

**SINGLE REDUCTION AXLE**

**RS-160QX**

**FIELD MAINTENANCE  
MANUAL**

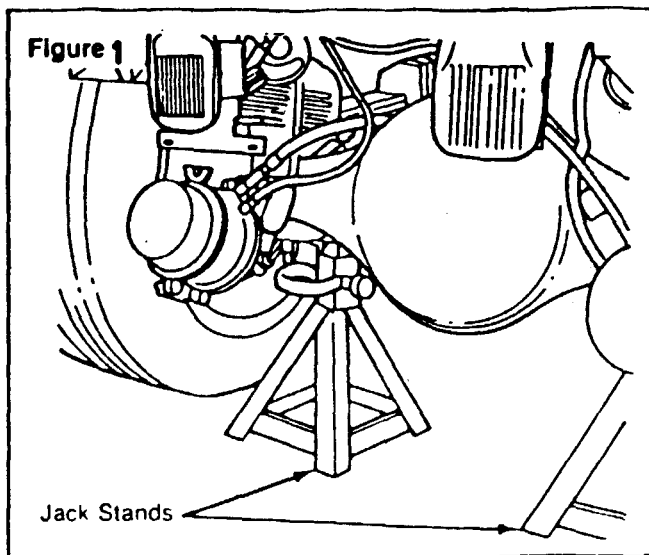


**MERITOR™**

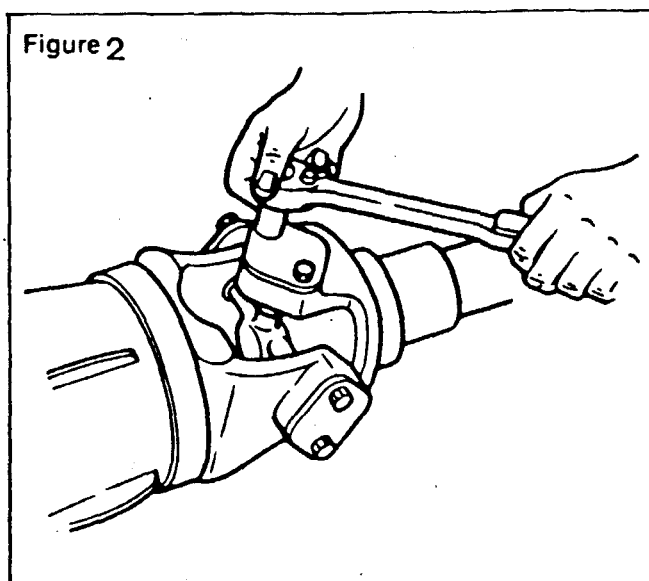
**Meritor HVS India Limited**

**I. REMOVAL OF DIFFERENTIAL CARRIER  
FROM AXLE HOUSING ;**

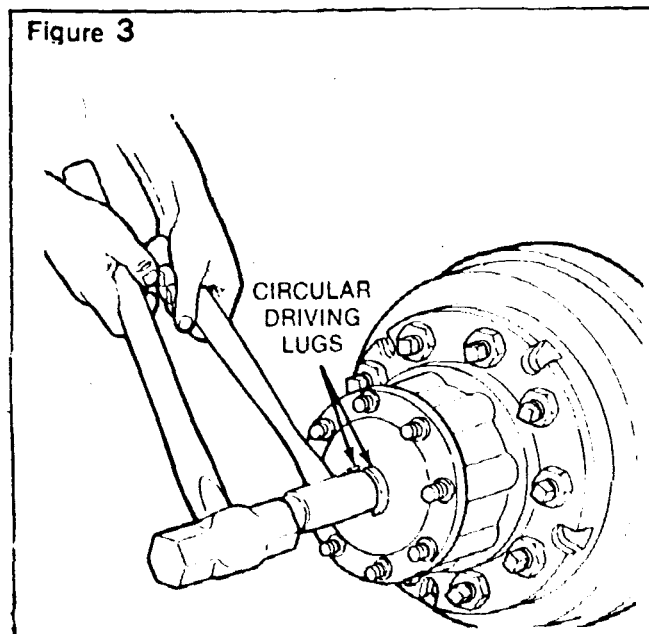
1. \* RAISE THE REAR END OF THE VEHICLE.
- \* PUT ON JACK STANDS FIG 1.



2. \* DISCONNECT THE PROPELLER SHAFT FROM INPUT FLANGE. FIG.2
- \* REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL.



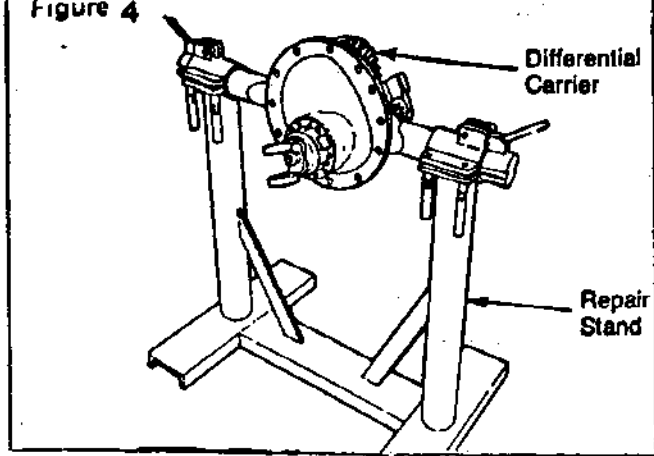
3. \* REMOVE NUTS AND WASHERS FROM THE AXLE SHAFTS
- \* LOOSEN THE TAPER DOWELS USING BRASS DRIFT AND HAMMER. FIG 3.
- \* REMOVE THE AXLE SHAFTS USING PULLER SCREWS



4. REMOVE ALL THE CARRIER MOUNTING FASTENERS.

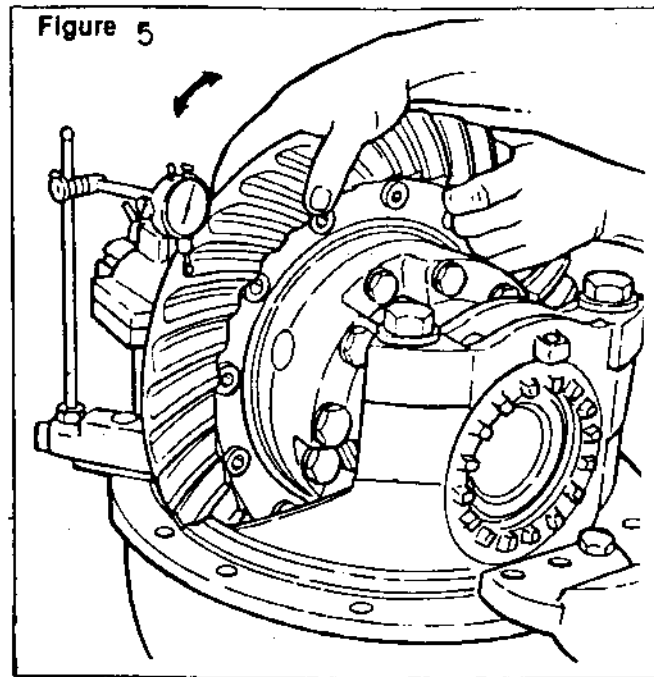
• REMOVE THE CARRIER FROM THE THE HOUSING.

• MOUNT THE CARRIER ON A REPAIR STAND FIG.4

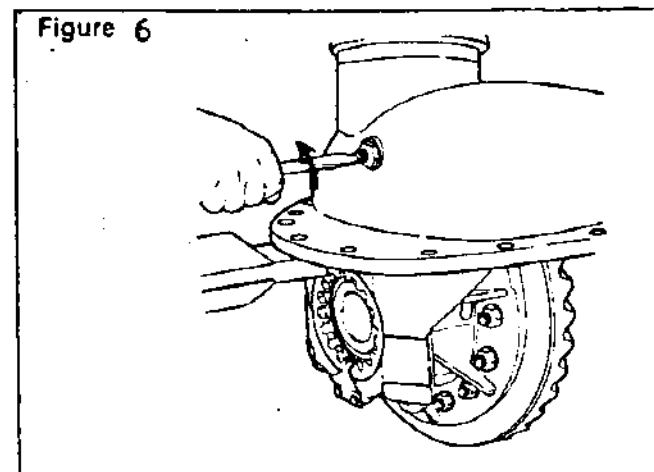


## II. DISASSEMBLY OF DIFFERENTIAL

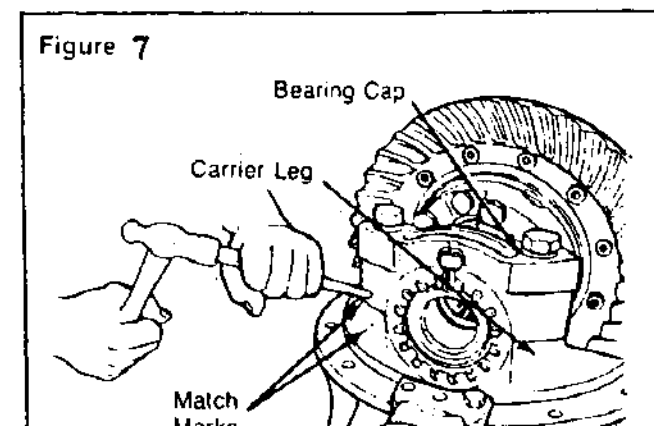
• IF THE SAME GEARSET IS TO BE REUSED RECORD THE BACKLASH BEFORE DISASSEMBLY. FIG.5



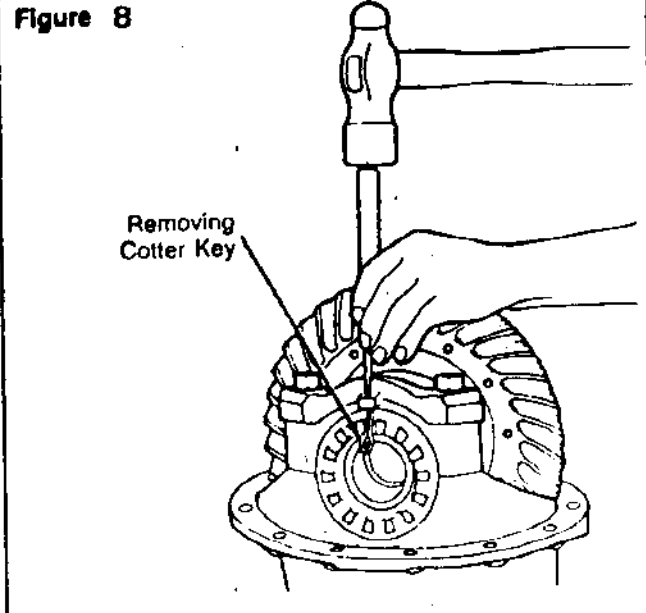
1. REMOVE THRUST SCREW AND JAM NUT. FIG. 6



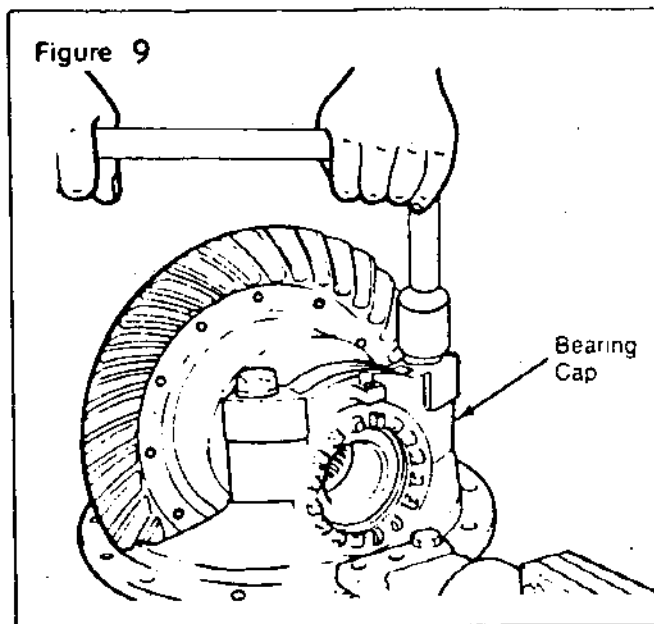
2. MAKE MATCH MARKS ON ONE CARRIER LEG AND BEARING CAP. FIG. 7



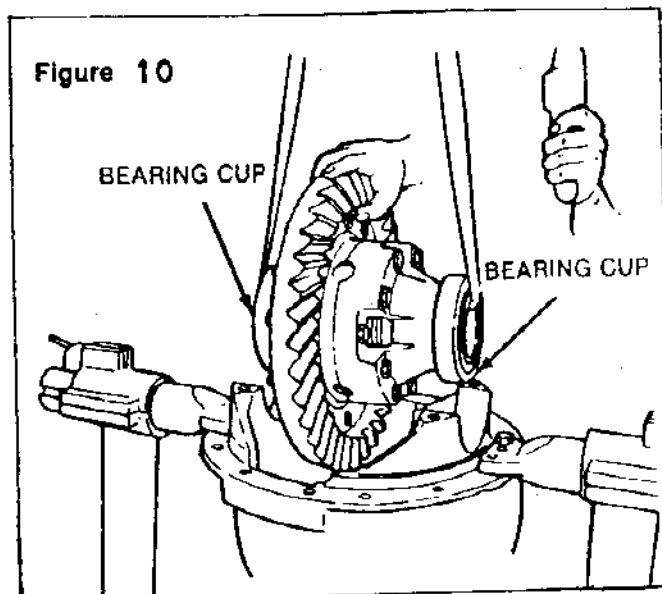
3. \* REMOVE COTTER PINS USING A SMALL DRIFT AND HAMMER.  
FIG. 8



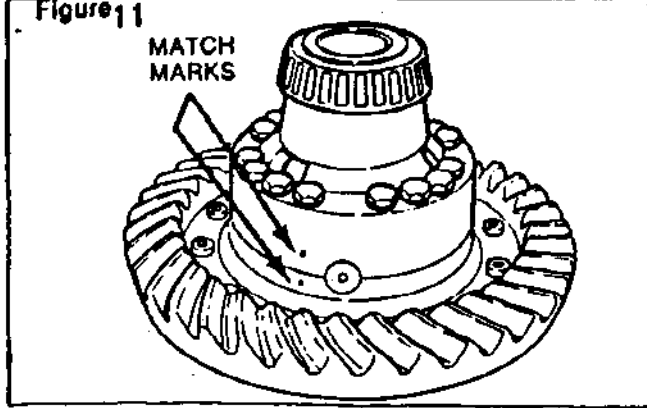
4. \* REMOVE CAPSCREWS AND WASHERS OF BEARING CAPS. FIG. 9
- \* REMOVE BEARING ADJUSTING RINGS



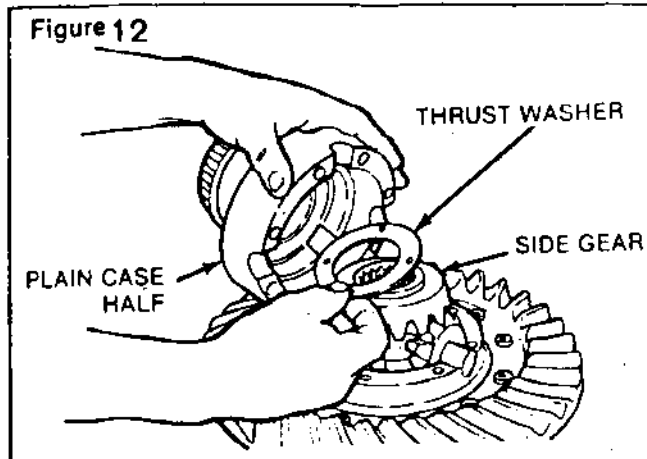
5. \* LIFT THE DIFFERENTIAL CASE & RING GEAR ASSEMBLY.  
FIG. 10



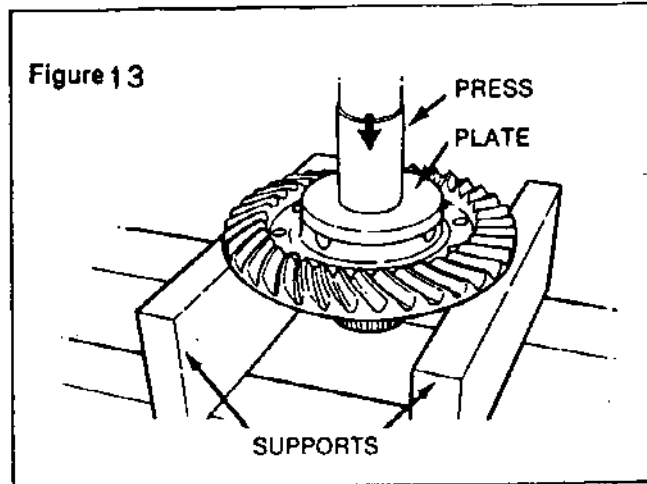
6. MAKE MATCH MARKS ON THE DIFF. CASE HALVES. FIG. 11



