

J2 TECHNICAL ARTICLE

Number 51

From Octagon Heaven

November 14, 1981

ASSEMBLY OF THE RING GEAR AND PINION (CROWN WHEEL AND PINION)

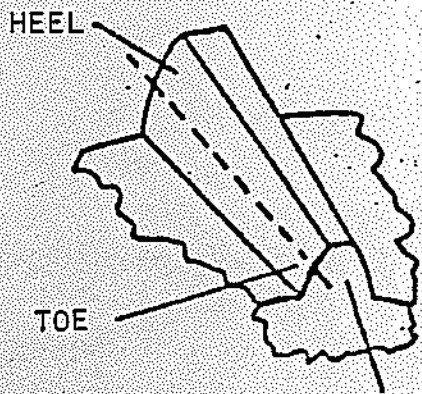
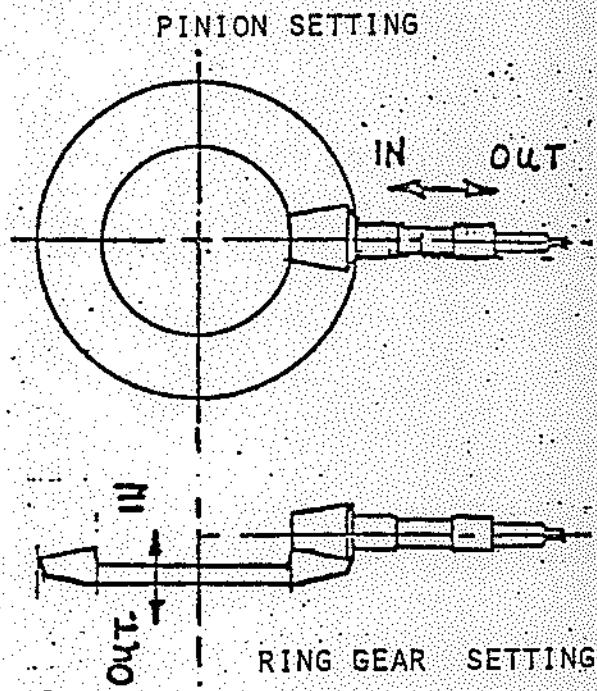
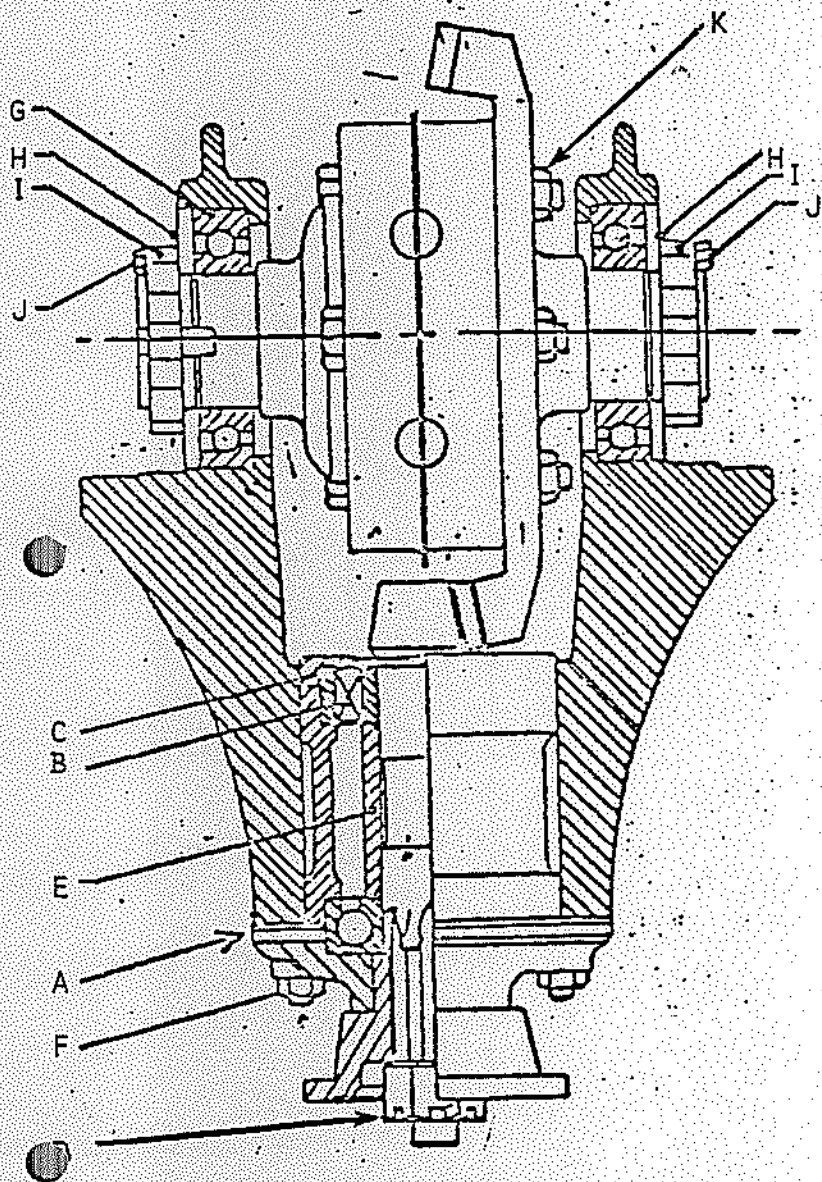
(an extended version of article No. 27)

