

SHOP MANUAL

FILE
G

THE GALION IRON WORKS & MFG. COMPANY, Galion, Ohio 44833, U.S.A.
A division of Jeffrey Galion Inc.

SECTION
4^{R2}

DISASSEMBLY AND ASSEMBLY INSTRUCTIONS FOR INDEPENDENT TYPE DRIVE AXLE USED ON GALION MAINLINE GRADERS (EXCEPT T-400A)

1/73

Prior to disassembly — clean the outside of the unit thoroughly to prevent the possibility of dirt and foreign material from entering the mechanism.

After disassembly — immerse all parts except bearings in suitable cleaning fluid until lubricant is dissolved and parts are cleaned thoroughly.

Bearings are to be dipped in cleaning fluid and slushed up and down slowly until bearings are clean.

Remove bearings from fluid and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant.

Repeat above operation until bearings are cleaned thoroughly. Blow bearing dry with compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings. Bearing may be slowly rotated by hand to facilitate drying procedure.

Thoroughly clean housing interior.

If magna-flux process is available, use process to check parts. Examine teeth of all gears carefully for wear, pitting, chipping, nicks or scores. If gear teeth show spots where case hardening is worn through, install new gear, small nicks may be carefully removed with a suitable hone. Examine pinion gear teeth for wear and check pinion shaft for evidence of twisting, particularly at splines. If evident, install new set of gears.

Pinion and drive (ring) gears are available only in matched sets and must be installed as such to assure satisfactory operation.

TORQUES AND ADJUSTMENTS:

Pinion retainer screws	- 113 to 124 lbs. ft.
Ring gear carrier capscrews	- 296 to 326 lbs. ft.
Carrier to housing capscrews	- 159 to 175 lbs. ft.
Ring gear carrier bearings	- No eng play — no preload
Pinion bearings	- 13 to 23 in. lbs. rolling torque not to include oil seal drag
Backlash adjustment	- .008 to .011 inches

WEAR PATTERN PROCEDURE:

1. Adjust pinion gear and ring gear for proper backlash (Within limits, .008 to .011)
2. Paint three or four teeth of pinion gear with red lead or mechanics' blue and rotate pinion gear until ring gear makes complete revolution

3. Note area of tooth contact on ring gear which should start at toe and extend about 80 percent of tooth length toward heel.
4. Vary position of pinion gear and ring gear until proper tooth contact is obtained. Be sure that sufficient backlash has been allowed so that ring gear can be completely revolved without any high spots being left. To correct improper tooth contact proceed as follows:
 - A. If short contact at heel, move ring gear toward pinion gear. Then move pinion gear away from ring gear to again secure correct backlash.
 - B. If short contact at toe, move ring gear away from pinion gear. Then move pinion gear toward ring gear to again secure correct backlash.
 - C. If heavy contact on flank or lower portion of tooth, move pinion gear away from ring gear until contact comes to full working depth of ring gear tooth without breaking contact at flank. Then move ring gear toward pinion gear to secure correct backlash.
 - D. If heavy contact on face or upper portion of tooth, move pinion gear toward ring gear until contact covers flank of tooth without breaking contact at face. Then moving gear away from pinion gear to secure correct backlash.

For illustration of preferred tooth contact see page 25.

LUBRICATION REQUIREMENTS

-10°F. to 0°F. use SAE 80 EP-SCL Gear Oil.
0°F. to 100°F. use SAE 90 EP-SCL Gear Oil.

-10°F. to 0°F. use EP 80 Gear Oil.
0°F. to 100°F. use EP 90 Gear Oil.

*DO NOT MIX OR ADD EP 80 or 90 GEAR OIL WITH THE SCL
GEAR OIL UNDER ANY CIRCUMSTANCE.*

NOTE: See File J, Section 1, this manual for specifications of required lubricant.

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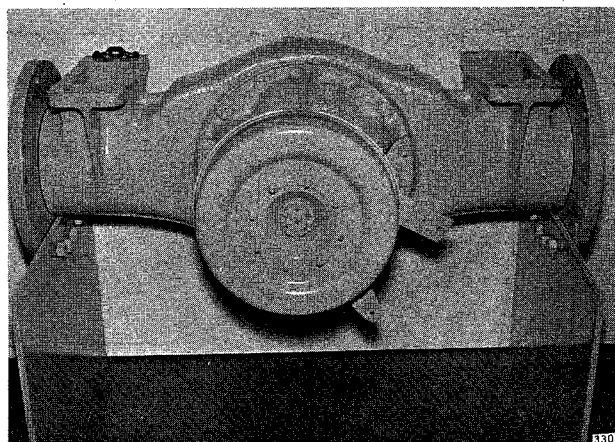
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DISASSEMBLY:

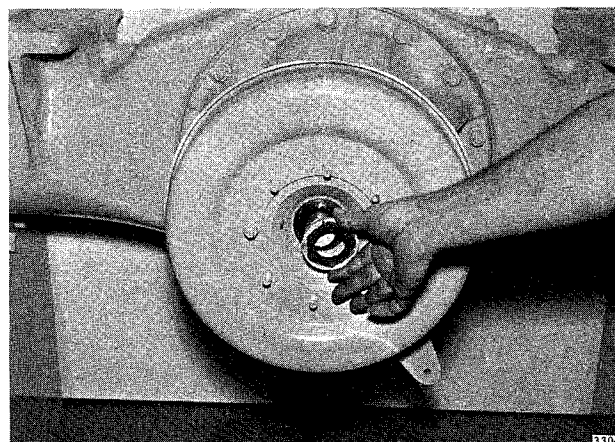
1

Place axle in suitable position for servicing.



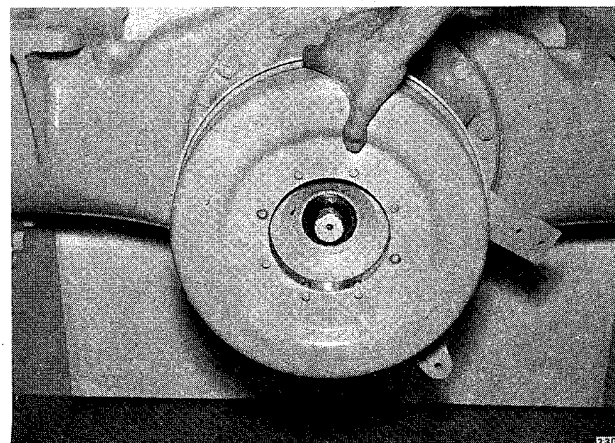
2

Remove pinion shaft nut and washer.



3

Remove brake drum.



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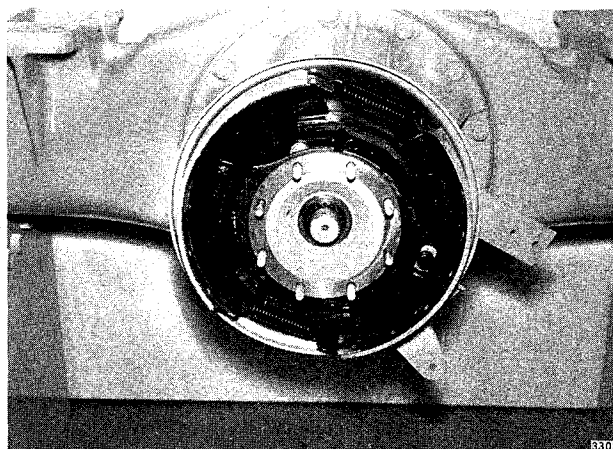


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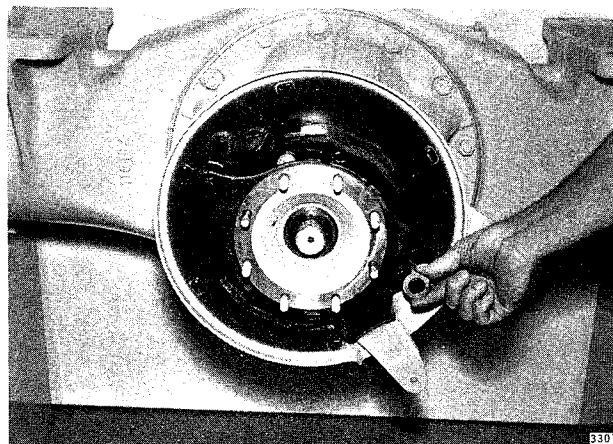
4

Remove brake shoes and springs.