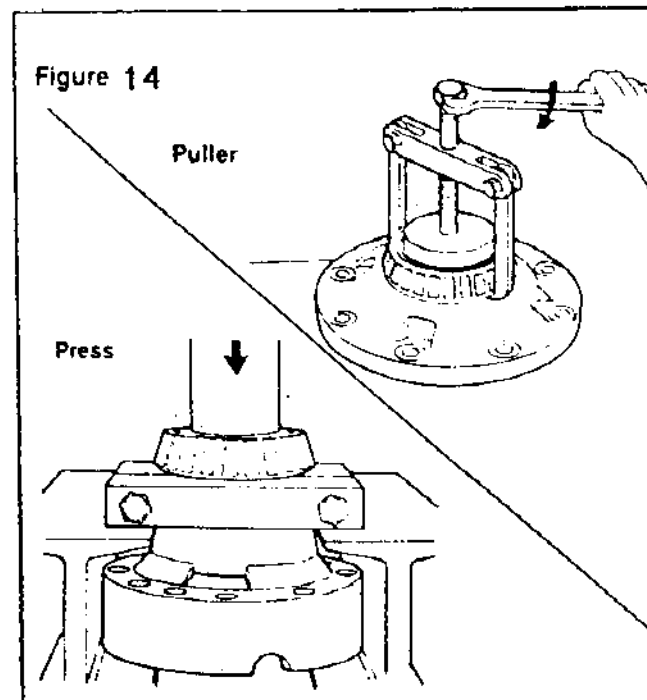
7. REMOVE THE LOCK WIRES AND DIFF CASE BOLTS.  
SEPERATE CASE HALVES.  
REMOVE SPIDER, PINIONS, SIDE GEARS AND THRUST WASHERS. FIG 12



8. REMOVE THE GEAR MOUNTING BOLTS AND LOCK PLATES  
REMOVE THE RING GEAR FROM DIFF. CASE USING A PRESS FIG. 13

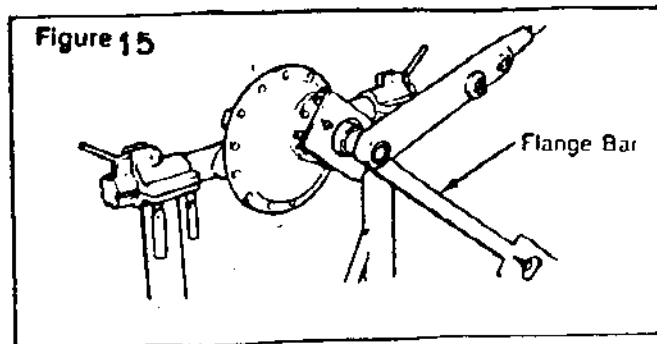


9. REMOVE THE BEARINGS FROM DIFF. CASES USING BEARING PULLER/ PRESS FIG. 14



10. FASTEN A FLANGE BAR TO THE COMPANION FLANGE

REMOVE PINION NUT AND WASHER  
FIG.15

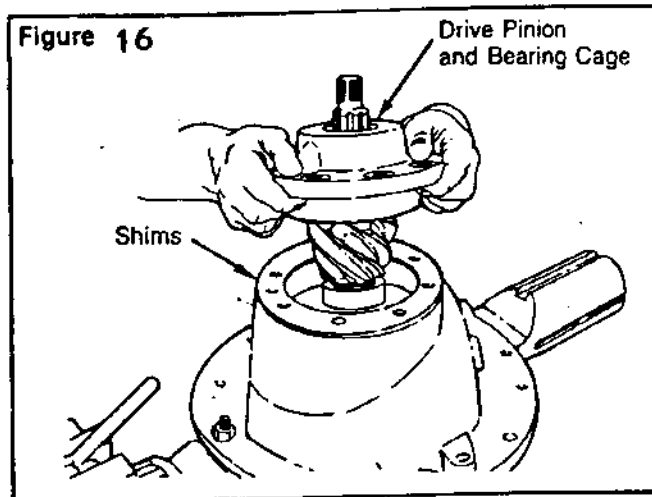


11. REMOVE THE COMPANION FLANGE USING A SUITABLE PULLER.

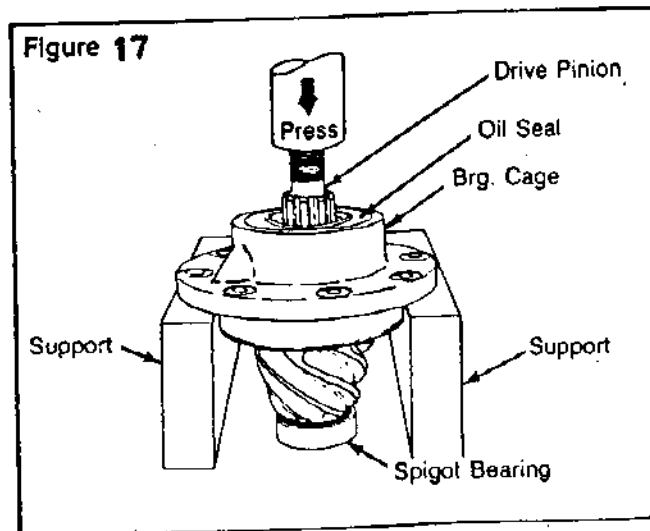
REMOVE CAP SCREWS AND WASHERS OF BRG. CAGE.

REMOVE BRG. CAGE AND SHIMS  
FIG.16

MEASURE AND NOTE DOWN THE TOTAL THICKNESS OF REMOVED SHIMS.



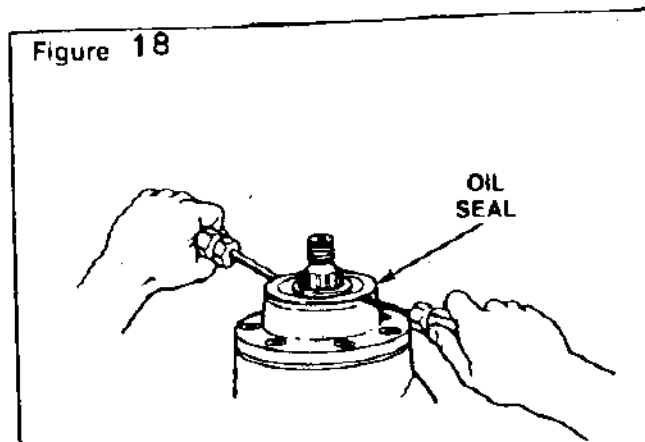
12. REMOVE DR. PINION FROM BRG. CAGE USING A PRESS. FIG.17



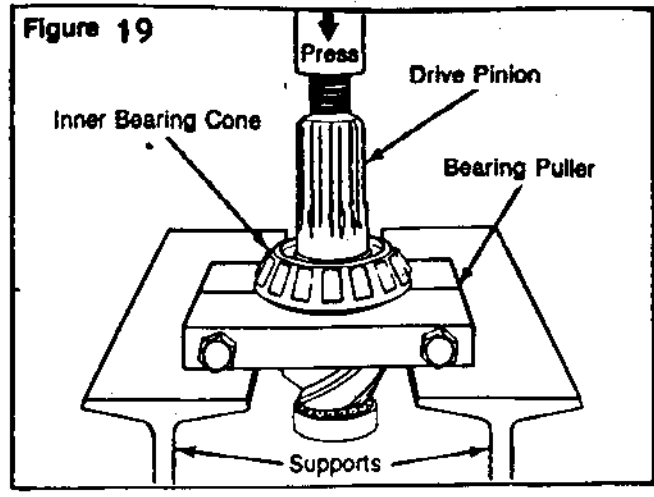
13. REMOVE THE OIL SEAL  
FIG.18

TAKE OUT THE OUTER BEARING CONE.

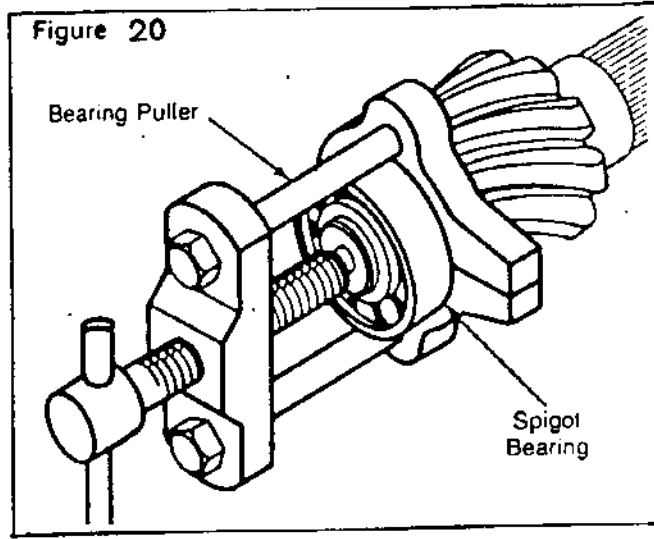
REMOVE THE BRG. CUPS FROM THE CAGE USING A SMALL DRIFT AND HAMMER.



- 14. REMOVE THE INNER BRG. CONE USING THE SPLIT PULLER AND PRESS. FIG. 19

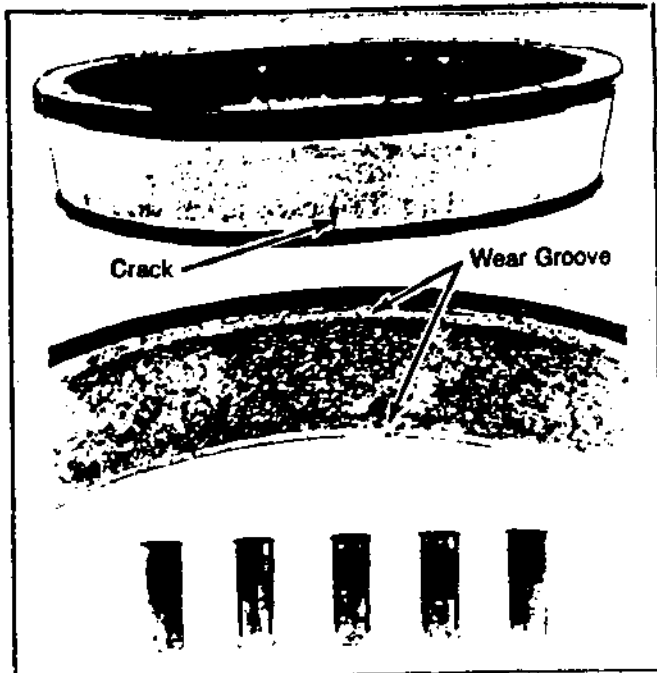


- 15. REMOVE THE SNAP RING .
- REMOVE THE SPIGOT BRG USING THE FULLER FIG. 20



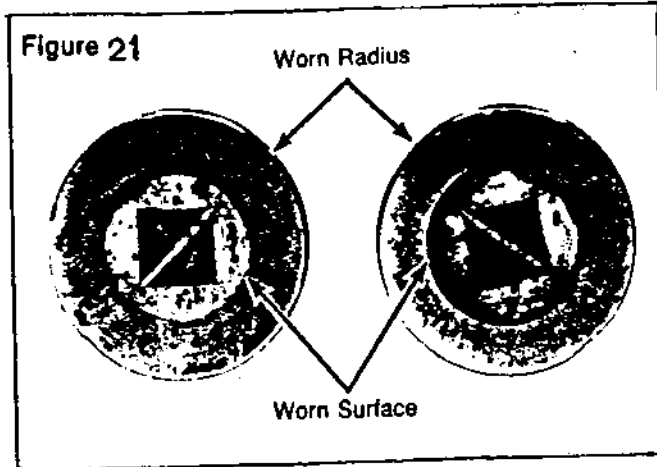
### III. CLEANING AND INSPECTION OF PARTS

1. - USE KEROSENE OR DIESEL TO WASH THE PARTS.
- DRY THE PARTS IMMEDIATELY AFTER CLEANING
- APPLY AXLE LUBRICANT/RUST PREVENTIVE OVER THE REUSABLE PARTS TO PREVENT RUST AND CORROSION.

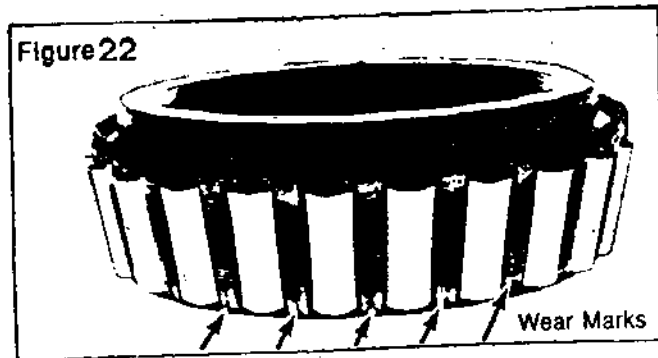


2. - INSPECT ROLLER BRGS. REPLACE IF ANY OF THE FOLLOWING CONDITIONS EXIST.

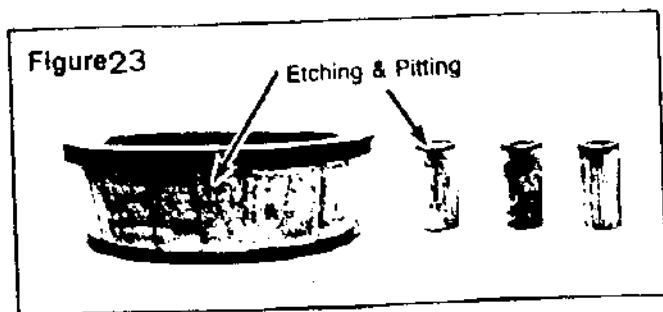
- 1> CENTRE OF BIGGER END OF ROLLERS WORN TO THE LEVEL OR BELOW THE OUTER SURFACE FIG. 21
- 11> RADIUS AT THE BIGGER END OF THE ROLLERS WORN OUT SHARPLY. FIG. 21



- 111> BRIGHT WEAR MARK ON THE OUTER SURFACE OF ROLLER CAGE. FIG. 22

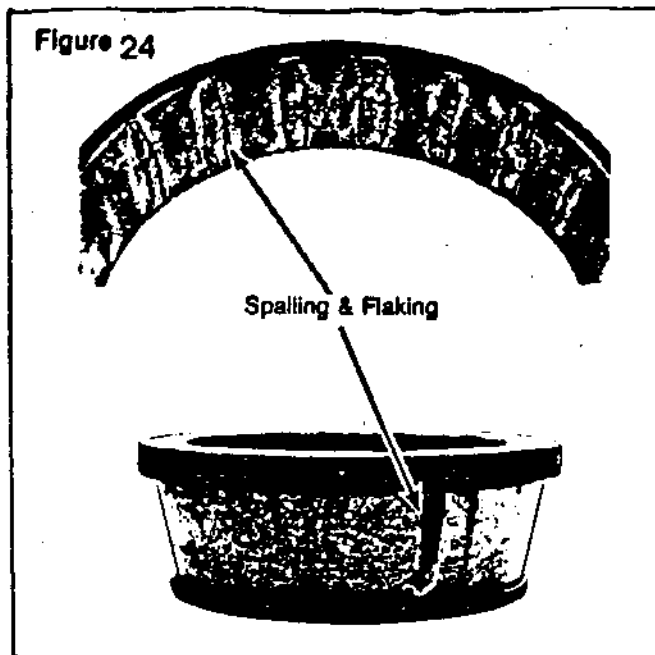


- 1v> ETCHING AND PITTING MARKS ON ROLLER AND ON CONTACT SURFACES. FIG. 23



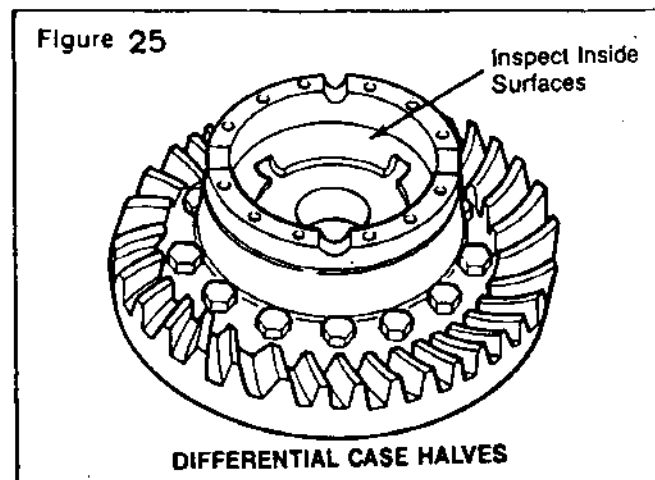


V) SPALLING AND FLAKING MARKS ON THE CUP AND CONE INNER RACE SURFACES. FIG. 24



3. - INSPECT THE FOLLOWING PARTS FOR WEAR OR STRESS.

1> INSIDE SURFACES OF DIFF. CASE HALVES. FIG. 25

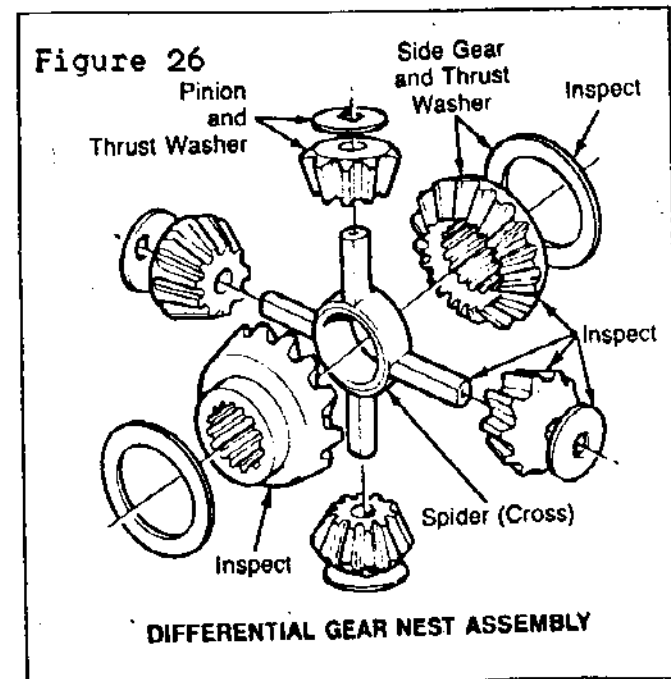


11> BOTH SURFACES OF ALL THRUST WASHERS. FIG. 26

111> FOUR TRUNION ENDS OF SPIDER.