All parts must be cleaned and all grit and fluff from cleaning rags blown off. Any bearings that show wear must be replaced. If there is any question, then replace it. It is impossible to get good gear life with bad bearings! The two pinion bearings will almost certainly be worn. The distance piece "C" is subject to be worn if nut "D" has been run loose. Replace it if any questions arise, or if in doubt.




- The pinion is first assembled in its own housing. The distance piece which is hardened and ground should be 0.120" to 0.130" thick. If the distance piece "C" is correct, fit it to the pinion head with the inside radius to the gear head. Next fit the roller bearing (inner) "B" to the pinion. Fit the roller bearing (outer) into the bearing housing and retain it with circleclip. Now fit distance piece "E" over pinion and slide assembly into the bearing housing. Now press the ball bearing onto the shaft and into the bearing housing using a light press. Do not use a hammer for it will ruin the bearing. Fit the bearing cover and fix with two countersunk screws. Fit the driving flange flat washer and nut. Tighten the pinion nut holding the assembly by the driving flange. Do not try to hold pinion teeth in a vice! When tight lock nut with a cotter pin (split pin). The pinion should now revolve freely without any end-play. If there is endplay it should be removed and fitted with a new ball race. If it is tight it is possible that the distance piece "C" is worn and should be replaced. Do not try to slacken the pinion nut to relieve the tightness on the pinion bearings for this would ruin the pinion in a few miles.

Take some engineering marking blue, some red lead, or similar marking compound and mark both sides of pinion teeth from toe to heel. Fit pinion assembly into differential housing using the correct number of shims as marked on Bevel Gear Setting Sheet. Shims to go at position "A". Lock down with nuts "F". Take the two halves of the differential carrier and fit on angular contact bearings "C", followed by locking ring "H" and nut "I". Note that lock screw "J" is withdrawn. Assemble differential gears into housing and close the two halves together. Note reference mark for correct assembly. Place the crown wheel (ring gear) over the differential carrier and press down tight. Fit the retaining bolts and pull slotted nuts up tight. Bolts are fitted bolts and may need light tapping to get into assembly. Care must be taken not to damage threads. Use cotter pins or locking wire to assure assembly does not come loose later.

(Continued on next page)



SMALLER END OF TOOTH

- | | | |
|---|---|-----|
| 1 |  | YES |
| 2 |  | YES |
| 3 |  | NO |

Assemble differential and ring gear into axle casing and fit bearing caps as marked. Tighten nuts and lock with cotter pins or locking wire.

- The crownwheel (ring gear) and pinion adjustments. Adjust nuts "I" until you can feel backlash between gear teeth but no slack in bearings. Backlash should be set at 0.004" to 0.006" at the tightest point on gear set. With backlash adjusted, rotate the ring gear while applying a little friction by hand to the pinion flange. This should be done in both directions. The rotation will transfer the blueing or red lead from the pinion teeth onto the ring gear teeth, showing the tooth contact. For straight-cut gears the procedure should be as follows- (the required marking is shown on the Bevel gear setting sheet". Aim for picture (1) or (2) with a marking towards the toe of the tooth.