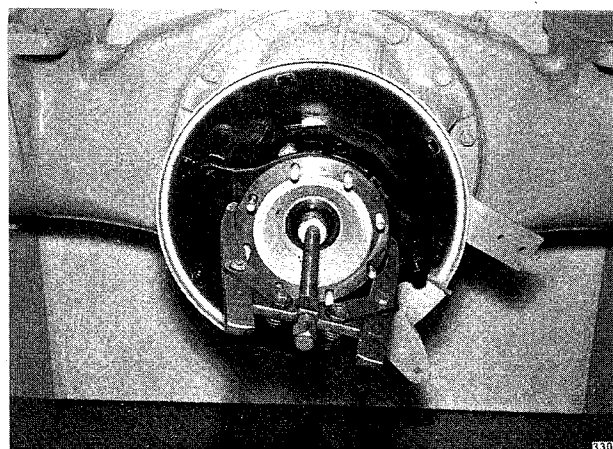
5

Remove (to avoid loss) the parking brake actuating roller.



6

Pull pinion flange assembly.



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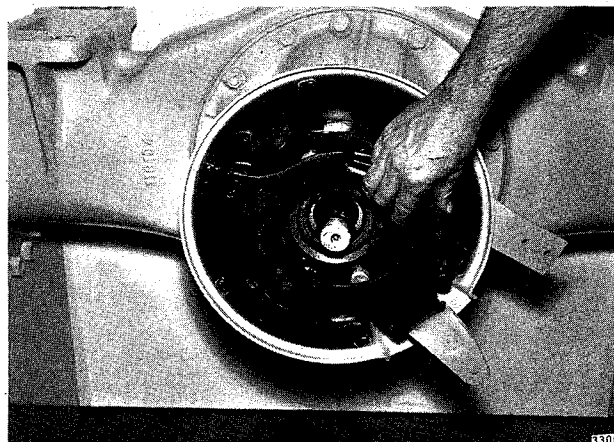


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7

Remove brake cam lever.



8

Remove retaining screws from brake backing plate.



9

Remove brake backing plate.



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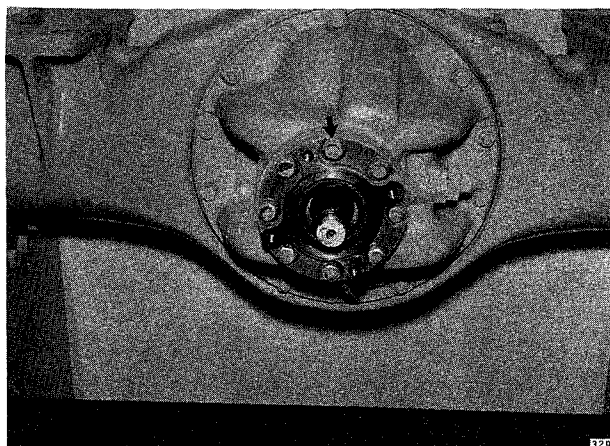


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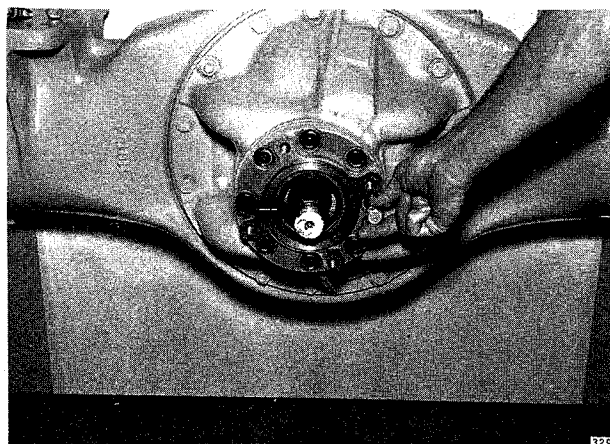
10

Mark oil seal retainer, bearing cage assembly and carrier housing to assure re-assembly in same position from which they were removed.



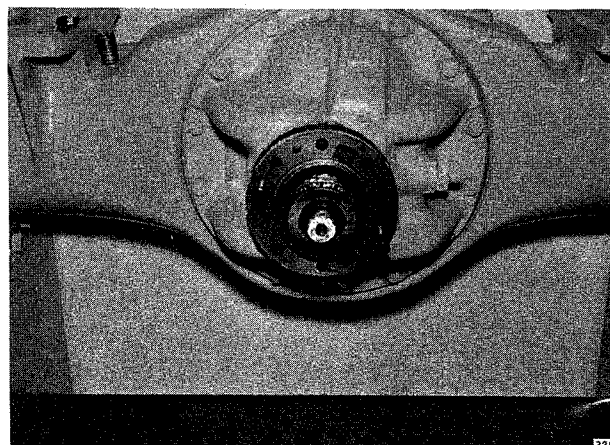
11

Remove oil seal retainer.



12

Use puller screw holes provided in cage to pull cage assembly loose from housing.



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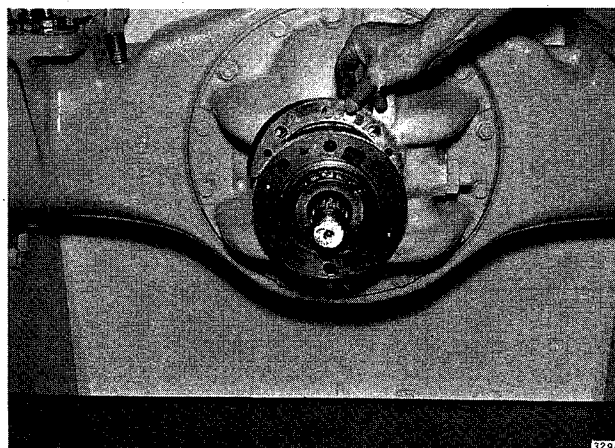


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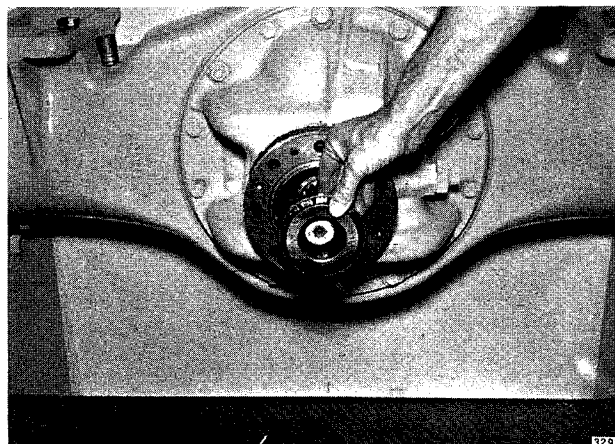
13

After loosening cage assembly--remove shims from between housing and cage.



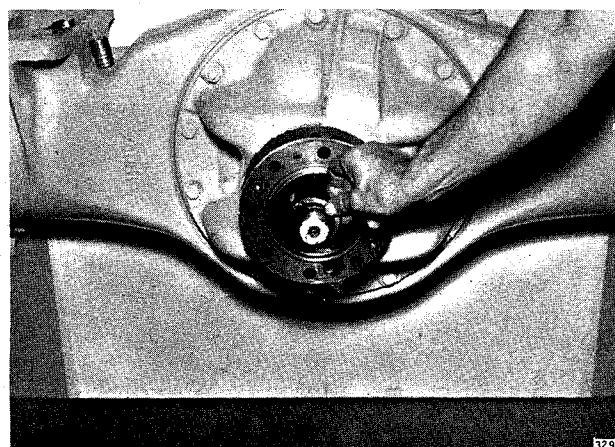
14

Remove outer bearing cone.



15

Remove pinion bearing spacer.

