Corvair Differential

I've had a lot of requests for an article on rebuilding the late model differential however this information should also be relevant to early models also. I've put it off until now because of the size of the project so this will be one of the larger articles to date. It will also require a moderate degree of mechanical ability on your part. You will need a shop manual for your vehicle as I will refer to it often and all the adjustments will be done from the manual..

Read through this entire guide before starting to be sure this is something you can or even want to do. Even if you decide not to do the work yourself you will at least have the knowledge to understand what the mechanic is doing.

The Corvair differential is basically the same as any other differential except for the fact that it's wedged in between the engine and the transmission necessitating the use of a hollow pinion shaft so that the power from the engine can pass through the differential to the transmission then back from the transmission to the differential.

Confused? Not to worry. After you get the power train apart it will become clear.

If you simply need to replace the throw out bearing shaft use a center punch and mark the side bearing adjuster nuts and the pinion bearing adjuster nut to the case so that they can be reassembled to the original settings.

Follow steps 1-13 then steps 39 - 56 but instead of doing the adjustments called for in the text you can simply align the marks made during disassembly.

Of coarse this only works if no parts (other than seals and gaskets) need to be replaced.

If any parts or bearings need to be replaced (which is usually the case) the all the clearances and adjustments need to be reset.

1. Typical transaxle assembly. Power is delivered from the engine via the long shaft entering on the right to the far left end of the trans. Then it is returned back from the trans. to the differential.

2. The 3 bolts on each side hold the transmission to the differential (2 bolts for 1965 and earlier).

3. After removing the bolts you may have to drive something between the housings to separate them. Here I used an old scraper.

4. Once separated remove the differential top cover. Now you can clearly see the hollow pinion shaft and the hollow output shaft on the trans.

5. Bend the lock tabs away from the bolts holding the yokes in place then remove the bolts.

6. Now the yokes should just pull out of the sides of the differential.

7. During reassembly remember that the long yoke goes on the left (drivers) side of the diff. In step 8 if you don't have a spanner tool to remove the side bearing adjusters you can use a square blade screwdriver to back it out.

8. Do not hammer on the tabs or they **will** break off. If you are just replacing the "snout" and no bearings or gears then mark the side adjusters and case with a center punch so they can be readjusted to the same place.

9. Again punch the retainer/case if only replacing the "snout". Remove the bolt and lock tab on the pinion bearing retainer then remove the retainer.

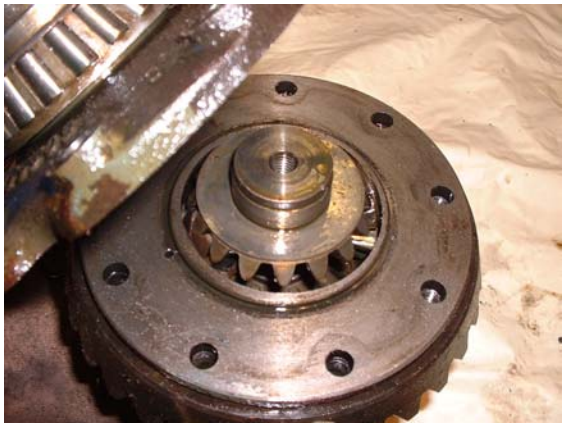
10. With the retainer and bearing cup out of the way remove the pinion shaft assembly out the top.

11. Roll the carrier assembly as shown.

12. Now remove the carrier assembly out the top.

13. Using a large hammer and a block of wood drive the throw out bearing shaft “snout” to the inside if the diff. This will also drive out the bearing cup. Keep track of any shims that are behind the bearing cup to be reinstalled later.

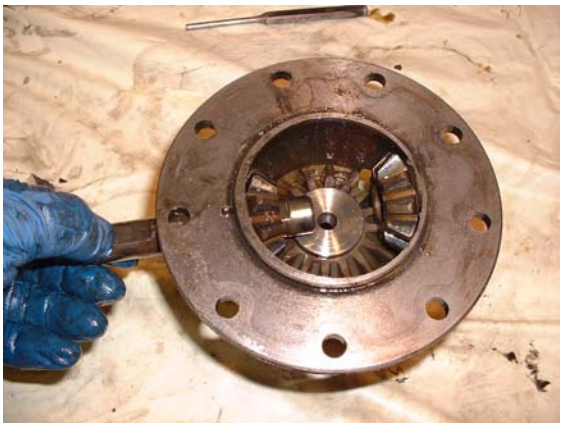
14. Punch 2 carrier halves and mark ring gear for later reassembly. Remove bolts from the ring gear. Notice white paint on the gear tooth. If there is a matching paint mark on the pinion gear they should be aligned during reassembly.