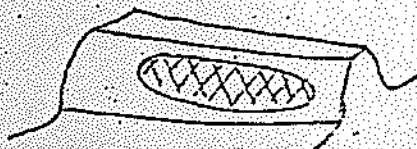
If the marking is not correct, withdraw the pinion assembly, increase or decrease shims at "A", re-blue and re-assemble, set backlash, and retest tooth contact. A setting will be found when a marking on the driving side of the tooth will show most likely like (2). At this setting the gears will run smoothly and quietly. Do not set gears at a setting like (3) for under load the tooth contact moves from the toe to the heel and with heel contact at light load the result will be early tooth failure. Contact on only the extreme end of the tooth toe is not acceptable as this will not use the full tooth under operation and likewise cause tooth failure

Backlash should be set by adjusting the crown wheel (ring gear) in or out on nuts "T". When the correct shims "A" have been found which give correct tooth makings, fit nuts "F" and lock. Adjust nuts "I" until backlash is correct. Aim for just nipping the bearings "G", no preload, but no shake. To lock, screw bolts "J" into lock rings "H". Your ring gear and pinion are now set and should run smoothly with no tightness or noise.

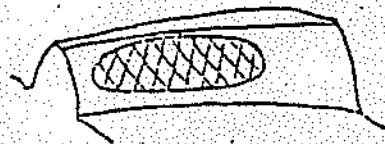
- For spiral gears the method is slightly different. The tooth contact point moves up and down the tooth quite a lot when the gears are moved in and out. Follow the same basic fitting process as previously written but use diagram on page 4 for tooth contact.

This total article was "lifted" from the MMM Register Infoletter number 63 and special credit is given to its author Barry Linger who wrote the article.

----- PERFERED TOOTH CONTACT ON SPIRAL GEARS-----

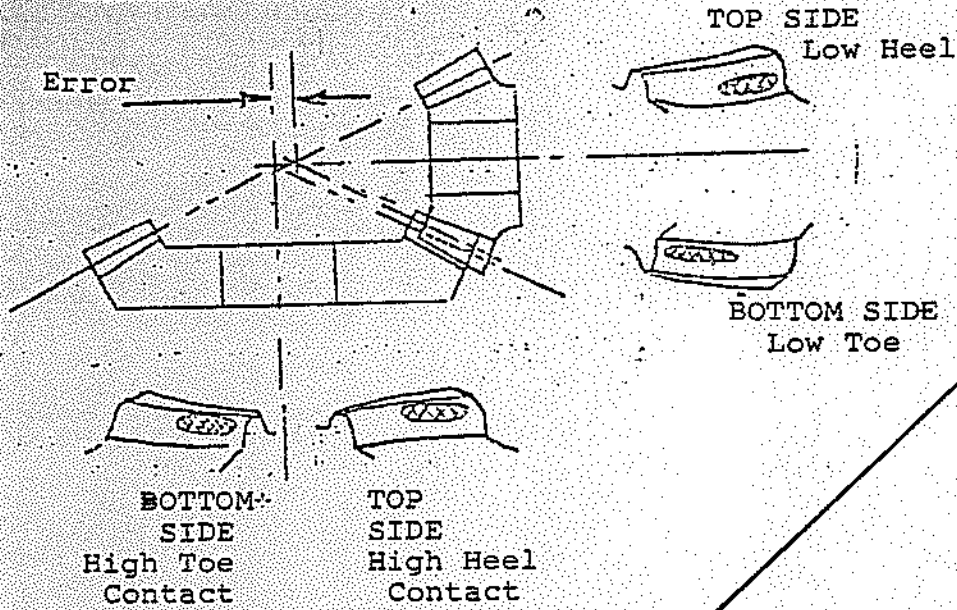


Bottom side



Top side

ERROR: PINION OUT
CORRECT: MOVE PINION IN



ERROR: PINION IN
CORRECT: MOVE PINION OUT