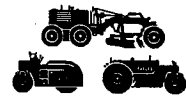


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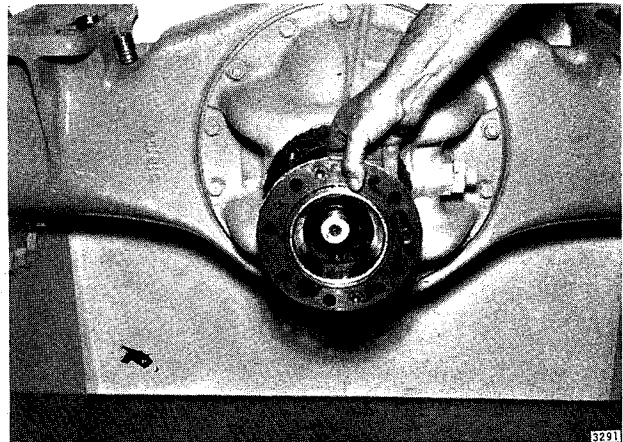


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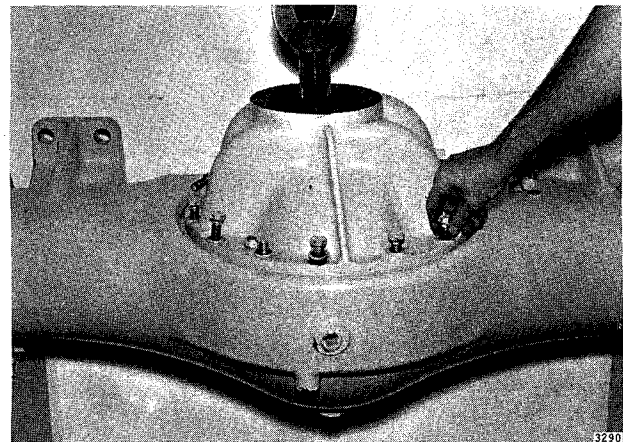
Remove bearing cage containing bearing cups.



17

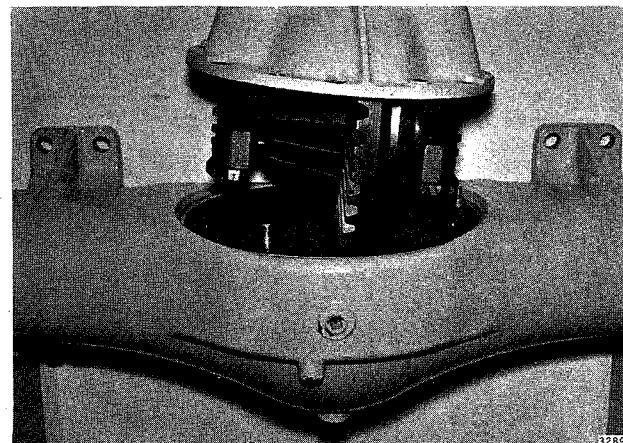
Turn housing assembly in position of carrier assembly pointing up.

Attach lifting eyes and remove retaining screws and nuts. (Studs with nuts have cone shaped dowels to align carrier assembly in housing.)



18

Lift carrier assembly from housing.

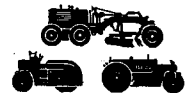


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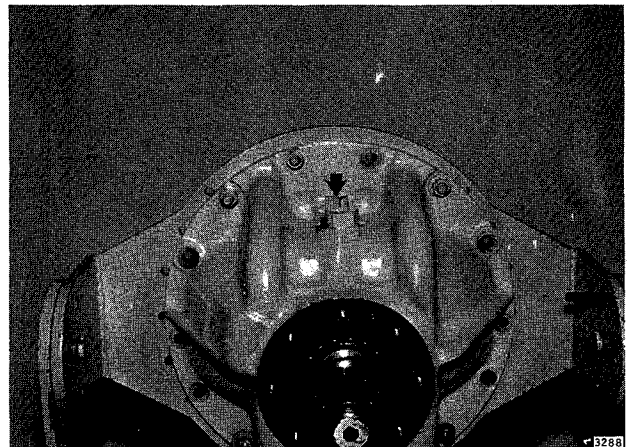


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Place carrier assembly in fixture or suitable position for servicing and remove ring gear thrust screw-nut.



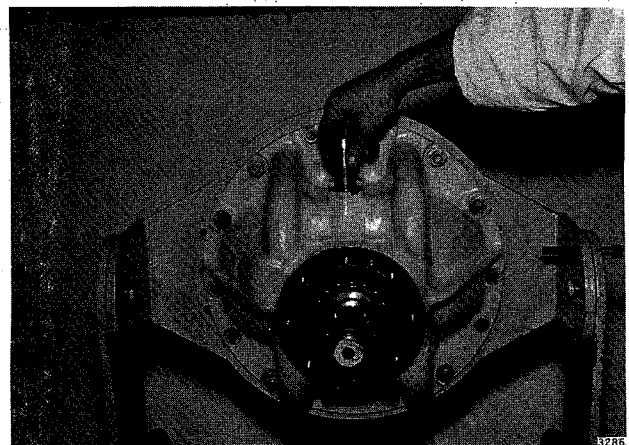
20

Remove locking washer.



21

Remove thrust screw.



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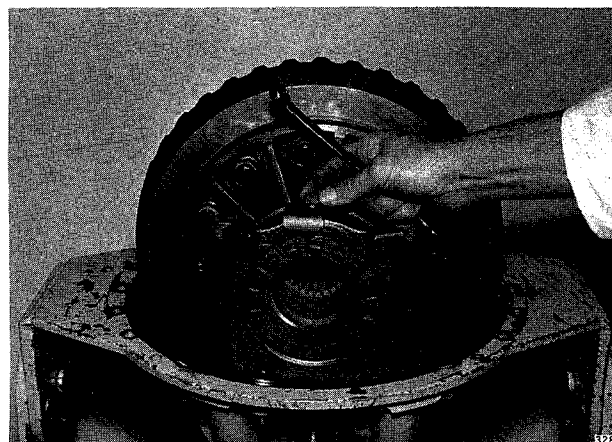
22

Mark ring gear housing caps to avoid placing in wrong location when re-assembly.



23

Cut tie wire and remove ring gear adjusting nut locks.



24

Remove housing cap retaining screws.



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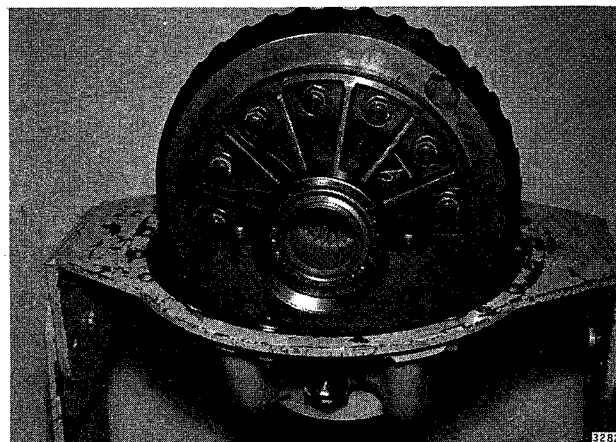


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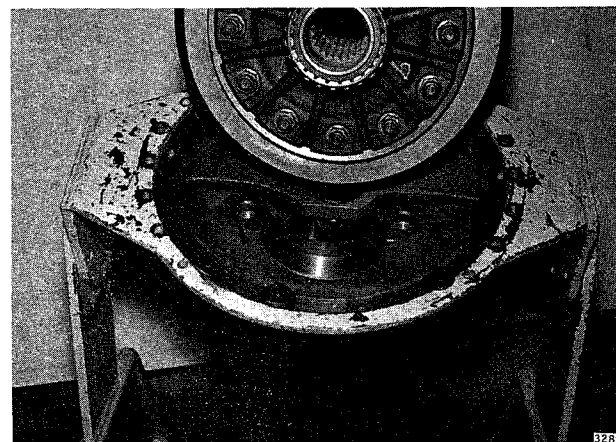
Remove housing caps and adjusting nuts.



26

Lift ring gear and hub assembly from housing.

NOTE: Ring gear and hub are a bolted assembly and bearings, hub or the gear maybe serviced at this time.



27

Lift pinion and bearing assembly from housing.