1v> TEETH AND SPLINES OF SIDE GEAR

v> TEETH AND BORE OF DIFF. PINIONS.

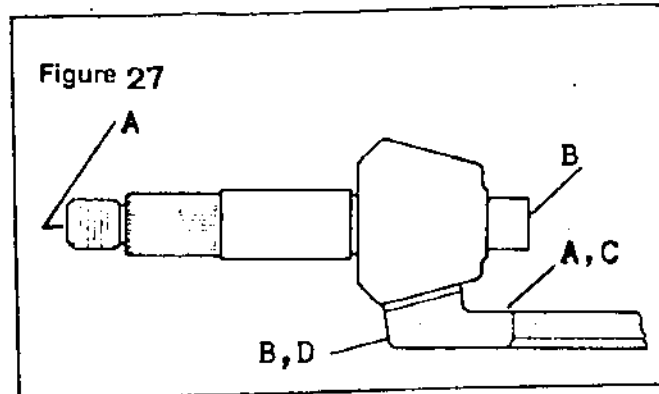


#### IV. ASSEMBLY OF CARRIER:

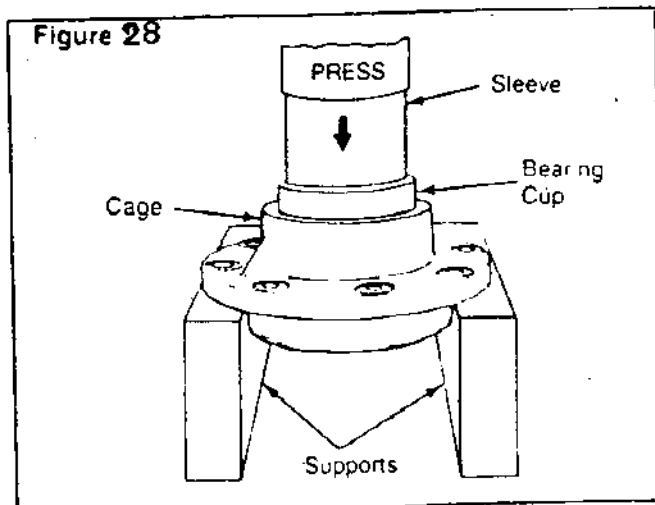
- BEFORE INSTALLING A NEW GEAR SET ENSURE SET NUMBER ETCHED ON THE RING GEAR AND THE DRIVE PINION ARE SAME.

LOCATION OF MARKS ARE AS SHOWN IN FIG.27.

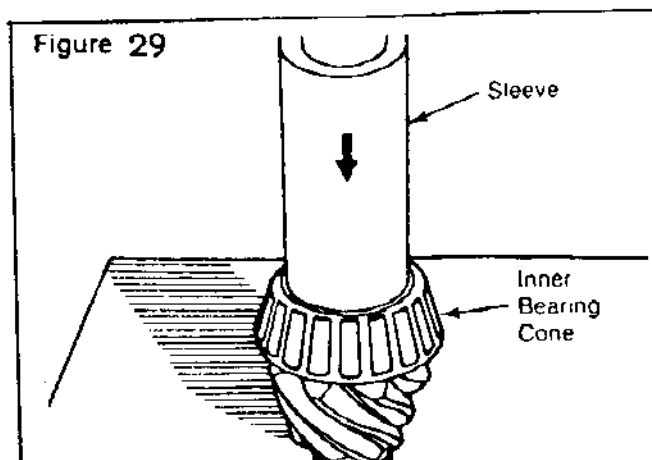
- A> TOOTH COMBINATION NUMBER
- B> SET NUMBER
- C> PART NUMBER
- D> PINION CONE VARIATION NUMBER



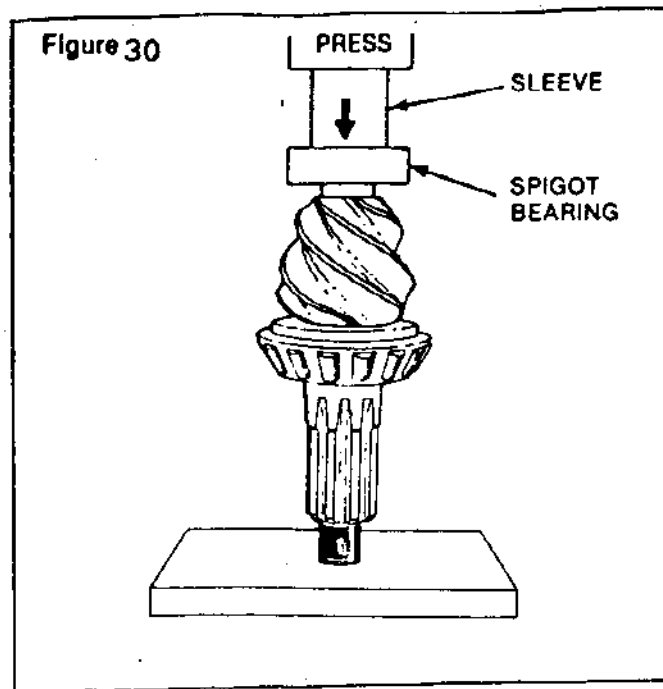
- PRESS INNER AND OUTER BRG. CUPS INTO BRG. CAGE USING CORRECT SLEEVES. FIG.28



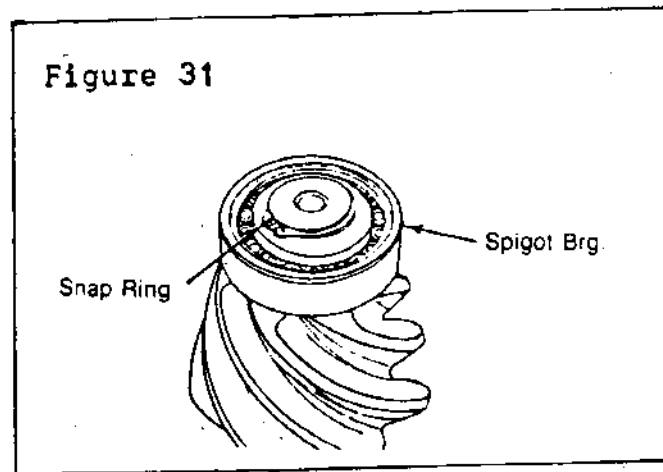
- PRESS THE INNER BRG. CONE ON THE PINION TILL IT SITS FIRMLY. FIG.29



3. \* PRESS THE SPIGOT BEARING ON THE DRIVE PINION FIG.30.



4. \* INSTALL THE SNAP RING INTO THE GROOVE.FIG.31



5. \* POSITION THE BRG.CAGE OVER INNER BRG.CONE.
- \* APPLY AXLE LUBRICANT ON BRGS.
- \* INSTALL THE BRG.SPACER.
- \* PRESS THE OUTER BRG.CONE ON THE PINION TILL IT SITS FIRMLY ON THE SPACER FIG.32.

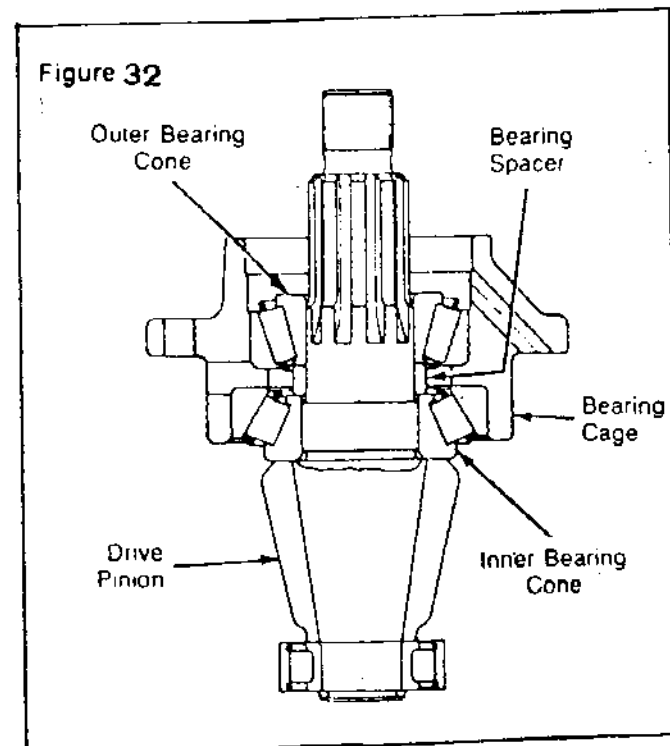




CHART I

9. INSTALL THE COMPANION FLANGE OVER THE PINION SPLINES.

o INSTALL WASHER AND PINION LOCK NUT. TIGHTEN THE PINION NUT TO THE TORQUE OF 1000-1200 Lb. Ft.

10. IF ORIGINAL GEAR SET IS REUSED INSTALL THE ORIGINAL SHIM PACK.

o IF NEW GEAR SET IS USED, ADJUST SHIM PACK ADOPTING FOLLOWING PROCEDURE.

A) NOTE PINION CONE VARIATION No. ETCHED ON REMOVED GEAR.

B) IF THIS IS A PLUS(+), SUBTRACT (-) THE No. FROM OLD SHIM PACK THICKNESS.

OR

IF IT IS MINUS(-), ADD(+) THE No. TO OLD SHIM PACK THICKNESS.

C) THE VALUE ARRIVED AS ABOVE, IS THE STANDARD SHIM PACK.

D) IF PINION CONE VARIATION No. OF NEW GEAR SET IS MINUS(-), SUBTRACT THE No. FROM STANDARD SHIM PACK ARRIVED AS ABOVE.

OR

IF IT IS PLUS(+), ADD TO STANDARD PACK THICKNESS.

REFER EXAMPLES - CHART 1.

11. INSTALL PINION ASSY WITH THE ABOVE SHIM PACK INTO DIFFERENTIAL CARRIER.

o ALIGN THE CAPSCREWS WITH THE HOLES.

o TIGHTEN CAPSCREWS UNIFORMLY AND ALTERNATIVELY SO THAT PINION CAGE SITS FIRMLY. TIGHTEN TO THE TORQUE OF 85-110 lb. Ft.

Examples:

	Inches
1. Old Shim Pack Thickness	.030
Old PC Number, PC + 2	-.002

Standard Shim Pack Thickness	.028
New PC Number, PC + 5	+.005

New Shim Pack Thickness	.033
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2. Old Shim Pack Thickness	.030
Old PC Number, PC - 2	+.002

Standard Shim Pack Thickness	.032
New PC Number, PC + 5	+.005

New Shim Pack Thickness	.037
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3. Old Shim Pack Thickness	.030
Old PC Number, PC + 2	-.002

Standard Shim Pack Thickness	.028
New PC Number, PC - 5	-.005

New Shim Pack Thickness	.023
-------------------------	------

4. Old Shim Pack Thickness	.030
Old PC Number, PC - 2	+.002

Standard Shim Pack Thickness	.032
New PC Number, PC - 5	-.005

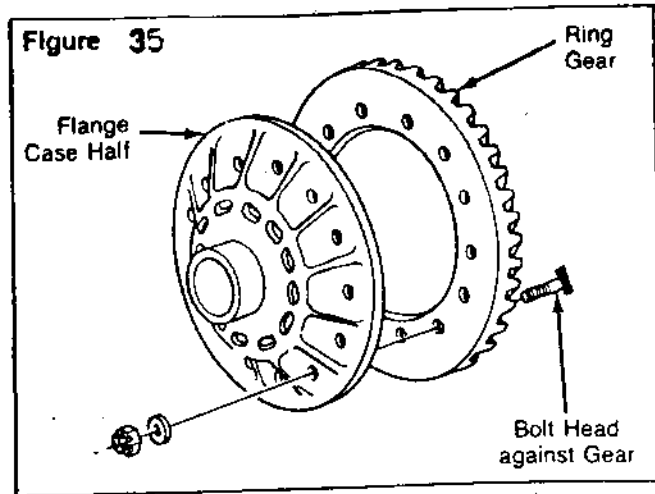
New Shim Pack Thickness	.027
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12. HEAT THE RING GEAR IN A WATER/OIL BATH TO ABOUT 170°F(80°C) FOR 15 MINUTES.

○ INSTALL THE RING GEAR ON FLANGE HALF IMMEDIATELY ALIGHNING MOUNTING HOLES. FIG. 35.

○ INSTALL MOUNTING BOLTS, WASHERS AND NUTS.

○ TIGHTEN THE NUTS TO THE TORQUE OF 195-260 FT.LBS

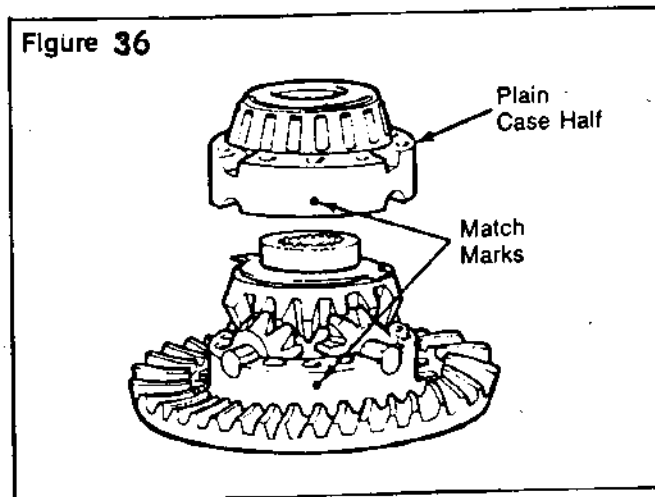


13. INSTALL THE BRG. CONES ON BOTH DIFF. CASES.

14. INSTALL SPIDER, SIDE GEAR, DIFF. PINIONS AND THRUST WASHERS INTO FLANGE HALF.

○ INSTALL PLAIN HALF ALIGNING MATCH MARKS FIG. 36 .

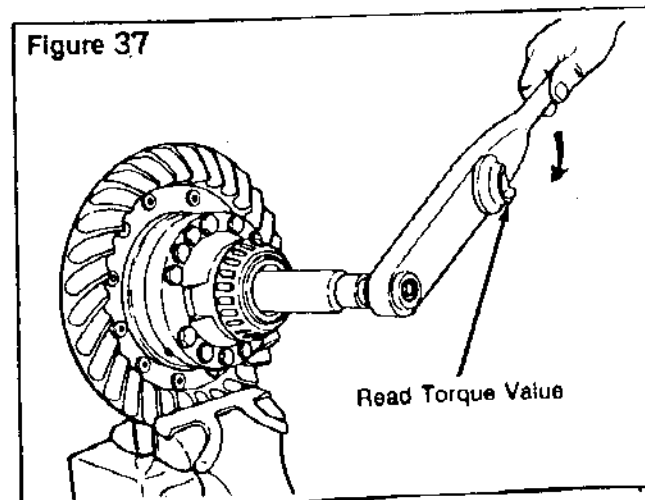
○ TORQUE TIGHTEN THE DIFF. CASE BOLTS TO 220-310 FT. LBS



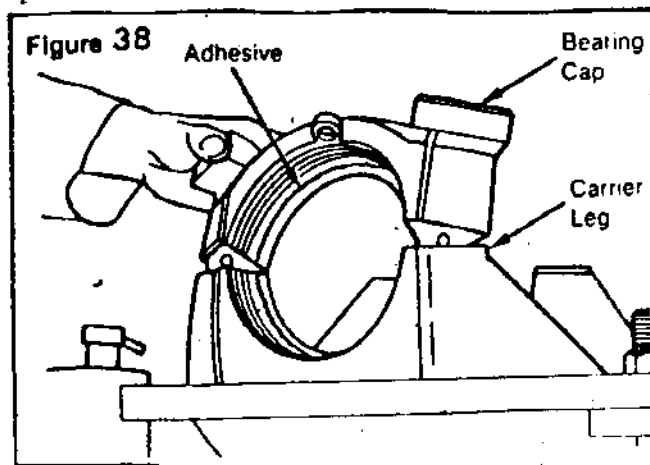
15. CHECK THE ROTATING RESISTANCE OF DIFF. GEARS FIG.37.

○ RECOMMENDED TORQUE IS 50 FT. LBS. Max.

