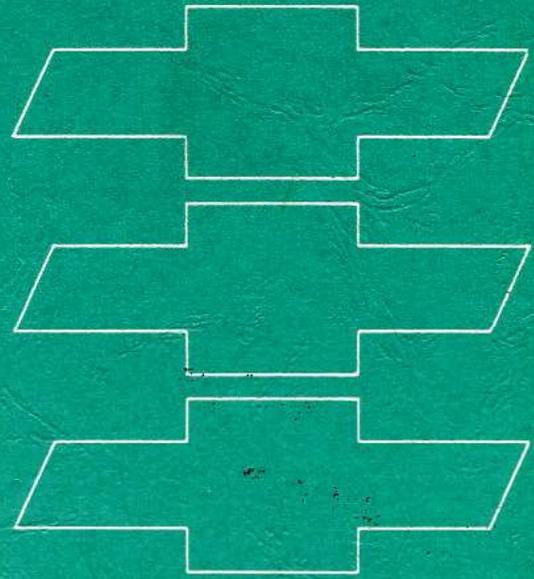
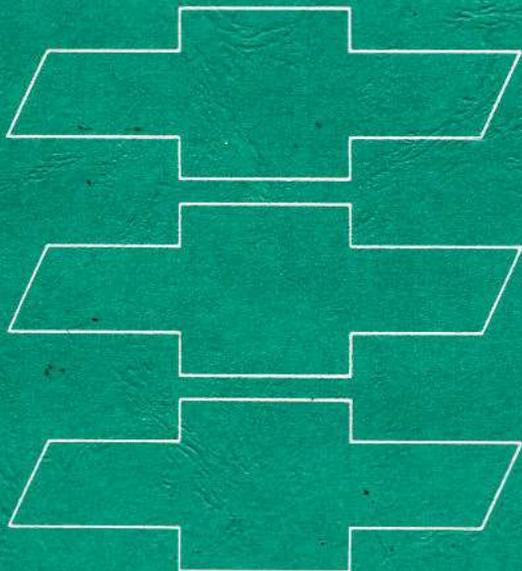


1965



CORVAIR



**CHASSIS
SHOP
MANUAL**

ST-59

REAR SUSPENSION

INDEX

	Page		Page
General Description	4-24	Service Operations	4-28
Maintenance and Adjustments	4-25	Wheel Spindle and Support	4-28
Wheel Alignment	4-25	Shock Absorber Replacement	4-29
Camber	4-25	Rear Strut Rod and Bracket Replacement	4-29
Toe-in	4-25	Front Strut Rod and Bracket Replacement	4-30
Wheel Bearing Adjustment	4-25	Spring Replacement	4-31
Riding Height and Rear Coil		Torque Control Arm Bushing Replacement	4-31
Spring Sag	4-27	Torque Control Arm Replacement	4-32

GENERAL DESCRIPTION

The independent four-link type rear suspension (fig. 60) consists of a front and a rear strut rod with the drive shaft and the torque control arm forming four links at each wheel, and a full-coil spring mounted between the frame and torque arm.

The stamped-steel, welded, hat-section control arms are pin-jointed to the front mounting brackets through a rubber isolated bushing pressed into the arm. Rear

wheel toe in angle is adjusted by positioning the horizontally slotted arm-to-body brackets to the proper setting. Wheel spindle and spindle support are attached to the torque arms through four studs which are pressed into the arm.

An adjustable bracket, attached to the transmission support, secures the inboard end of the rubber mounted front strut rod. The outboard end is rubber mounted and directly connected to the torque arm.

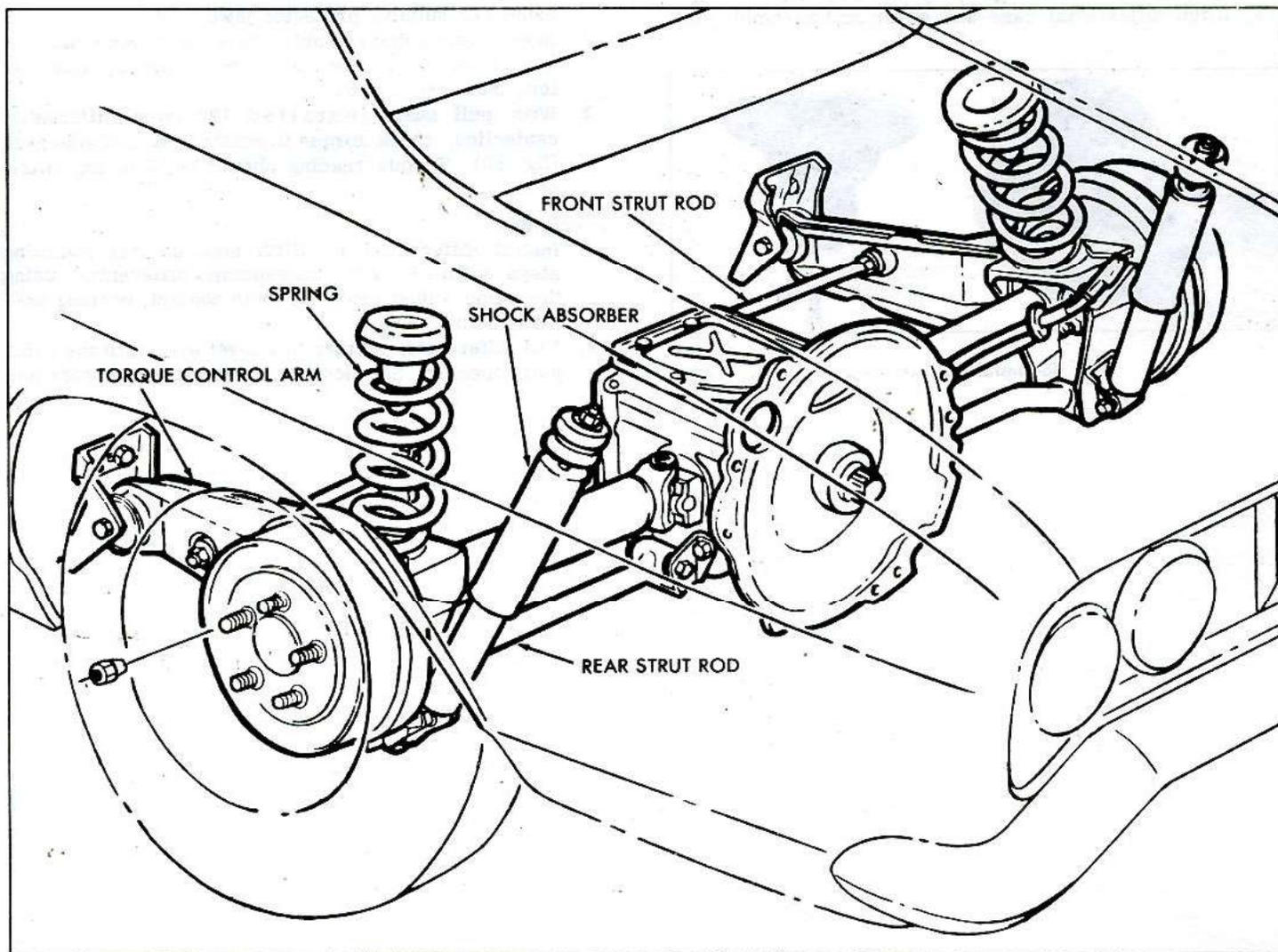


Fig. 60—Rear Suspension Components

A rear strut is mounted laterally from a bracket bolted to lower surface of axle carrier to the torque arm. The strut rod to torque arm connection provides for rear wheel camber adjustment through an eccentric cam bolt adjustment.

The rear wheel spindles are driven through double universal jointed, tubular drive shafts, which are bolted to the differential yoke and drive spindle flange. Wheel spindle support houses the inner and outer tapered roller

bearings. Bearing adjustment is made through the use of a spacer and variable thickness shims between the bearings.

The direct, double-acting shock absorbers upper end is secured to an underbody bracket and at the lower end to the torque arm bracket. A full coil spring is seated against the upper surface of the torque arm and the upper end rests against the underbody side rail.

MAINTENANCE AND ADJUSTMENTS

Periodic maintenance and adjustments are not required for the rear suspension components. The suspension system should be checked for shock absorber action, condition of suspension bushings, tightness of suspension attaching bolts and an overall visual inspection of components for defects.