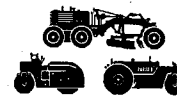


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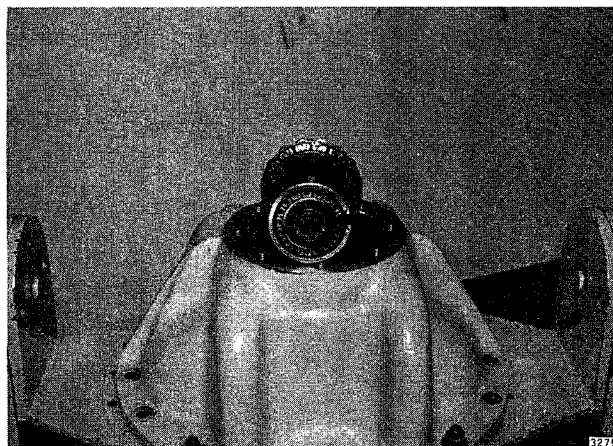


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Note that the end of pinion has been spread slightly by punching to retain inner bearing on pinion.



29

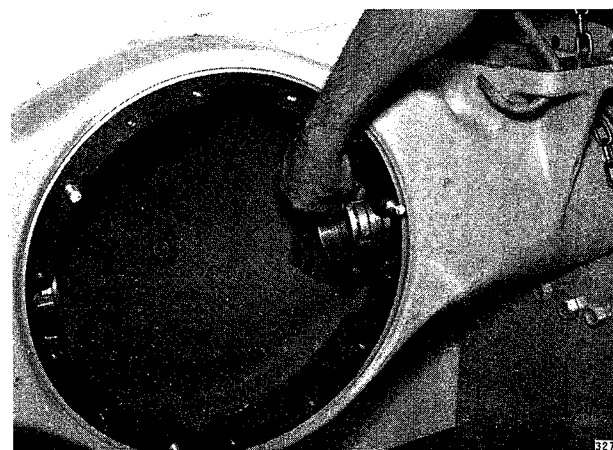
Axle sleeve retaining nuts are wedged into detent in end of sleeve to lock nut in position.

Drill detent or raise with small chisel to free nut before removing.



30

Remove retaining nuts.

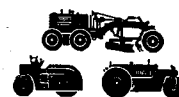


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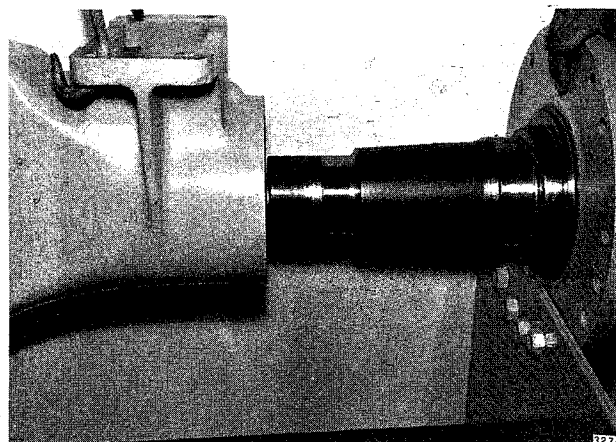
31

Remove sleeve spacer.



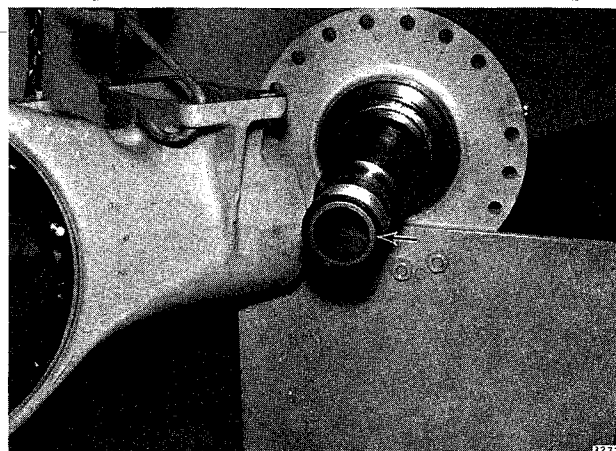
32

Remove sleeve from housing.



33

Remove inner oil seal from sleeve.

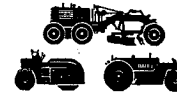


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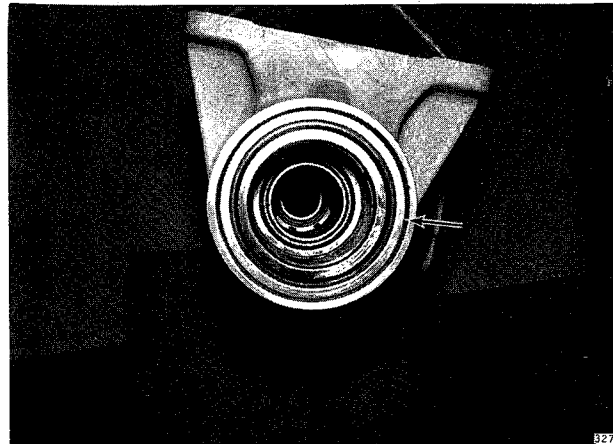


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Remove outer seal from housing.



35

Remove outer bearing cone.



36

Remove outer bearing cup.

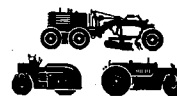


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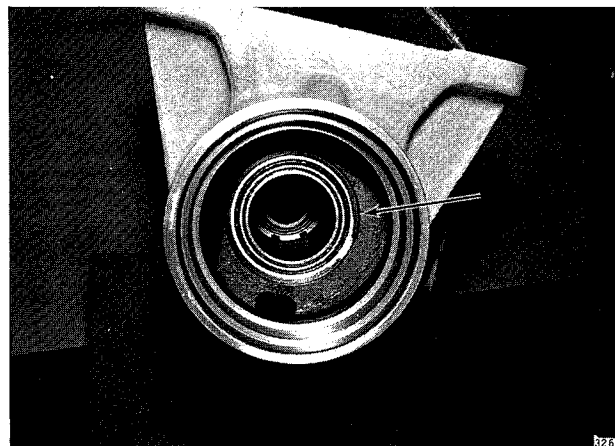


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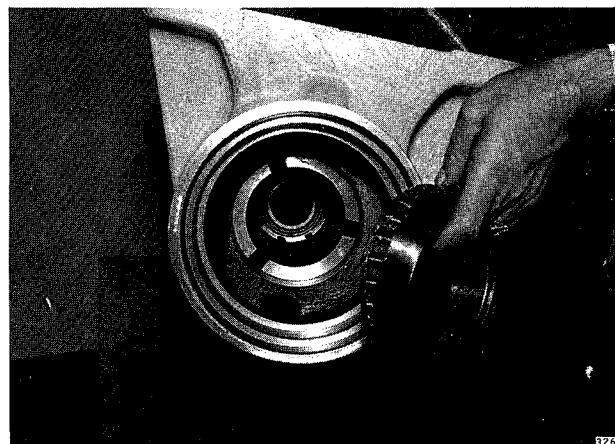
37

Remove inner bearing retaining snap ring.



38

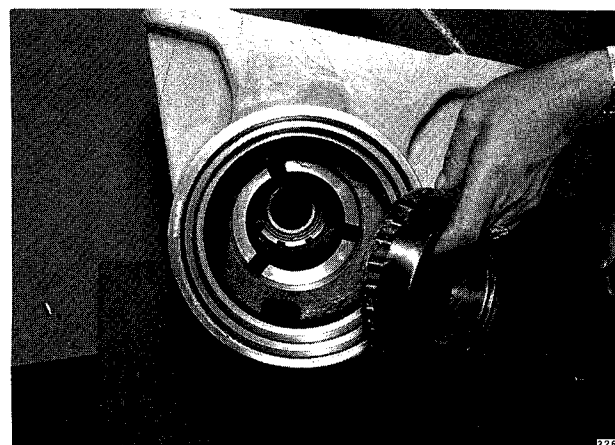
Remove inner bearing cup and cone.



ASSEMBLY:

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Install inner bearing cone and cup.



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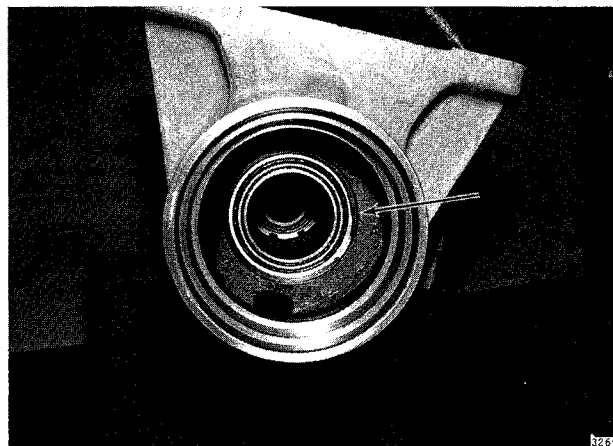


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Install inner bearing retaining ring.



