

SECTION 3

CARRIER SECTION

DISASSEMBLY

NOTE

The photos or pictures contained herein are for illustrative and instructional purposes only. The appearance of your axle assembly and/or components may vary from that shown. However, the service procedures described will apply.

If it becomes necessary to disassemble any parts inside the carrier, it is suggested that the entire axle be removed from the vehicle and held tight in a stand or rack.

All dimensions are in inches unless otherwise stated. Dimensions in parentheses followed by mm are in millimeters.



WARNING: When removing axle assembly, make sure vehicle is properly supported. Improperly supported vehicle can cause serious injury or death. Follow vehicle manufacturers recommendations for proper axle assembly removal procedures.

Step (1) Remove cover plate from housing and drain lubricant.

NOTE

Before removing differential case assembly, make sure the axle shafts are pulled out far enough for clearance to allow removal.

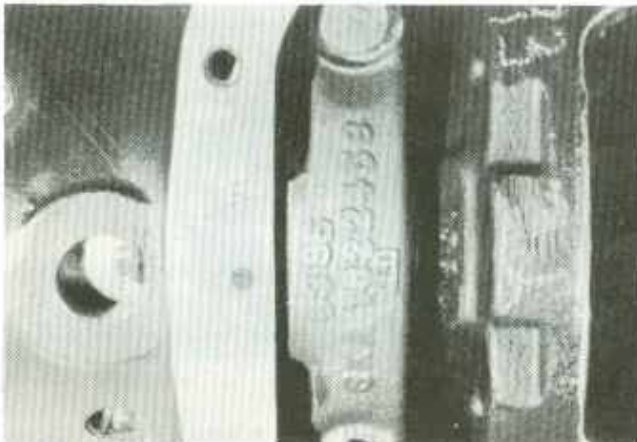


Figure 3-1

Step (2) Remove bearing caps. Note mating letters stamped on caps and carrier. This is important at time of assembly as they are to be assembled exactly

as removed. Letters or numbers are in vertical and horizontal position.

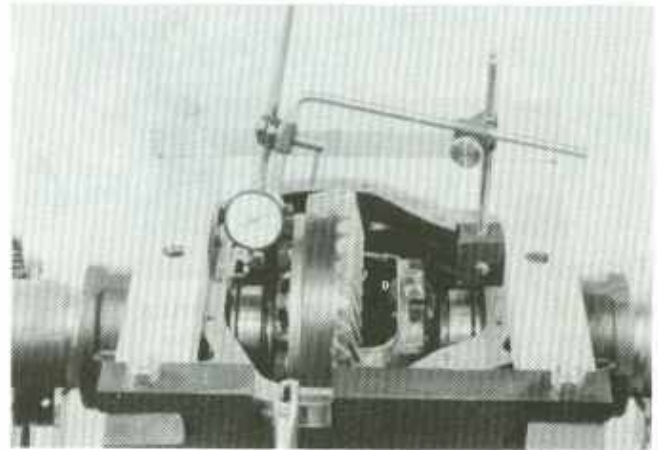


Figure 3-2

Step (3) Mount spreader to housing. DO NOT SPREAD CARRIER OVER .015 (.38 mm). Use dial indicator as shown.

TOOLS: D-167 Spreader
D-128 Dial Indicator Set

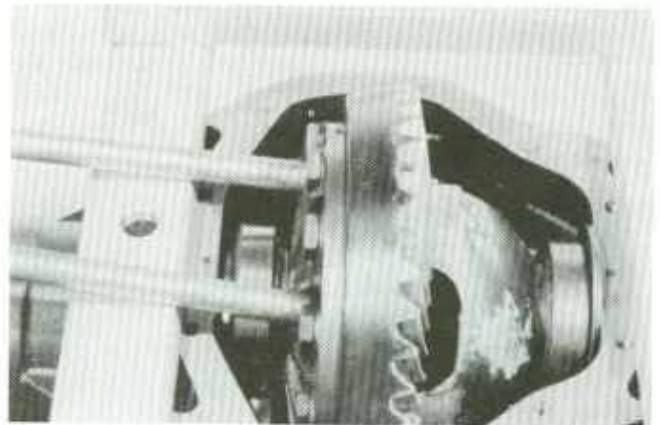


Figure 3-3

Step (4) Pry differential case from carrier with two pry bars. After differential case has been removed, remove spreader. Use caution to avoid damage to components. Tag bearing cups indicating from which side they were removed from. See note below regarding the use of bearings.