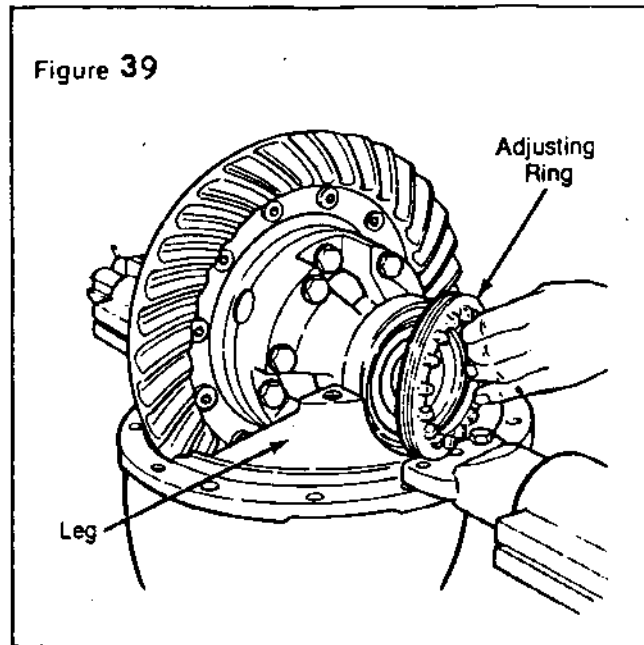
○ IF TORQUE IS MORE, CHECK CASE HALVES, SPIDER, DIFF. GEARS, THRUST WASHERS. REPLACE THE PARTS AS NECESSARY.



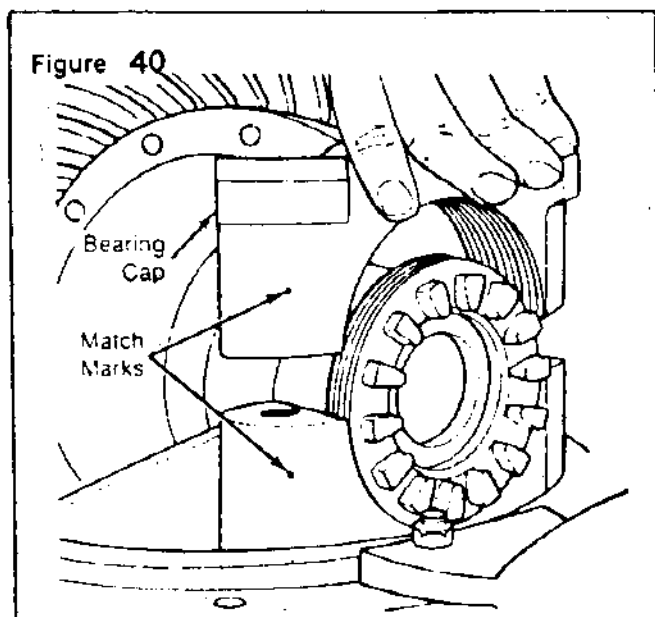
16. APPLY ADHESIVE TO BRG. BORES.  
FIG. 38.



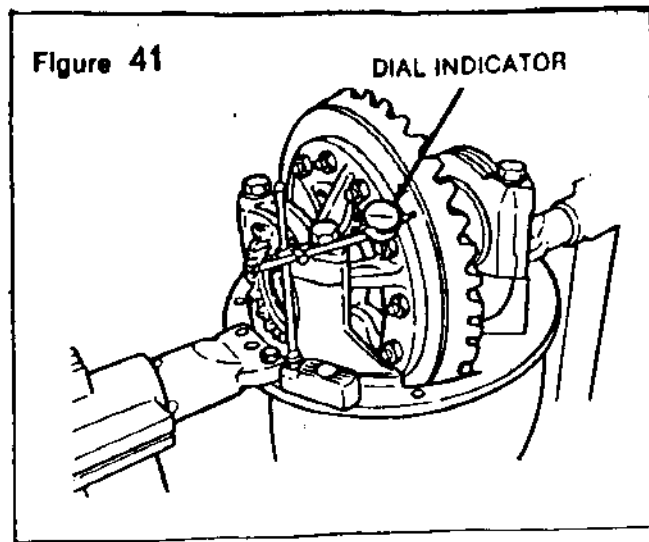
17. INSTALL DIFF. ASSY. INTO THE  
CARRIER.  
• INSTALL BOTH SIDE ADJ. RINGS  
AND HAND TIGHTEN TILL THESE  
TOUCHES THE DIFF. BRGS. FIG. 39.



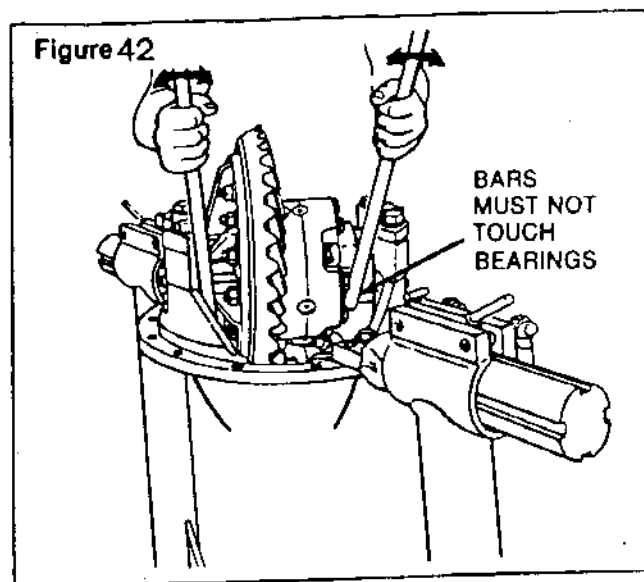
18. INSTALL THE BRG. CAPS ALIGNING  
THE MATCH MARKS. FIG. 40  
• TIGHTEN THE BRG. CAP BOLTS  
UNTIL THE BOLT HEAD SITS ON  
THE BRG. CAPS



19. ATTACH A DIAL INDICATOR SO THAT THAT THE PLUNGER IS AGAINST THE BACK FACE OF THE RING GEAR. FIG. 41

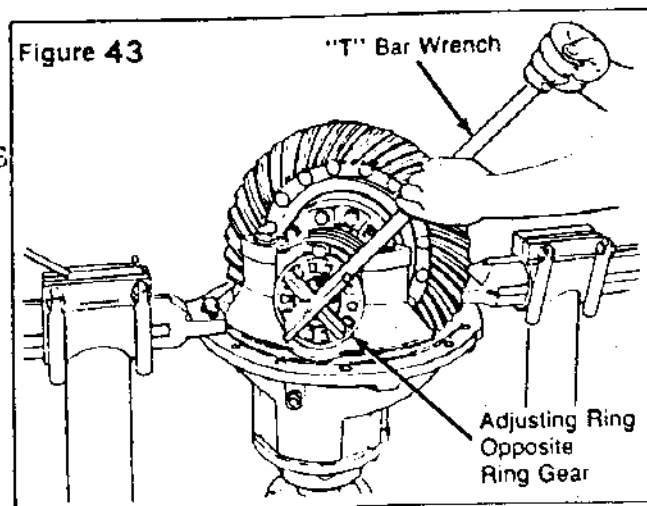


20. MOVE THE DIFFERENTIAL TO THE LEFT AND RIGHT WITH PRY BARS AND ENSURE SMALL AMOUNT OF END PLAY FIG. 42



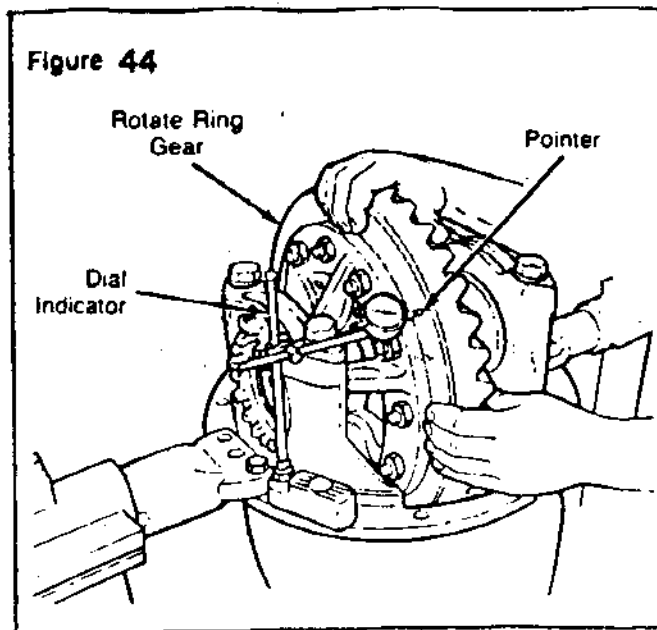
21. TIGHTEN THE ADJ. RING OPPOSITE TO RING GEAR TILL THE INDICATOR SHOWS ZERO END PLAY. FIG. 43

22. TIGHTEN BOTH ADJ. RINGS ONE NOTCH TO PRELOAD THE DIFF. BRGS.

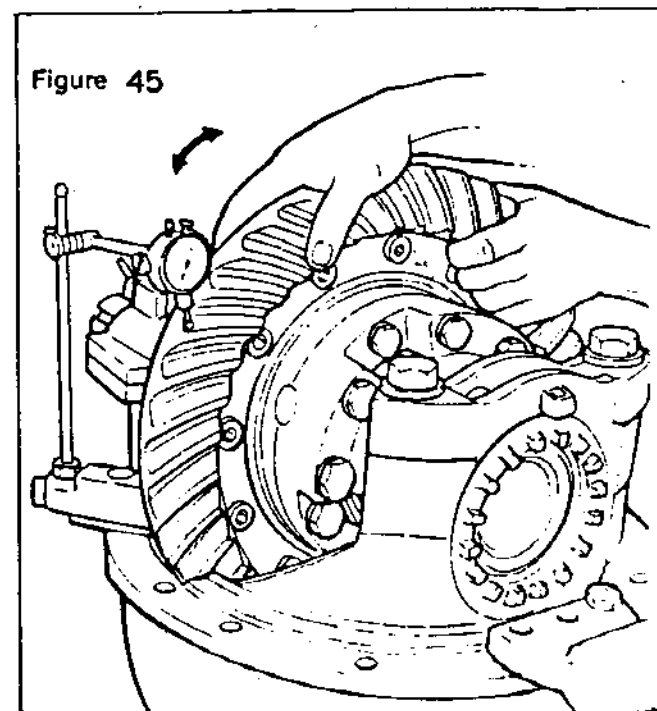




- 23. ADJUST DIAL INDICATOR TO ZERO.
- ROTATE THE RING GEAR TO CHECK THE RUN OUT. FIG. 44
- RUN OUT SHOULD BE WITHIN  $0.008''$  ( $0.20\text{mm}$ ).



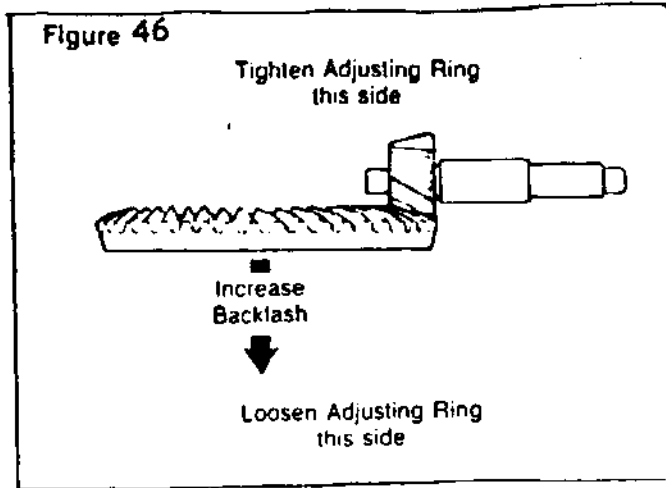
- 24. POSITION THE DIAL INDICATOR SO THAT THE PLUNGER IS ON THE DRIVE SIDE OF THE TOOTH. FIG. 45
- ADJUST THE BACKLASH BY LOOSENING THE ONE OF THE ADJ. RINGS AND TIGHTENING THE OTHER ADJ. RING TO THE EQUAL AMOUNT



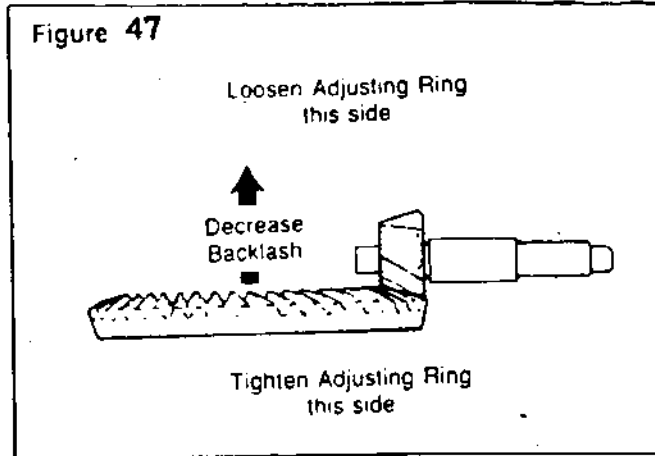
BACKLASH SPECIFICATION :

- BACKLASH RANGE =  $0.010'' - 0.020''$  ( $0.25 - 0.51\text{mm}$ )
- BACKLASH FOR NEW GEAR SET =  $0.015''$  ( $0.38\text{mm}$ )
- WHILE REUSING OLD GEAR SET ADJUST THE BACKLASH NOTED DURING DISASSEMBLY.

25. TO INCREASE BACKLASH MOVE THE RING GEAR AWAY FROM THE DRIVE PINION. FIG.46

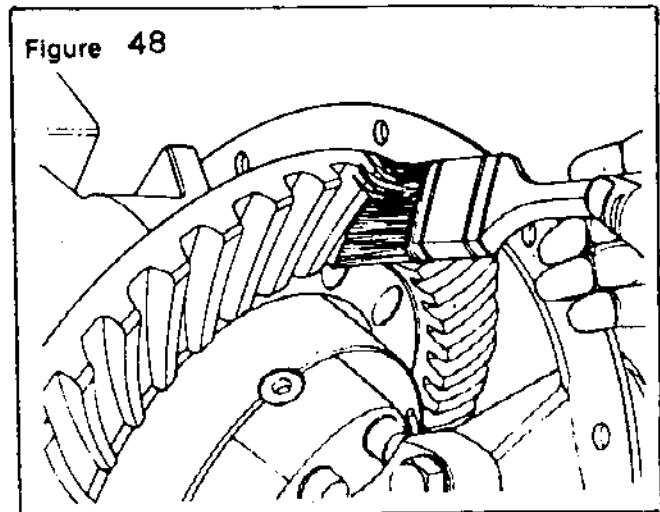


26. TO DECREASE BACKLASH MOVE THE RING GEAR TOWARDS THE DRIVE PINION. FIG.47



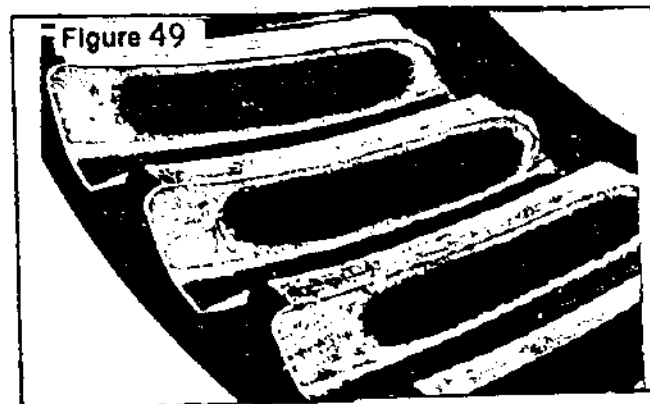
27. APPLY MARKING COMPOUND TO SIX TEETH OF RING GEAR.

ROTATE THE RING GEAR FORWARD AND BACKWARD SO THAT THESE TEETH GO PAST PINION TO OBTAIN CLEAR PATTERN. FIG. 48

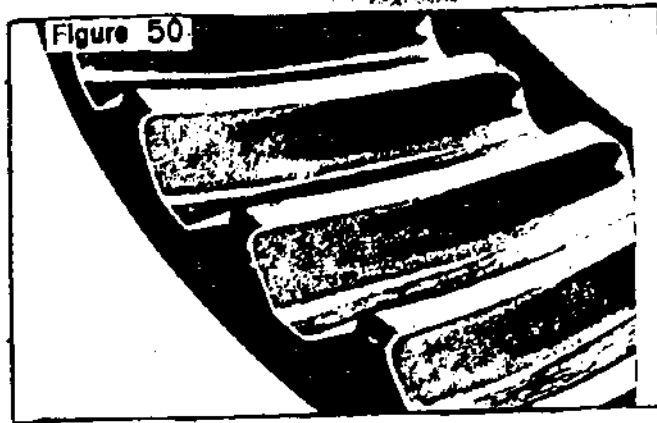


28. COMPARE THE CONTACT PATTERN TO FIGS. 49, 50 & 51

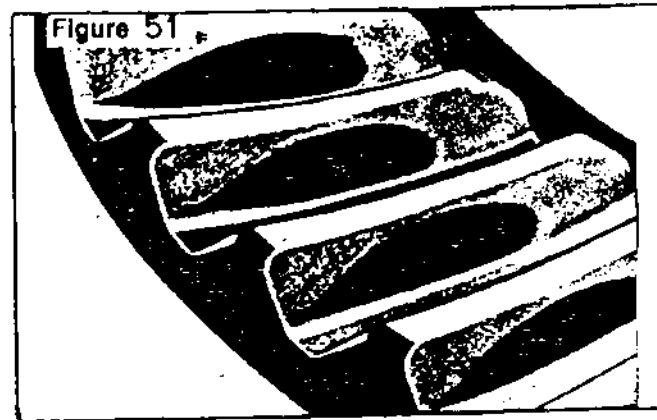
GOOD CONTACT PATTERN - TOWARDS THE TOE OF THE GEAR TEETH AND IN CENTRE BETWEEN TOP AND BOTTOM OF TEETH FIG.49



- HIGH PATTERN - THIS INDICATES THAT THE DRIVE PINION IS NOT INSTALLED DEEP ENOUGH INTO THE CARRIER. FIG. 50

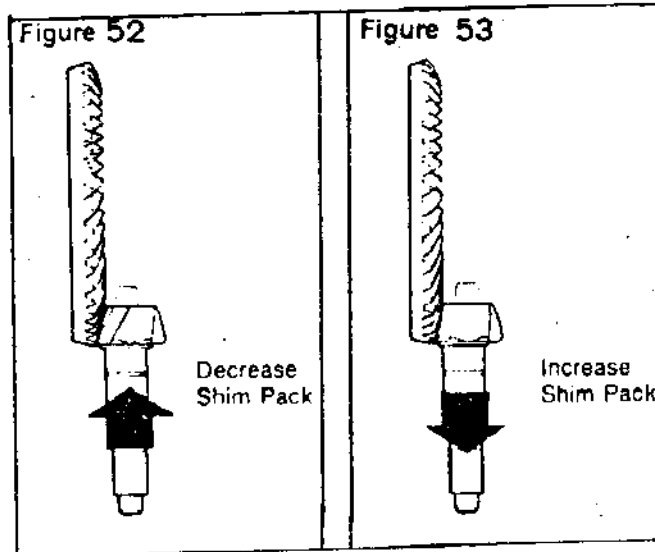


- LOW PATTERN - THIS INDICATES THAT THE DRIVE PINION IS INSTALLED TOO DEEP IN THE CARRIER. FIG. 51.