WHEEL ALIGNMENT

Camber

Wheel camber angle is obtained by adjusting the eccentric cam and bolt assembly located at the outboard mounting of the rear strut rod (fig. 61). Place rear wheels on alignment machine and determine camber angle. Adjust camber by loosening the cam bolt and rotating cam and bolt assembly to obtain specified camber. Tighten nut securely and torque to specifications.

Toe-in

Wheel toe-in is adjusted by moving the torque arm to underbody bracket horizontally as required to obtain specified toe-in (fig. 62). To adjust wheel toe-in, loosen front strut rod inner bracket to transmission support bolts so that bracket is loose on slots, loosen bracket to underbody attaching bolts until bracket is free enough to be moved. Position torque arm to obtain specified toe-in. Tighten affected bolts securely and torque to specifications.

WHEEL BEARING ADJUSTMENT

1. Raise rear of vehicle and remove wheel and tire assembly and brake drum.

2. Remove axle drive shaft as outlined in this section.
3. Attach dial indicator (Tool J-8001) to adjacent surface and measure wheel bearing end play (fig. 63). End play should be between .001"-.006". If reading is not within limit record reading for future reference.
4. Remove cotter pin from spindle retaining nut, install brake drum, apply parking brake and remove spindle nut and washer. Release parking brake and remove brake drum.
5. Screw Tool J-21859-1 onto spindle. Install Tool J-21859-2 to spindle flange, using the special bolts supplied with tool. Screw Tool J-8614-3 into J-21859-2 and remove spindle flange by turning J-8614-3 (fig. 64).
6. Remove two diagonally opposite nuts from spindle support retaining studs. Install Tool J-21831-1 (one on each stud) so that it bottoms against flange plate. Thread Tool J-21831-2 over J-21831-1, then remove spindle by rotating each tool an equal amount until spindle is free (fig. 65).
7. Remove spindle and bearing assembly, spacer and shim from the spindle. Then remove dust deflector and inner seal from spindle support (fig. 66).
8. Remove tool from studs, reinstall stud nuts—torque nuts to specifications.
9. Note size of shim removed. If dial indicator reading, obtained in Step 3, was over .006", select a shim thinner by the amount needed to bring end play within limits. If dial indicator reading was less than .001", select thicker shim to obtain correct movement.

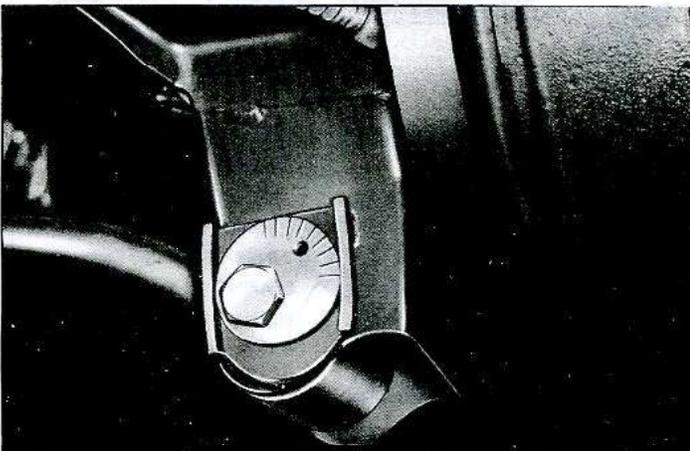


Fig. 61—Camber Adjusting Cam Location

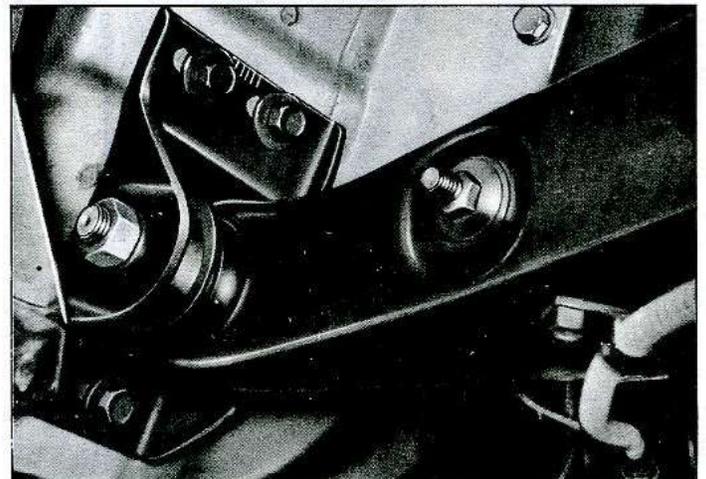


Fig. 62—Toe-in Adjusting Bracket Location

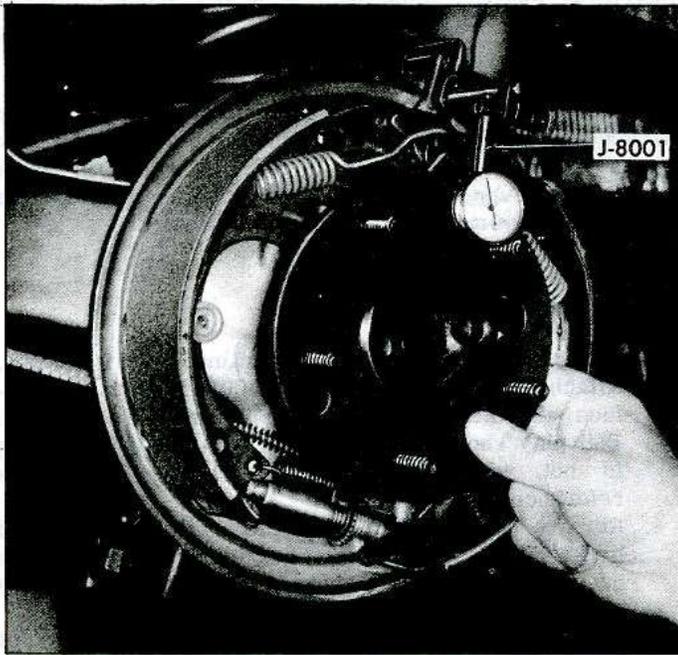


Fig. 63—Measuring Wheel Bearing End Play

NOTE: Shims are available in thicknesses from .097" to .148" in increments of .003".

EXAMPLE: Bearing end play reading was .011".

Bearing shim removed from spindle was .127".

New shim to be installed .121 (.006" smaller than shim removed).

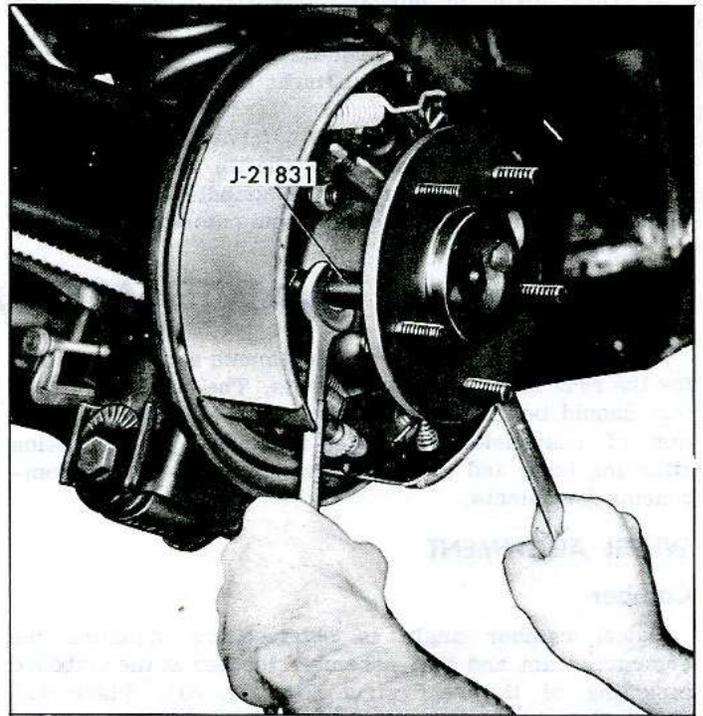


Fig. 65—Removing Wheel Drive Spindle

End play is decreased by .006" and now within the .001"-.006" limit.