NOTE

It is recommended that whenever bearings are removed, they are to be replaced with new ones, regardless of mileage.

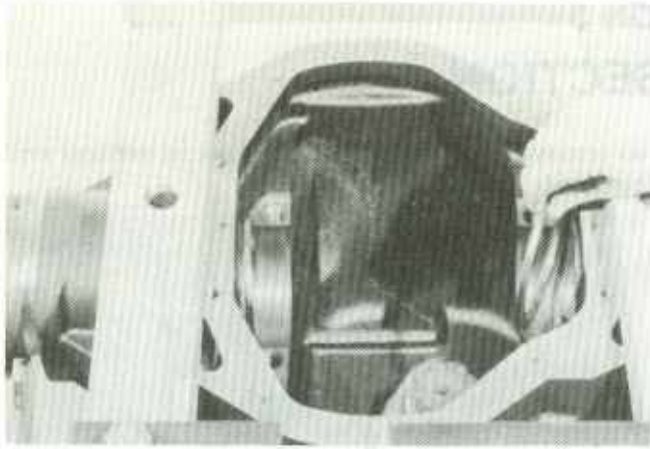


Figure 3-4

Step (5) Note the differential bearing outboard spacers located on each side of the differential bearing bore. Remove and tag which side they were removed from. Ring gear side or opposite side. They will be reused during assembly, unless damaged or worn.

NOTE

Check outboard spacers for damage. (e.g. bent, or deep grooves caused by worn bearings). If damaged, they should be replaced with new ones at time of reassembly.

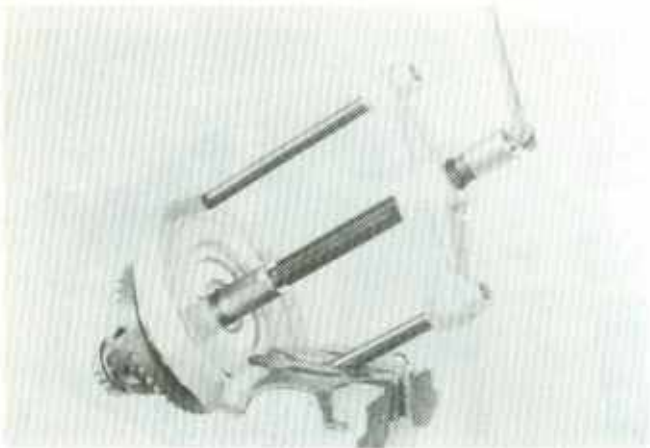


Figure 3-5

Step (6) Remove differential bearing cones with a puller as shown. Tag cones indicating from which side they were removed from.

TOOLS: DD-914 Press
 DD-914-99 Adapters
 DD-914-8 Adapter Ring
 DD-914-7 Extension
 DD-914-42 Button



WARNING: When pulling bearings, do not allow differential assembly to fall. It can strike legs or feet and may cause serious injury.

RING GEAR REMOVAL

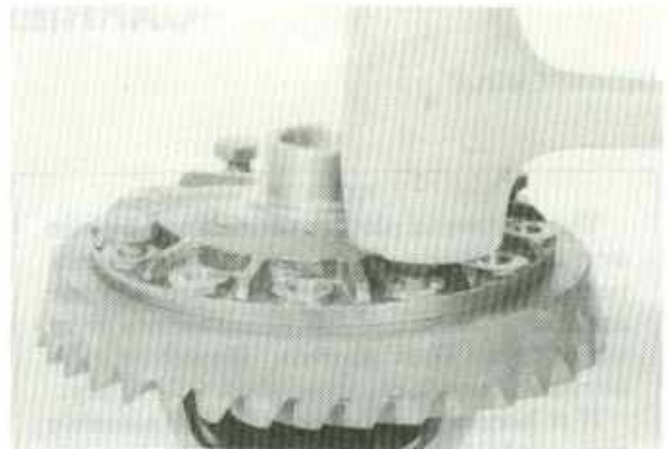


Figure 3-6

Step (7) Place differential case in vise or suitable holding fixture. Remove ring gear screws. Leave 4 screws loosely assembled 90 degrees apart. Place assembly on a solid bench. Tap screws alternately and evenly to free ring gear from differential case. Remove screws and ring gear. Discard ring gear screws. Ring gear screws are to be replaced with new ones at time of reassembly.