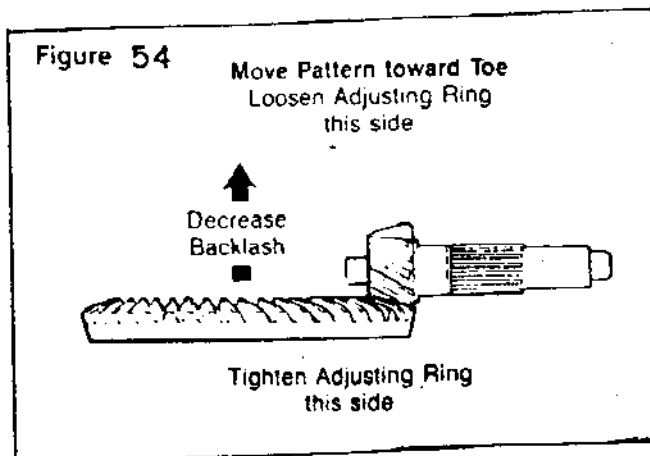
29. TO CORRECT THE PATTERN PROCEED AS FOLLOWS.

- HIGH PATTERN- DECREASE THE THICKNESS OF SHIM PACK UNDER BEARING CAGE. THIS WILL MOVE THE PINION TOWARDS RING GEAR. FIG. 52.
- LOW PATTERN - INCREASE THE THICKNESS OF SHIM PACK UNDER BEARING CAGE. THIS WILL MOVE THE PINION AWAY FROM RING GEAR. FIG. 53.

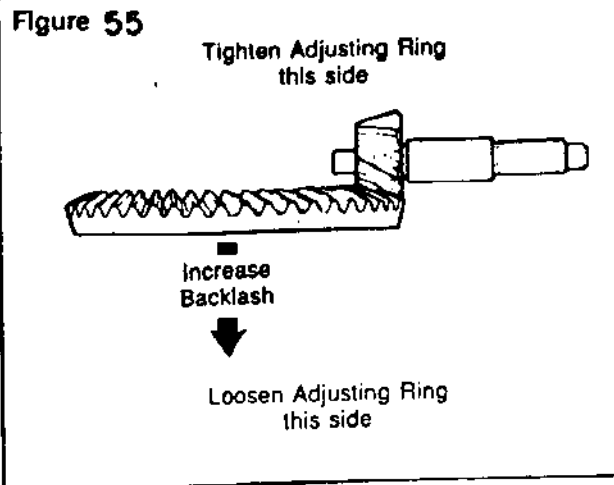


30. LOCATION OF PATTERNS - TO MOVE THE CONTACT PATTERNS TO THE CORRECT LOCATION IN THE LENGTH OF TEETH, ADJUST THE BACKLASH WITHIN SPECIFIED RANGE AS FOLLOWS.

- TO SHIFT THE PATTERN TOWARDS TOE OF THE TEETH DECREASE THE BACKLASH. FIG. 54.

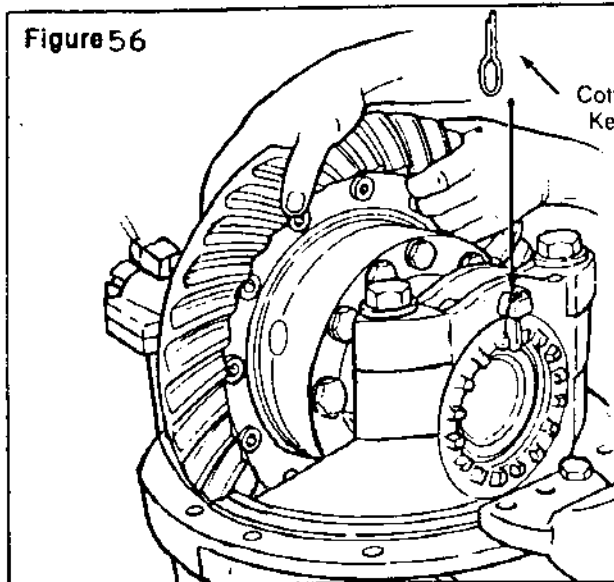


- TO SHIFT THE PATTERN TOWARDS HEEL INCREASE THE BACKLASH. FIG. 55.

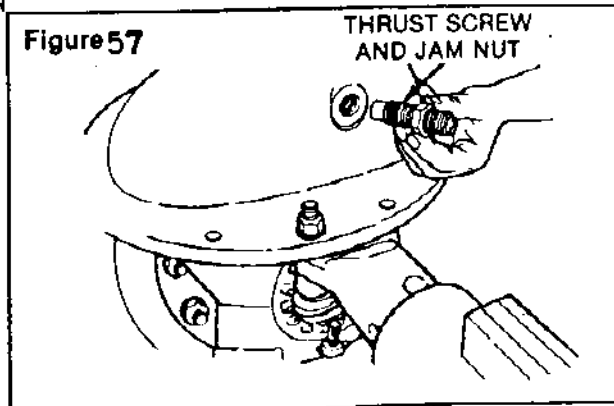


31. TORQUE TIGHTEN THE BRG. CAP BOLTS TO THE VALUE OF 480-600 FT. LBS.

32. INSTALL THE COTTER PINS IN THE ADJ. RINGS USING A DRIFT AND HAMMER FIG. 56.



33. INSTALL THE THRUST SCREW AND TIGHTEN UNTIL IT TOUCHES THE RING GEAR.



- LOOSEN THE THRUST SCREW 1/2 TURN (180°) FIG. 57. CLEARANCE BETWEEN THRUST SCREW AND RING GEAR SHOULD BE 0.025" - 0.045" (0.65-1.14 mm)

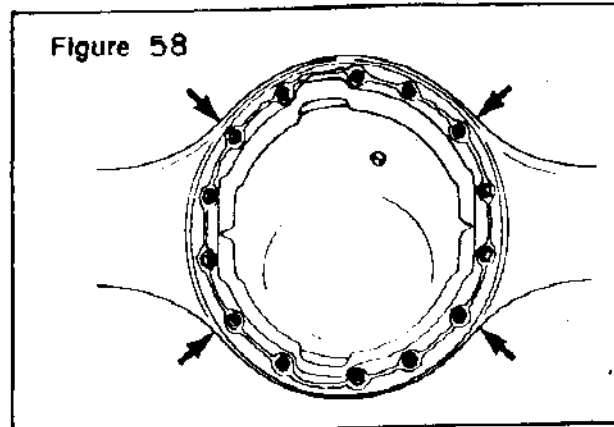
35. TIGHTEN JAM NUT TO THE TORQUE OF 150-180 FT. LBS.

36. CLEAN THE HOUSING MOUNTING FACE. REMOVE THE OLD GASKET MATERIAL.

- APPLY SILICON GASKET MATERIAL UNIFORMLY. FIG 58.

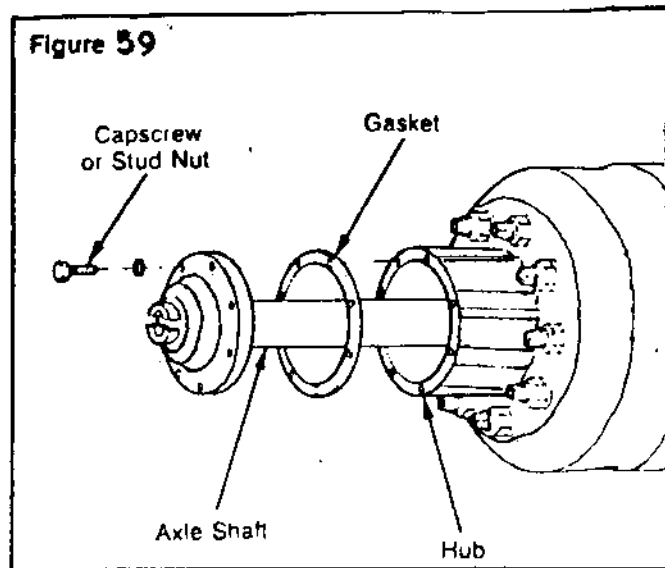
- INSTALL THE CARRIER INTO THE HOUSING.

- INSTALL WASHERS, NUTS AND CAPSCREWS. TIGHTEN TO THE TORQUE OF 180-230 FT. LBS.



37. - INSTALL THE GASKETS AND AXLE SHAFTS  
FIG. 59.

- INSTALL THE WASHERS AND CAP SCREWS  
AND TIGHTEN TO THE CORRECT TORQUE  
VALUE.



38 - CONNECT THE PROPELLER SHAFT TO THE  
INPUT FLANGE.

39 - INSTALL DRAIN PLUG AND FILL UP  
WITH LUBRICANT TO THE REQUIRED  
LEVEL.

## LUBRICATION.

LUBRICANT CAPACITY :

-----21.0 LTRES (GUIDANCE ONLY)

### LUBRICATION SCHEDULE FOR NEW AND RECONDITIONED UNITS :

FIRST LUBRICATION CHANGE : - MUST BE MADE AT 1600 - 4800 Kms.

SUBSEQUENT LUBRICANT CHANGE : MUST BE MADE AT EVERY 40,000 TO 48,000 KMS, WHEN YEARLY MILEAGE IS IN EXCESS OF 96,000 Kms. BUT , IF THE YEARLY MILEAGE IS LESS 96,000 Kms. OIL TO BE CHANGED TWICE YEAR (AT 6 MONTHLY INTERVALS)

- THE OIL RECOMMENDED TO USE IS API GL5, SAE 140
- THERE IS NO UPPER LIMIT ON OUTSIDE TEMPERATURE.
- MAX ALLOWABLE AXLE SUMP TEMPERATURE IS 121 C

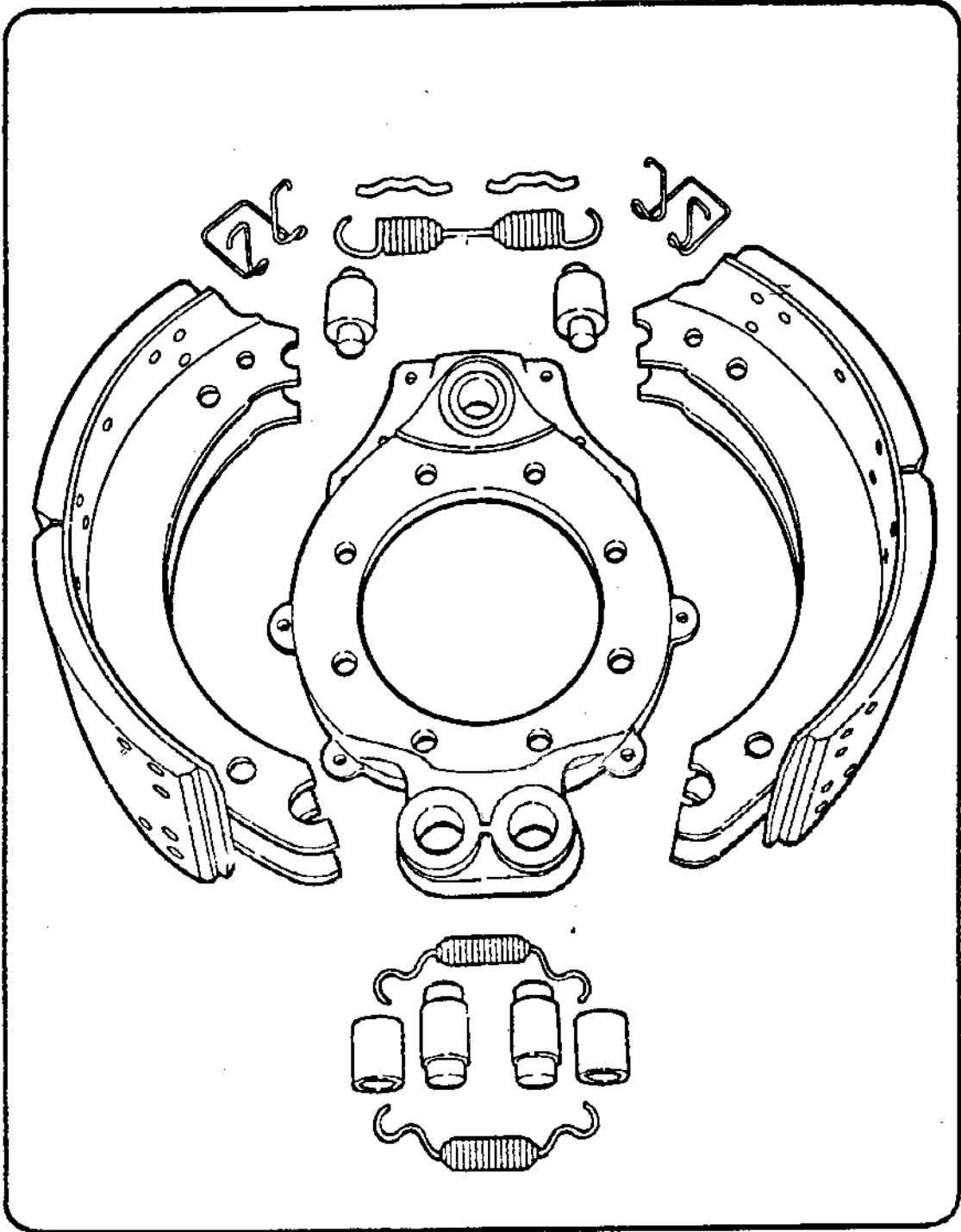
### INDIAN EQUIVALENTS OF LUBRICANTS

LUBRICANT MAKE	SPECIFICATION
GULF OL INDIA	GULF MP GEAR OIL 140
INDIAN OIL CORPORATION	SERVO GEAR SUPER 140
HINDUSTAN PETROLEUM	HP GEAR OIL XP 140
BHARTH PETROLEUM	SPRIAL HD 140
I.B.P	ESGO 140

**'Q' SERIES CAM-MASTER BRAKES**

**FIELD MAINTENANCE  
MANUAL**

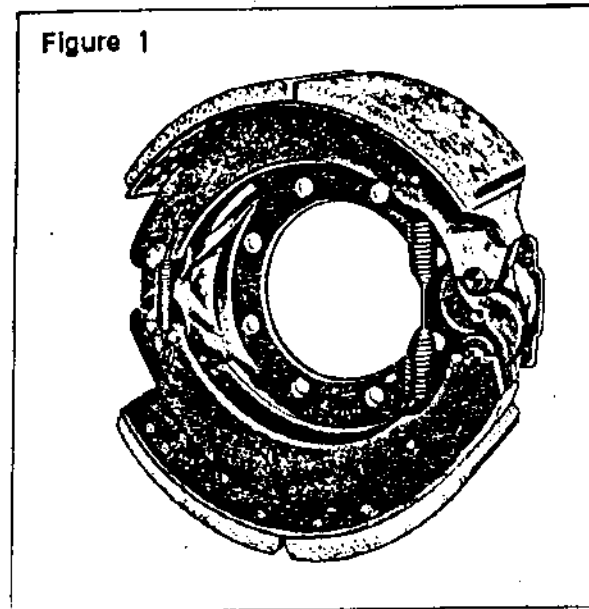
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## SALIENT FEATURES

- o TAPER LININGS.
- o HEAVY DUTY SPRINGS.
- o HARDENED CAMRAD WASHER.
- o HIGH LIFT CAMSHAFT.
- o LONG LIFE CAMSHAFT BUSHES.
- o QUICK CHANGE DOUBLE WEEL SHORS
- o STAINLESS STEEL BUSHES