10. Position spacer and shim on spindle and place assembly in spindle support.

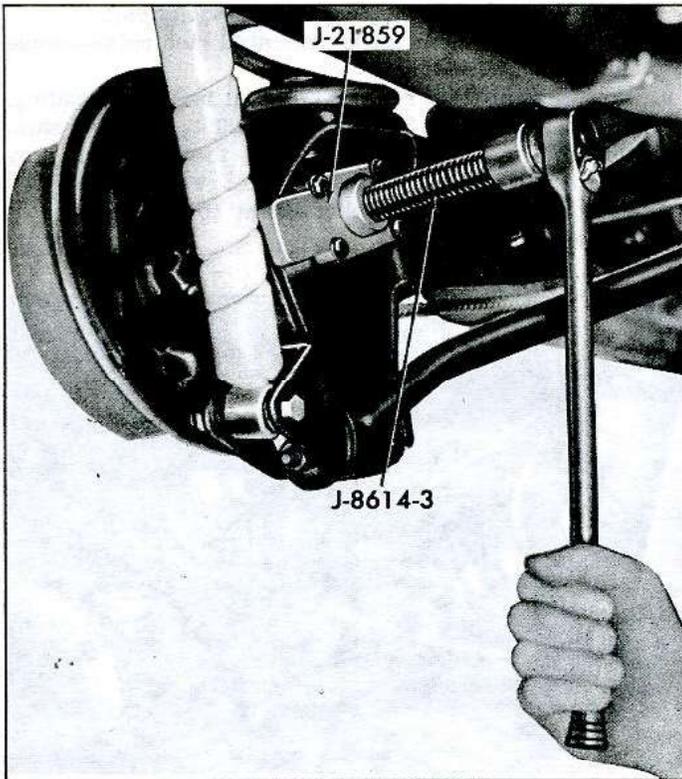


Fig. 64—Removing Wheel Spindle Flange

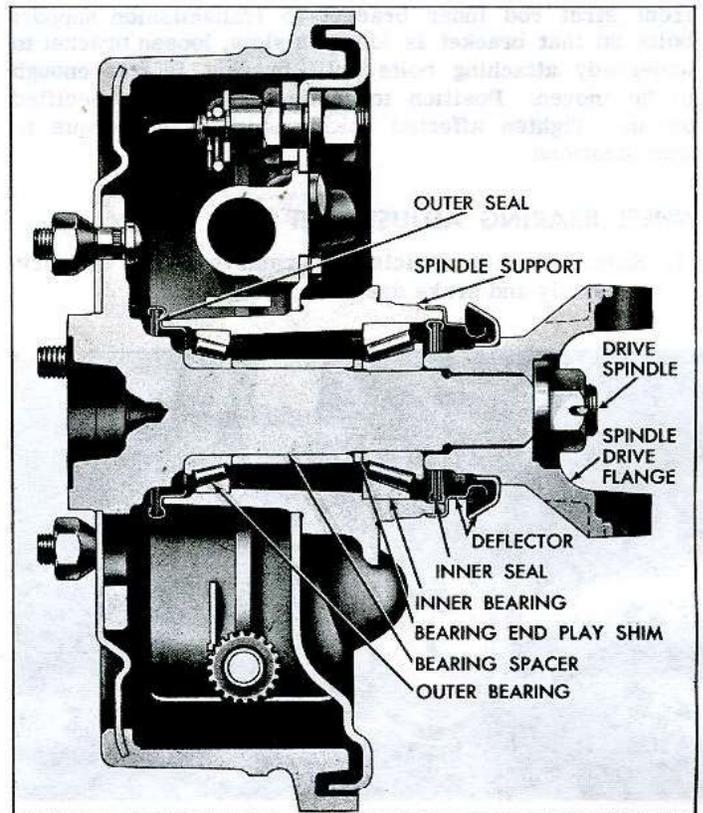


Fig. 66—Wheel Spindle and Support Cross Section

11. Install Tool J-21843-1 on drive spindle then position J-21843-2 and nut J-21843-3 over J-21843-1. Turn nut against sleeve to pull spindle into inner bearing. Remove tool from spindle (fig. 67).
 12. Install spindle support inner seal, using Tool J-21837 (fig. 68), then install dust deflector to support.
- NOTE:** Pack cavity of deflector with wheel bearing lubricant before installing.
13. Reinstall Tool J-21843-1 on drive spindle, position drive spindle flange over tool and onto spindle so that splines are aligned. Install sleeve (J-21843-2) and nut (J-21843-3). Tighten nut to install flange on spindle.
 14. Remove Tool J-21843. Install washer and nut on spindle. Torque nut to specifications while rotating spindle and install cotter pin. If spindle hole and slot in nut do not line up, tighten nut a minimum amount, not more than 1/2 flat to align.
 15. Measure bearing end play as described in Step 3. If shim thickness has been computed properly, end play should be within limits. If end play is not within limits, disassemble spindle and repeat procedure varying shim thickness as necessary.
 16. Reassemble axle drive shaft as outlined in this section.
 17. Install brake drum and wheel and tire assembly—torque wheel stud nuts to specifications, and lower vehicle.

RIDING HEIGHT AND REAR COIL SPRING SAG

In cases of vehicle riding height complaints, a rear coil spring height check will show if the rear suspension is at the proper height.

1. Position car on smooth, level floor. The vehicle should be at curb weight (a full tank of gasoline, but an empty front compartment except for spare tire).
2. Bounce rear end several times and allow it to settle to its normal height.
3. Measure the distance from the floor to the bottom

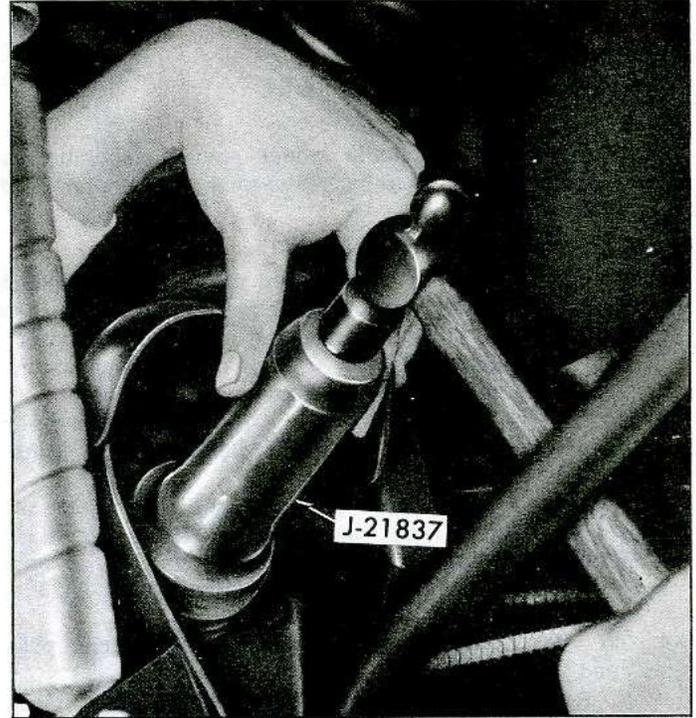


Fig. 68—Installing Spindle Support Inner Seal

- of the rocker panel 29" ahead of center line of rear wheel (fig. 69).
4. This measurement should be $8\text{-}1/2 \pm 1/2$ ".
 5. Measure the opposite side of the vehicle in a similar manner. It is essential that the two be within 1/2".
 6. To correct these heights, springs must be replaced. These springs do not have flat ends and shims should not be used.

NOTE: This check should be used in conjunction with the front coil spring check to be certain that overall "sag" (trim) is within 1/2".