SERVICING STANDARD DIFFERENTIAL CASE ASSEMBLY

The differential assembly may be serviced at this time, if required. If differential case, side gears and pinion mate gears are useable and do not require servicing, proceed to DRIVE PINION REMOVAL.

CASE DISASSEMBLY



Figure 3-7

Step (8) Remove roll pin with a small drift.

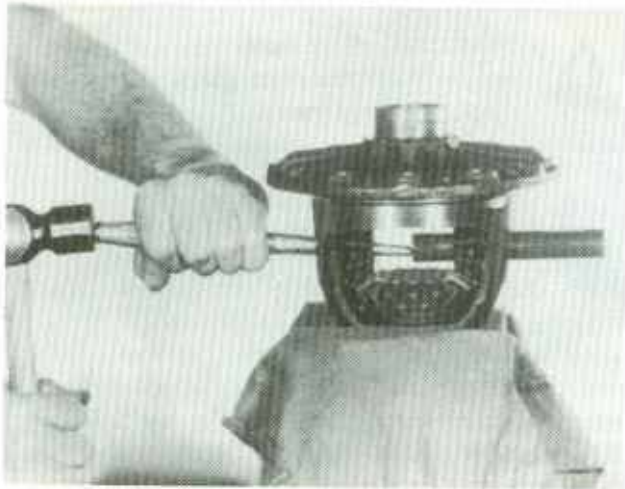


Figure 3-8

Step (9) Remove differential pinion mate shaft with drift.



Figure 3-10

Step (13) Assemble both side gears into case. Hold top side gear up with fingers. Assemble one pinion mate gear. Rotate gears until pinion mate gear is directly in the center of the small opening of the case. Line up the other pinion mate gear with the gear which has just been assembled. Rotate gears until the holes of pinion mate gears are in direct line with the holes of the differential case.

Step (14) After making sure the gears are in alignment, apply a small amount of grease to the new spherical washers. Assemble washers between the gears and case. Also line up the holes of the washers with those of the gears and case. Assemble pinion mate cross shaft, make sure lock pin hole of the shaft is in vertical position and lined up with the lock pin hole of the case.

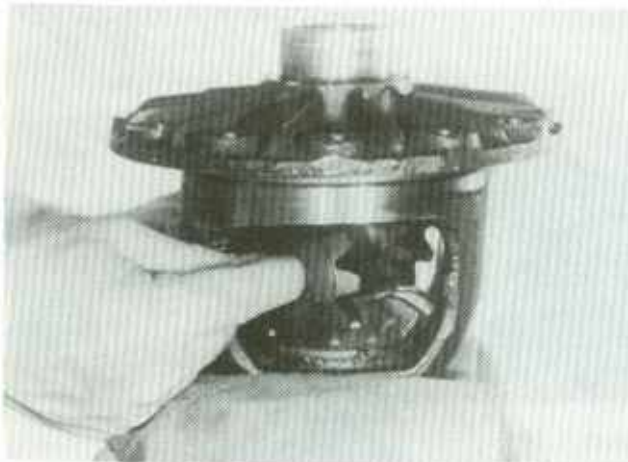


Figure 3-9

Step (10) Rotate gears until the pinion mate (small gears) enter the large opening of the case. Remove pinion mate gears and spherical washers. After removal of the pinion mate gears, the side gear and thrust washers can be easily removed.

Step (11) Inspect and replace components as required.

NOTE

Always replace gears as a complete set. Do not mix new gears with old gears, as this may cause uneven wear and short gear life.

CASE REASSEMBLY

Step (12) Apply a small amount of grease on both side gear hubs. Assemble new thrust washers onto side gears.



Figure 3-11

Step (15) Assemble new roll pin. Peen metal of case over pin to lock in place.

DRIVE PINION REMOVAL

Step (16) Secure end yoke or flange with holding wrench, and remove pinion nut and washer. **NOTE:** PINION NUT HAS 500 LBS. FT. (677.9 N·m) MAX. OF TORQUE FOR RETENTION.