15. Remove the differential cover to expose the gears inside. If you have a positraction diff. there may be some countersunk screws holding the cover on.

16. Remove the side gear and shim then use a flat punch and drive out the pin that holds the shaft in place

17. The ring gear can be removed from the carrier by dropping it on a wooden block.



18. Remove the shaft, spider gears and shims and the remaining side gear and shim.

19. To remove the bearing cups you'll have to drill 2-3/16 holes 9/16 over from the edge of the ridge then punch out the cup. See the 1965 shop manual pg 4-13.

20. After driving out the bearing cups clean the retainers and fill the holes by driving a lead ball (small sinker) into each one or fill with JB Weld.

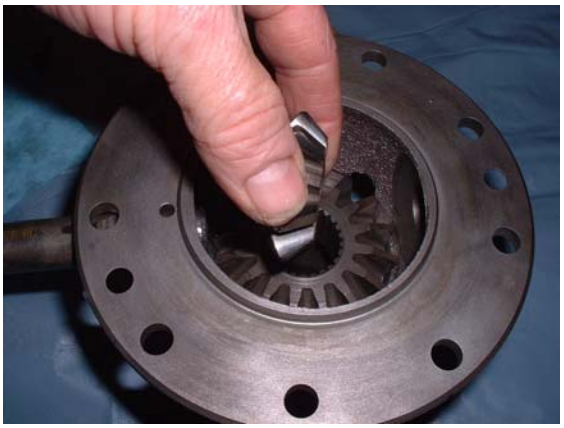
21. Using a bearing separator remove the pinion bearing and both differential carrier side bearings. Note the shim. Try to save this or at least measure the thickness. It must be used as a starting point during reassembly and setup.

22. Notice the markings to identify the ring gear. It has GM, part number 3861779, ratio 9-32 (3.55:1) and month of mfg. 11-64 965 model year). Similar information is on the end of the pinion gear.

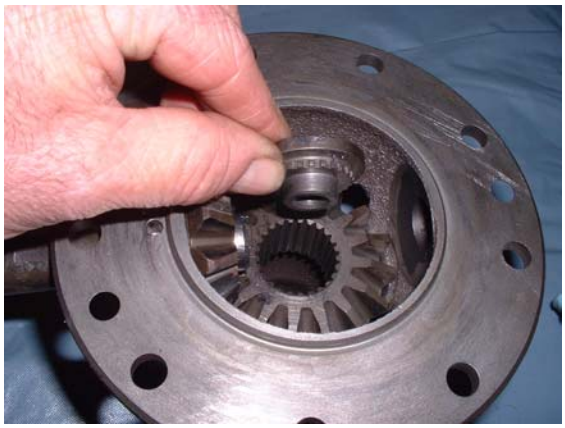
23. Now it's time to clean, scrub and/or blast all the parts. Cleanliness it imperative. I painted the case, yokes adjusters and top with cast iron gray.

24. Start the reassembly by installing one of the side gears w/shim into the carrier. All parts should be lubricated although I don't show it for clarity.

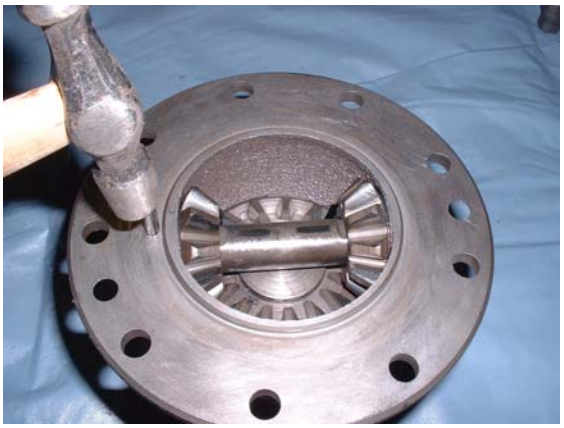
25. Partially insert the shaft and install one of the curved shims on the end of it.



