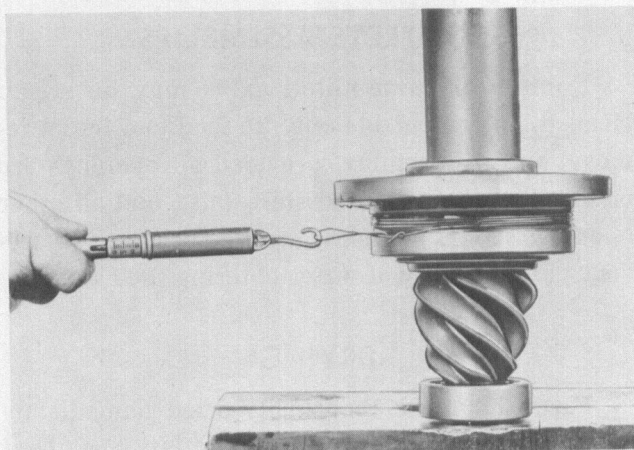
REASSEMBLE PINION AND CAGE ASSEMBLY

- A. Press rear thrust bearing firmly against the pinion shoulder with a suitable sleeve against the bearing inner race.



- B. Press the radial bearing into position.
- C. Install radial bearing retaining ring.
- D. If new cups are to be installed, press cups into cage using suitable sleeve; make sure cups are firmly against the cage shoulders.

- E. Lubricate bearing and cups with light machine oil.
- F. Insert pinion and bearing assembly in pinion cage and position spacer over the pinion shaft.
- G. Press forward bearing firmly against the spacer.
- H. Rotate cage several revolutions to assure normal bearing contact.



- I. While in the press under pressure, check the bearing preload torque. Wrap a soft wire around the cage pilot and pull on a horizontal line with a pound scale. (If the press is not equipped with a pressure gauge, the pinion nut may be tightened to the correct torque and the preload checked in a vise.)

(If the rotating torque is not within 5-15 pound inches use a thinner spacer to increase, or a thicker spacer to decrease, the preload torque.)

The correct pressures and nut torques for checking pinion bearing pre-load are as follows:

| PINION SHAFT THREAD SIZE | REQUIRED NUT TORQUE TO OBTAIN CORRECT PRE-LOAD | REQUIRED PRESSURE TO OBTAIN CORRECT PRE-LOAD |
|-----------------------------|--|--|
| 1" x 20 | 300-400 lb. ft. | 6 tons |
| 1¼" x 18 | 700-900 lb. ft. | 11 tons |
| 1½" x 12 | 800-1100 lb. ft. | 14 tons |
| 1½" x 18 | 800-1100 lb. ft. | 14 tons |
| 1¾" x 12 | 800-1100 lb. ft. | 14 tons |
| 2" x 16 | 800-1100 lb. ft. | 14 tons |

Use rotating torque, not starting torque.

Example: Assuming pinion cage diameter to be 6 inches, the radius would be 3 inches; with 5 pounds pull, pre-load torque would equal 15 pound inches.

- J. Press the drive pinion helical gear against the forward bearing (or spacer where employed) and install washer and pinion shaft nut.
- K. Using a suitable holder on gear, tighten the pinion shaft nut to the required torque and install cotter key.
- L. Recheck pinion bearing pre-load torque. If rotating torque is not within 5-15 pound inches, repeat the foregoing procedure.
- M. If original gears are reused, install original shim pack (and spacing washer where employed). If gears have been replaced, *alter* the original shim pack as follows: Note the variation from the nominal assembly dimension on both the old and new pinion. (The nominal dimension is stamped and the variation is etched on the "nose" of the pinion.) Increase or reduce the shim pack in accordance with the change in the variation from the old to the new pinion. After changing the sign of the old variation—plus to minus or minus to plus—add to the new variation (sign unchanged). The answer will be the shim pack increase or decrease in thousandths of an inch.
- N. Position the pinion and cage assembly in the carrier pinion cage bore and tap into place with a soft mallet.
- O. Install pinion cage cap screws and tighten to correct torque. (Do not lock wire until final carrier adjustments are made.)

ASSEMBLE DIFFERENTIAL AND GEAR

- A. Rivet the hypoid gear to the case half with new rivets. Rivets should not be heated, but always upset cold. When the correct rivet is used, the head being formed will be at least $\frac{1}{8}$ " larger in diameter than the rivet hole. The head will then be approximately the same height as the pre-formed head.

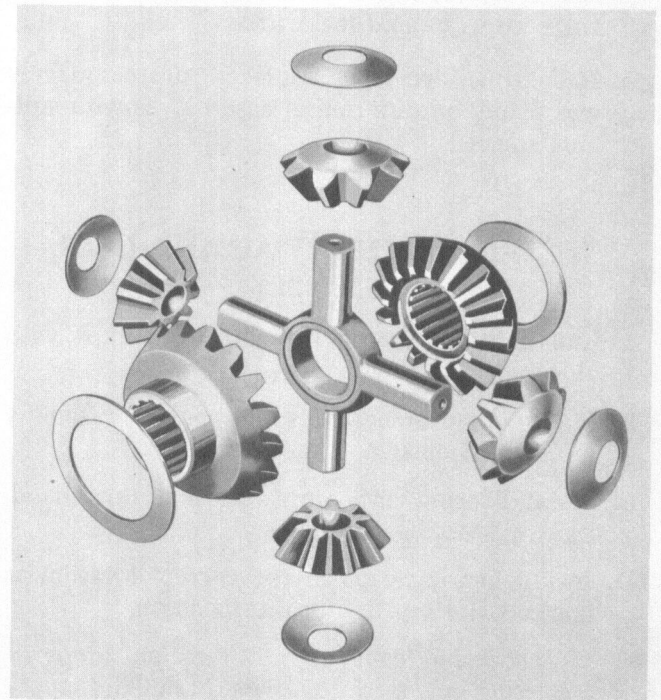
Tonnage required for squeezing cold rivets: These pressures are approximate for annealed steel rivets and pressure may be adjusted to suit individual working conditions.

| DIAMETER OF RIVET | TONNAGE REQUIRED |
|----------------------|---------------------|
| $\frac{7}{16}$ " | 22 |
| $\frac{1}{2}$ " | 30 |
| $\frac{9}{16}$ " | 36 |
| $\frac{5}{8}$ " | 45 |

Final pressure should be held for approximately one minute to make sure the rivet has filled the hole.

