

## FOREWORD

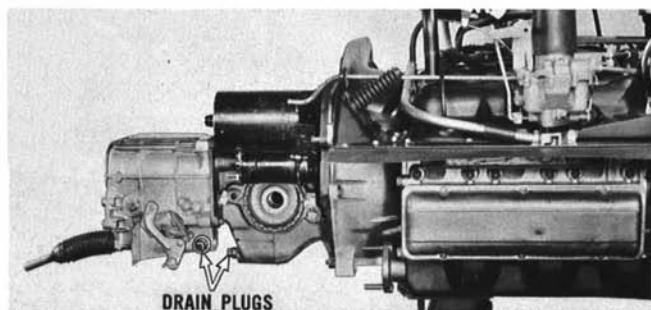
This booklet contains a complete review of the discus- sional slidefilm, Overhauling the Corvair Differential Carrier.

Each man should have one of these booklets for on-the- job reference, and one copy should be retained in the Service Department file of Technical Information.

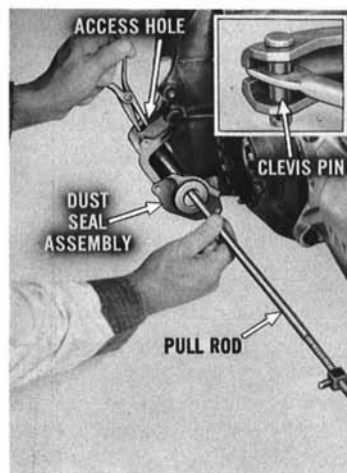
## CONTENTS

	Page
REMOVING TRANSAXLE FROM ENGINE.....	1
SEPARATING TRANSMISSION FROM DIFFERENTIAL CARRIER.....	2
DIFFERENTIAL CARRIER DISASSEMBLY.....	3
BEARING REPLACEMENT.....	5
DIFFERENTIAL CASE DISASSEMBLY AND INSPECTION.....	10
RING GEAR AND PINION GEAR CLEARANCES...12	
DISASSEMBLY OF DIFFERENTIAL CARRIER...15	
POWERGLIDE END PLAY CHECK.....	18
INSTALLING POWERGLIDE TRANSMISSION TO DIFFERENTIAL CARRIER.....	20
ANCHORING MANUAL TRANSMISSION COUNTERSHAFT.....	21
INSTALLING MANUAL TRANSMISSION TO DIFFERENTIAL CARRIER.....	22

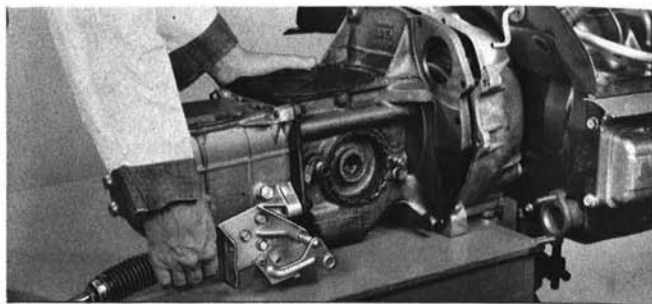
This presentation covers overhaul proce- dures for the Corvair Differential Carrier on both Manual Transmission and Powerglide-equipped cars. Both units are basically the same. Therefore, the Manual Transaxle will be shown with additional pictures on those few areas where Powerglide units require variations in the basic procedures.



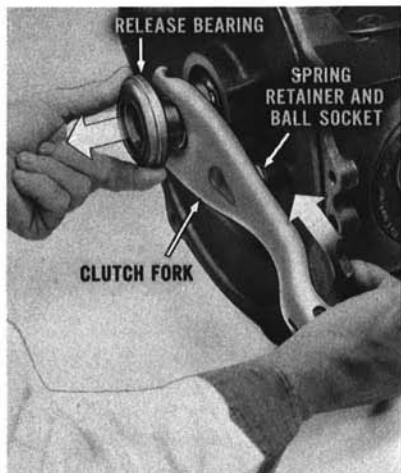
With power train mounted on transmission jack, completely drain Transaxle and clean exterior surface. To remove Powerglide Transaxles, follow steps in the Corvair Shop Manual, Page 6-7, or in the film Servicing the Corvair Powerglide — Parts III and IV, Overhaul.



To remove Manual Transmission units, lower unit so differential carrier just rests on a flat surface. Remove two screws holding clutch pull rod dust seal assembly to clutch housing. Remove dust seal assembly. Remove the clavis pin retainer; then through access hole in clutch housing, pull out clavis pin holding clutch pull rod to clutch fork, and remove pull rod.



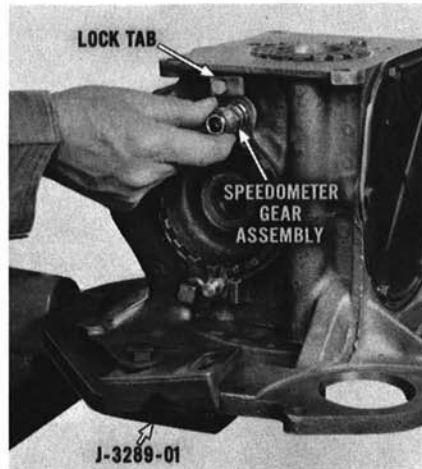
Remove the two starter mounting bolts, and remove starter. Remove the five remaining mounting bolts holding the Transaxle to the clutch housing. Carefully pull Transaxle straight away from clutch housing to prevent damaging clutch shaft and clutch fork. Remove clutch shaft.



Apply pressure on clutch fork toward the release bearing to disengage the clutch fork spring retainer from the ball socket. Remove the clutch fork and clutch release bearing from the Differential Carrier.