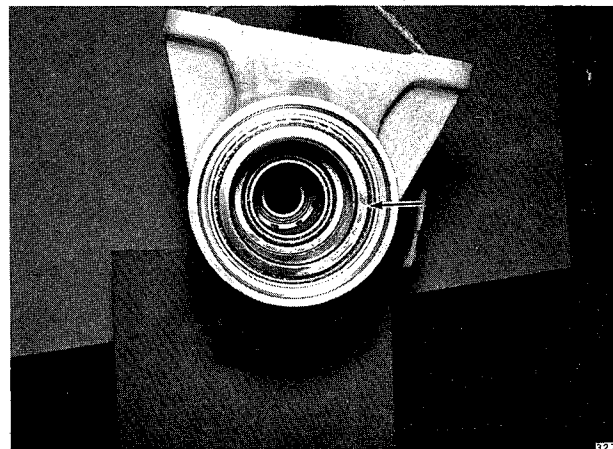
41

Install outer bearing cup.



42

Install outer bearing cone.

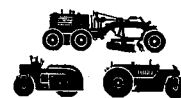


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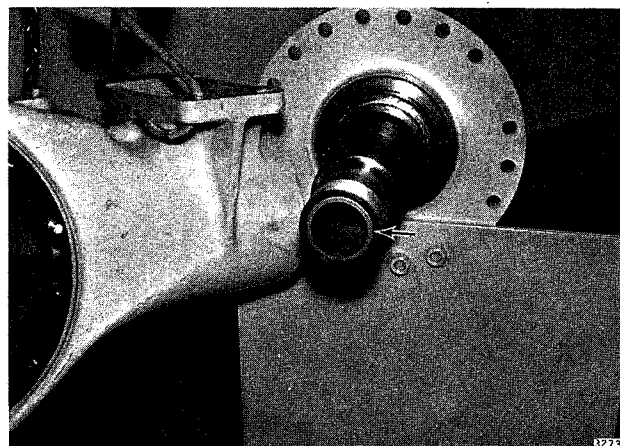
43

Install sleeve outer oil seal in housing.



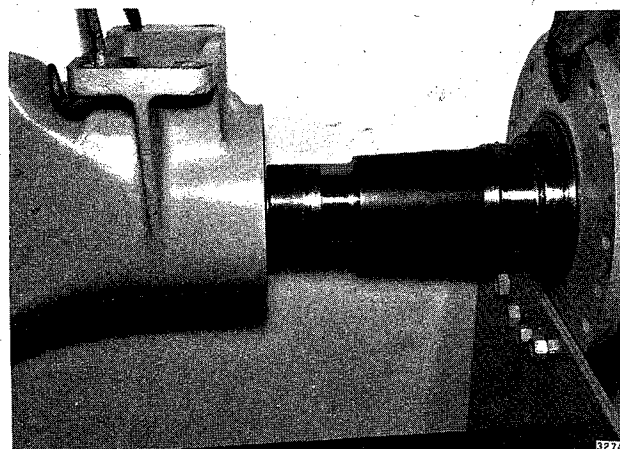
44

Install inner oil seal in sleeve.



45

Install sleeve in housing assembly after lubricating seal contact areas.



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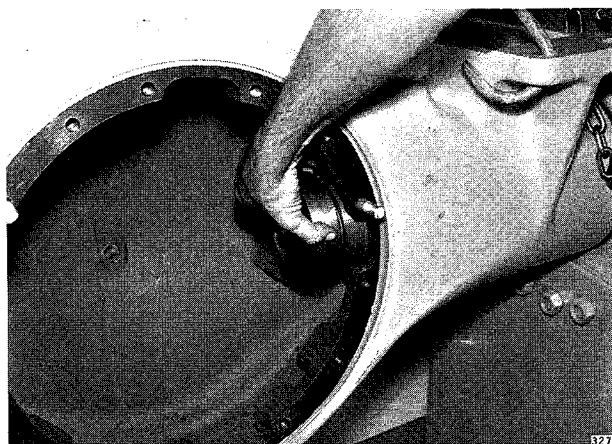


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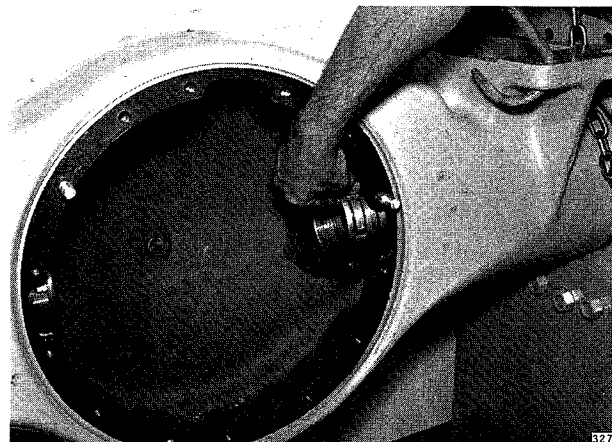
46

Install sleeve spacer.



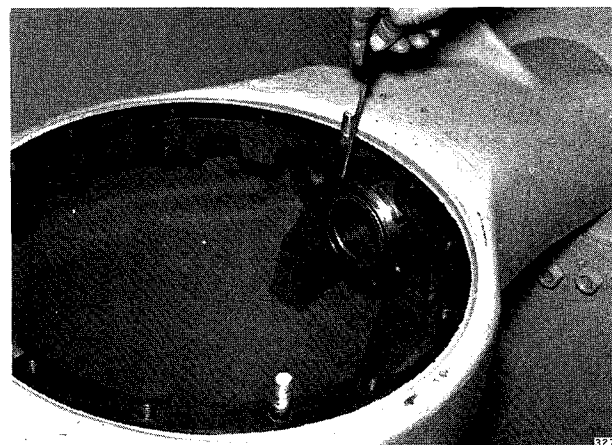
47

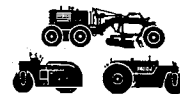
Install sleeve retainer nut and adjust sleeve bearing pre-load to 20 - 40 in.-lbs. exclusive of oil seal drag.



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Stake thin edge of nut into detent in sleeve to lock in place.

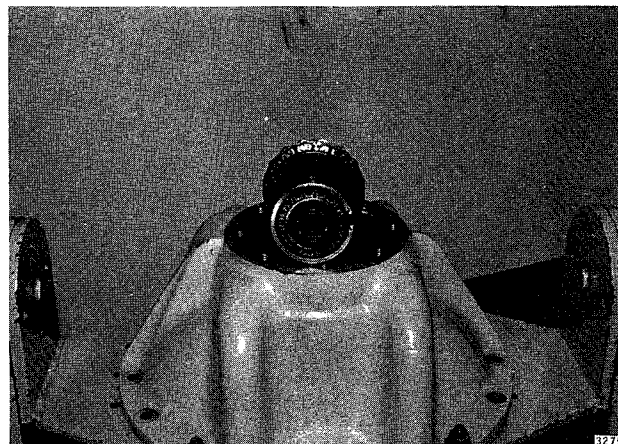




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Install straight roller bearing on inner end of pinion.

Stake end of pinion to retain bearing on pinion.



50

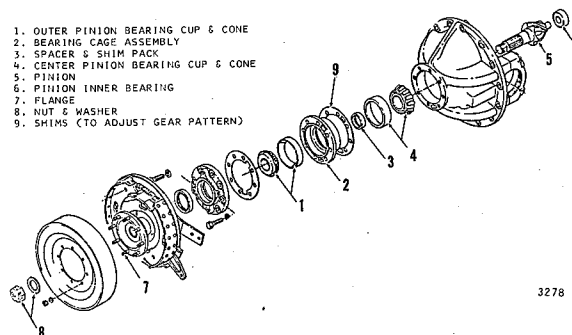
At the time of manufacture a ground spacer (3) is used to establish pinion bearing pre-load.