TOOL: D-189 holding Wrench
TM-1000-F Torque multiplier or equivalent
Long Handle break-over bar (wrench)

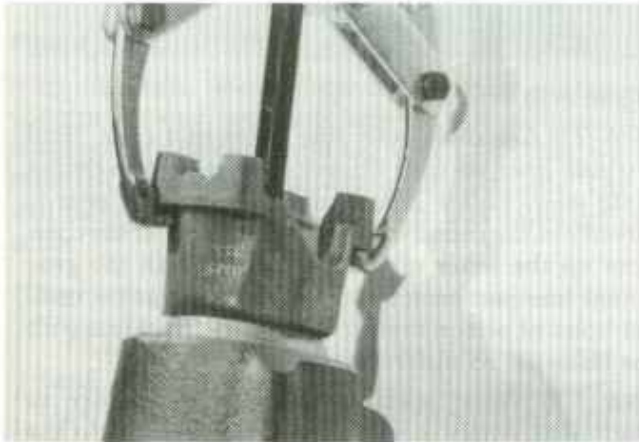


Figure 3-12

Step (17) Remove end yoke or flange with tools as shown. If end yoke or flange shows wear in the area of the seal contact surface, it should be replaced.

TOOL: L-4534 Yoke Remover (2 Jaw Puller)

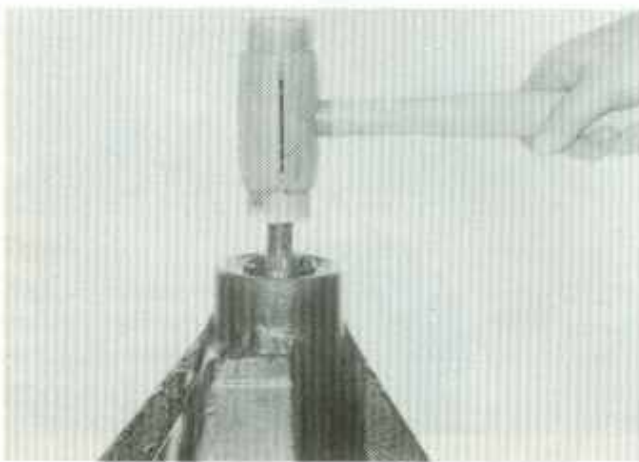


Figure 3-13

Step (18) Remove pinion by tapping with a rawhide or plastic hammer. Catch the pinion with your hand to prevent it from falling and being damaged.



WARNING: Gear teeth may have sharp edges. When handling gears, use care to avoid personal injury.

NOTE

On the spline end of the pinion, there are bearing preload shims. These shims may stick to the pinion or bearing or even fall out. These shims are to be collected and kept together since they will be used later in assembly. Try not to mutilate shims. If shims are mutilated, replace with new ones.



Figure 3-14

Step (19) Pull out pinion seal with puller as shown. Discard seal. **REPLACE WITH NEW ONE AT TIME OF ASSEMBLY.** Remove bearing cone and outer thrust washer.

TOOL: D-131 Slide Hammer.

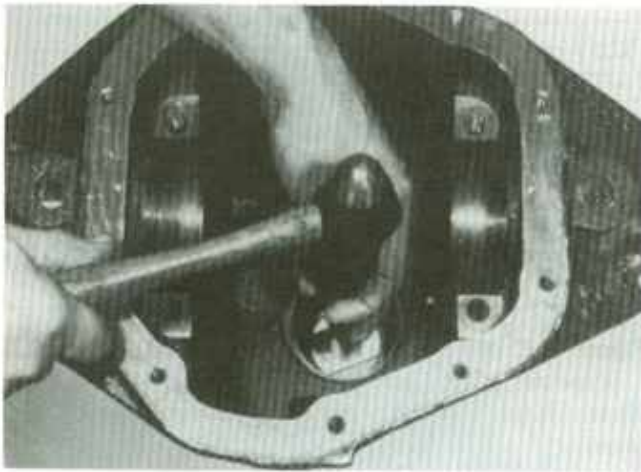


Figure 3-15

Step (20) Turn nose of carrier down. Remove outer pinion bearing cup. Locate driver on back edge of cup; drive cup out of carrier. **CAUTION: DO NOT NICK CARRIER BORE.**

TOOLS: C-4307 Cup Remover
C-4171 Handle



Figure 3-16

Step (21) Remove the inner bearing cup with tools as shown.