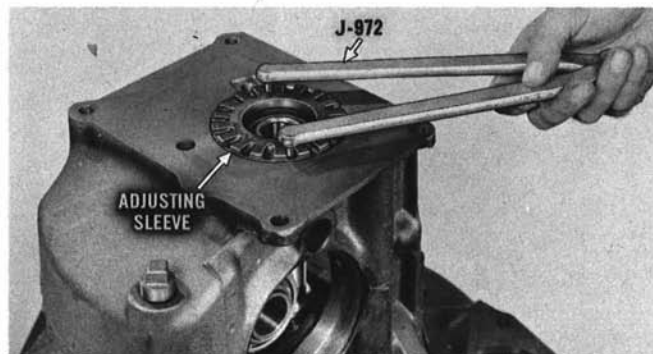
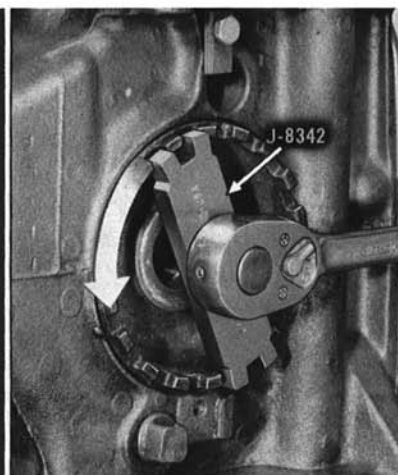
Separate transmission and Differential Carrier by removing four attaching bolts and carefully pulling two units apart. This procedure applies to both Manual and Powerglide Transaxles.



Mount Differential Carrier in Holding Fixture J-3289-01. Lock in vertical position, then loosen lock tab and remove speedometer gear assembly.

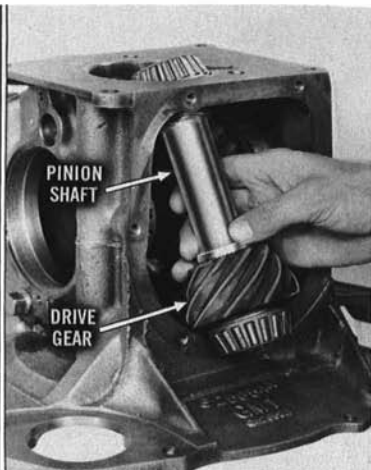


Next, remove locking tab screw and tab from side gear adjusting sleeves. Use Tool J-8342 and remove adjusting sleeves by turning counterclockwise.

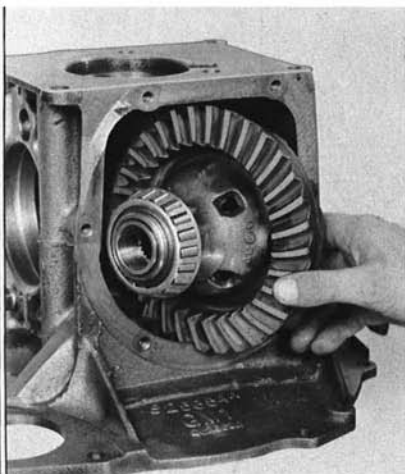


Remove Differential Carrier top cover and gasket. Then, remove lock tab screw and lock tab, holding pinion adjusting sleeve. Use Tool J-972 and unscrew adjusting sleeve.

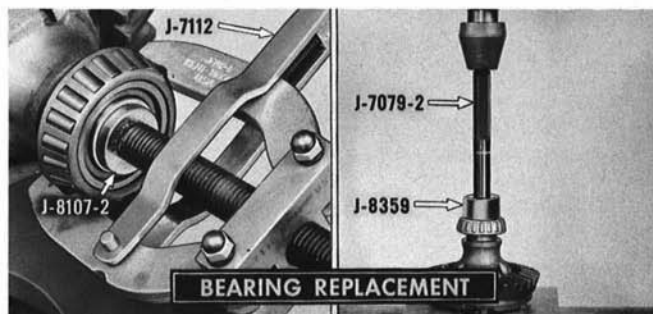
Lift out pinion shaft and gear by pulling upward to move bottom of shaft out of bearing race. Then swing bottom of shaft out through top cover opening.



Differential case can now be removed by shifting to one side and turning at right angle so ring gear can pass through top cover opening.

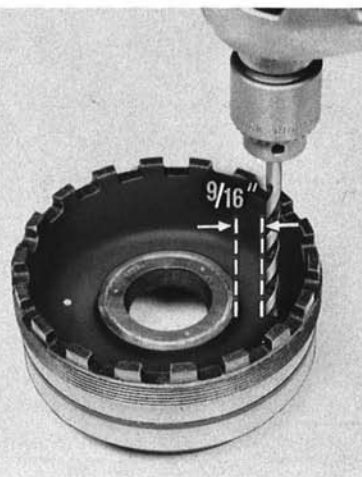


With the main components out of the carrier, clean and carefully inspect for wear. Pinion bearings will normally have a uniform frosted appearance. Unusual wear at either end of rollers indicates improper pre-loading, either too loose or too tight. Make sure races aren't cracked or gouged. Check carrier for cracks or cross threads.



If damaged, bearings and races should be replaced as a set. To remove differential side bearings, use Bearing Puller J-7112 with Pilot J-8107-2 as shown. Clamp differential case in vise and pull bearings. Replace bearings using J-8359 and Handle J-7079-2 as shown.

To remove side bearing races, measure  $\frac{3}{16}$ " out from center hub of adjusting sleeves at two places, 180 degrees apart. Make punch marks, then drill a  $\frac{3}{16}$ " hole through adjusting sleeve to bearing race. Use pin punch through drilled holes to drive out old races.