For service purposes this spacer is replaced with a spacer and shim kit.

Install items (1), (2), (3), and (4) on pinion.

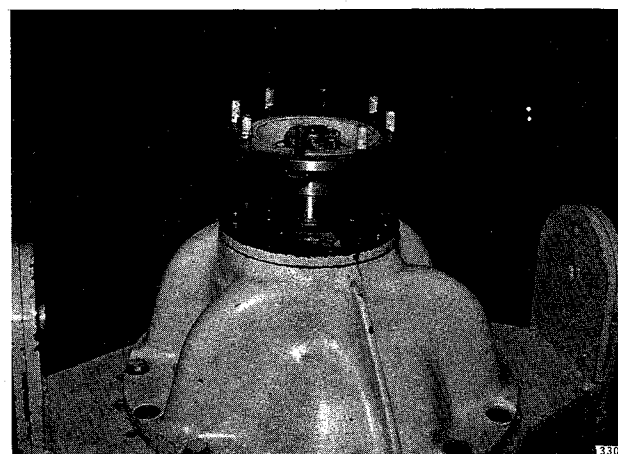
Use flange (7) and nut and washer (8) to tighten bearings against spacer. (Note: that bearing pre-load does not include oil seal drag)

Rolling torque required to turn pinion in cage should be not less than 13 in.-lbs. nor more than 23 in.-lbs.



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Install caged bearing and pinion in housing and attach with two capscrews.



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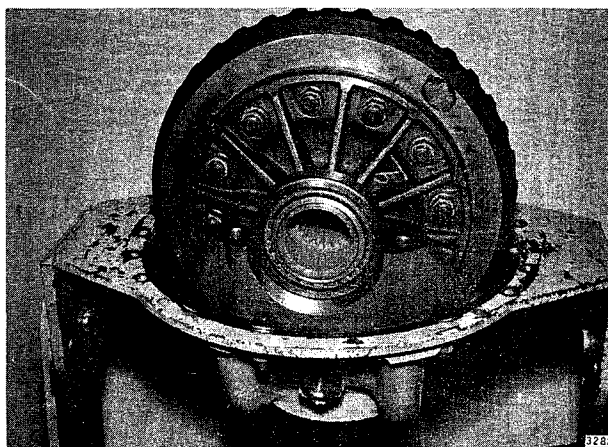


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Install bearings on ring gear hub and place in carrier assembly.



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Install carrier caps and ring gear adjusting nuts. (Arrow)

Match previously marked cap to boss.



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Adjust ring gear to center of carrier and bearings to a no end play no pre load condition and install lock.

Do not lock wire at this time as back lash adjusting may be necessary later, after wear pattern has been established.

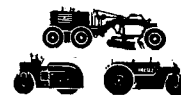


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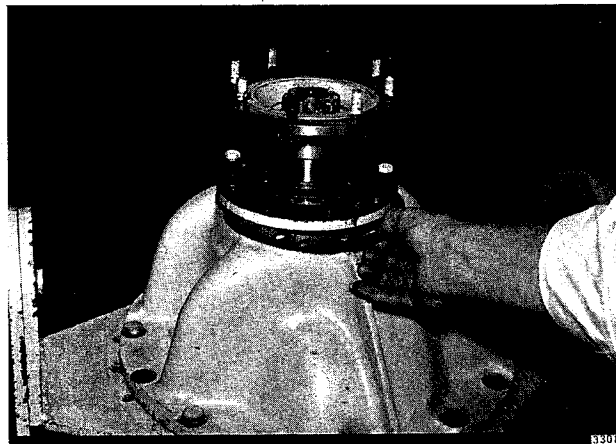


55

Following procedure outlined in cover page of this section, add or remove shims to move pinion out or in to establish proper contact pattern.

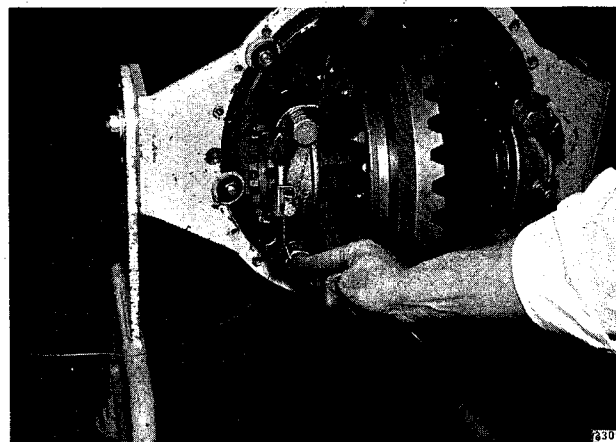
After pattern has been established, remove nut, flange, cage, outer bearing and shims.

Put aside so they may be used in same manner later in assembly.



56

Torque carrier bolts and locks and tie with wire.

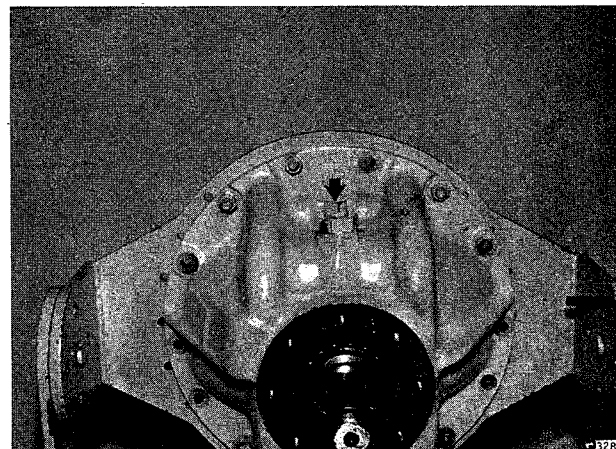


57

Install ring gear thrust screw and screw in until screw touches gear.

Now back out until screw clears gear about .010 inch.

Install thrust screw lock and nut and lock in place.

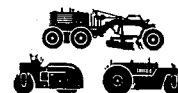


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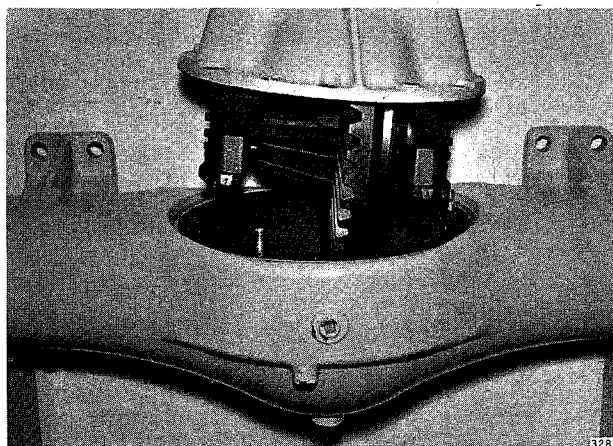


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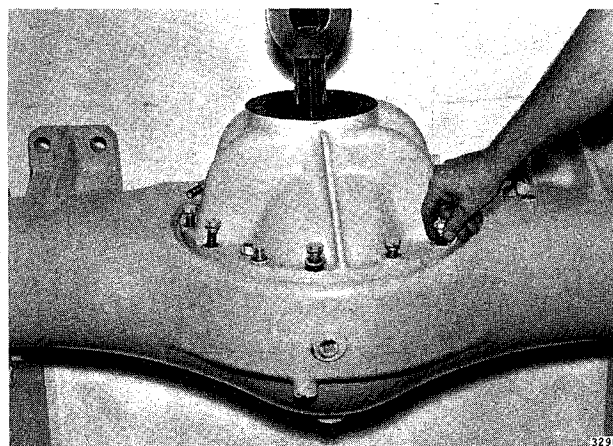
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Place assembly in axle housing.