26. Now install a spider gear.



27. Install the yoke retaining nut. Install the other gear and shim then fully insert the shaft making sure the hole for the roll pin aligns. See step 28



28. Drive pin flush with a small hammer. Steps 29-34 are for positraction differentials only. If you don't have positraction then skip to step 35.

29. Refer to the 1965 shop manual page 4-22. For a posi diff. start by installing the belleville spacer curved side down. Into the cover.

30. Now install the belleville disk curved side down.

31. Now install the flat clutch plate, clutch disk and the other clutch plate in the order shown. There is no top or bottom to these.

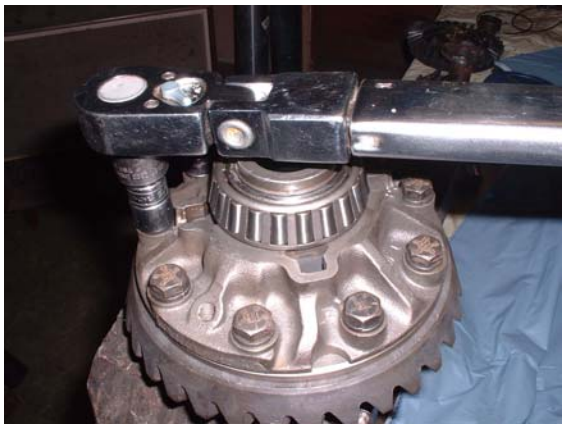
32. Install the side gear making sure it fully engages all the teeth inside the clutch pack.

33. Insert the yoke retaining nut into the side gear Then install the preload spacer with the beveled side up as shown.

34. Finally put the differential haves together being sure to align the marks made during disassembly. Install the 2 screws if equipped to hold it all together. Go to step 36.

35. Install the other side gear, shim and yoke retainer nut in the cover and put the halves together aligning the marks made during disassembly.

36. Install the carrier bearings then start all the bolts in the ring gear. Now pull the ring gear onto the carrier evenly with the bolts.



37. Torque to 40-60 ft lbs.

38. Install the pinion bearing and shim. Be careful not to chip any teeth on the pinion. They are much more brittle than they look.

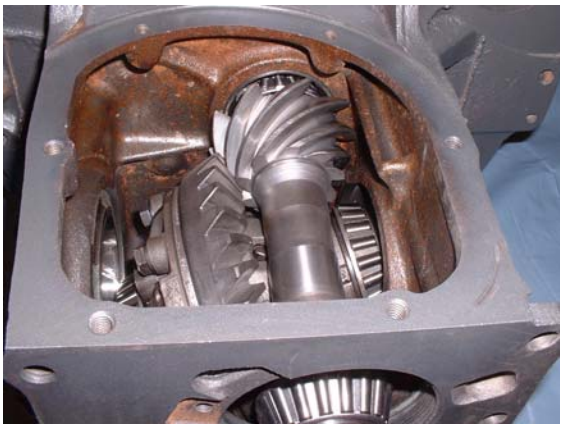
39. I like to use a transparently thin layer of RTV silicon on the outside of all seals before installing. Drive seal flush with top of retainer.

40. Install the bearing cups (if removed) into the retainers and put the o-rings in the grooves on the retainers.

41. Install the seal in the throw out bearing shaft until it bottoms out. Then install the C shaped retainer.

42. Put a thin layer of RTV in the flange area of the shaft (see fig. 41). Now drive the shaft back into the case until it bottoms out.

43. Install the shim then drive in the bearing cup until it bottoms out.



44. Install the carrier assembly in the bottom of the case then the pinion assembly goes in.

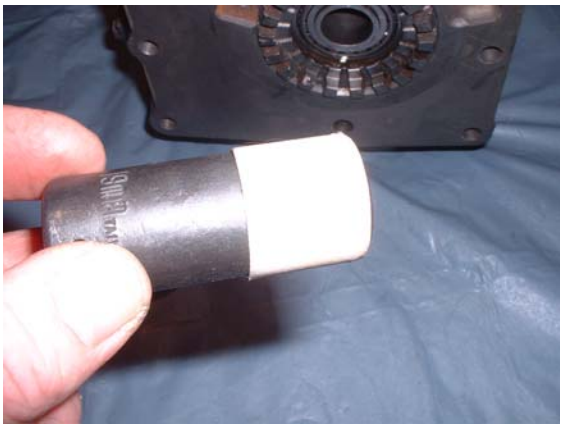
45. Put a thin layer of grease on the sealing surfaces and threads in the case.