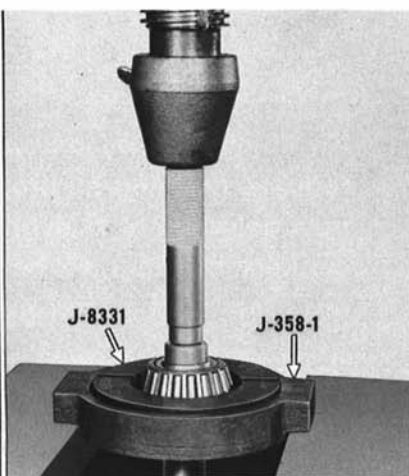


J-8148



Install new race using Driver J-8148. Seal the drilled holes with lead balls similar to small fishing line sinkers.

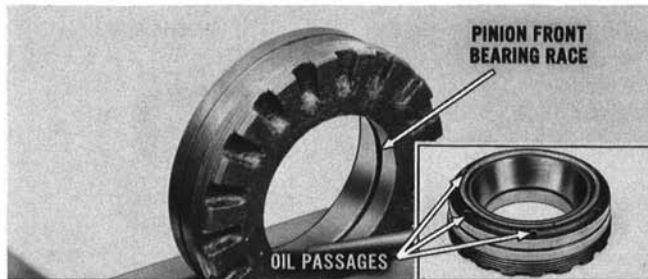
To remove pinion shaft front and rear bearings, use Puller Plate J-8331 and mount in Holder J-358-1 as shown. Place in press and press shaft out of bearings.



New ring and pinion gear installation requires checking for proper shim thickness. Selection of shim and replacement of pinion bearings will be covered under ring gear and pinion gear clearances.



On Powerglide-equipped units, carefully chisel out front pinion shaft bushing if worn. Use Bushing Installer J-8333 to install new bushing as shown. Inspect pinion shaft seal ring on rear of pinion shaft and replace if broken.



If damaged, remove pinion front bearing race by driving out with a punch. Late production models use a new-style front pinion adjusting sleeve with six drilled oil passages to lubricate pinion bearing. Replace old-style adjusting sleeves with new-style Part 3781001. Use Driver J-7137 to press new bearing race into position in sleeve.

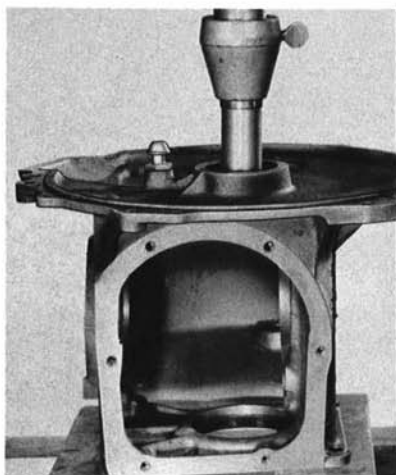


Shims are used between rear pinion bearing and pinion gear. These are for proper depth setting of pinion gear and can be re-used if pinion and ring gear are not being replaced.

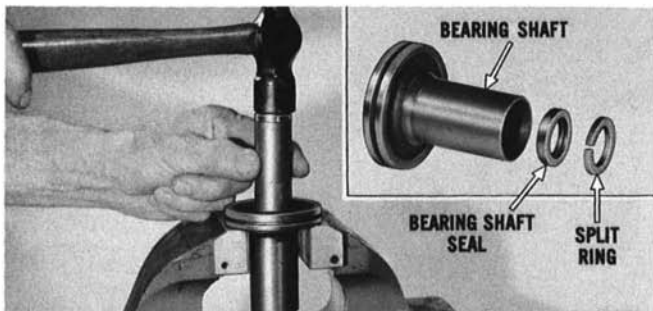
On Powerglide Transaxles, inspect pinion shaft front oil seal. If damaged, drive out old seal with punch. Use GM Perfect Seal on O.D. of new oil seal and install with flat side toward carrier using Tool J-8340 as shown.



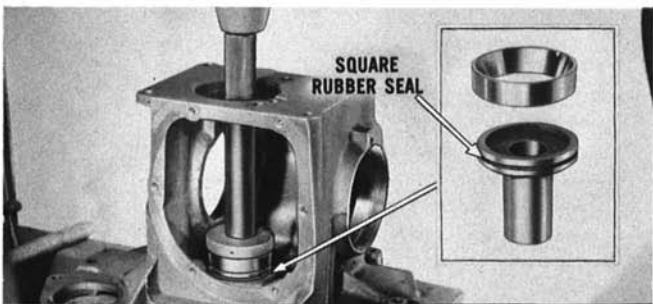




If rear pinion race is damaged, remove by placing carrier in press and pressing directly on clutch release bearing shaft or stator support as shown. Shaft or stator support and bearing race will come out together.

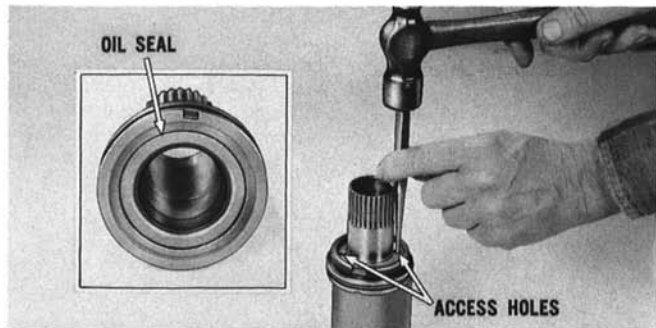
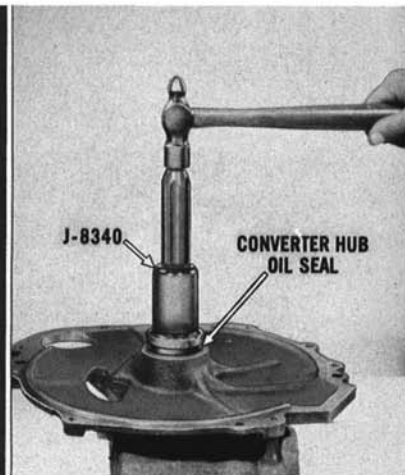


On Manual Transmission models, check clutch release bearing shaft seal for damage. To replace, remove split ring and drive out old seal as shown. Use a suitable tool and install new seal, open face inward, and tap until bottomed. Reinstall split ring.