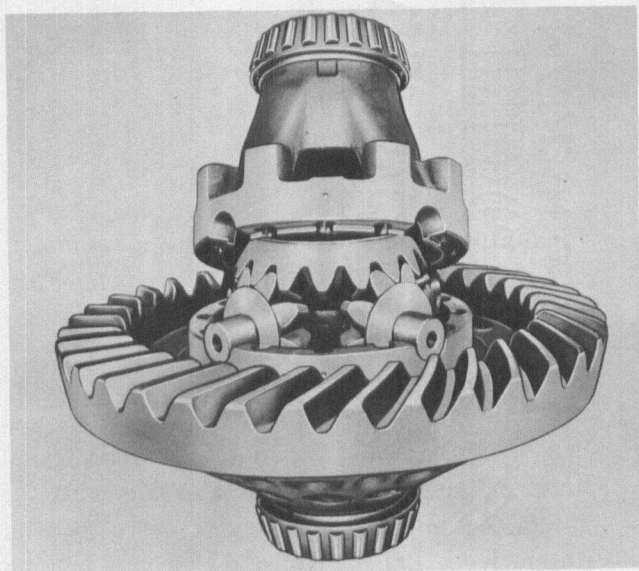
Differential case and gear bolts are also available for service replacement of rivets. The use of bolts greatly facilitates servicing these units in the field and eliminates the need for special equipment necessary to correctly cold upset rivets. Consult chart for service bolt instructions shown with the torque chart on last page of manual.

- B. Lubricate differential case inner walls and all component parts with axle lubricant.



DIFFERENTIAL PINION AND SIDE GEAR ASSEMBLY

- C. Position thrust washer and side gear in gear case half.
- D. Place spider with pinions and thrust washers in position.
- E. Install second side gear and thrust washer.

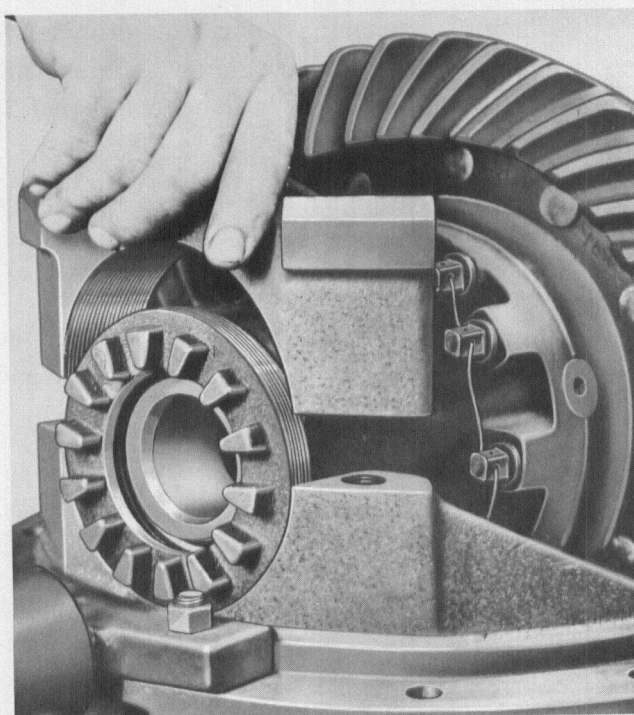


- F. Align mating marks, position mating case half and draw assembly together with three (3) equally spaced cap screws.
- G. Install remaining cap screws and tighten to correct torque and lockwire.
- H. If bearings are to be replaced, press squarely and firmly on differential case halves with suitable sleeve.

INSTALL DIFFERENTIAL AND GEAR ASSEMBLY

- A. Lubricate differential bearings and cups with axle lubricant.
- B. Place cups over bearings and position assembly in carrier housing.
- C. Insert bearing adjusting nuts and turn hand-tight against bearing cups.
- D. Install bearing caps in the correct location as marked and tap lightly into position.

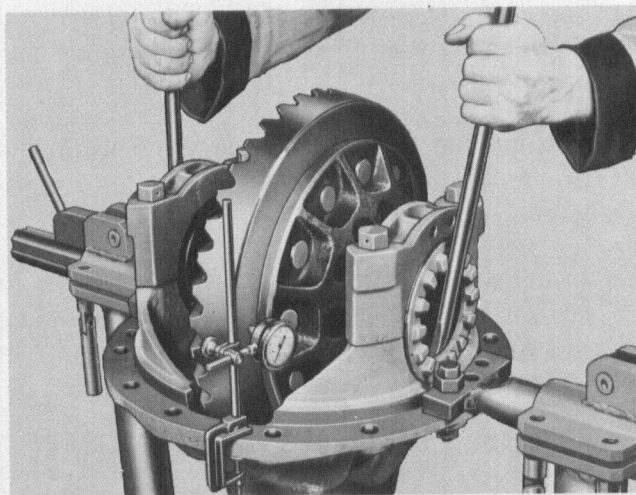
If bearing caps do not position properly, adjusting nuts might be cross threaded. Remove caps and reposition the adjusting nuts. For-



ing caps into position will result in irreparable damage to the carrier housing or bearing caps.

- E. Install carrier leg cap screws and tighten to required torque. Install adjusting nut, cotter keys and lockwire carrier leg cap screws *after* final adjustments are made.