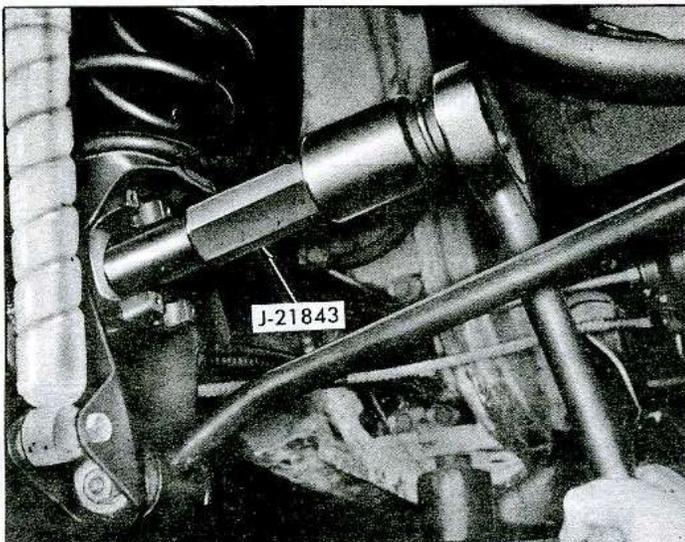


Fig. 67—Installing Wheel Drive Spindle Flange

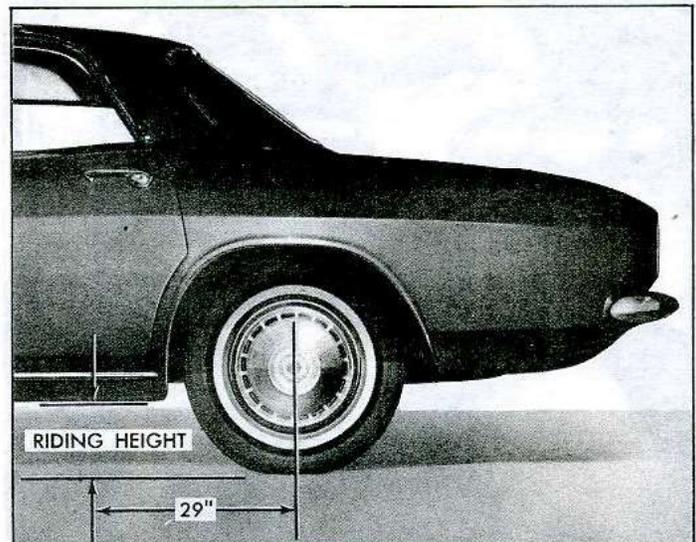


Fig. 69—Rear Riding Height

SERVICE OPERATIONS

WHEEL SPINDLE AND SUPPORT

Removal

Remove and disassemble wheel spindle assembly as outlined in "Wheel Bearing Adjustment" procedures of this section.

Repairs

1. Bearing cups may be removed while spindle support is still mounted to the torque arm, by using a brass drift to tap the cups from the support. Tap alternately against opposite side of cup to prevent unnecessary cocking while removing cups.
2. Install new bearing cups, using Tool J-8850 for outer bearing and Tool J-7817 for inner bearing (figs. 70 and 71).
3. Remove spindle outer bearing race and roller assembly, using split plates (J-8331) as shown in Figure 72. Installation of bearing can be accomplished by using bearing spacer and Tool J-9436 as a support.
4. To remove spindle support from torque arm, proceed as follows:
 - a. Remove brake line from wheel cylinder inlet. Remove four nuts securing brake flange plate and spindle support to torque arm.
 - b. Disconnect parking brake cable at actuating lever and remove brake flange plate and brake shoes as an assembly. If brake flange plate requires replacement, refer to Section 5 for brake shoe assembly and disassembly procedures.
 - c. Separate support from torque arm and remove support from the four torque arm studs.

Assembly

1. Position spindle support over torque arm studs, then position brake flange plate and shoe assembly over support and studs. Connect parking brake cable to actuating lever. Torque stud nuts to specifications.

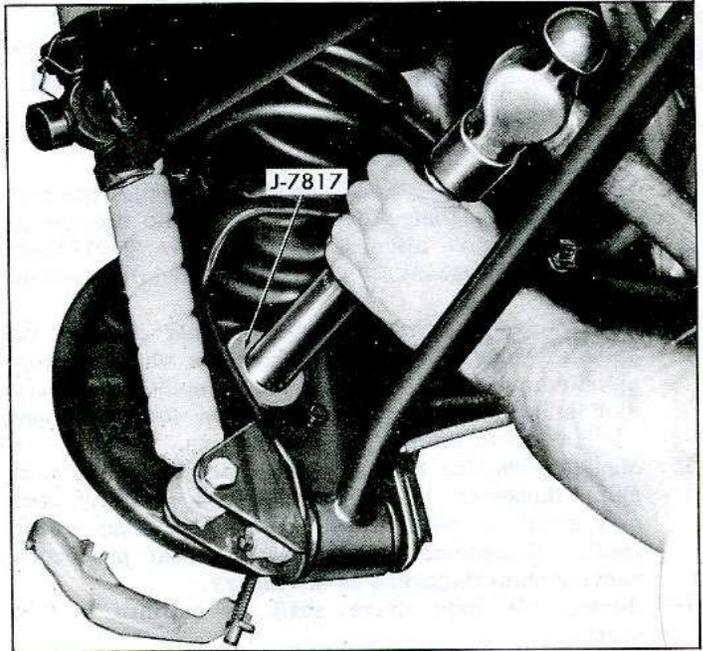


Fig. 71—Installing Spindle Support Inner Bearing

2. Install wheel spindle bearing cups in the support, using Tool J-8850 for outer bearing and Tool J-7817 for inner bearing.
3. The wheel spindle, spindle support, spindle bearings and the spindle bearing spacer are the various items that affect wheel bearing end play. Therefore when replacing any of the aforementioned items, it will be necessary to ascertain proper adjusting shim thickness to maintain specified end play. Select the shim thickness, using Tool J-21836 as follows:
 - a. Remove the knurled nut from each end of gauge J-21836.
 - b. Install bearing spacer over large end of gauge, then position outer bearing race and roller assembly over large end of gauge so that small end of bearing is against spacer. Install large knurled nut and hand tighten nut on gauge.
 - c. Position the gauge and bearing assembly into the spindle support.