TOOLS: D-159 Cup Remover
C-4171 Universal Handle

NOTE

Shims are located between the bearing cup and carrier bore and may also include an oil baffle, depending upon the application. If shims and baffle are bent or nicked, they should be replaced at time of assembly.

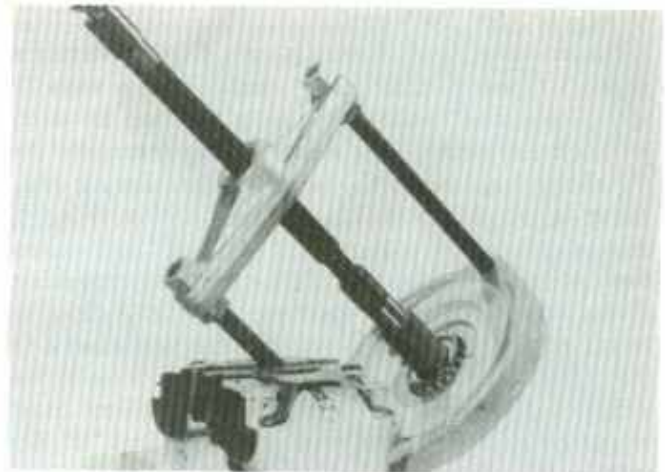


Figure 3-17

Step (22) Remove pinion bearing with tools as shown.

TOOLS: DD-914-P Press
DD-914-8 Adapter Ring
DD-914-95 Adapters



WARNING: Do not allow gear to fall. It can strike legs or feet and may cause serious injury. Gear teeth may have sharp edges. When handling, use care to avoid cutting hands.

RING & PINION GEAR ASSEMBLY THEORY

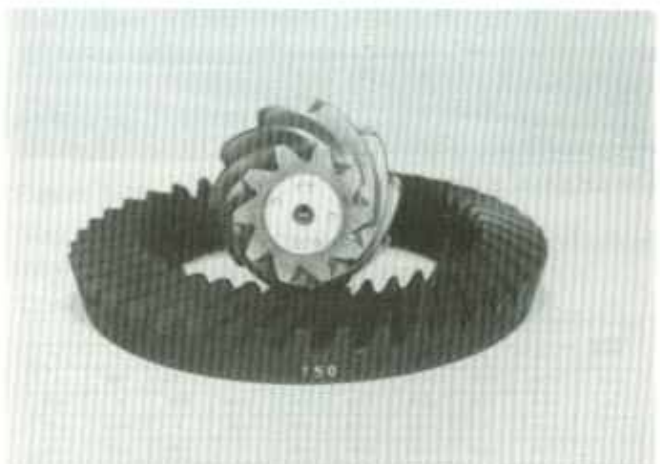


Figure 3-18 (View of ring & pinion set)

Step (23) Ring gears and pinions are supplied in matched sets only. Matching numbers on both the pinion and ring gear are etched for verification. If a new gear set is being used, verify the numbers of each pinion and ring gear before proceeding with assembly.

The nominal distance from the centerline of the ring gear to the button end of the pinion for the Model

80 axle is 3.500 (88.9 mm).

On the button end of each pinion, there is etched a plus (+) number, a minus (-) number, or a zero (0) which indicates the best running position for each particular gear set. This dimension is controlled by the shimming behind the inner pinion bearing cup.

For example: If a pinion is etched a plus +3 (m+8), this pinion would require .003 (.08 mm) less shims than a pinion etched "0". This means by removing shims, the mounting distance of the pinion is increased to 3.503 (88.98 mm), which is just what a +3 (m+8) indicates. Or if a pinion is etched -3 (m-8), we would want to add .003 (.08 mm) more shims than would be required if the pinion were etched "0". By adding .003 (.08 mm) shims, the mounting distance of the pinion was decreased to 3.497 inches (88.82 mm) which is just what a -3 (m-8) indicates.

If the old ring and pinion set is to be reused, measure the old shim pack and build a new shim pack to this same dimension. If a baffle is used in the axle assembly, it is considered as part of the shim pack.

To change the pinion adjustments, use different combination of the pinion shims which come in different thicknesses.

NOTE

If baffle or slinger is bent or mutilated, it should be replaced.

Measure each shim separately with a micrometer and add together to get total shim pack thickness from the original build-up.