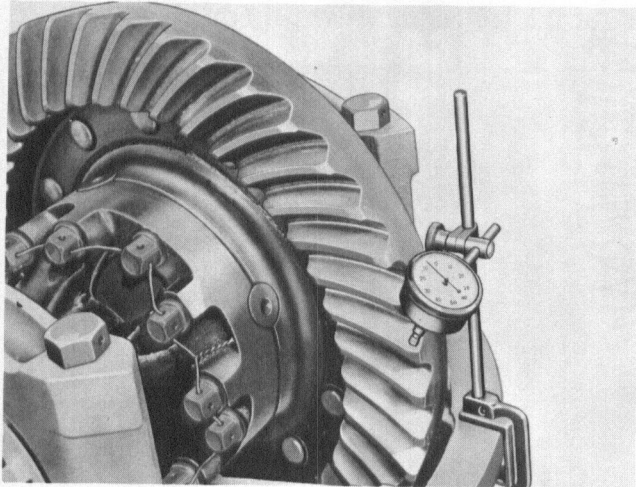
ADJUST DIFFERENTIAL BEARING PRE-LOAD



- A. Using dial indicator at backface of gear, loosen the bearing adjusting nut on *the side opposite gear only* sufficient to notice end play on the indicator.
- B. Tighten the same adjusting nut only sufficient to obtain .000 end play.

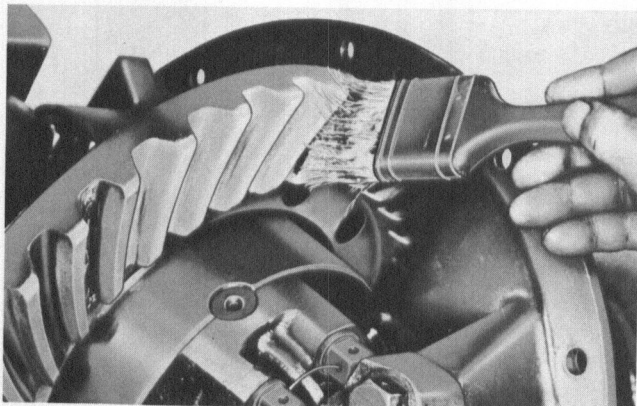
- C. Check gear for runout. If runout exceeds .008", remove differential and check for cause.
- D. Tighten adjusting nuts *one notch each* from .000 end play to pre-load differential bearings.

CHECK HYPOID GEAR BACKLASH



If the drive gear is not going to be replaced, we suggest the established backlash recorded before disassembly be used. For new gears the new backlash should be initially set at .010". Adjust backlash by moving the gear only. This is done by backing off one adjusting ring and advancing the opposite ring the same amount.

CHECK TOOTH CONTACT



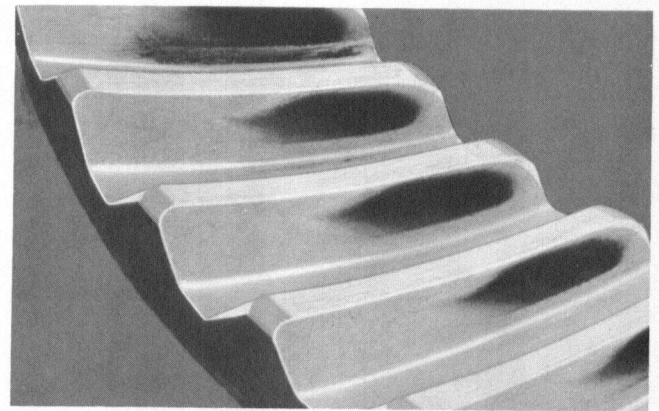
Apply oiled red lead lightly to the hypoid gear teeth. When the pinion is rotated, the red lead is

squeezed away by the contact of the teeth, leaving bare areas the exact size, shape and location of the contacts.

Sharper impressions may be obtained by applying a small amount of resistance to the gear with a flat steel bar and using a wrench to rotate the pinion. When making adjustments, check the drive side of the gear teeth. Coast side should be automatically correct when drive side is correct. As a rule, coating about twelve teeth is sufficient for checking purposes.

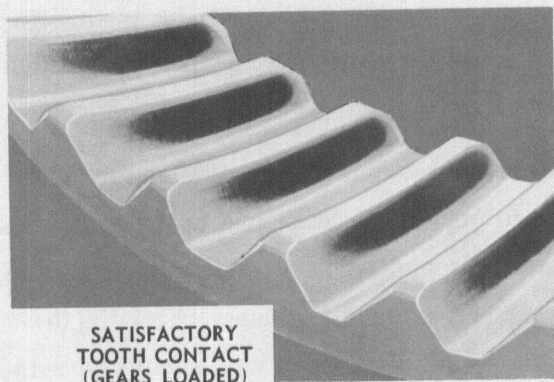
CORRECT TOOTH CONTACT ASSURES LONGER GEAR LIFE

With adjustments properly made (pinion at correct depth and backlash set at .010") the above contacts will be procured. The area of contact favors the toe and is centered between the top and bottom of the tooth.



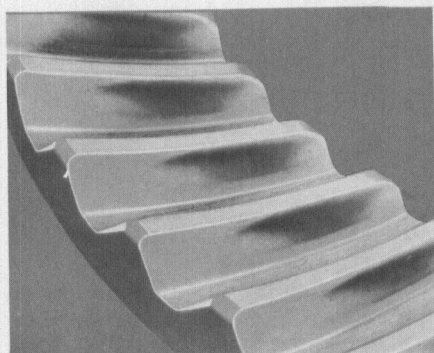
SATISFACTORY
TOOTH CONTACT
(GEARS UNLOADED)

The hand rolled pattern shown above (gears unloaded) will result in a pattern centered in the length of the tooth when the gears are under load shown on page 14. The loaded pattern will be almost full length and the top of pattern will approach the top of the gear.