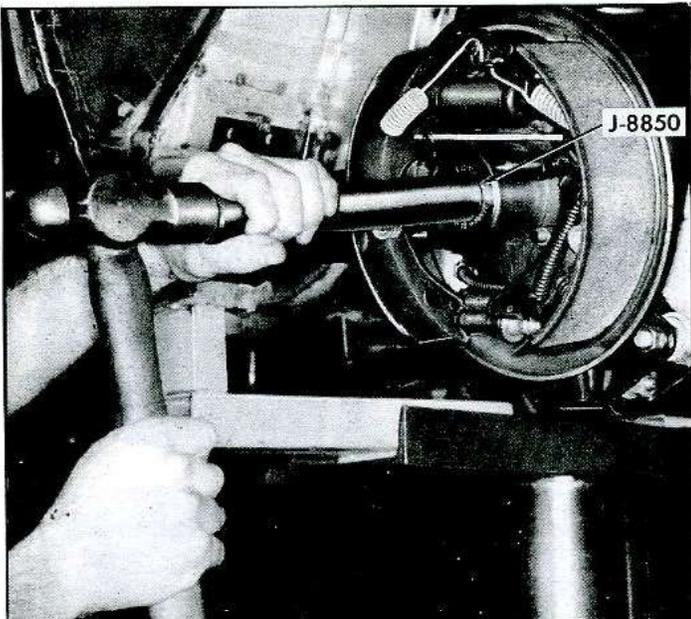


Fig. 70—Installing Spindle Support Outer Bearing

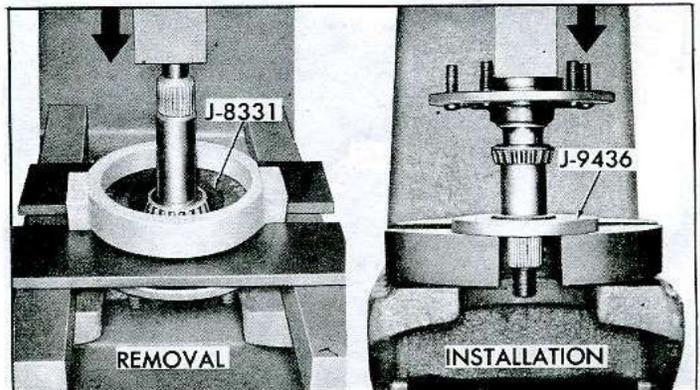


Fig. 72—Removing and Installing Drive Spindle Outer Bearing

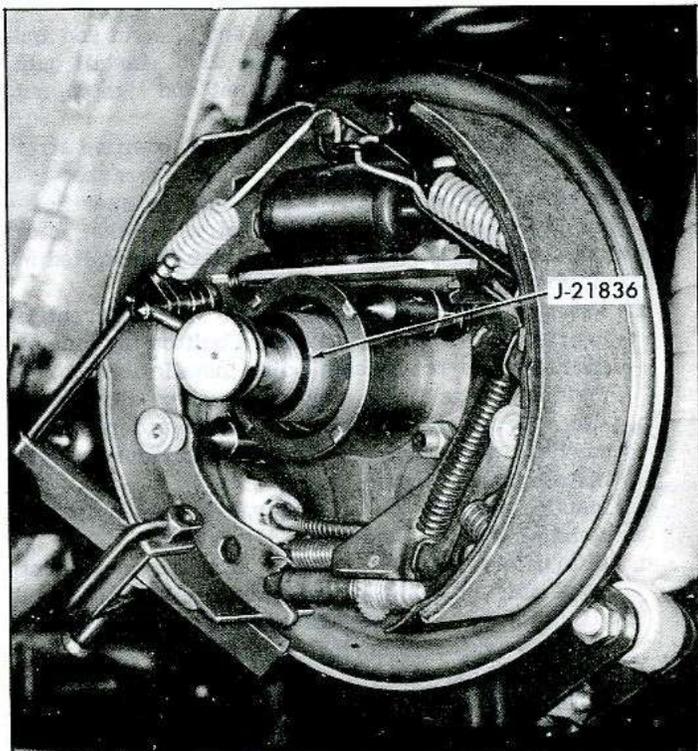


Fig. 73—Gauging Wheel Bearing Shim Requirement

- d. Install the inboard spindle bearing and hand tighten knurled nut on gauge.
- e. Install dial indicator (J-8001) and position indicator finger against moveable shaft of J-21836 (fig. 73).
- f. Move shaft of J-21836 so that it travels the maximum permissible distance limited by spacer and inner bearing.
- g. Record reading obtained in Step f—recheck to ensure accuracy.
- h. To the reading obtained in Step f, add 0.097". The total obtained is the required shim thickness necessary to maintain specified end play.

EXAMPLE: Dial indicator reading obtained in Step f: 0.026"

Add 0.097" to dial indicator reading 0.097"
(Gauge J-21836 is constructed to represent the smallest shim, which is 0.097")

Shim thickness required (TOTAL): 0.123"

Shim to be installed would be 0.124" thick since this is the shim with a thickness nearer to the value as computed above.

4. Disassemble gauge and install spindle outer bearing on spindle as shown in Figure 72. Pack both wheel bearings with a high-melting point wheel bearing lubricant prior to installation.
5. Position support outer seal on Tool J-21842 (align notches in seal with slots in tool) and install seal in support (fig. 74).
6. Reassemble spindle to spindle support as outlined in "Wheel Bearing Adjustment" procedures of this section.

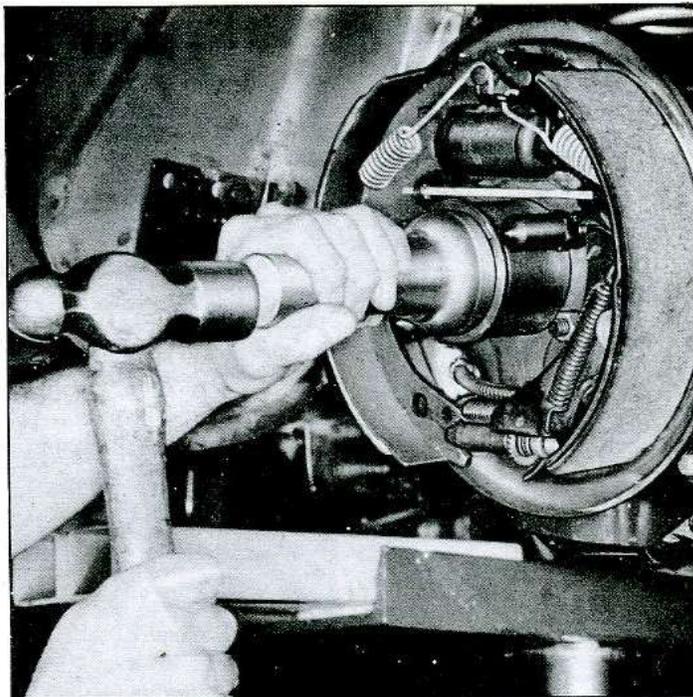


Fig. 74—Installing Spindle Support Outer Seal

7. Reassemble axle drive shaft as outlined in this section.
8. Connect brake line at wheel cylinder inlet.
9. Install brake drum and wheel and tire assembly—torque wheel stud nuts to specifications.
10. Bleed brakes as outlined in Section 5.

SHOCK ABSORBER REPLACEMENT

1. Raise engine compartment lid and remove shock absorber upper attaching nut, retainer and grommet (fig. 75).
2. Raise rear of vehicle to obtain access to shock absorber attachment at rear of torque control arm.
3. Remove bolt securing shock absorber to torque arm bracket and withdraw shock from vehicle.
4. Extend upper portion of shock absorber into underbody bracket so that it protrudes into the engine compartment.
5. Install grommet, retainer and nut to shock absorber upper attaching rod in the engine compartment—torque nut to specifications.
6. Position shock absorber lower eye into torque arm bracket and install through bolt. Install lock washer and nut—torque nut to specifications.
7. Lower vehicle and test shock absorber action.

REAR STRUT ROD AND BRACKET REPLACEMENT

1. Raise rear of vehicle to obtain working clearance. Remove wheel and tire assembly and support torque arm so that spring is compressed to be near curb height.
2. Disconnect strut rod bracket at differential carrier (fig. 76).
3. Mark relationship of camber cam to torque arm bracket so that they may be reassembled in same location.
4. Remove cam bolt retaining nut and remove cam bolt

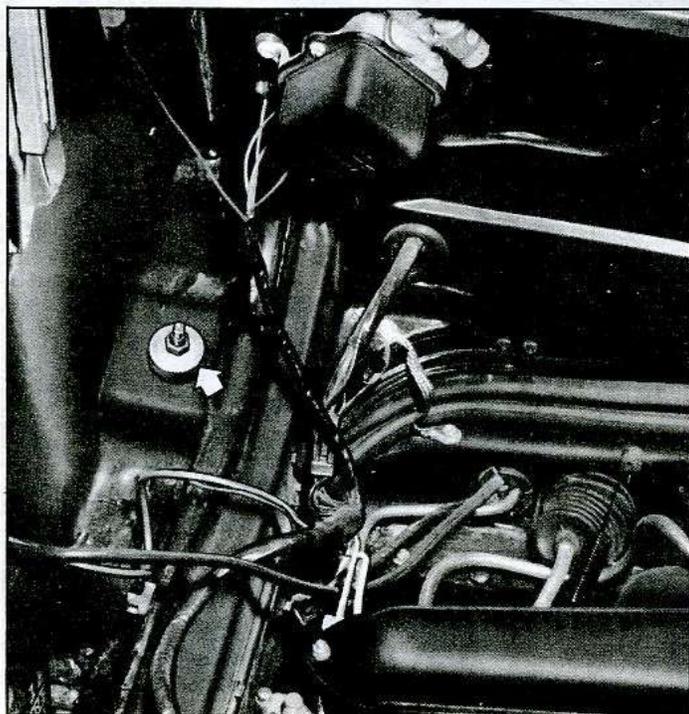


Fig. 75—Shock Absorber Upper Attachment Location

and cam, then pull strut rod out of bracket and remove bushing caps.

5. Place strut rod and bracket assembly in a vise and remove strut rod to bracket through bolt. Separate bracket and strut rod then remove bushing caps from strut rod.
6. Install bushing caps to inboard end of strut rod and position rod to bracket. Install pivot bolt, washer and nut—tighten nut but do not torque at this time.