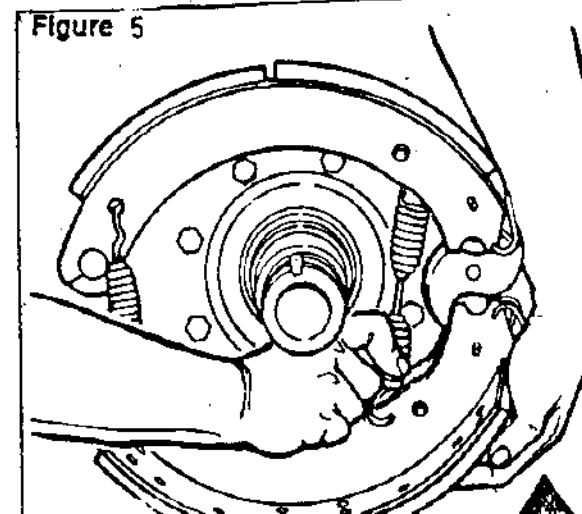
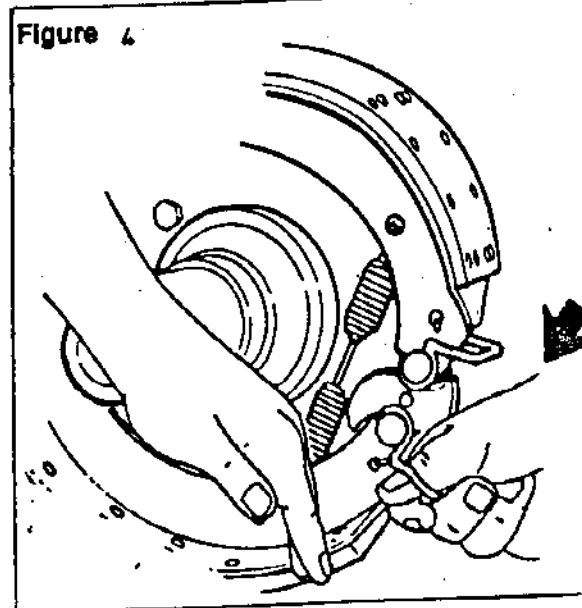
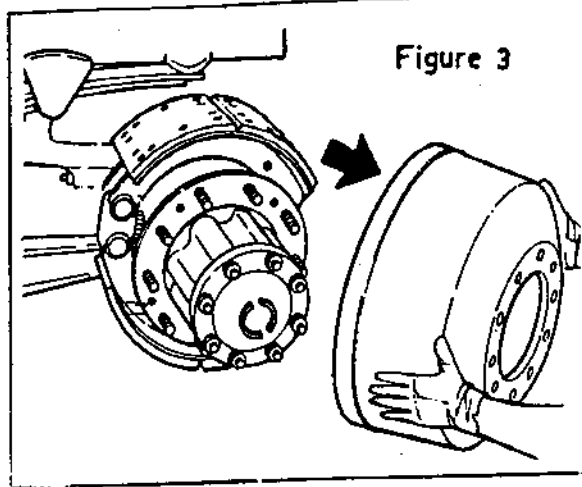
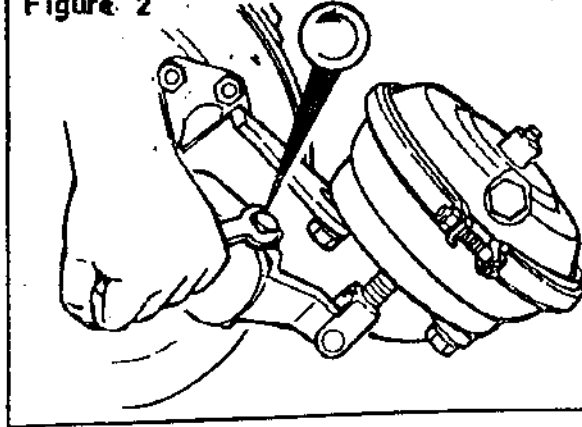


## NOTE

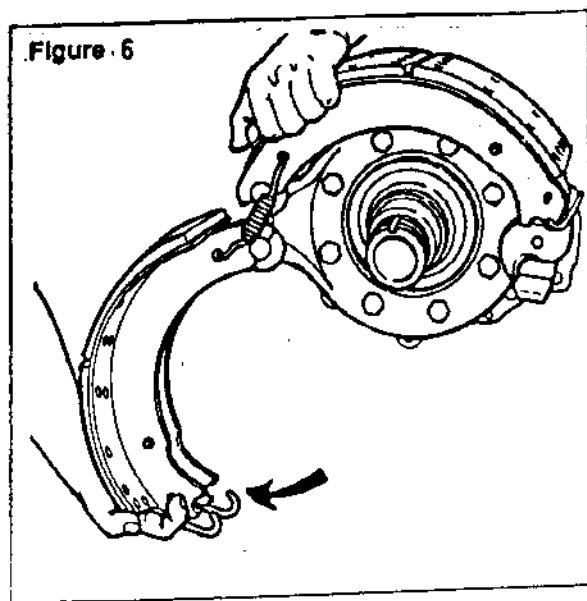
- o FEATURES AND DESIGN ASPECTS OF BOTH FRONT AND REAR BRAKES ARE SAME, EXCEPT FOR THE TYPE OF MOUNTING.
- o FRONT BRAKES ARE UNIT-MOUNTED TYPE AND REAR BRAKES ARE HOUSING-MOUNTED TYPE.
- o UNIQUE SERVICE POINTS FOR REAR BRAKES ARE MARKED AT APPROPRIATE STAGES WITH \* MARK.

## I. DISASSEMBLY

1. ○ JACK UP THE VEHICLE AND INSTALL JACK STANDS.  
○ REMOVE THE WHEELS
2. ○ RELEASE SLACK ADJUSTER SO THAT SHOES RETRACT FULLY. FIG.2
3. ○ REMOVE THE BRAKE DRUM. FIG.3
4. ○ PUSH DOWN BOTTOM BRAKE SHOE.  
○ FULL OUT ROLLER RETAINING SPRING ALONG WITH THE ROLLER. FIG. 4
5. ○ LIFT THE TOP BRAKE SHOE AND REMOVE ROLLER WITH THE RETAINER.
6. ○ LIFT THE BOTTOM SHOE.  
○ NOW THE RETURN SPRING WILL BE FREE FROM TENSION.  
○ REMOVE THE RETURN SPRING. FIG.5

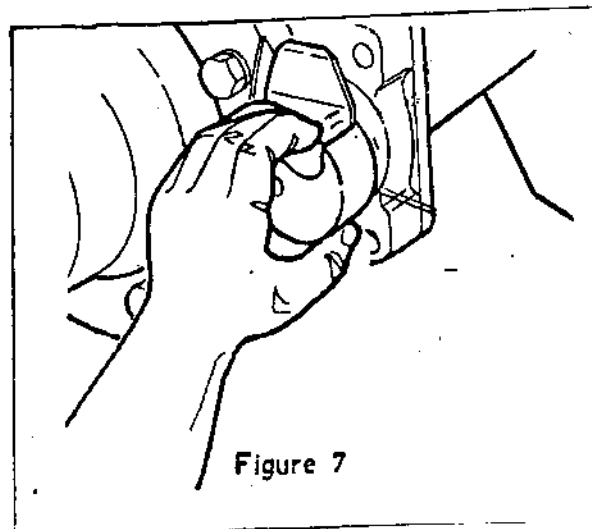


7. ○ SWING THE BOTTOM SHOE SUCH THAT THE ANCHOR SPRINGS WILL BE FREE FROM TENSION. FIG.6
- REMOVE THE ANCHOR SPRINGS AND BRAKE SHOES.
- REMOVE ANCHOR PINS.



8. ○ REMOVE THE LOCK RING, WASHERS AND SLACK-ADJUSTER FROM CAMSHAFT.
- \* REMOVE LOCK RING, WASHERS, SLACK ADJUSTER AND SPACER.

9. ○ PULL OUT THE CAMSHAFT FROM SPIDER. FIG.7



10. ○ TAKE OUT THE DUST SHIELDS BY REMOVING THE MOUNTING BOLTS.
11. ○ REMOVE CAMSHAFT BRACKET MOUNTING BOLTS AND REMOVE THE BRACKET.
- \* REMOVE THE PLUMMER BLOCK MOUNTING BOLTS AND REMOVE THE PLUMMER BLOCK.
12. ○ REMOVE THE MOUNTING BOLTS & NUTS AND TAKE OUT THE SPIDER.

## II. CLEANING , INSPECTION AND REPLACEMENT OF PARTS

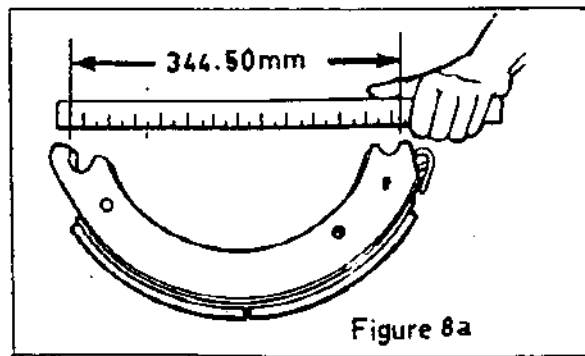
### 1. CLEANING OF PARTS

- USE A CLEANING SOLVENT, KEROSENE OR DIESEL.
- DRY THE PARTS IMMEDIATELY AFTER CLEANING.
- COAT ALL THE PARTS WITH LUBRICANT TO PREVENT CORROSION AND RUST.

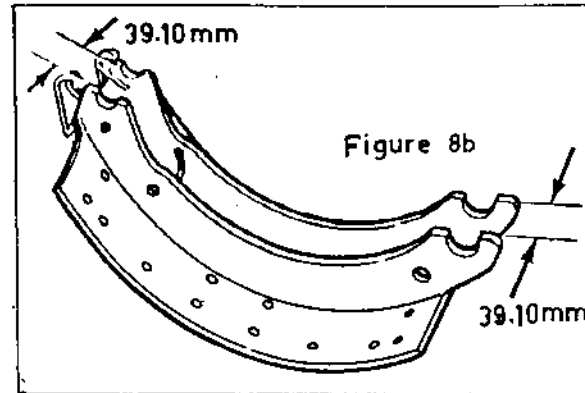
### o INSPECTION AND REPLACEMENT OF PARTS.

2. - CHECK THE BRAKE DRUMS FOR CRACKS, SCORING, PITTING, HEAT SPOTTING AND DISTORTION. REPLACE DRUMS AS REQUIRED.
  
3. - CHECK DUST-SHIELD FOR RUST AND DISTORTION. REPAIR OR REPLACE. AS NECESSARY.
  
4. - CHECK CAMSHAFT FOR CRACKS AND WEAR. CHECK CAMHEAD, JOURNALS AND SPLINES FOR WEAR. REPLACE WORN OUT CAMSHAFTS.
  
5. - CHECK AND REPLACE CAMSHAFT BRACKETS IF FOUND WITH CRACKS AND BROKEN WELDS.
  - \* CHECK AND REPLACE PLUMMER BLOCKS. IF FOUND CRACKED OR DAMAGED.

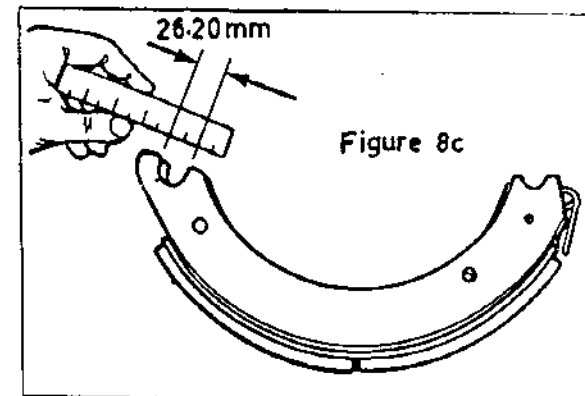
- 6> - CHECK THE SHOES FOR ELONGATED RIVET HOLES, WELD DAMAGES AND FOR THE WEAR.



- REPLACE THE SHOES, IF ANY ONE OF THE READINGS EXCEED THE SPECIFIED LIMITS. FIG.8a, 8b & 8c.



- 7> - CHECK THE ROLLERS FOR FLAT SPOTTING AND BRINELLING, IF FOUND REPLACE THE ROLLERS.



- 8> - CHECK AND REPLACE THE CAMHEAD WASHER, IF FOUND WORN AND DISTORTED.

- 9> ○ REPLACE RETURN SPRING, ANCHOR SPRINGS AND ROLLER RETAINERS, IF FOUND ELONGATED AND DAMAGED.

- IT IS RECOMMENDED TO REPLACE ALL THE SPRINGS AT THE SAME TIME.

- 10> ○ CHECK CAMSHAFT SEALS FOR WEAR AND DAMAGES.

- IT IS RECOMMENDED TO REPLACE ALL THE CAMSHAFT SEALS DURING OVERHAULING.

### III. ASSEMBLY

- 1) ○ INSTALL THE SPIDER MOUNTING BOLTS & NUTS.  
  
○ TIGHTEN TO THE TORQUE OF 180-200 Ft.lbs. FIG.9 ,
- 2) ○ INSTALL THE CAMSHAFT BRACKET IN THE SPIDER WITH THE NEW GASKET.  
  
○ TIGHTEN THE BRACKET MOUNTING BOLTS TO THE TORQUE OF 90-120 Ft.lbs. FRONT 135-170 FL.LBS REAR.

Figure 9

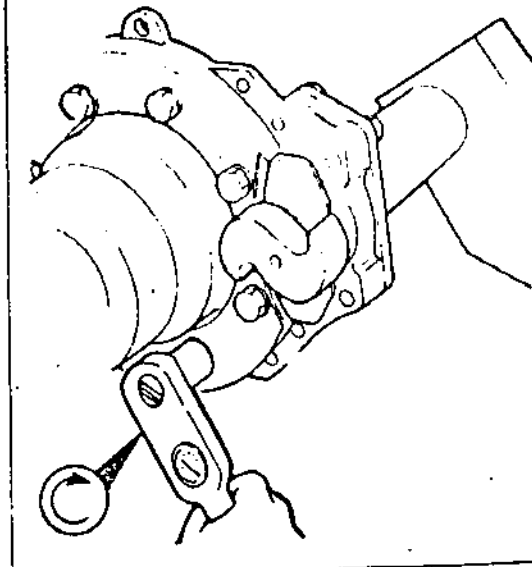
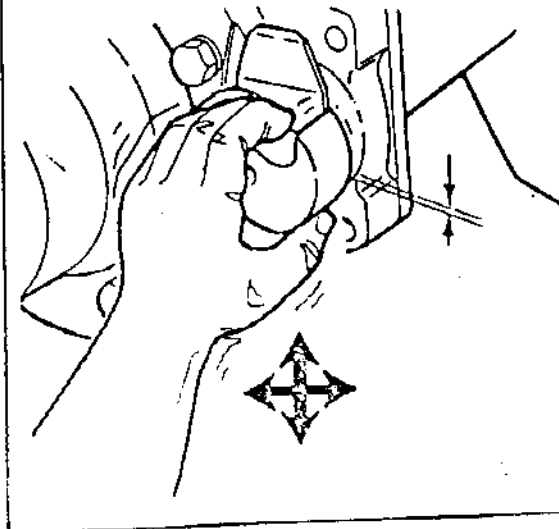


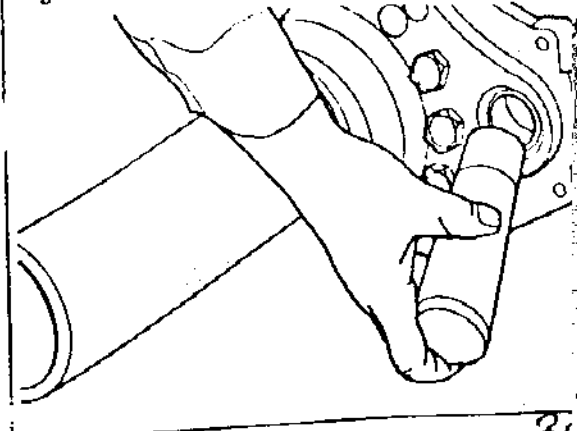
Figure 10



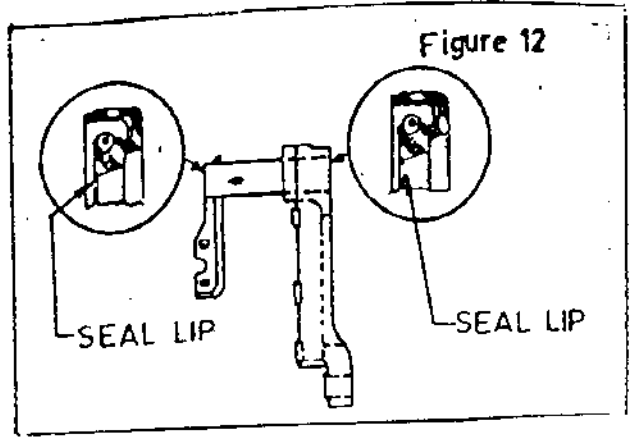
- 3) ○ INSTALL THE CAMSHAFT ALONG WITH THE CAMHEAD WASHERS.
- 4) ○ CHECK THE RADIAL PLAY OF THE CAMSHAFT BUSHING FIG.10