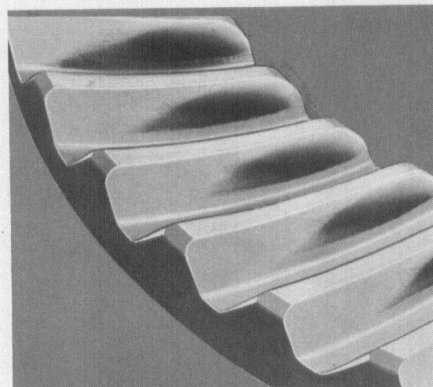


The pattern on the coast side of teeth will appear the same width as the drive side shown at left; however, the over-all length will be centered between the toe and heel of gear tooth.

Set used hypoid gears so the tooth contacts match existing wear patterns. Hand rolled patterns of used gears will be smaller in area and should be at the toe end of wear patterns.



A high contact indicates pinion is too far out. Set the pinion to the correct depth by removing shims under the pinion cage. Slight outward movement of hypoid gear may be necessary to maintain correct backlash.



A low contact indicates pinion is too deep. Set the pinion to the correct depth by adding shims under the pinion cage. Slight inward movement of the hypoid gear may be necessary to maintain correct backlash.

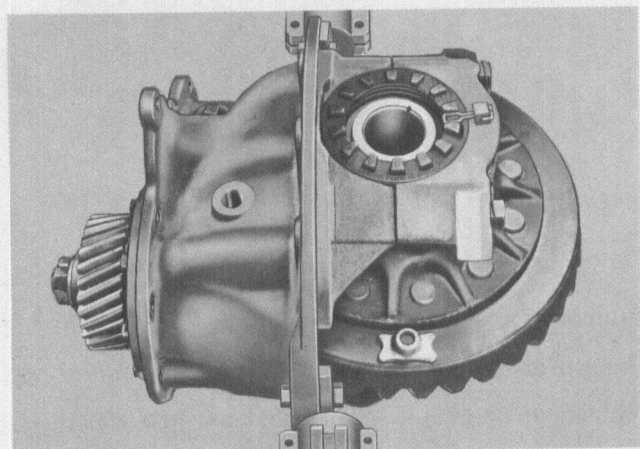


INSTALL THRUST BLOCK

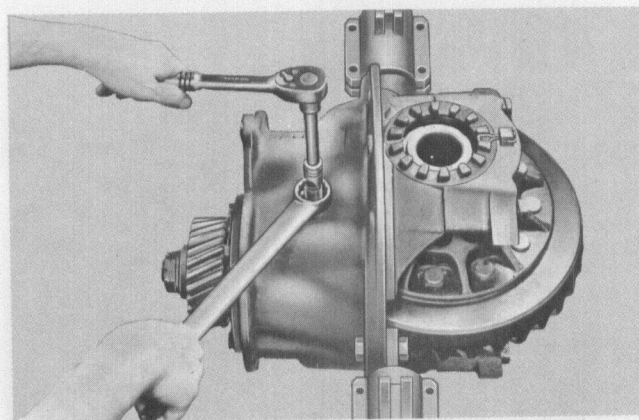
- A. Remove carrier from stand and position with back face of hypoid gear upward.
- B. Remove adjusting screw and lock nut.

rotate the gear until the hole in the thrust block is in line with the adjusting screw hole.

- D. Install adjusting screw and lock nut and tighten screw until thrust block is firm against back face of hypoid gear.



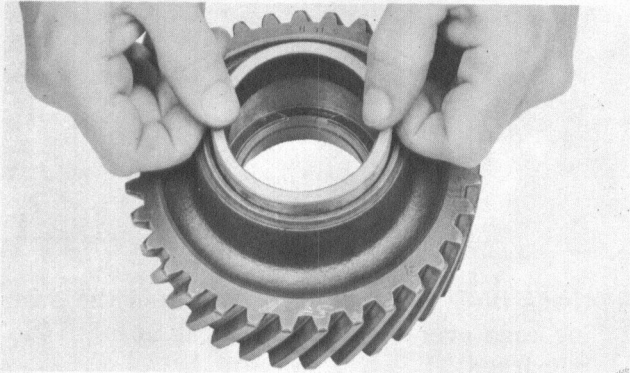
- C. Coat face of the thrust block with grease and place on the back face of the hypoid gear;



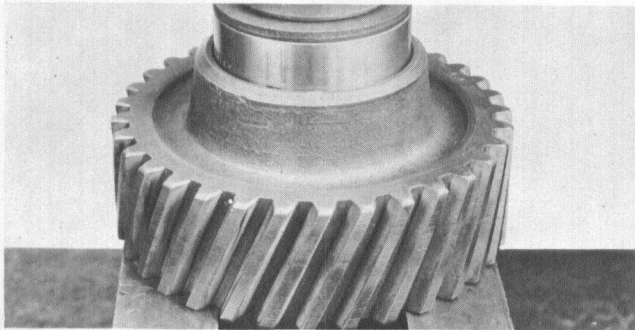
- E. To secure the correct adjustment of .010"-.015" clearance, loosen adjusting screw 1/4 turn and lock securely with nut.

ASSEMBLE ADAPTER CASE

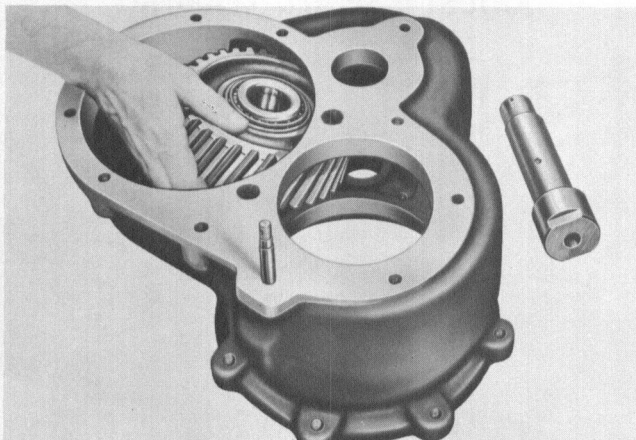
- A. Install the snap ring and press idler gear inner bearing cup squarely against snap ring.