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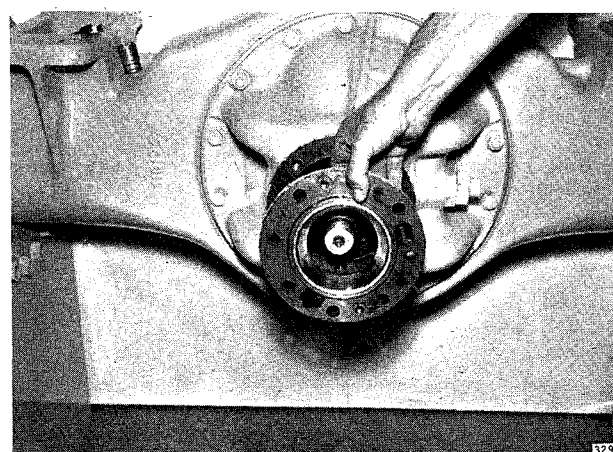
Insert cone shaped dowels on studs to align assembly then install capscrews.



60

Install cage and bearing cups.

NOTE: Index cage in position that aligns smaller capscrew hole with hole in housing or with previous index marks.

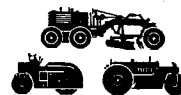


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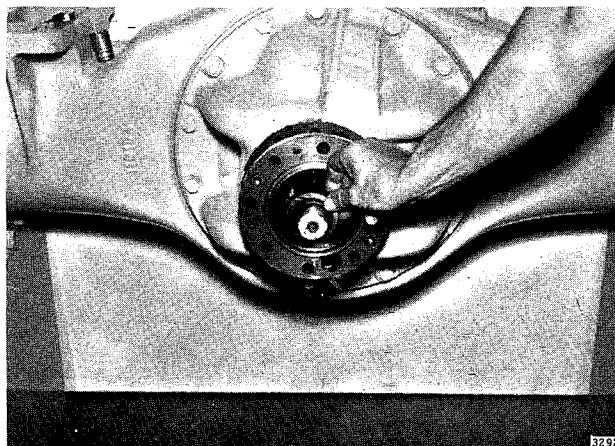


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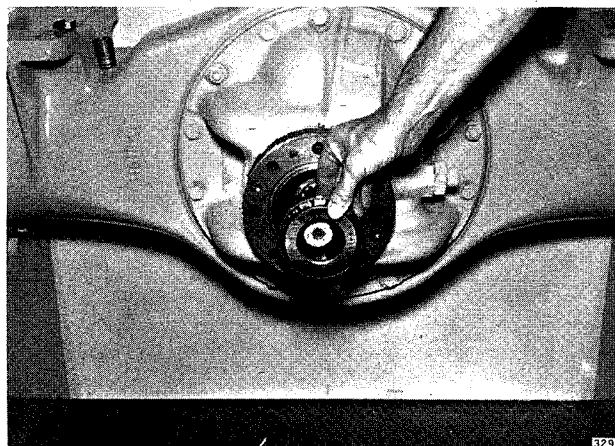
61

Install bearing spacer or spacer and shims
which ever is used.



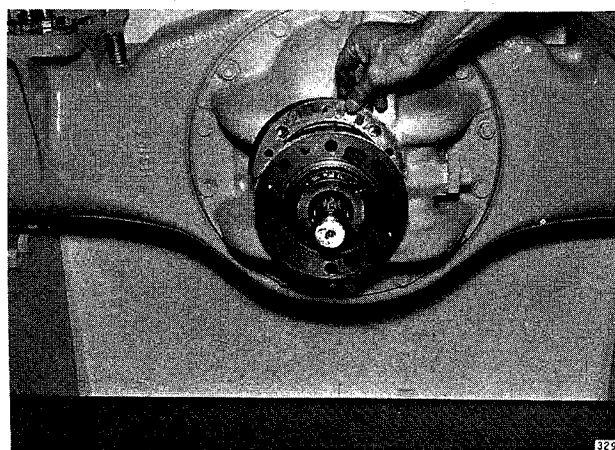
62

Install outer bearing.



63

Install shims to control pattern.

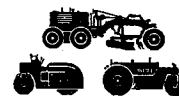


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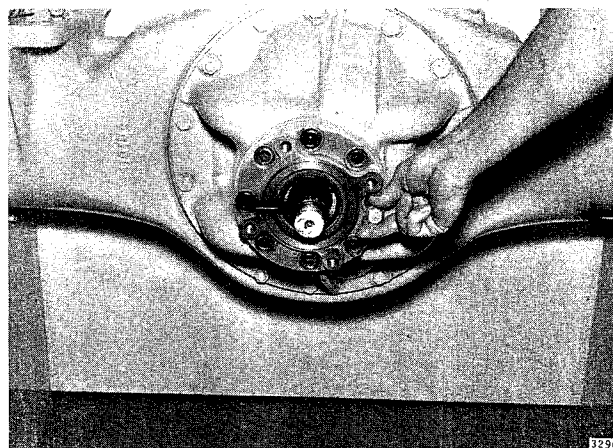
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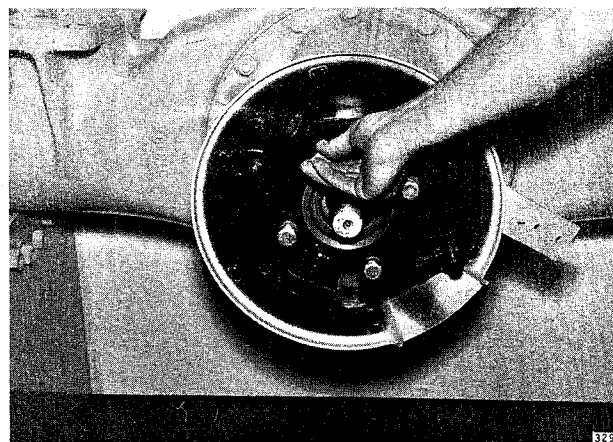
Install seal and seal retainer.

NOTE: Align seal retainer capscrew holes with those in bearing cage or with previous index marks.



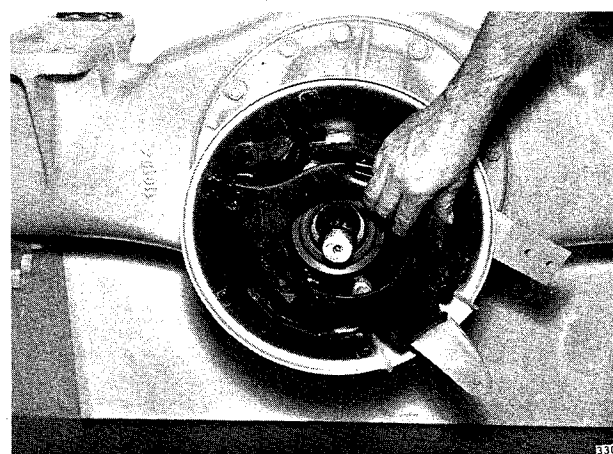
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Install brake backing plate.



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Install brake operating cam lever.



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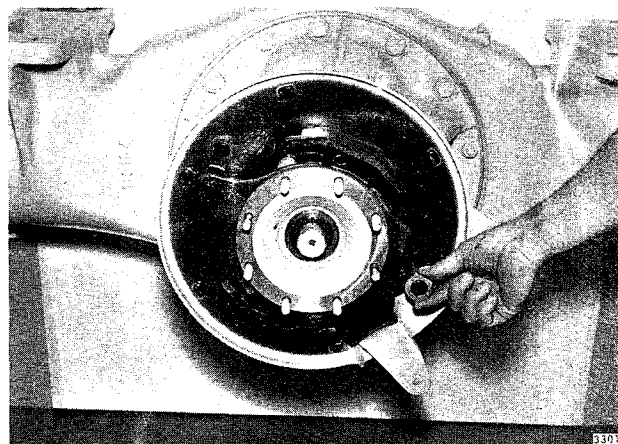


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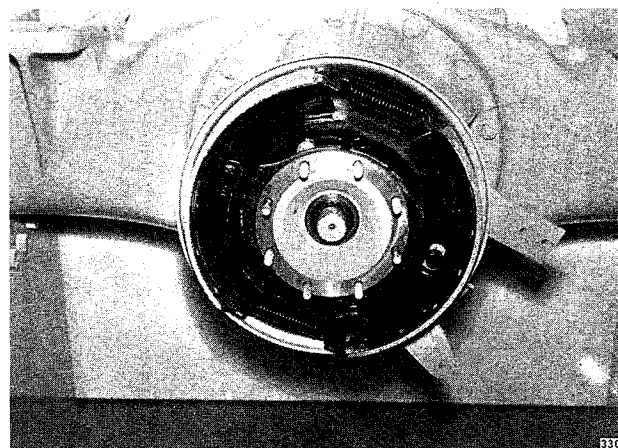
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Install companion flange and brake actuating roller.