46. Also on the o-rings and the threads on the bearing retainers.

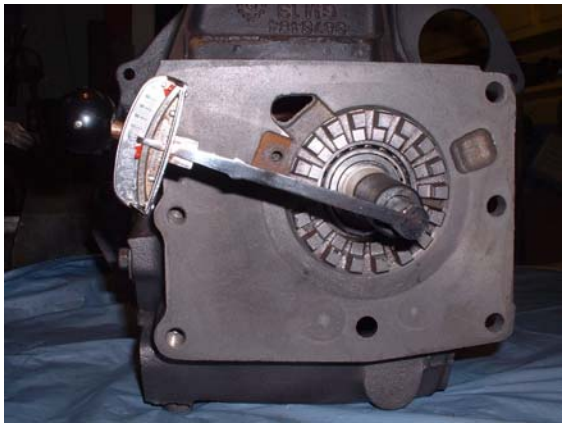
47. Start both retainers in the case. Make sure they are not cross threaded. Adjust according to shop manual pg. 4-18 4-21.

48. You can make a spanner by cutting slots in the end of an old scrap of metal with a die grinder. Then weld an old socket in the center.

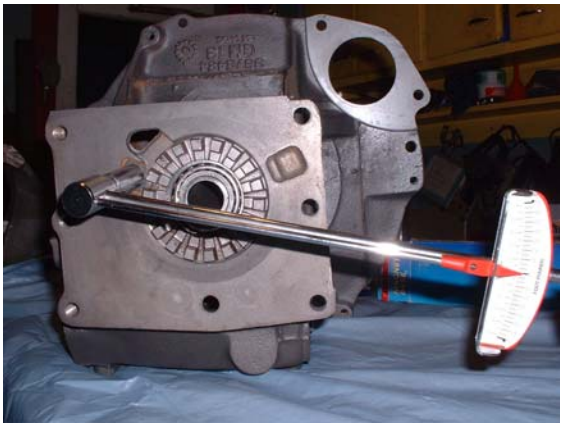
49. Turn pinion adjuster in until all the play is removed but bearing is not tight.



50. To make a tool to turn torque the pinion wrap masking tape around a socket until it will fit tight inside the pinion hole and force it in..



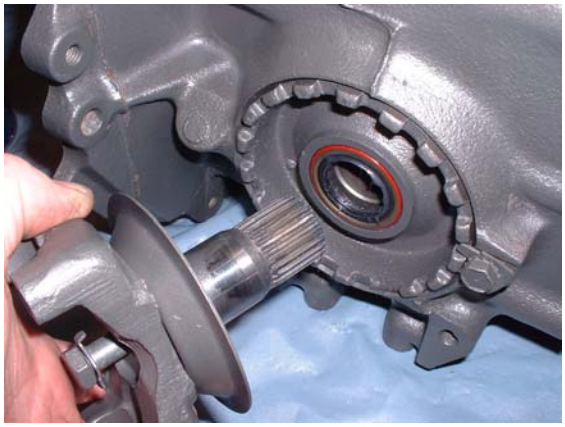
51. Now you can adjust the pinion preload to 5-10 in lbs. by tightening the adjuster while turning the pinion with a torque wrench. Again refer to shop manual page 4-18 and 4-21.



52. When all adjustments are correct install and torque the pinion adjuster lock to 20-25 ft lbs.

53. Checking backlash with a dial indicator. First turn the ring gear until all play is removed then zero the dial indicator.

54. Now turn the ring gear in the other direction until all play is removed and read the free play on the dial indicator.



55. After you're satisfied with all the adjustments install the axle yokes and torque to 15 ft lbs. Don't forget to install the lock tabs.

56. Finishing up install the top cover and gasket then torque to 130-230 in lbs. Install a new gasket between the trans and diff. Bolt together and torque to 35-50 ft lbs. <>