- B. Insert the idler gear cup spacing sleeve against opposite side of snap ring.

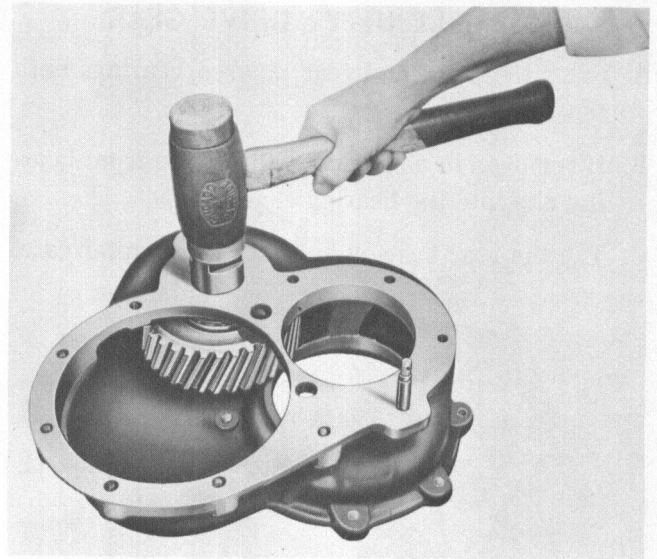


- C. Press idler gear outer bearing cup squarely against the spacing sleeve.
D. Position the idler gear inner and outer bearings into cups with the hardened bearing spacer (or combination of two spacers) between them.



- E. Slide the complete assembly through the adapter case drive pinion opening.

Position the assembly so that the bearings are aligned with adapter case shaft hole.



- F. Tap the idler shaft through the idler gear assembly so that the inner bearing is squarely against the idler shaft shoulder.

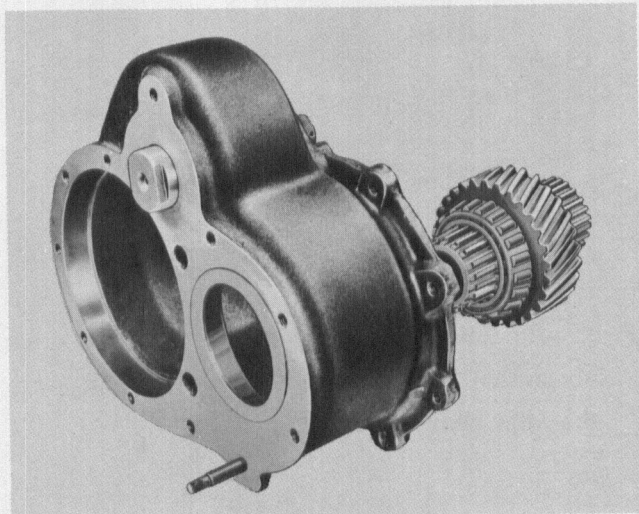
IDLER SHAFT BEARING ADJUSTMENT

Hold the adapter case and idler gear assembly securely in vise with jaws clamped on flatted end of idler shaft.

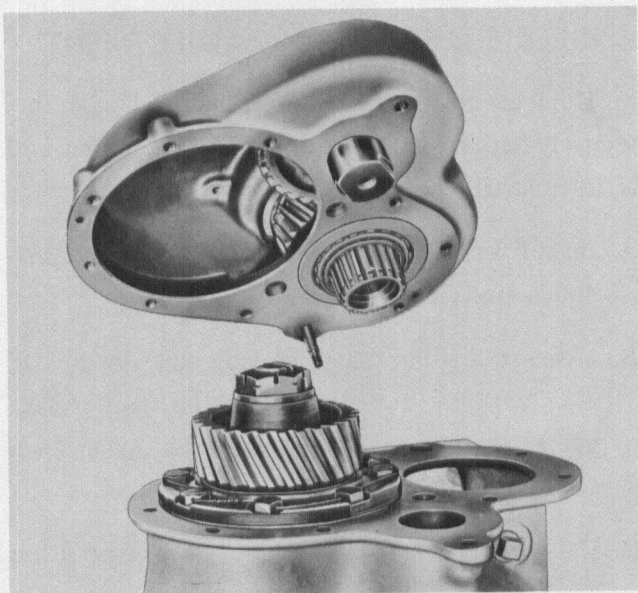
- A. Install washer and nut, and torque nut to 350-400 pound feet.
B. Measure the idler shaft bearing end play by use of a dial indicator mounted to the adapter case proper with stem set against idler gear face. Correct limits .001"-.005".
C. If bearing end play does not measure within these limits, use a thinner or thicker spacer or combination of two spacers as required.
D. After end play has been established within the .001"-.005" limits, remove the washer and nut. Insert "O" ring and reinstall washer and nut. Tighten nut to 350-400 pound feet. Install cotter key.