Use new square rubber seal on outer bearing shaft. Place carrier in press as shown. Make sure inner bore of carrier is thoroughly cleaned. Install new bearing shaft and bearing race using Installer J-7137 so cup is flush with inside of carrier case.

On Powerglide Transmission units, inspect converter hub oil seal for evidence of leaking. If damaged, pry out old seal with a punch. Coat O.D. of new seal with GM Perfect Seal and install with open face inward using Tool J-8340 as shown.

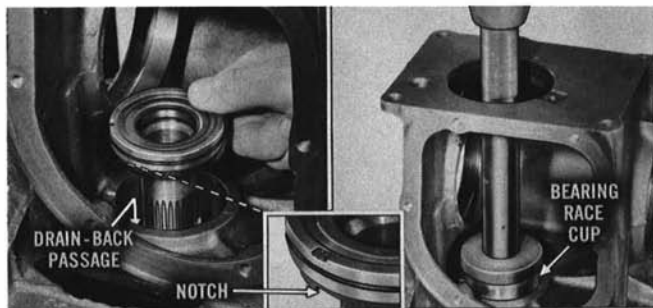


Powerglide-equipped units use a pinion rear oil seal in the stator shaft bore. If damaged, drive out old oil seal with pin punch through access holes as shown. Use Installer J-5747 to drive new seal in position.

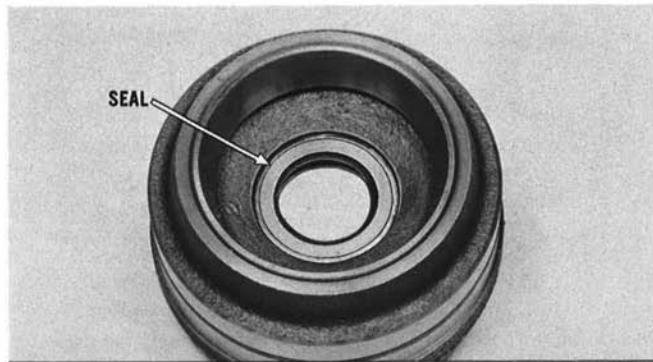
Current production units use an improved stator support with a square rubber seal similar to very early production models. On removal, any support, either very early with a seal or later with no seal should be replaced with NEW support, PART 3780998.

SQUARE RUBBER SEAL

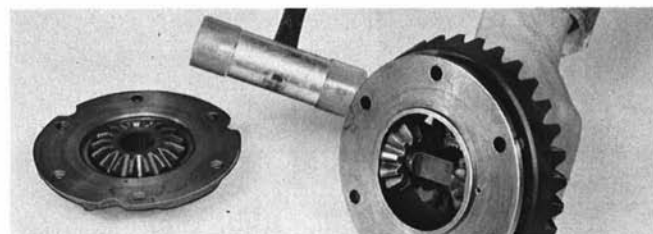




Make sure oil drain-back passage and stator shaft cavity are thoroughly cleaned. Place bearing race cup on stator shaft and press stator shaft and bearing race into carrier housing. Make sure notch on stator shaft is aligned with drain-back passage in carrier.

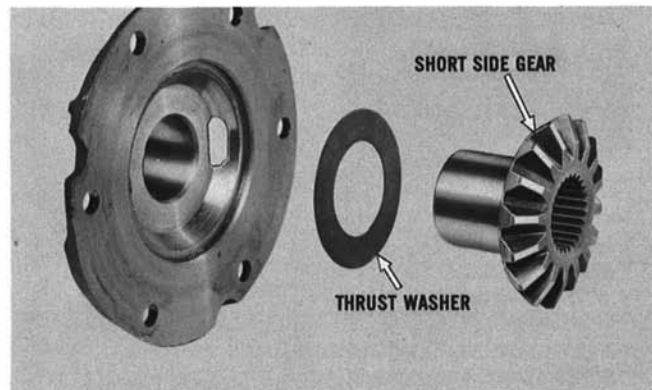


Side bearing adjusting sleeve oil seals are easily replaced by driving out with a punch. Install new seals with lip facing inward and tap into position with a soft hammer.

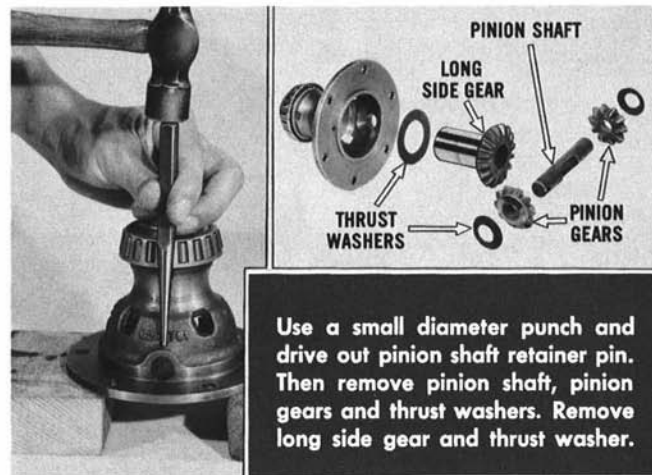


#### DIFFERENTIAL CASE DISASSEMBLY AND INSPECTION — RING GEAR REPLACEMENT

Use a suitable tool and make alignment marks in differential case and cover. Remove the six bolts holding case together. Use soft hammer and tap ring gear from case. For ring gear replacement only, further disassembly is not required.