If a new gear set is being used, notice the (+) or (-) etching on both the old and new pinion and adjust the thickness of the new shim pack to compensate for the differences of these two figures.

For example: If the old pinion reads +2 (m+5) and the new pinion is -2 (m-5), add .004 (.10 mm) shims to the original shim pack.

Old Pinion Marking	New Pinion Marking									
	+4	+3	+2	+1	0	-1	-2	-3	-4	-5
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008	-0.009

Figure 3-19 (Pinion Setting Chart - English U.S. Standard)

Old Pinion Marking	New Pinion Marking									
	+10	+8	+6	+4	0	-2	-4	-6	-8	-10
+10	+0.000	+0.002	+0.004	+0.006	+0.008	+0.010	+0.012	+0.014	+0.016	+0.018
+8	+0.002	+0.000	+0.002	+0.004	+0.006	+0.008	+0.010	+0.012	+0.014	+0.016
+6	+0.004	+0.002	+0.000	+0.002	+0.004	+0.006	+0.008	+0.010	+0.012	+0.014
+4	+0.006	+0.004	+0.002	+0.000	+0.002	+0.004	+0.006	+0.008	+0.010	+0.012
0	+0.008	+0.006	+0.004	+0.002	+0.000	+0.002	+0.004	+0.006	+0.008	+0.010
-2	+0.010	+0.008	+0.006	+0.004	+0.002	+0.000	+0.002	+0.004	+0.006	+0.008
-4	+0.012	+0.010	+0.008	+0.006	+0.004	+0.002	+0.000	+0.002	+0.004	+0.006
-6	+0.014	+0.012	+0.010	+0.008	+0.006	+0.004	+0.002	+0.000	+0.002	+0.004
-8	+0.016	+0.014	+0.012	+0.010	+0.008	+0.006	+0.004	+0.002	+0.000	+0.002
-10	+0.018	+0.016	+0.014	+0.012	+0.010	+0.008	+0.006	+0.004	+0.002	+0.000

Figure 3-20 (Pinion Setting Chart - Metric)

If metric, pinion will be etched (m+ some number). Example (m+5). Use these charts as a guideline to set pinion.

ESTABLISHING PINION GEAR DEPTH USING SERVICE TOOL GAGES.



Figure 3-21

View of master pinion bearing, pinion height block, scooter gage, cross arbor, arbor discs and master differential bearings.

NOTE

Make sure that all carrier bores are free from all nicks, dirt or any other contamination.



Figure 3-22

Step (24) Assemble the outer pinion bearing cup into carrier as shown. Make sure cup is seated.

TOOLS: C-4171 Universal Handle
C-4308 Cup Installer

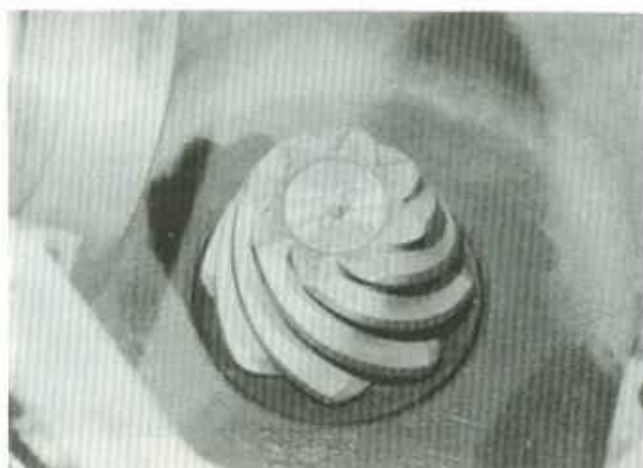


Figure 3-24

Step (26) Assemble pinion with master bearing into housing. Assemble outer pinion bearing cone, end yoke, washer, and nut. Torque nut until pinion gear and master bearing is snug (seated) in housing. The pinion gear should not have any end play. **NOTE:** Do not try to rotate pinion using master bearing.



Figure 3-23

Step (25) Assemble master pinion bearing on pinion.

TOOL: D-391 Master Pinion Bearing



WARNING: Gear teeth may have sharp edges. When handling gears, use care to avoid personal injury.



Figure 3-25

Step (27) Place arbor discs (large diameter) and arbor into cross bores of carrier as shown.

TOOLS: D-116-1 Master Discs
D-115 Arbor