ASSEMBLE UPPER DRIVE GEAR

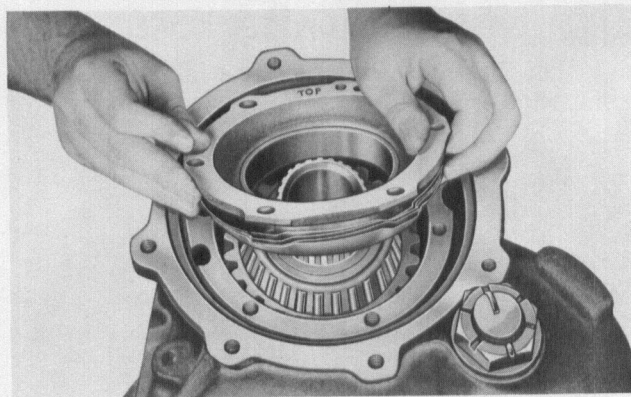
- A. Press the front and rear tapered bearings onto the gear.
- B. If removed in disassembly, press the front bearing cup into the bearing cage.
- C. Tap the rear bearing cup into the adapter case.



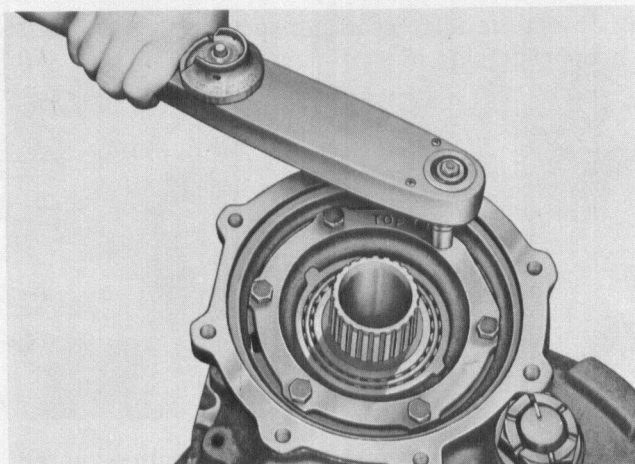
- D. Slide the gear assembly into the adapter case.



- E. Mount the carrier in the stand in an upright position. Install the gasket and place the adapter case assembly over the carrier. (The idler shaft flat must be lined up with the corresponding flat in the carrier.)
- F. Install the lock washers and cap screws and tighten the cap screws to specified torque.

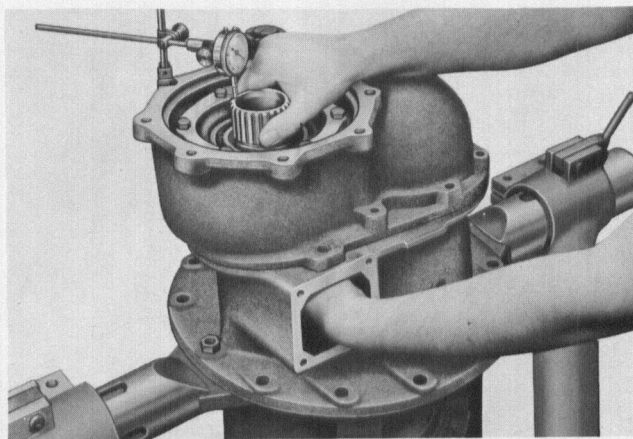


- G. Using the original shim pack, install the bearing cage over the Upper Helical Gear. "TOP" is marked.



- H. Install lock washers and cap screws and tighten to specified torque.

ADJUST TAPERED BEARINGS

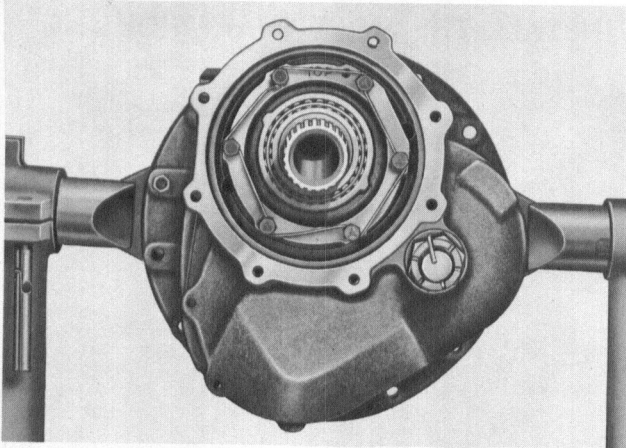


- A. Adjust the tapered bearings to .001—.005" end-play using a dial indicator set against the end of the gear.

1. Rotate the bearings by hand to seat them in position.
2. With one hand through the shift slot and the other on top, move the gear assembly up and down. The amount of movement should be within the specified amount of endplay.

CAUTION: Do not use a bar to move the bearings up and down because it may cock them in position.

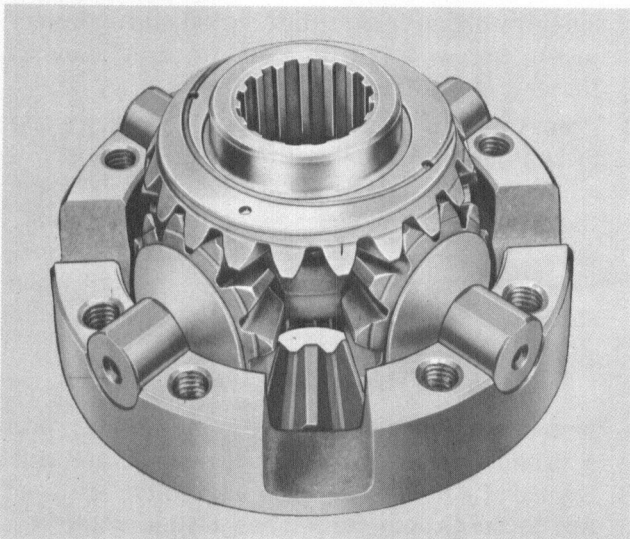
3. The shims control the endplay and can be added to or subtracted from, to achieve the correct amount of endplay.



- B. Lockwire cap screws into position.