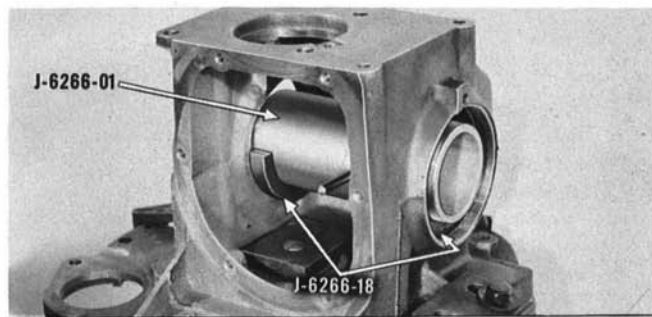
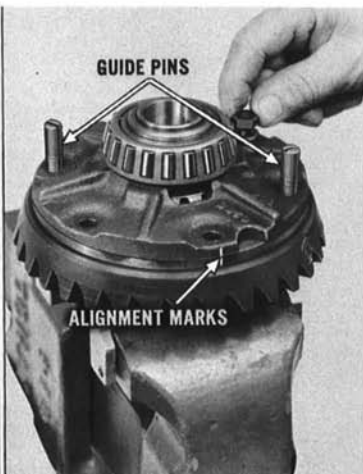
Continue by removing short side gear and thrust washer from differential case.



Use a small diameter punch and drive out pinion shaft retainer pin. Then remove pinion shaft, pinion gears and thrust washers. Remove long side gear and thrust washer.

With case disassembled, inspect pinion gears, side gears, shaft and thrust washers. Replace parts as needed. Rebuild differential by reversing the disassembly procedures just shown. Make certain pinion shaft is installed with flat surface toward differential cover.

Align marks on differential case and cover. Use guide pins to hold ring gear in position. Install attaching bolts and torque 40 to 60 foot-pounds.

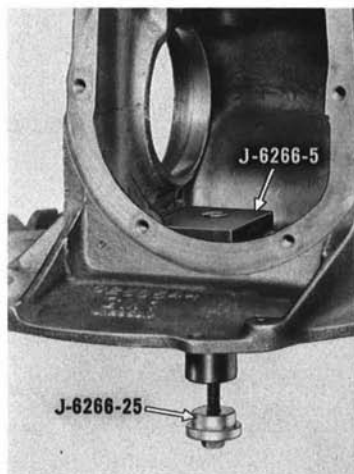
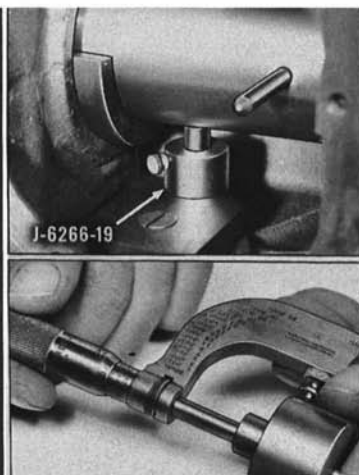


Continue by placing Gauge Cylinder Adapters J-6266-18 in each side bearing adjusting sleeve bore so they rest on machined portion of bore. Place Gauge Cylinder J-6266-01 on adapters with plunger and mounting post in a horizontal position.

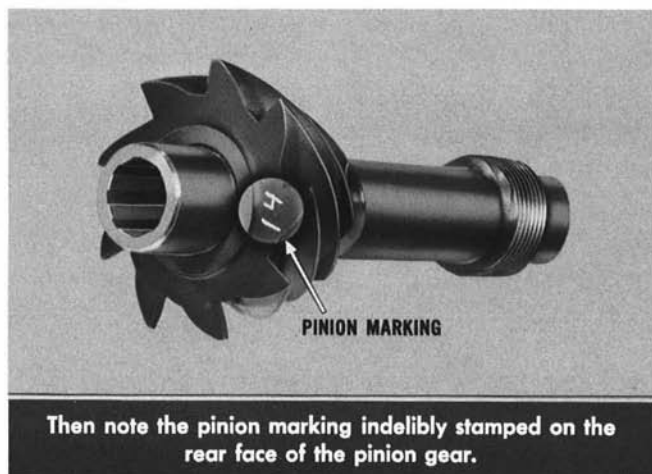
When installing NEW ring gear and pinion sets, it is necessary to determine the shims needed between pinion rear bearing and pinion gear that control pinion depth. Begin by placing rear bearing in its race and rotating to check for seating and roundness.



Place Gauge J-6266-19 on gauge plate so it is centered under gauge cylinder. Tighten set screw and note reading with micrometer. Make several readings and use the highest reading obtained.



Next, place Gauge Plate J-6266-5 on bearing and insert threaded bolt through plate. Add Adapter J-6266-25 and nut. Tighten lightly, shifting gauge plate around to make sure it is centered for accurate readings. Tighten nut to 6 foot-pounds.



Then note the pinion marking indelibly stamped on the rear face of the pinion gear.

REAR AXLE-6C-12

"CORVAIR" PINION DEPTH SHIM USAGE CHART

Micrometer Reading	Pinion Marking										
	10	11	12	13	14	15	16	17	18	19	20
1.250	6	6	9	9	9	12	12	12	15	15	18
1.251	6	9	9	9	12	12	12	15	15	18	18
1.252	9	9	12	12	12	15	15	18	18	18	18
1.253	9	9	12	12	15	15	18	18	18	18+6	18+6
1.254	9	12	12	12	15	15	18	18	18	18+6	18+6
1.255	12	12	12	15	15	18	18	18	18+6	18+6	18+6
1.256	12	12	15	15	18	18	18	18	18+6	18+6	18+6
1.257	12	15	15	18	18	18	18	18+6	18+6	18+6	18+6
1.258	15	15	18	18	18	18	18	18+6	18+6	18+6	18+6
1.259	15	18	18	18	18+6	18+6	18+6	18+6	18+6	18+6	18+6
1.260	18	18	18	18	18+6	18+6	18+6	18+6	18+6	18+6	18+6
1.261	18	18	18	18	18+6	18+6	18+6	18+6	18+6	18+6	18+6