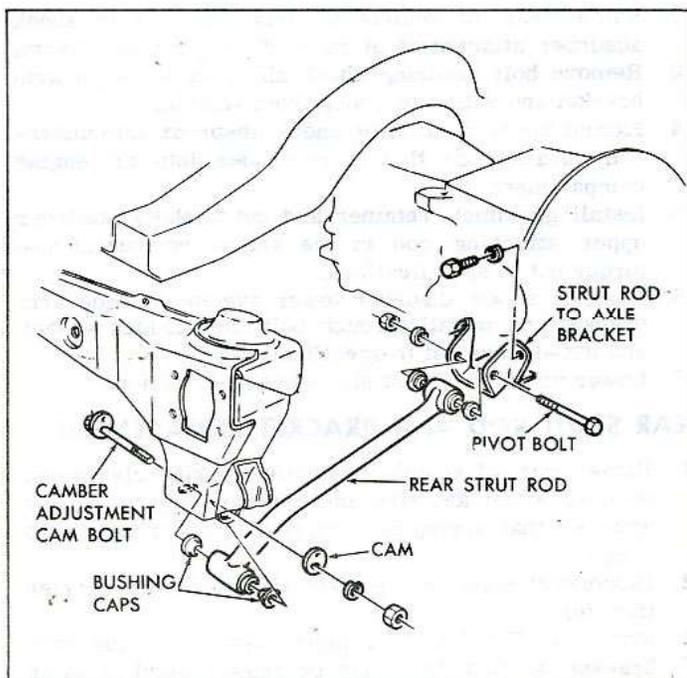


Fig. 76—Rear Strut Rod Attachment

7. Install bushing caps to outboard end of strut rod and position rod to bracket at torque arm. Install cam bolt and cam. Install cam bolt nut and tighten, but do not torque at this time.
8. With spring compressed as in Step 1, position strut bracket to differential carrier. Install bracket-to-differential carrier bolts and torque to specifications. To prevent distortion to strut bracket it is recommended that the retaining bolts be installed in the following manner:
 - a. Using a long drift, align bracket with differential carrier and install the forward bolt on the side of carrier. Do not tighten bolt. Installation of remaining bolts will require further alignment.
 - b. Align bracket with rear bolt on underside of carrier, using drift to align bracket during bolt installation.
 - c. Install rear bolt on side of carrier, then install remaining bolt to underside of carrier.
 - d. Alternately tighten all bolts in small increment to permit an even draw against bracket. Tighten all bolts snugly and check bracket for proper seating against carrier. Torque all bolts to specifications.
9. Align camber cam with reference mark on torque arm bracket and tighten nut to retain setting. If strut rod has been replaced, camber setting should be checked.
10. Remove support from torque arm, install wheel and tire assembly, lower vehicle so that weight rest on wheels and torque strut rod and wheel nuts.

FRONT STRUT ROD AND BRACKET REPLACEMENT

1. Raise vehicle sufficiently to permit access to front strut rod bracket at transmission support.
2. Disconnect strut rod bracket at transmission support by removing the retaining nuts (fig. 77).
3. Remove nut, retainer and grommet securing strut rod to torque arm.
4. Remove strut rod and bracket assembly from torque arm and clamp bracket in vise. Remove nut, retainer and grommet securing strut rod to bracket.
5. Position retainer and grommet against shoulder on strut rod then place strut rod in bracket. Install grommet, retainer and nut to retain strut rod to bracket.

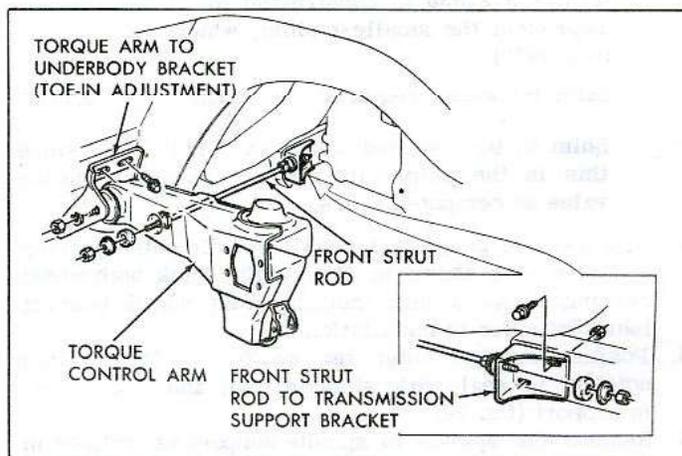


Fig. 77—Front Strut Rod Attachment

6. Position retainer and grommet on opposite end of strut rod then place end through torque arm and place grommet, retainer and nut on protruding end of strut rod.
7. Position bracket to transmission support, then install retaining screws and nuts.
8. Torque all parts to specifications and lower vehicle to floor.

SPRING REPLACEMENT

1. Raise rear of vehicle, position stand jacks at jacking pads and remove wheel and tire assembly.
2. Position hydraulic jack under torque arm (fig. 78), raise torque arm and compress spring so that it is near curb height.
3. Disconnect rear strut rod bracket at the differential carrier.
4. Disconnect shock absorber at torque arm bracket, then slowly release hydraulic jack permitting spring to relax until it is fully expanded.
5. Remove spring, spring retainer and cushion from the vehicle (fig. 79).
6. Place spring retainer and cushion on spring so that spring end rest against stop on retainer, then place assembly between torque arm and under body bracket. Make sure spring is indexed in both the upper and lower seats.
7. Slowly raise hydraulic jack to partially compress spring, then connect shock absorber to torque arm bracket.
8. With shock absorber installed to torque arm, continue to raise hydraulic jack until spring is at curb position. Connect rear strut rod bracket to differential carrier.
9. Remove hydraulic jack and install wheel and tire assembly.
10. With weight of vehicle resting on suspension, torque affected attaching parts to specifications.

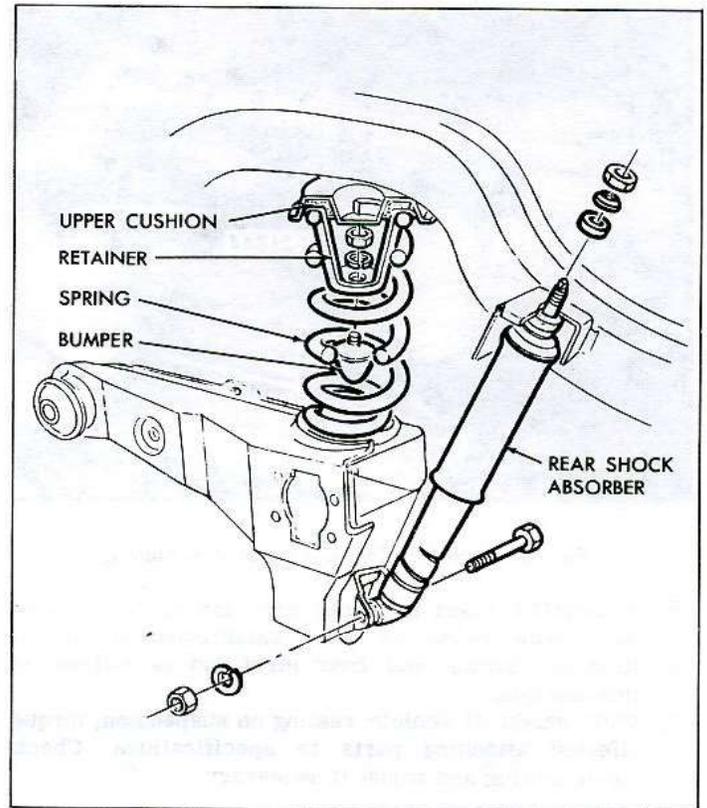


Fig. 79—Spring and Shock Absorber Installation

TORQUE CONTROL ARM BUSHING REPLACEMENT

1. Raise rear of vehicle and remove spring and front strut rod as outlined in this section.
2. Mark relationship of torque arm toe-in bracket to underbody and disconnect bracket from underbody.
3. Remove the bracket from torque arm and install bushing removal tools as shown in Figure 80.
4. Install new bushing to torque arm using tools as shown in Figure 81.