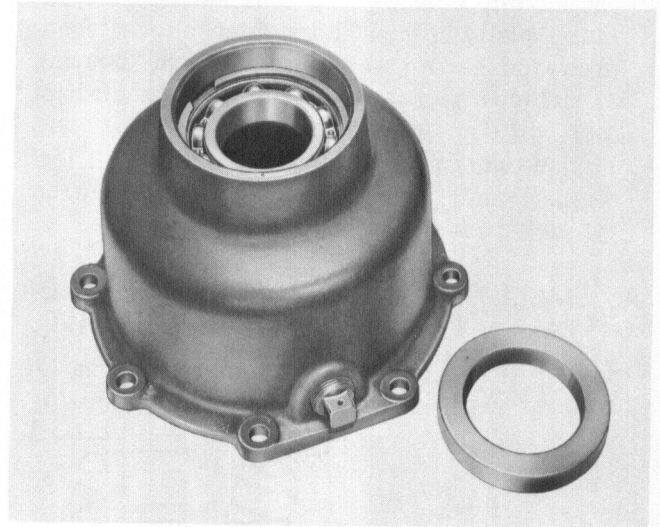
ASSEMBLE INTER-AXLE DIFFERENTIAL

- A. Lubricate differential case walls and all component parts with axle lubricant.
- B. Position thrust washer and rear side gear into rear case half.
- C. Place spider with pinions and thrust washers in position.



- D. Install forward side gear and thrust washer.
- E. Align mating marks, position forward case half.
- F. Install the case cap screws, tighten to correct torque and lock wire.
- G. Check for free rotation of gears and correct if necessary.

COVER BUILT-UP



- A. If the cover assembly was disassembled, install the forward radial bearing and the snap ring.
- B. Install the spacer on the input shaft.
- C. Position the cover assembly over the input shaft and tap down until the radial bearing seats against the spacer.
- D. Install the gasket and position the cover and differential assembly over the upper drive gear hub. Tap the assembly into position. (It will be necessary to line up the splines of the drive gear with those of the side gear.)
- E. Install the cap screws and lock washers. Tighten the cap screws to specified torque.
- F. Install the cover oil seal with a suitable driver.
- G. Mount the cover assembly on the adapter case with gasket in position.
- H. Install the cap screws and lock washers. Tighten the cap screws to specified torque.

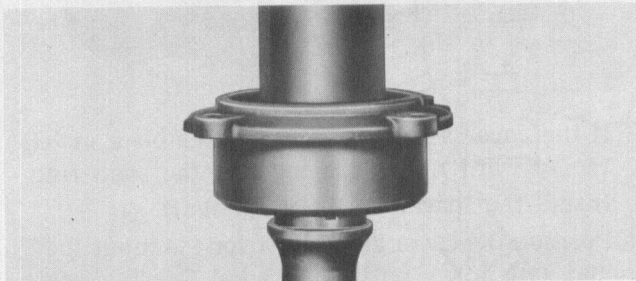
CLEAN AND INSPECT HOUSING, ASSEMBLE DRIVE UNIT

- A. Remove any accumulation of dirt, grit or gum from housing bowl and sleeves. Clean housing thoroughly with solvent and blow dry with compressed air.

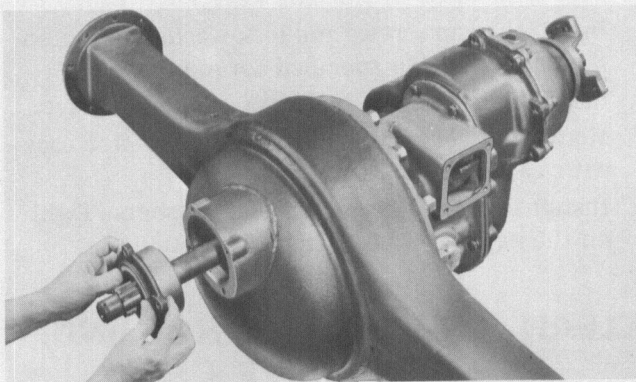
- B. Inspect housing for cracks, loose studs, nicks and burrs at machined surfaces. Remove nicks and burrs with stone or file. Make all necessary repairs or parts replacements before installing drive unit in housing. Be sure housing is thoroughly cleaned after repairing.
- C. Install new drive unit and housing gasket over housing studs.
- D. Roll carrier into position on roller jack. Start carrier into housing with four flat washers and nuts equally spaced and tighten alternately to draw the carrier squarely into axle housing. (Driving carrier into housing with a steel hammer will damage carrier flange.)
- E. Remove nuts and flat washers and install lock washers and stud nuts. Tighten to correct torque.

ASSEMBLE THROUGH-SHAFT CAGE AND INSTALL ASSEMBLY INTO DRIVE UNIT

- A. Install the through-shaft rear radial bearing into the cage and lock in place with snap ring.



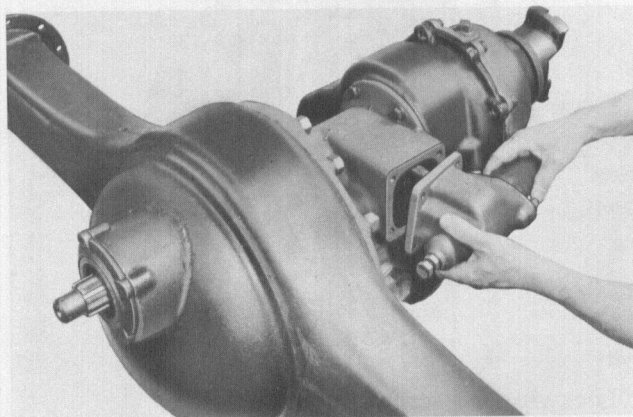
- B. Press the cage and bearing assembly on the splined end of through-shaft with suitable sleeve.
- C. Install the through-shaft cage oil seal with a suitable driver.



- D. Enter the through-shaft and cage assembly with new cage gasket into the cage bore in the rear of the axle housing until the forward end of shaft is even with shift lever opening.