SHIM(S) TO BE INSTALLED Chart

Using micrometer reading and pinion marking refer to tables on Page 6C-12 of Corvaire Shop Manual to determine thickness of shims required. In the chart the numbers shown are in thousandths. The decimals and zeros have been omitted. For example:

REAR AXLE-6C-12

"CORVAIR" PINION DEPTH SHIM USAGE CHART

Micrometer Reading	Pinion Marking								
	10	11	12	13	14	15	16	17	18
1.250	6	6	9	9	9	12	12	12	15
1.251	6	9	9	9	12	12	12	15	15
1.252	9	9	12	12	12	15	15	18	18
1.253	9	9	12	12	15	15	18	18	18
1.254	9	12	12	15	15	18	18	18	18+6
1.255	12	12	15	15	18	18	18	18	18+6
1.256	12	12	15	15	18	18	18	18	18+6

If micrometer reading is 1.255 and the pinion marking is 14, read across the chart for the micrometer reading; and under the column for the pinion marking is the thickness of spacer needed behind the pinion gear. In this case, .015".

15+6	15+6	18+6	18+6	18+9	18+9
15+6	15+6	18+6	18+6	18+9	18+9
15+6	18+6	18+6	18+6	18+9	18+9

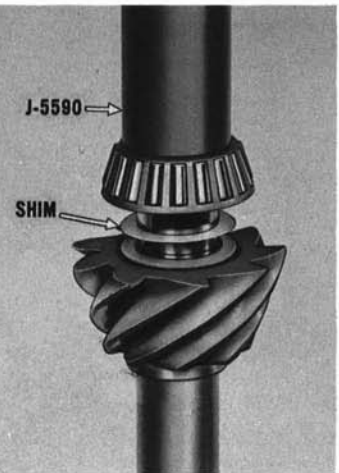
SHIM(S) TO BE INSTALLED

Identification Notches	Shim Thickness	Chart Indication
NONE	.006"	6
1	.009"	9
2	.012"	12
3	.015"	15
4	.018"	18

3. Assemble shim(s) selected in Step 2f on rear face of pinion gear, then install pinion rear bearing as illustrated in Figure 6C-21. Install in same manner.

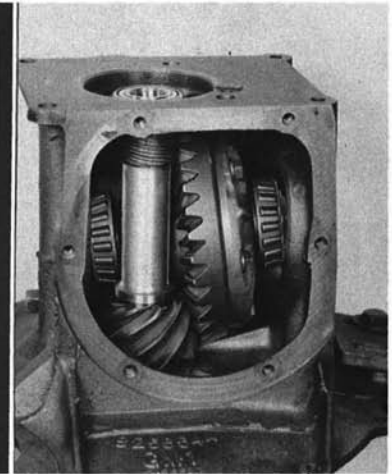
Shims are available in five thicknesses from .006" to .018" and can be used singly or in combination to arrive at correct depth setting.

Place selected shim or shims over rear of pinion shaft. Then press on rear pinion bearing using Driver J-5590 as shown. Install front pinion shaft bearing with the same tool.



### REASSEMBLY OF DIFFERENTIAL CARRIER

First lay differential case in carrier in its approximate position. Then place pinion shaft and gear in carrier so rear bearing seats in its race.



Powerglide units require a square rubber seal on pinion adjusting sleeve to keep carrier lubricant and transmission fluid from mixing. If seal is damaged, replace. Coat threads with a non-hardening pipe compound and install adjusting sleeve loosely in carrier.

### SQUARE RUBBER SEAL





Install new square rubber seal on side adjusting sleeves. Coat threads with a non-hardening pipe compound, then install loosely in position to align differential side bearings.

SQUARE SEAL

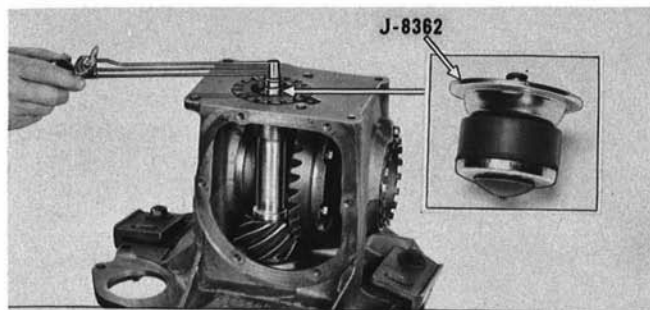


Tighten side adjusting sleeves and pinion adjusting sleeve to take up all lash. Tighten right-side adjusting sleeve until there is ZERO backlash. This is a matter of "feel." Mark carrier case and corresponding notch with a crayon.



Back off adjustment 3 notches from ZERO backlash to eliminate square rubber seal windup. Final-tighten sleeve one notch LOOSE from the ZERO backlash mark and install locking tab and locking tab screw.

Tighten left adjusting sleeve in the same manner, marking the ZERO backlash adjustment with crayon. After backing off to relieve rubber seal windup, final-adjust by tightening 2 to 3 notches TIGHT past the ZERO backlash mark. Install locking tab and locking tab screw.



Tighten pinion bearing adjusting sleeve to just remove pinion bearing end play. Back off adjusting sleeve 1/4 turn. Use Adapter J-8362 and measure the turning torque at the drive pinion. This represents the pre-load on differential side bearings.

For NEW BEARINGS: Tighten pinion adjusting sleeve to obtain an ADDITIONAL 9 to 11 inch-pounds turning torque.