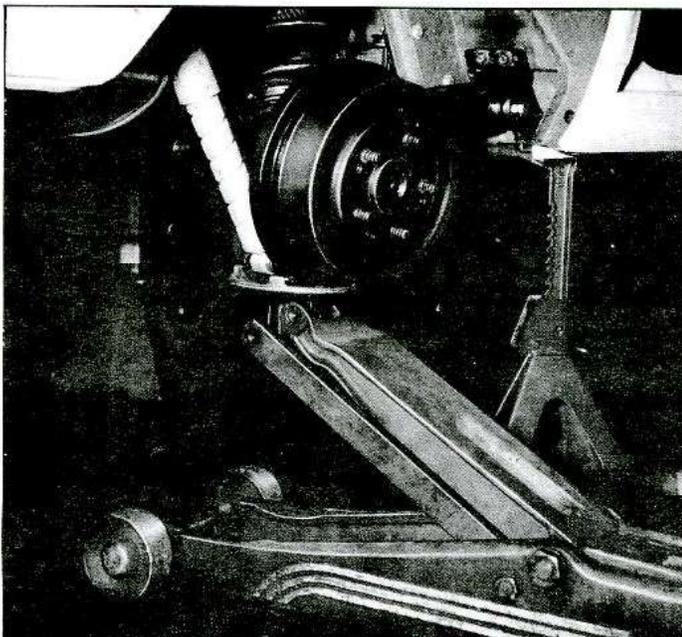


Fig. 78—Positioning Jack for Spring Removal

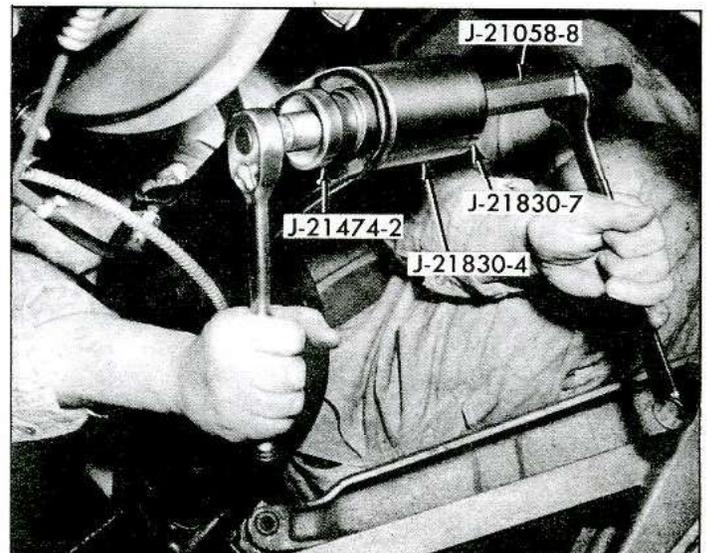


Fig. 80—Removing Torque Control Arm Bushing

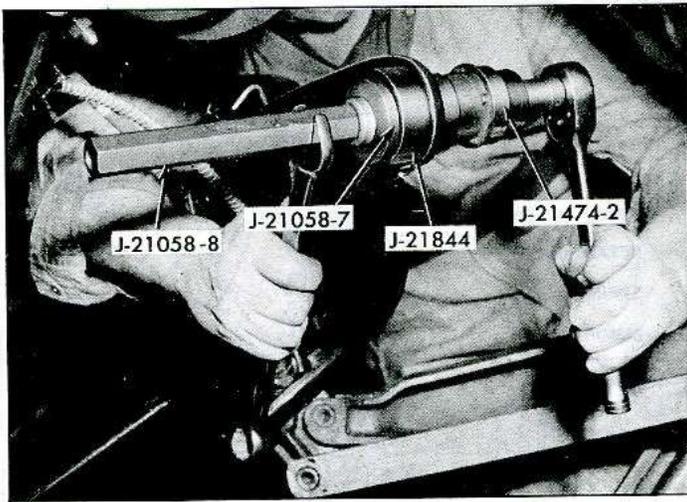


Fig. 81—Installing Torque Control Arm Bushing

5. Reinstall bracket to torque arm and vehicle underbody using reference mark established in Step 2.
6. Reinstall spring and front strut rod as outlined in this section.
7. With weight of vehicle resting on suspension, torque affected attaching parts to specifications. Check toe-in setting and adjust if necessary.

TORQUE CONTROL ARM REPLACEMENT

1. Raise rear of vehicle, then remove spring, shock absorber at lower attachment, axle drive shaft and front and rear strut rods as outlined in this section.
2. Remove brake drum, disconnect hydraulic brake line at wheel cylinder inlet and at torque arm bracket, then disconnect parking brake cable at actuating lever and at torque arm.
3. Remove the torque arm-to-spindle support retaining nuts, then remove the spindle, spindle support and brake flange plate as an assembly (fig. 82).

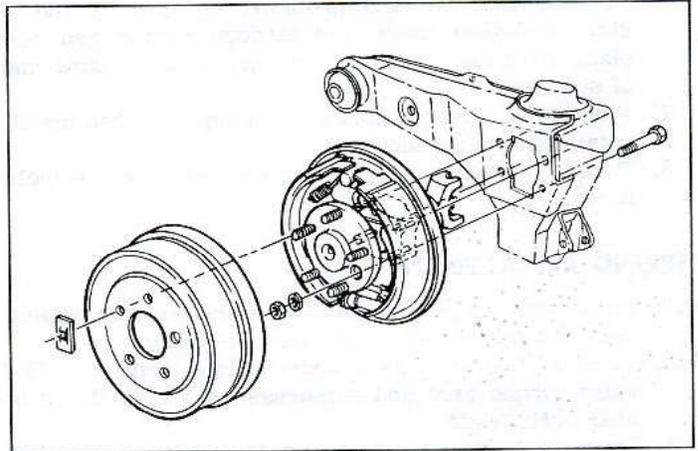


Fig. 82—Rear Wheel Spindle, Support and Brake Removal

4. Mark relationship of toe-in bracket to underbody and disconnect torque arm toe-in bracket from underbody, then separate bracket from torque arm.
5. Install toe-in bracket to torque arm, then loosely install toe-in bracket to vehicle underbody. Align bracket with reference mark on underbody.
6. Install spring, shock absorber, and front and rear strut rods following procedures outlined in this section.
7. Position spindle, spindle support and brake flange plate assembly in torque arm and secure with stud nuts.
8. Connect parking brake cable to actuating lever and to torque arm.
9. Connect hydraulic brake line to torque arm bracket and to wheel cylinder inlet.
10. Install axle drive shaft, brake drum and wheel and tire assembly.
11. Bleed brakes as outlined in Section 5.
12. With weight of vehicle resting on suspension, torque affected attaching parts to specifications.

SPECIAL TOOLS

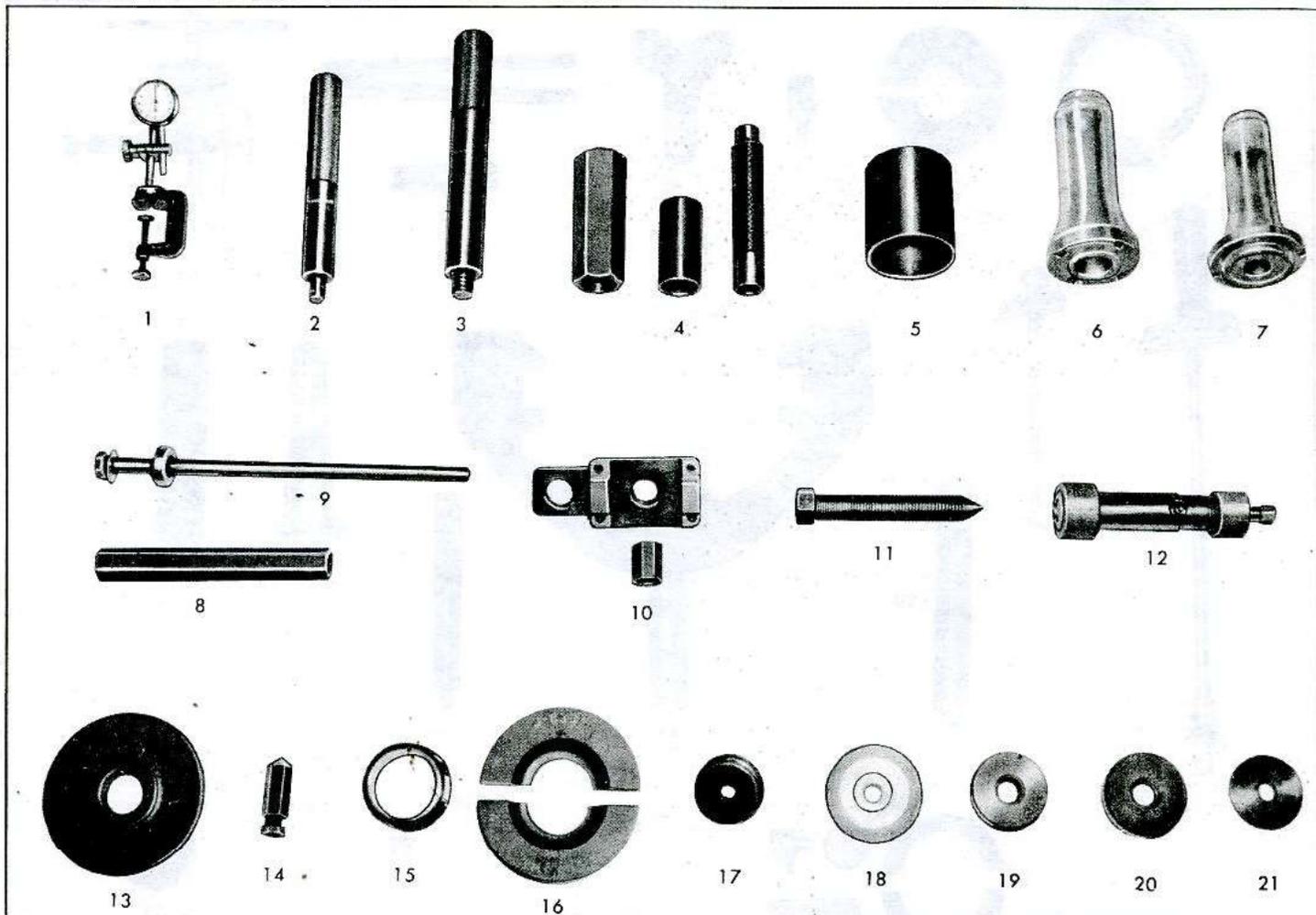


Fig. 83—Special Tools (Rear Suspension)