- E. Install the sliding shift collar over the forward end of shaft through the shift housing opening. Ease shaft into the forward side gear of the inter-axle differential, while at the same time passing the shift collar onto the collar splines.
- F. Install through-shaft cage cap screws and lock washers and tighten to correct torque.
- G. Install over the shift lever bolt the shift lever spring, cup and lever. Lever inner yoke must be properly located in collar groove at this time. Install shift lever button and nut. Tighten nut securely with box wrench and install cotter key.

INSTALL THE SHIFT SHAFT HOUSING



- A. Position the gasket and shift housing assembly.
- B. Install lock washers and cap screws and tighten to specified torque.

ADJUSTMENT OF SHIFT SHAFT

Adjust the positioning screw at the rear of the shift housing assembly in the following manner:

- A. With the shift shaft moved back its full travel locking the inter-axle differential, turn the adjusting screw in until the end of screw touches the end of shift shaft.
- B. From this point proceed 1 to 1¼ turn more and lock adjusting screw with jam nut. (This will allow approximately .012" clearance between the yoke and groove of collar and thus eliminate yoke or collar wear.) The shift collar provides a definite stop against housing wall when shifted in the opposite direction.

INSTALL THROUGH-SHAFT YOKE

- A. Install the through-shaft yoke on splines with a suitable sleeve. Install yoke washer and nut.
- B. By use of a holder on the yoke, tighten the yoke nut to the proper torque and install cotter key.

LUBRICATION

"Standard" S.A.E. 140 viscosity lubricants are to be used in drive units that operate under average conditions, except where atmospheric temperatures require the use of the lower viscosity S.A.E. 90.

"Optional" S.A.E. 90 viscosity lubricants should be used when starting or storage temperatures fall below the channel point of the particular S.A.E. 140 viscosity lubricant being used.

Generally speaking, the "Standard" lubricants will render satisfactory service in most areas of the continental United States.

Unusual temperature or operating conditions may require other or more specific lubricant recommendations. The Transmission and Axle Division will review these circumstances, upon request, and make optional gear oil or grease recommendations. It is essential that all details of vehicle operation, loads, area temperatures, etc., are clearly and completely stated when applying to our Engineering Department for an optional lubricant recommendation.

The design of hypoid gear teeth, which mesh with a sliding action, enables them to withstand higher unit pressures. Therefore, the lubricant should have extreme pressure properties.

Hypoid gear lubricants "GL5" best meet these requirements whenever Inter-axle differential assemblies are employed.

NEW AND RECONDITIONED AXLE SERVICE

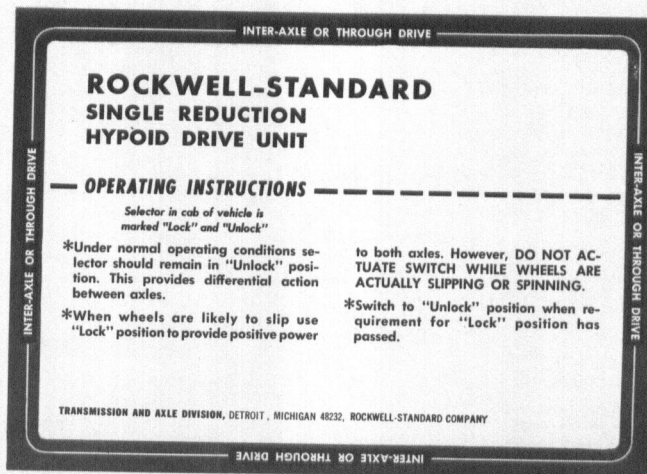
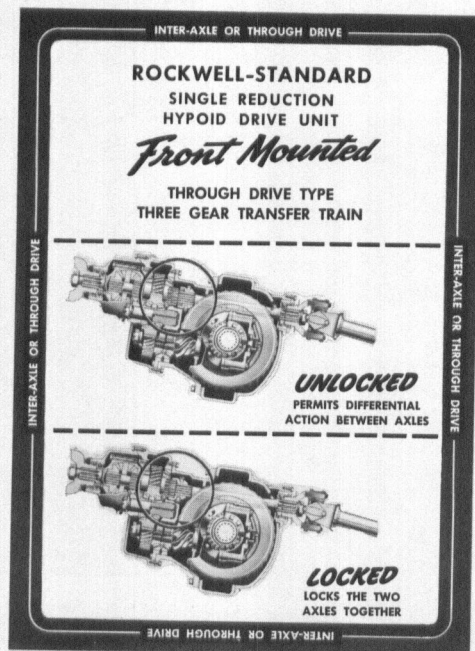
The original rear axle lubricant should be drained at the end of the drive-away or before the maximum of 3,000 miles prior to placing the vehicle in regular service. Drain the lubricant initially used in the assembly following reconditioning at the same interval. Completely drain the lubricant while the unit is warm. Flush well with clean flushing oil and thoroughly drain.

Fill axle housings to bottom of level hole with specified lubricant with the vehicle level. Put an additional two U. S. pints of specified lubricant in the inter-axle differential housing.

REGULAR AXLE SERVICE

Refer to Field Maintenance Manual No. 1, "Lubrication," for recommended service interval. Service the inter-axle differential housing at the same time and in the same manner as the axle housings. Completely drain the lubricant while the unit is warm. Flush well with clean flushing oil and thoroughly drain. Whenever the inter-axle differential housing has been drained, always add an additional two U. S. pints of specified lubricant directly to the inter-axle differential housing.

Jack up all four wheels of the assembly and run at 25 M.P.H. in high transmission gear for five minutes to thoroughly circulate the lubricant throughout the assembly. Be sure brakes are fully released.



Heavy stock 5x7 shift cards, shown above, are available for use in the cab of the vehicle through the Technical Publications Department; Rockwell-Standard Company, Detroit, Michigan 48232.

TABULATION OF TORQUE LIMITS