- IF IT EXCEEDS 0.80 MM REPLACE THE BUSHES. FIG.11

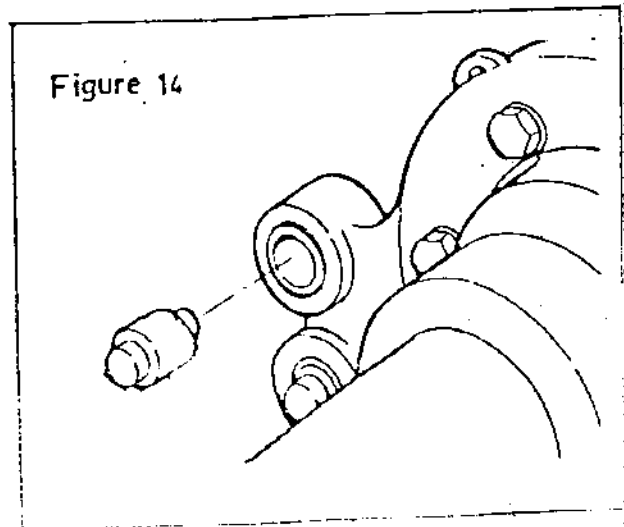
Figure 11



- 5> ○ WHILE REPLACING SEALS IN BOTH SPIDER AND BRACKET ENSURE SEAL LIPS FACE THE SLACK-ADJUSTER.  
FIG. 12



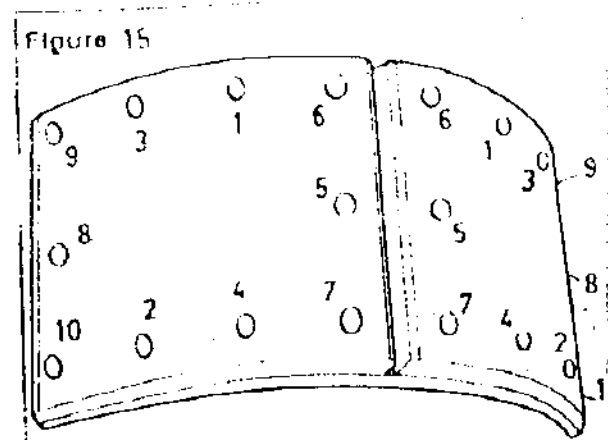
- 6> ○ SMEAR THE GREASE IN THE STAINLESS STEEL BUSHES OF THE SPIDERS.  
○ INSTALL THE ANCHOR PINS.  
○ CHECK THEIR RADIAL PLAY IN THE BUSHES. FIG.14  
○ IF THE RADIAL PLAY EXCEEDS 0.80MM REPLACE THE STAINLESS STEEL BUSHES.  
○ WITH THE NEW BUSHES, IF THERE IS MORE THAN 0.4MM PLAY, THEN REPLACE THE ANCHOR PINS



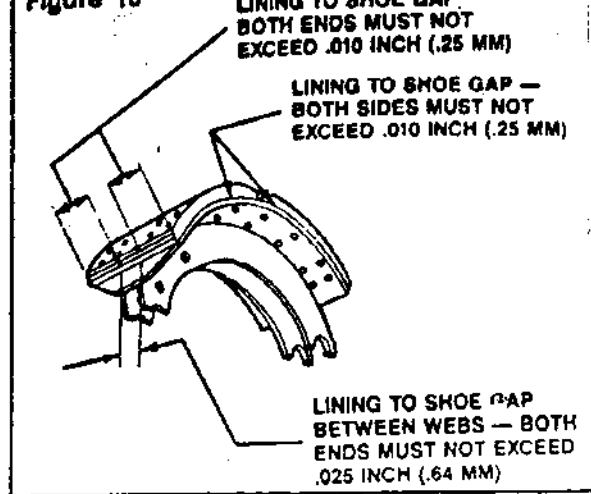
7. ○ CHECK THE BRAKE LININGS  
○ REPLACE THESE LININGS WHEN FOUND WORN TO THE LEVEL OF WEAR INDICATOR (BUILT IN THE SIDE WALL OF THE LININGS AT 4.5 MM THICKNESS)

8. DURING RELINING, MAKE SURE THE CONTACT SURFACES OF SHOE AND LINING ARE CLEAN

INSTALL THE RIVETS IN THE SEQUENCE SHOWN IN THE FIGURE



9. - CHECK THE GAP BETWEEN THE SHOE AND LININGS ALONG THE SIDES AND THE ENDS. THIS SHOULD NOT EXCEED 0.25 MM BUT BETWEEN WEBS 0.60MM GAP IS ACCEPTABLE. FIG.16.



10. ○ SMEAR GREASE ON ALL THE SLOTS OF THE SHOES.

- POSITION THE TOP SHOE OVER THE ANCHOR PIN.

- HOLD THE BOTTOM SHOE OVER THE ANCHOR PIN.

- INSTALL THE SHOE RETAINING (ANCHOR) SPRINGS. FIG.17

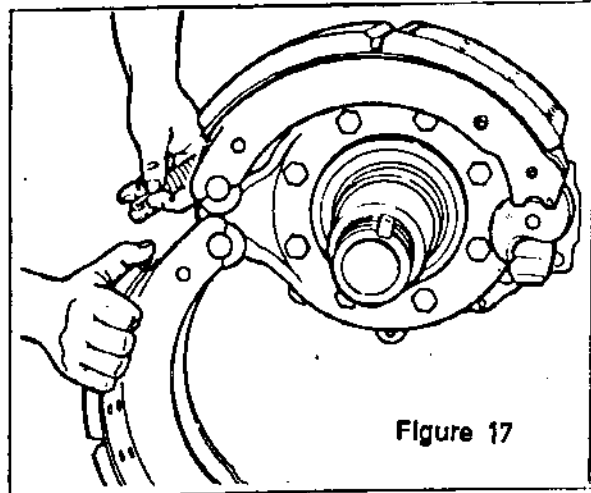


Figure 17

11. - SWING AND BRING THE BOTTOM SHOE CLOSER TO CAMHEAD.

INSTALL THE SHOE RETURN SPRING. FIG.18

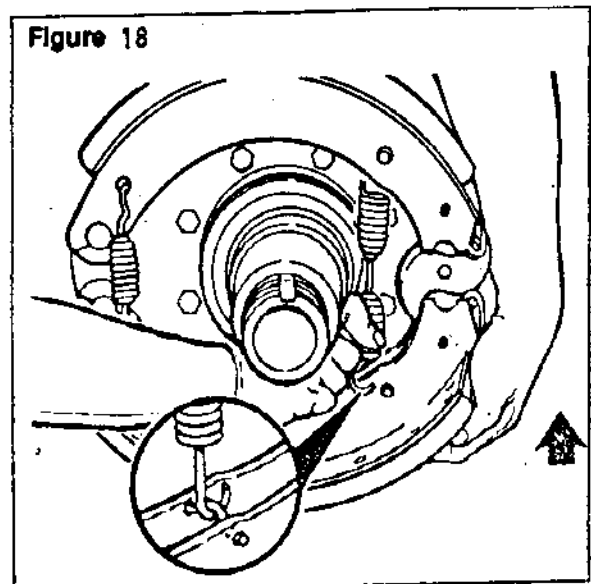


Figure 18

12. - INSTALL NEW ROLLER RETAINERS ON THE ROLLERS.

- FULL THE SHOES AWAY FROM THE CAMHEAD AND INSTALL THE ROLLERS WITH THE RETAINERS.

- SQUEEZE THE EARS OF THE RETAINERS SO THAT THE RETAINERS FIT BETWEEN THE SHOE WEBS. FIG.19

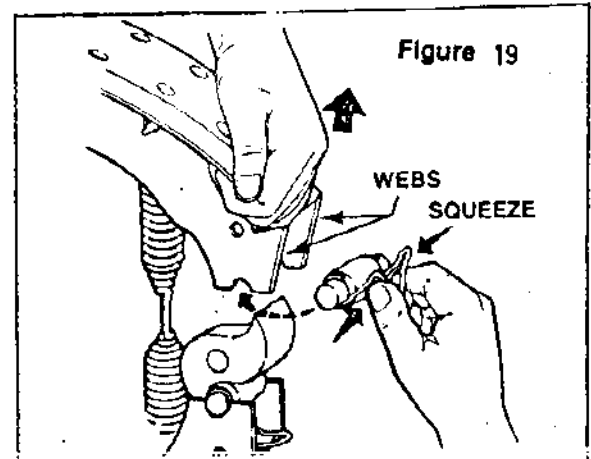
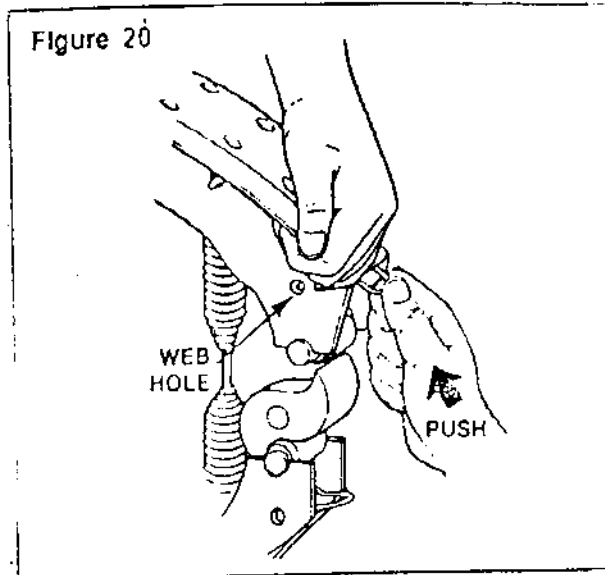


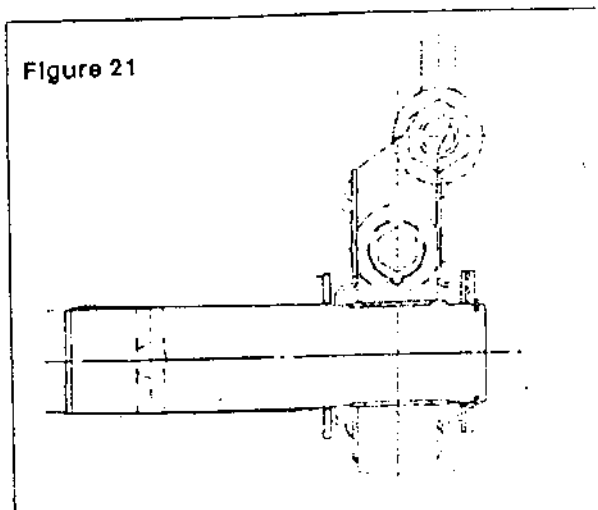
Figure 19



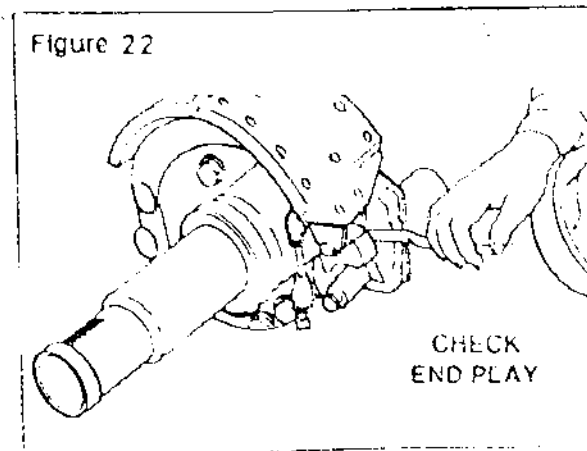
- 13. - PUSH THE RETAINER INTO THE SHOES UNTIL ITS EARS LOCK IN THE HOLES OF THE WEBS. FIG.20
- 14. - INSTALL THE SPACER WASHER (2.5MM THICK) AT THE END OF CAMSHAFT BRACKET. THEN INSTALL THE SLACK ADJUSTER.



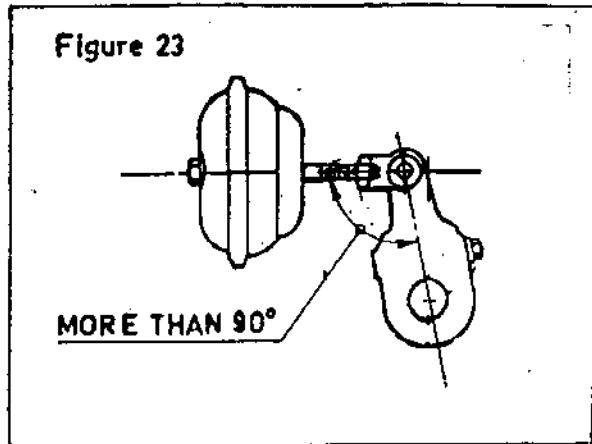
- 15. - NEXT TO SLACK ADJUSTER, ADD SPACER WASHERS 0.8MM, 1.4MM AND 2.5MM (HARDENED).
  - ENSURE 2.5MM (HARDENED) WASHER IS NEXT TO LOCK RING . FIG. 21
- (HARDENED WASHER CAN BE IDENTIFIED WITH THE SEMI-CIRCLE GROOVE ON THE I.D.)
- INSTALL A NEW LOCK RING



- 16. CHECK THE CAMSHAFT END PLAY FIG. 22
- RECOMMENDED PLAY IS 0.5MM MAXIMUM
- TO REDUCE THE PLAY INCREASE THE SPACER WASHERS
- (BE ADJUST THE END PLAY WHEN IT EXCEEDS 1.0MM DURING THE OPERATION)
- 17. CONNECT THE SLACK ADJUSTER TO THE AIR CHAMBER PRESSURE



18. - CHECK THE POSITION OF THE CHAMBER PUSH ROD AND THE SLACK ADJUSTER IN "OFF" POSITION.
- THE ANGLE BETWEEN THE CENTRE LINE OF PUSH ROD AND THE SLACK ADJUSTER SHOULD BE MORE THAN 90 DEG. REFER FIG. 23
  - IF NECESSARY, REMOVE THE SLACK ADJUSTER, RE-POSITION ON THE SPLINES.

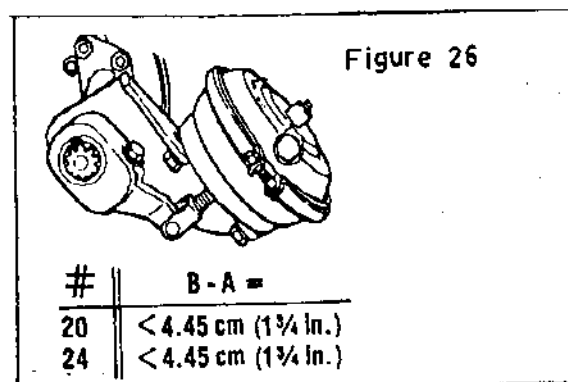
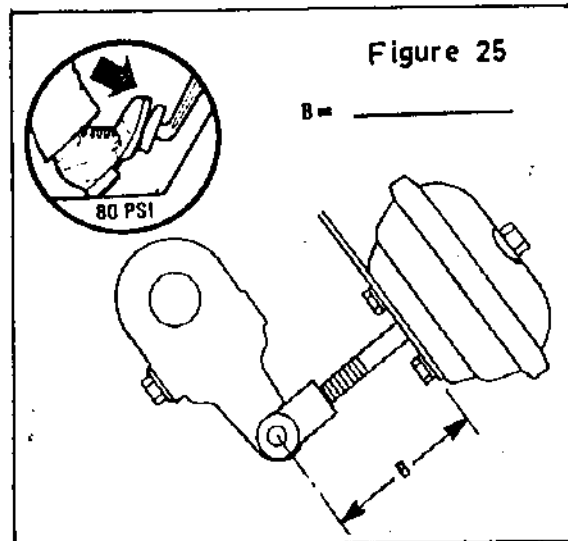
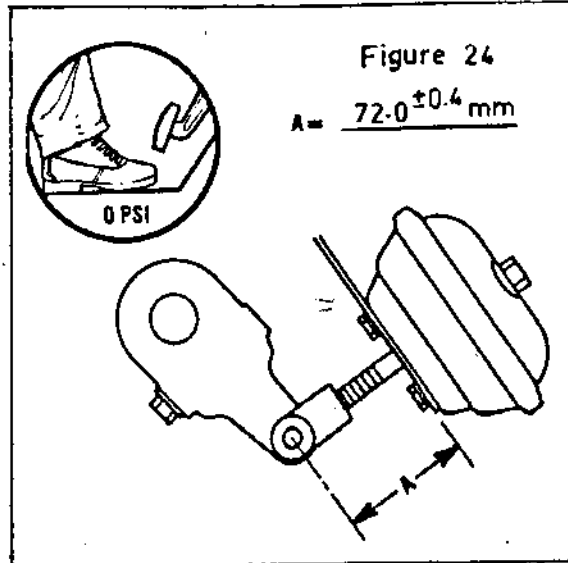


19. - INSTALL THE DUST SHIELDS.

TIGHTEN THE MOUNTING BOLTS  
TO THE TORQUE OF 25-35 Ft.lbs.