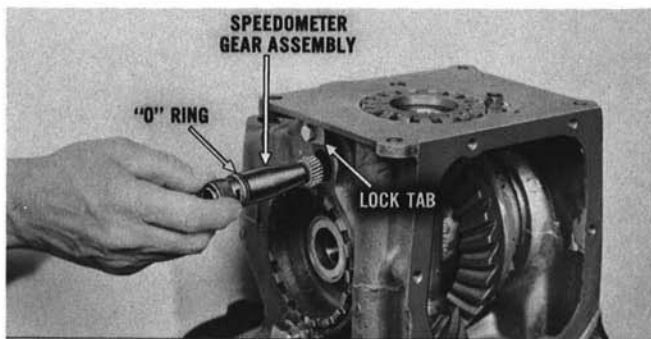
For ORIGINAL BEARINGS: Tighten pinion adjusting sleeve to obtain an ADDITIONAL 4 to 6 inch-pounds turning torque.

**FOR EXAMPLE:**

If pre-load on differential side bearings is 5 inch-pounds then:

	Beginning Turning Torque	Additional Torque Required	Final Pinion Turning Torque
<b>NEW BEARINGS</b>	5 inch-pounds	+ 9 to 11 inch-pounds	= 14 to 16 inch-pounds
<b>ORIGINAL BEARINGS</b>	5 inch-pounds	+ 4 to 6 inch-pounds	= 9 to 11 inch-pounds

Install locking tab and locking tab screw.



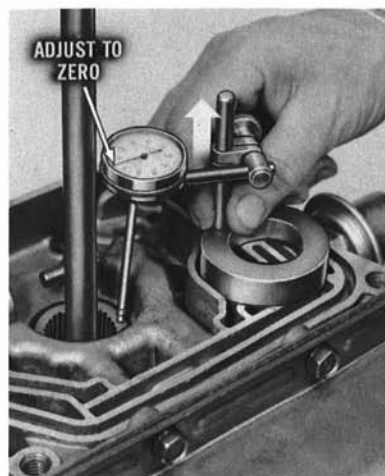
Replace rubber "O" ring seal on speedometer gear assembly and then install in carrier. Tighten lock tab. Use a new gasket under top cover and replace cover. Install attaching screws and torque 11 to 19 foot-pounds.

Before assembling Differential Carrier to Powerglide transmissions, it will be necessary to determine the thrust washers required at the front face of the governor gear to maintain proper transmission end play.

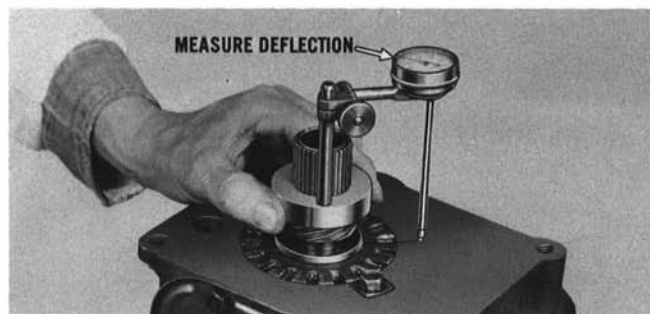
**Proceed as follows:**



Place transmission front end down on bench and remove turbine shaft. Install a dial indicator on Support J-8364 and install 3" extension. Place support on rear pump cavity surface as shown, with indicator tip resting on planet carrier hub.



Adjust gauge to ZERO. Slowly lift gauge and note range of deflection from ZERO. If deflection exceeds .050", relocate indicator on Support J-8364 and repeat check so that deflection is less than .050".



Without disturbing setting of indicator, carefully lower support on governor gear as shown. Measure the needle deflection from ZERO, then refer to the following table from Page 6-10 of the Corvair Shop Manual for the required number of spacers.

and refer to the following chart for spacers to be installed on governor gear.

POWERGLIDE REAR THRUST SPACER USAGE CHART	
Indicator Reading	Spacers to Be Used
*.011 - .038	NONE
.039 - .053	.016
.054 - .068	.031
.069 - .083	.046
.084 - .098	.046 + .016
.099 - .113	.046 + .031
.114 - .128	.046 + .046
.129 - .145	.046 + .046 + .016
.146 - .155	.046 + .046 + .031

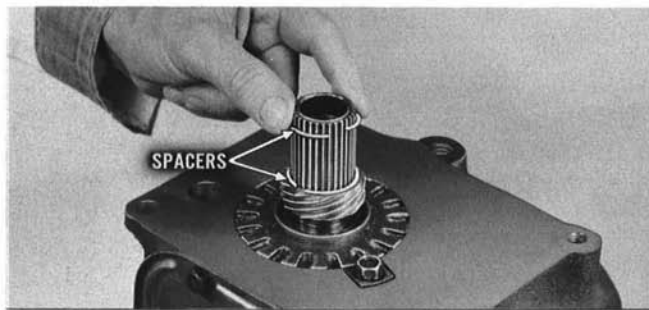
\*If initial indicator reading is below .011", replace .038" thrust washer at the clutch hub-front pump with an .076" or .050" thrust washer, then repeat entire rear thrust spacer selection procedure.

Spacer	Part No.
.016"	6256827
.031"	6256828
.046"	6255664

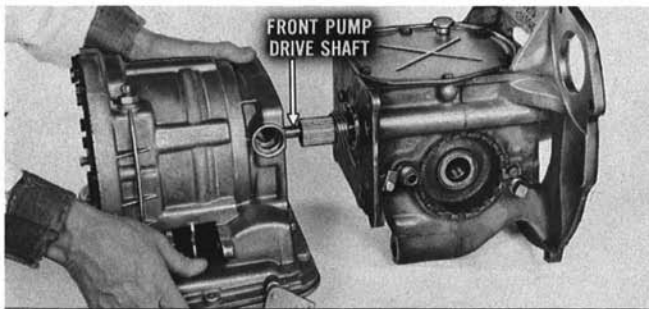
e. Install spacers selected on governor gear (fig. 6-18), then check that proper total thickness

Output shaft on rear pump housing case with illustrated (fig. 6-19) rests on planet carrier travel and

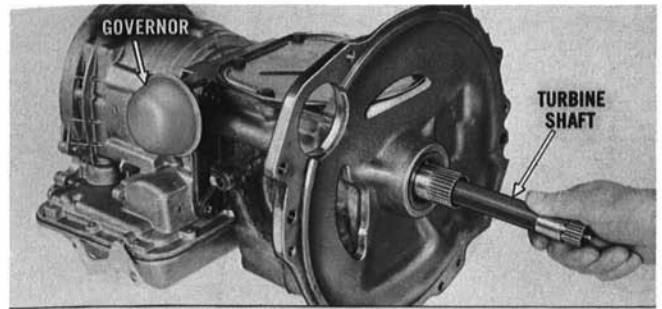
must face



Install spacers on governor gear. Check for proper thickness by measuring with dial indicator as already shown. If spacers are correct, indicator reading will be between .011" and .038". Add or remove spacers as required to correct reading.