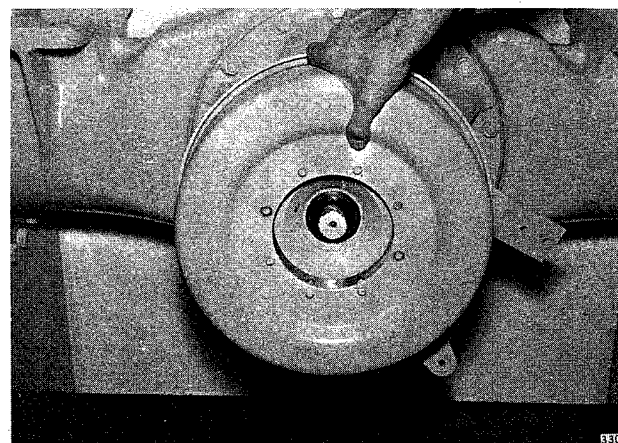
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Install brake shoes and springs.



69

Install brake drum.

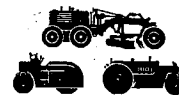


FILE: 6
SECTION: 4

SHOP

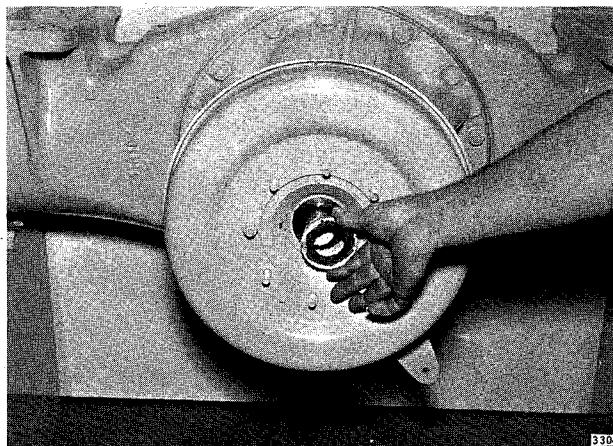


MANUAL



70

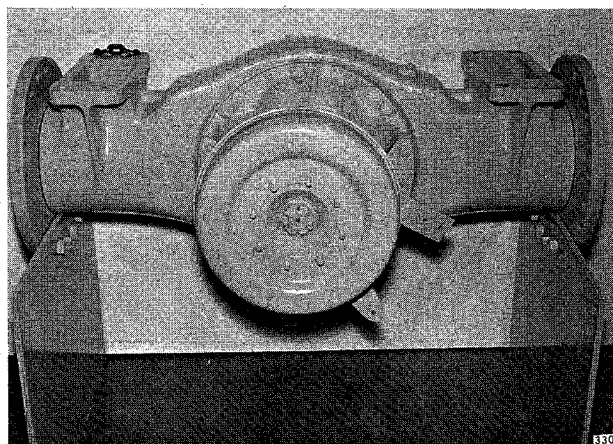
Install washer.

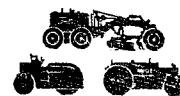


71

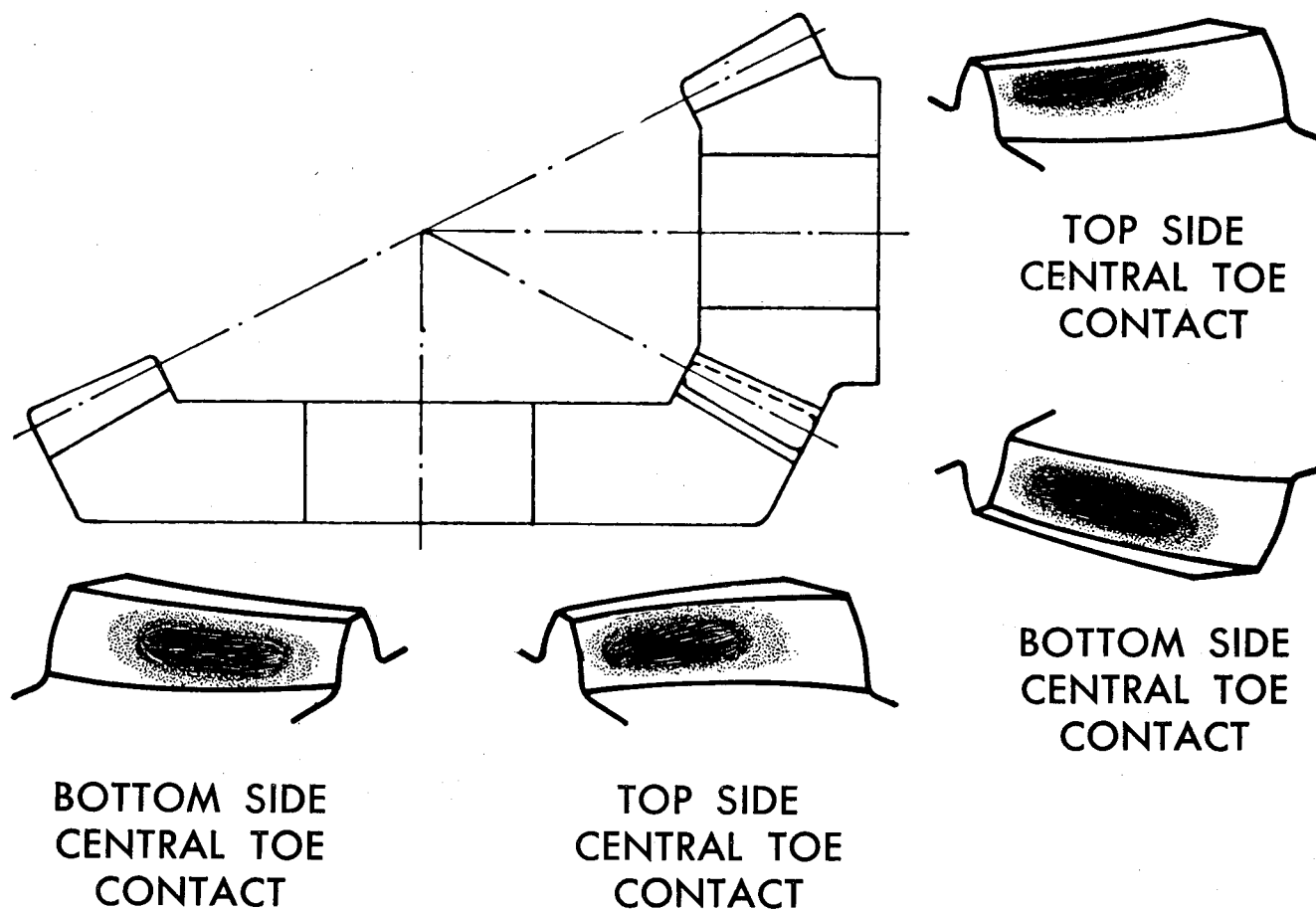
Install nut.

Tighten to 500 lbs.-ft. and lock with
cotter pin.

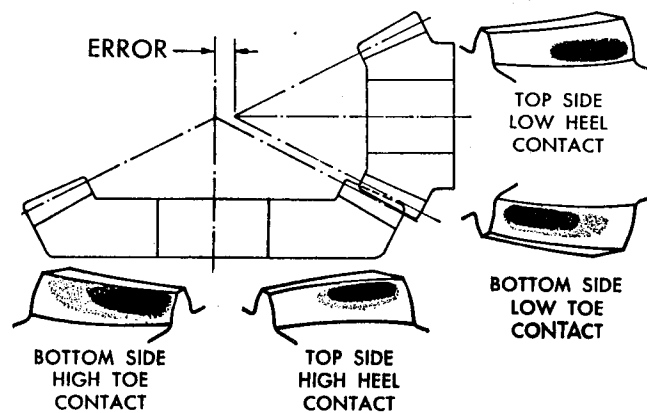




SPIRAL BEVEL GEARS—Typical Preferred Tooth Contact (Pinion Member Left Hand in All Cases Shown)



PROFILE ERROR—To Correct: move in on pinion cone.



PROFILE ERROR: To Correct: move out on pinion cone.