#### IV. BRAKE ADJUSTMENT

1. - RE-FIX THE DRUM AND MOUNT THE WHEELS.
2. - TURN THE ADJUSTING NUT OF THE SLACK ADJUSTER TILL THE LINING TOUCHES THE DRUM.
3. - TURN THE ADJUSTING NUT IN THE OPPOSITE DIRECTION FOR ONE OR TWO CLICKS SO THAT THE LINING JUST CLEARS THE DRUM.
  - ROTATE THE DRUM AND CHECK THE RUNNING CLEARANCE. IT WILL BE AROUND 0.25 TO 0.40 MM.
4. - WHILE THE BRAKES ARE NOT APPLIED CHECK THE DISTANCE BETWEEN THE AIR-CHAMBER MOUNTING FACE AND THE CENTRE OF THE SLACK ADJUSTER CLEVIS PIN. FIG. 24
  - IF THE READING IS NOT  $72.0 \pm 0.4$ MM. DISCONNECT THE YOKE FROM SLACK ADJUSTER. SLACKEN THE LOCK NUT. ROTATE THE YOKE AS NECESSARY AND RE-FIT.
5. - WHILE THE BRAKES ARE APPLIED. MEASURE THE DISTANCE AGAIN. FIG. 25
6. - THE DIFFERENCE BETWEEN THE ABOVE TWO READINGS IS THE STROKE OF THE AIR CHAMBER. THIS SHOULD NOT EXCEED THE PRESCRIBED LIMIT. FIG. 26.
- KEEP THE STROKE AS MINIMUM AS POSSIBLE.
7. - BRAKES ARE TO BE ADJUSTED WHENEVER THE STROKE LENGTH EXCEEDS 44.50MM.



## LUBRICATION

### o RECOMMENDED LUBRICANT

INDIAN OIL

INDIAN OIL

-- MULTI PURPOSE CHASSIS GREASE.

-- SERVO GREASE MF

-- SERVO MOLEX GREASE

### o RECOMMENDED GREASING FREQUENCY

-- ONCE IN 10,000 KM

### o GREASING POINTS (THROUGH NIPPLE)

\*\* TO BE GREASED TILL  
THE GREASE FLOWS  
FROM SEAL.

-- CAMSHAFT BRACKET ASSY.

- REAR SPIDER ASSY

-- PLUMMER BLOCK

### o GREASING POINTS - DURING OVERHAULING

- CAMSHAFT SPLINES.

-- SHOE SLOTS.

-- ID OF THE STAINLESS STEEL RICHES.

-- SMALLER DIAMETERS OF ANCHOR PIN AND ROLLER.

### o DO NOT GREASE THE BODY OF THE ROLLERS AND THE CAM HEAD.

RECOMMENDED MAJOR AND MINOR INSPECTIONS

MINOR INSPECTION (DURING EVERY LUBRICATION SCHEDULE)

- SPIDER MOUNTING BOLTS
- COMPLETE RETRACTION OF RETURN SPRINGS.
- LEFT OVER LINING THICKNESS.

MAJOR INSPECTION (DURING EVERY RE-LINING)

- BRAKES SPIDER FOR DISTORTION AND LOOSE MOUNTING BOLTS.
- ANCHOR PINS AND ROLLERS FOR WEAR.
- BRAKE SHOES FOR WEAR AND CRACK.
- CAMSHAFT AND BUSHINGS FOR WEAR
- RETURN SPRING AND SHOE RETAINING SPRING FOR ELONGATION.
- CAMSHAFT SEALS FOR LEAK AND DAMAGE.
- DRUMS FOR CRACKS, SCRATCHES AND SCORING
- ENSURE SAME TYPE AIR CHAMBER AND SLACK ADJUSTERS ARE USED ON BOTH SIDES OF THE AXLE
- EQUAL CHORD LENGTH ON ALL WHEELS.

# I. Axle Hub and Brake Drum dismantling procedure.

Position the Vehicle on a flat surface and Chock the Front wheels.

Slacken the rear wheel nuts and raise the Rear wheels clear of the Ground using a Jack or other lifting tool and position Jack stands.

Lower the vehicle on the Jack stands. **Figure 1**

Remove the rear wheels.

Remove the Drain-plug from bottom of Axle housing and drain lubricant from the assembly.

Remove the nuts and washers from the flanges of both axle shafts

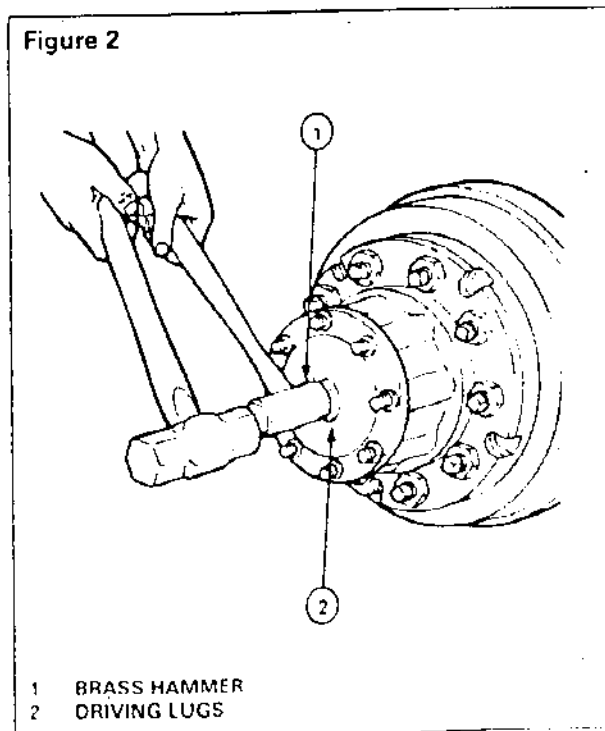
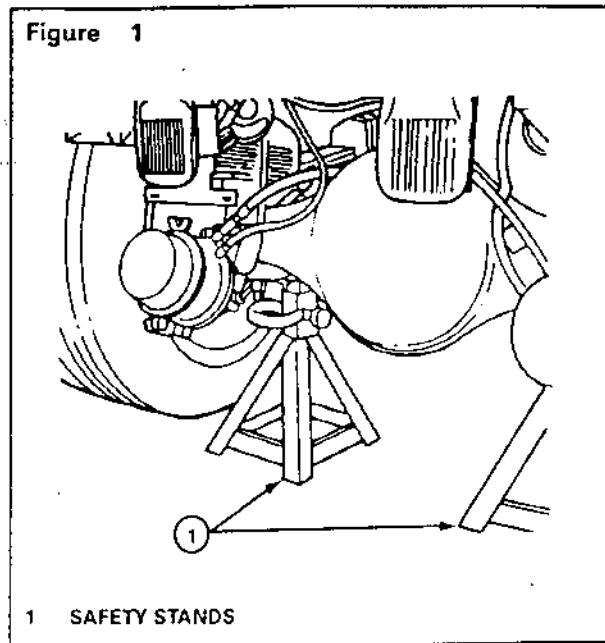
Loosen the tapered dowels in the axle flanges of both axle shafts using Brass Drift and hammer.

Hold a 1-1/2 inch diameter brass drift against the Center of the axle shaft, inside the round driving Lugs. **Figure 2**

**Note:** A 1-1/2 inch diameter brass Hammer can be used as a drift.

Strike the end of the drift with a large Hammer (three to four Kgs.) and the Axle shaft and tapered dowels will loosen.

Mark to identify each axle shaft before it is removed from the main axle hub assembly.



Remove the tapered dowels and separate the axle Shafts From the main axle hub Assembly. **Figure 3**

Slacken the Brake adjuster on each Rear Wheels, in order to clear the brake lining With drum surface.

Remove drum-mounting cap screws (Two nos. - not shown) and dismantle Brake drums (1). **Figure 4**

Remove the Jam Nut (2)

Remove the Lock washer (3)

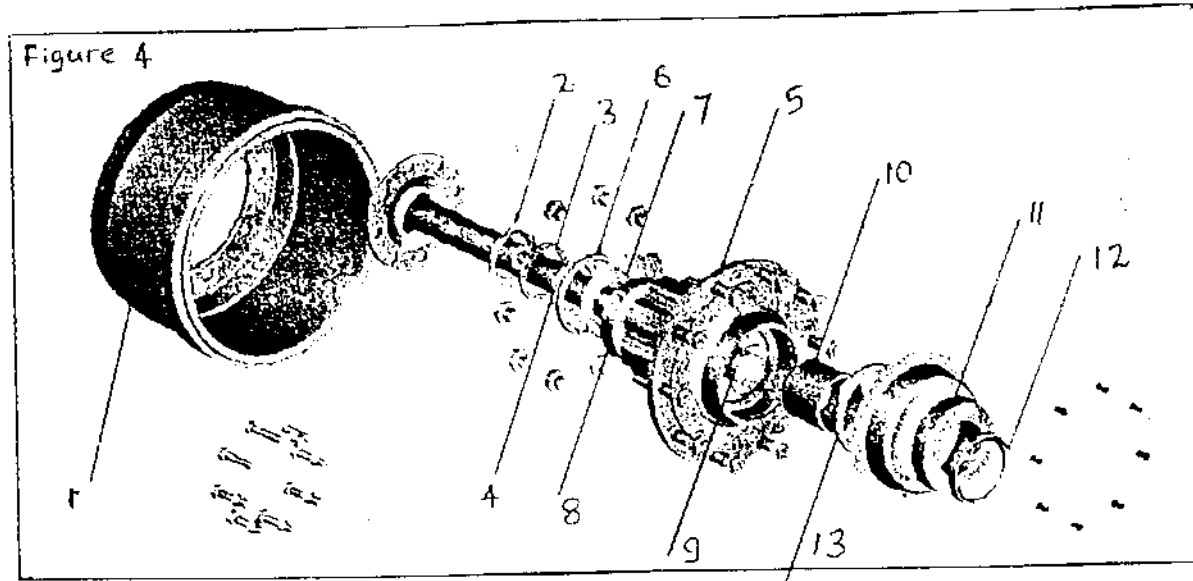
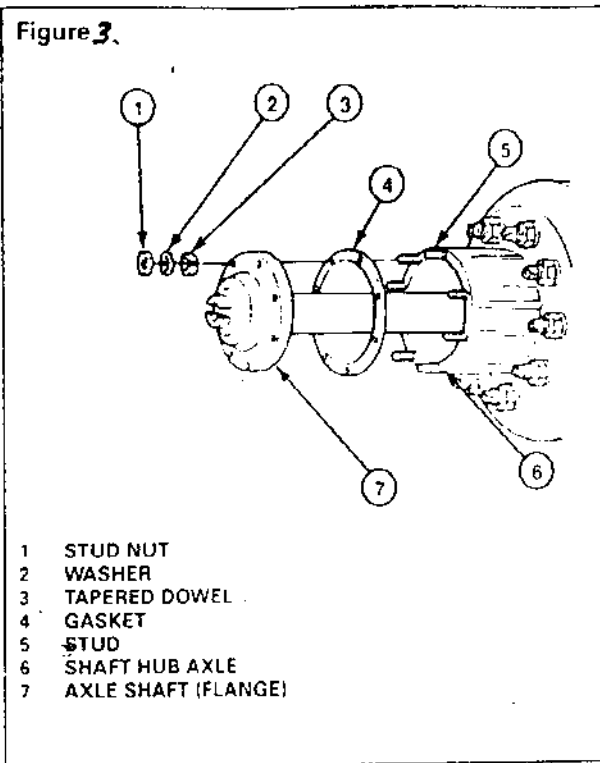
Remove the Adjusting Nut(4)

Carefully remove the axle hub (5) along With oil seal outer (6), oil seal ring -outer (7) and Outer Bearing cone(8).

Remove the shims (9), spacer (10) and the Inner bearing (11)and oil seal ring- Inner(12)

Remove the outer races of both inner and outer bearing using drift or puller from axle hub.

Cut outs are provided in the Hub for The removal of the outer races.



## **II Preparing the parts for Assembly.**

### **Cleaning and Inspection of Parts.**

Use a cleaning solvent to clean ground or polished parts or surface. Kerosene or Diesel fuel can be used for this purpose.

Use a tool with a flat blade, if required, to Remove sealant material from parts. Be careful not to damage the polished or Smooth surface.

Do not clean ground or polished parts with Water or steam. Do not immerse ground or Polished parts in a hot solution tank or use Strong alkaline solutions for cleaning, or the smooth sealing surface may be damaged.

Clean the rough parts with the same method As cleaning ground and polished parts.

Rough parts can be cleaned in hot solution Tanks with a weak or diluted alkaline solution.

Parts must remain in hot solution tanks until Heated and completely cleaned.

Parts must be washed with water until heated And alkaline solutions are removed.

### **Drying Parts After Cleaning**

Parts must be dried immediately after cleaning And washing.

Dry the parts using soft, clean paper or cloth rags.

Except for bearing, parts can be dried with compressed air.

### **Preventing corrosion on Cleaned parts.**

Apply axle lubricant to cleaned and dried parts that Are not damaged and to be assembled.



### III. Inspection of Parts.

It is very important to inspect all parts carefully and completely before the axle Hub is assembled. Inspect all parts for wear and replace damaged parts. Replacement of damaged or worn parts now, will prevent failures of assembly later.

#### Inspecting Tapered Roller Bearings:

Inspect the Cup, Cone Rollers and Cage of Tapered roller bearings in the assembly.

If any of the following conditions exist, the bearing must be replaced.

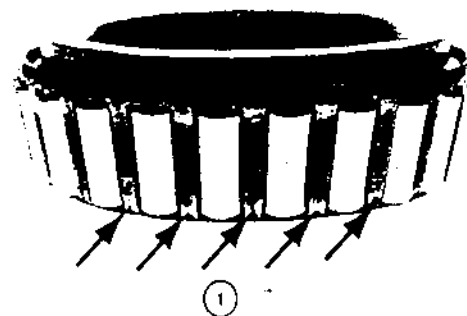
A visible roller groove in the cup or cone

Inner race surface. The groove can be seen at the small - or - larger - diameter end of both parts **Figure - 5**

Deep cracks or breaks in the cup, cone inner race or roller surfaces **Figure - 5**

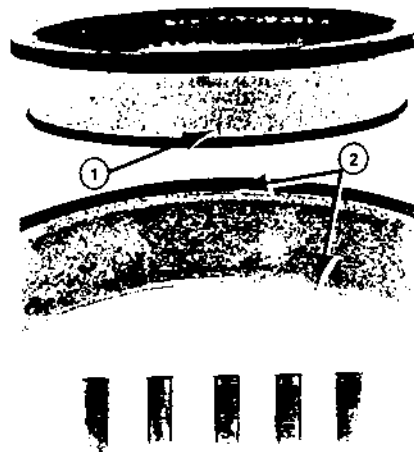
Bright wear marks on the outer surface of the roller cage. **Figure - 6**

Figure 5



1 WEAR MARKS

Figure 6



1 CRACK  
2 WEAR GROOVE

#### Repair or Replacement of Parts, General

Replace any fastener if corners of the head are worn.

Replace washers if damaged.

Replace gaskets, or grease seals at the time of axle hub repair.

Clean parts and apply new silicone gasket material where require when axle hub is assembled.

Remove nicks, mars and burrs from parts with machined or ground surfaces use a fine file, India stone, emery cloth for this purpose.

## Wheel nut adjustment procedure.

**Step 1:** Tighten the adjusting nut  
To 100 FT- LBS torque.

Rotate the axle hub to be ensure  
That all bearing surfaces are in contact.

Back Off one turn. Retighten to 50  
FT-LBS torque.

**Step 2:** Assemble wheel bearing  
Adjusting nut, lock washer & Jam nut.  
Tighten the Jam nut to torque  
specified below.

Nut Size.	Torque (Ft-LBS)
1.12" - 2.62"	200Min.- 300Max.
2.62" - over	250Min - 400 Max

**Step 3:** Ensure that the resulting end-play  
Must be within limits of 0.001" to 0.005"  
Loose. Figure. 7

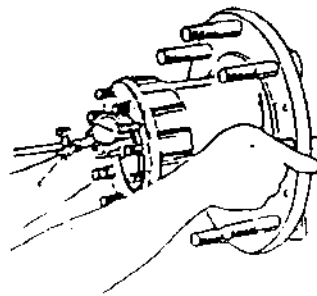
If necessary change the shims to achieve  
the required end by.

Insert the outer oil seal in to the  
Axle hub by using a seal installer.

**Note :**

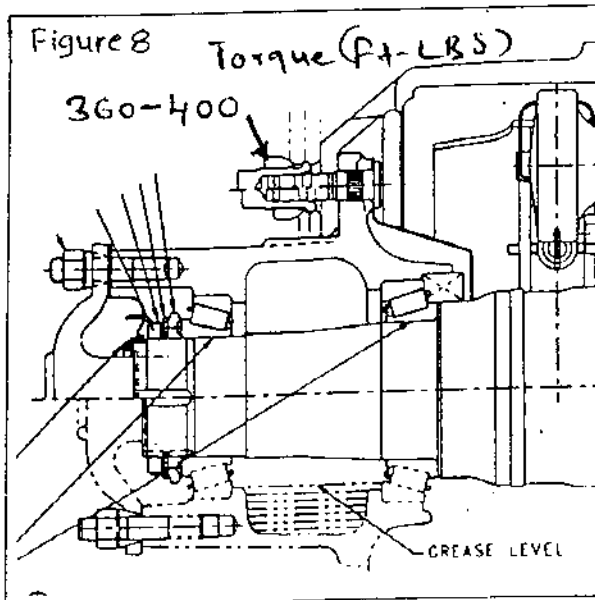
1. All drive axle wheel bearing cone are to be pre-packed with grease (MP grease No.2) prior to installation.
2. Apply a film of axle hub grease to wheel bearing cone bores at assembly.
3. Do not apply grease to spindle threads.
4. The hub cavity shall be partially filled with grease approximately to the levels shown. Figure 8

Figure 7



REAR HUB END PLAY

Figure 8



GREASE LEVEL