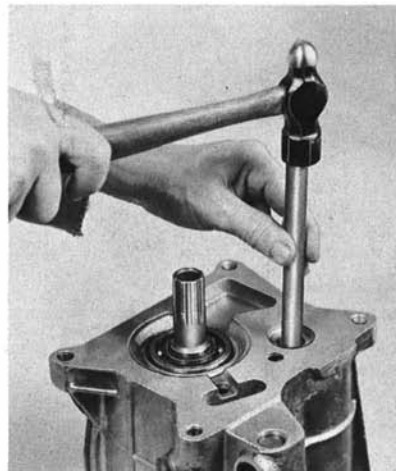
Use petroleum jelly to hold new gasket in position on either transmission or carrier. Align units on a flat surface and carefully guide front pump drive shaft through carrier to avoid damaging pinion bushings. Engage pinion shaft splines with planet carrier.



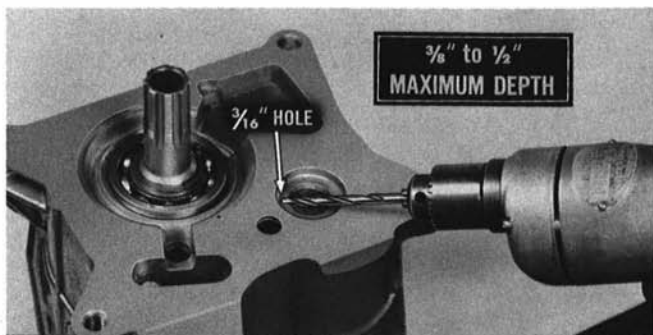
Install governor and install all four attaching bolts. Torque 24 to 32 foot-pounds. Install turbine shaft, making sure all splines are engaged. To install converter and reassemble power train, refer to Corvair Shop Manual, Page 6-11, or the film Servicing the Corvair Powerglide—Part IV, Overhaul.

On all Manual Transaxles, before joining transmission and Differential Carrier, perform the following modification to anchor transmission countershaft from fore and aft movement as well as turning.

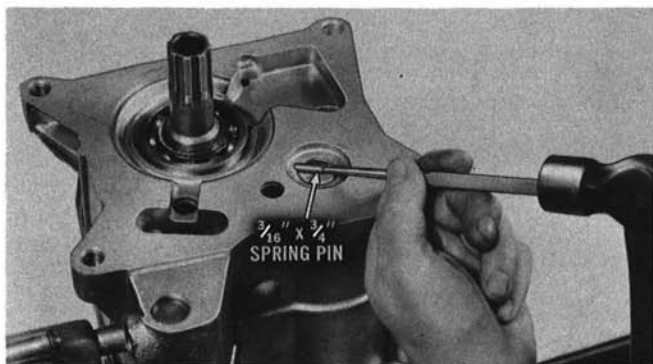
This modification prevents countershaft from unseating, causing loss of Transaxle lubricant through front of case which would lead to early Transaxle failure.



Tap countershaft with soft drift to firmly position against stakes at front of case bore. If press fit of countershaft has been lost, replace transmission case since shaft would not form an oil seal.



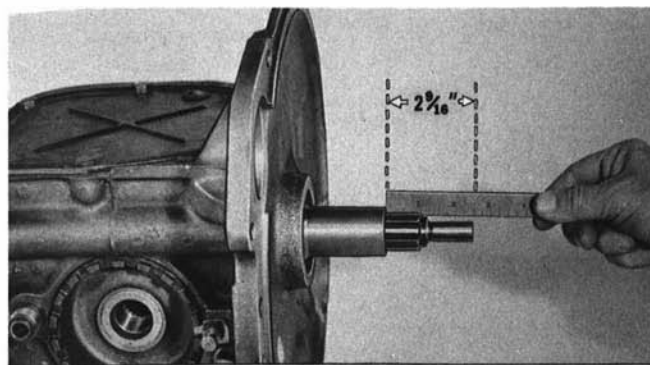
With shaft fully seated, drill a  $\frac{3}{16}$ " hole at a fairly flat angle in the shaft bore just above the step in the end of the shaft. Drill  $\frac{3}{8}$ " to  $\frac{1}{2}$ " maximum depth to prevent breaking through into transmission.



Install a  $\frac{3}{16}$ " x  $\frac{3}{4}$ " spring pin (Part Number 454512) in newly drilled hole. Make sure pin does not protrude beyond face of transmission case.



To join 3-speed transmission and carrier, apply petroleum jelly to new gasket and mount on either transmission or carrier. Carefully engage splines of transmission mainshaft with pinion shaft splines and draw units together. Install attaching bolts and torque 24 to 32 foot-pounds.



Install clutch shaft in the Transaxle. If fully engaged, the distance from end of clutch release bearing shaft to end of clutch shaft will be  $2\frac{1}{16}$ " plus or minus  $\frac{1}{32}$ ".

Follow procedures outlined on Pages 6-9 of Corvair Shop Manual to reinstall Transaxle to engine.

This completes the overhaul procedures of the Corvair Differential Carriers.



**NOTES**