- | | | | |
|---------------|--------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------|
| 1. J-8001 | Dial Indicator Set
(Use with J-8364 Stand—not Illustrated) | 11. J-8614-3 | Drive Spindle Flange Remover
Power Screw |
| 2. J-7079-2 | Driver Handle (insert type) | 12. J-21836 | Drive Spindle Spacer Selector Gauge |
| 3. J-8092 | Driver Handle (threaded type) | 13. J-9436 | Drive Spindle Outer
Bearing Installer Plate |
| 4. J-21843 | Wheel Drive Spindle Flange
and Bearing Installer—Consists of
21843-1 Bolt, 21843-2 Sleeve
and 21843-3 Nut | 14. J-21831 | Drive Spindle Remover—Consists of
J-21831-1 Bolt, and J-21831-2 Nut |
| 5. J-21830-4 | Torque Arm Bushing Remover Sleeve | 15. J-21844 | Torque Arm Bushing Installer |
| 6. J-21837 | Drive Spindle Inner Seal Installer | 16. J-8331 | Drive Spindle Outer
Bearing Remover Plates |
| 7. J-21842 | Drive Spindle Outer Seal Installer | 17. J-21474-2 | Torque Arm Bushing Adapter |
| 8. J-21058-8 | Torque Arm Bushing Remover Nut | 18. J-21830-7 | Torque Arm Bushing Bridge |
| 9. J-21058-15 | Torque Arm Bushing Remover Bolt | 19. J-8850 | Drive Spindle
Outer Bearing Installer |
| 10. J-21859 | Drive Spindle Flange Remover—Consists
of J-21859-1 Nut, J-21859-2 Plate
and J-21859-3 Bolt. Used with
J-8614-3. | 20. J-7817 | Drive Spindle
Inner Bearing Cup Installer |
| | | 21. J-21058-7 | Torque Arm Bushing Adapter |

SPECIAL TOOLS

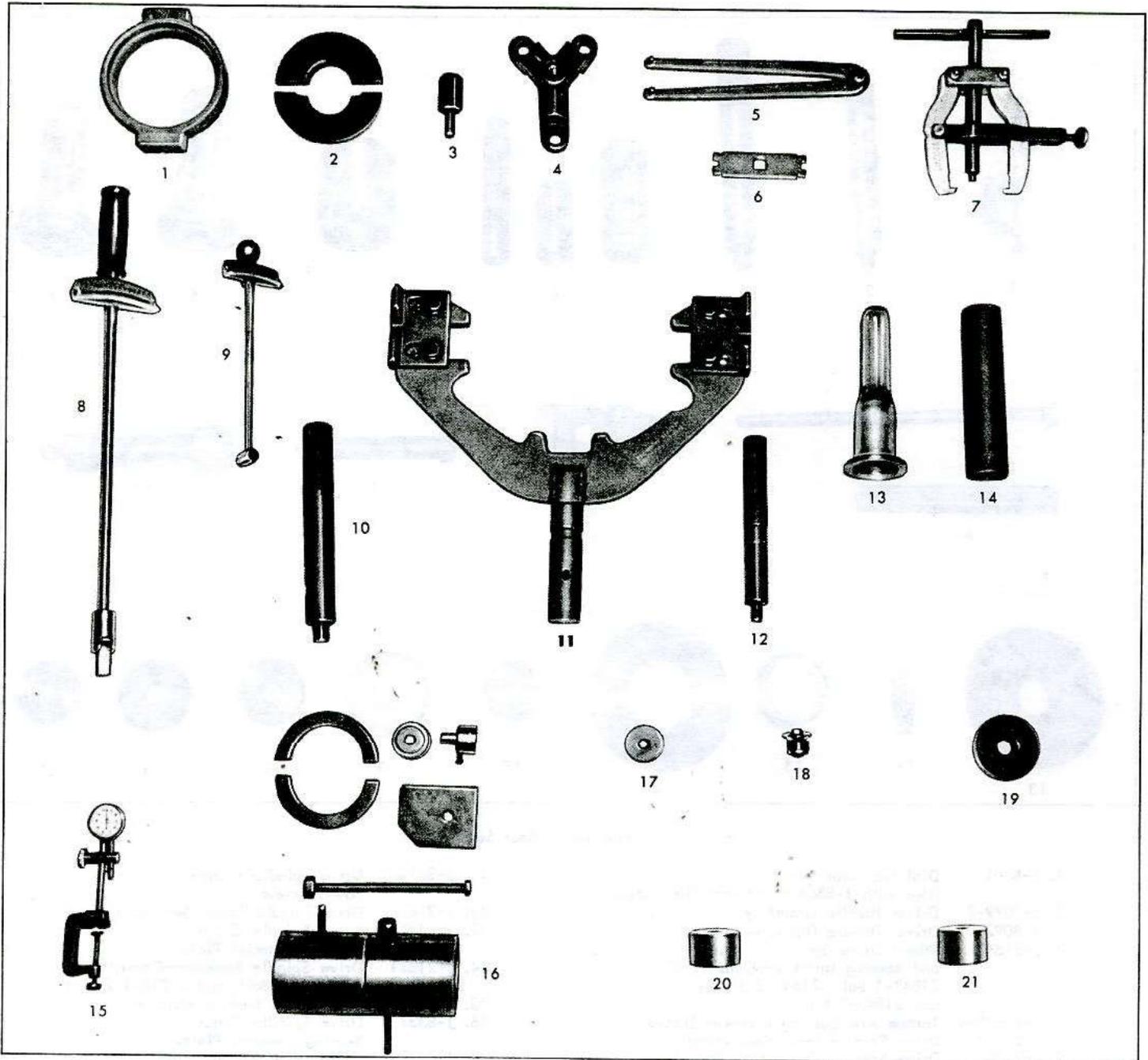


Fig. 84—Special Tools (Rear Axle)

- | | | |
|-----------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1. J-0358-1 Pinion Bearing Remover Press Plate Holder | 7. J-7112 Differential Side Bearing Puller | 16. J-6266 Pinion Setting Depth Gauge—Consists of J-6266-18 Adapters, J-6266-25 Plug, J-6266-19 Gauge, J-6266-5 Plate and J-6266-1 Cylinder |
| 2. J-8331 Pinion Bearing Remover Plates—Used with J-0358-1 Holder | 8. J-1313 0-150 ft. lbs. torque wrench | 17. J-8107-2 Differential Side Bearing Puller Pilot Adapter |
| 3. J-2619-4 Positraction Axle Torque Adapter | 9. J-5853 0-50 in. lbs. torque wrench | 18. J-8362 Pinion Turning Adapter |
| 4. J-5748 Positraction Axle Torque Adapter Plate—Used with J-2619-4 Adapter | 10. J-8092 Driver Handle (threaded type) | 19. J-7137 Pinion Rear Bearing Race—Installer Used with J-7079-2 Handle |
| 5. J-972 Pinion Adjusting Sleeve Wrench | 11. J-3289 Differential Carrier Holding Fixture | 20. J-8359 Differential Side Bearing Installer—Used with J-7079-2 Hdl. |
| 6. J-8342 Differential Side Bearing Adjusting Sleeve Wrench | 12. J-7079-2 Driver Handle (insert type) | 21. J-8448-1 Pinion Shaft Rear Oil Seal Installer |
| | 13. J-8340 Pinion Shaft Front Oil Seal Installer | |
| | 14. J-5590 Pinion Shaft Bearing Installer | |
| | 15. J-8001 Dial Indicator Set | |

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