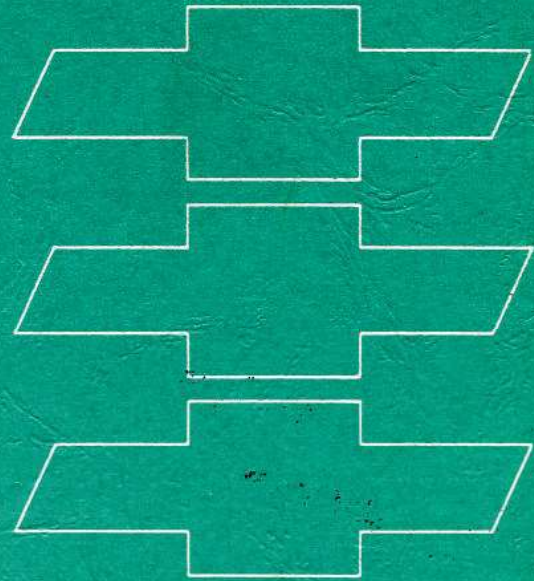
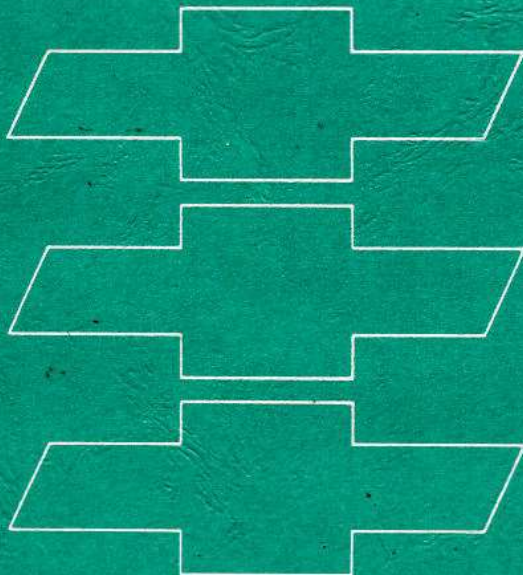


1965



CORVAIR



**CHASSIS
SHOP
MANUAL**

1965 CHEVROLET CORVAIR CHASSIS SHOP MANUAL

FOREWORD

This manual is designed to provide complete information on the maintenance and repair of various units, except the Body, of the 1965 Chevrolet Corvair Passenger Vehicles. Service information for 1965 body items for these vehicles is contained in the 1965 Body Service Manual. For service information on the 1965 Corvair Greenbrier refer to the 1961 Corvair Shop Manual and the 1964 Corvair Shop Manual Supplement.

An effort has been made to produce a manual that will serve as a ready reference book for the experienced service man and also cover step by step procedure for the guidance of the less experienced man.

The Section Index on this page enables the user to quickly locate any desired section. At the beginning of each section, a Table of Contents gives the page number on which major subjects begin. An Index is placed at the beginning of each major subject within the section.

Summaries of Special Tools, when required, are found at the end of major sections, while Specifications covering vehicle components are presented at the rear of the manual.

This manual should be kept in a handy place for ready reference. If properly used, it will enable the technician to better serve the owners of Chevrolet Corvair vehicles.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

CHEVROLET MOTOR DIVISION

General Motors Corporation
DETROIT, MICHIGAN

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4	REAR AXLE AND REAR SUSPENSION
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6M	ENGINE FUEL
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7	TRANSMISSION, CLUTCH AND CONTROLS
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10	WHEELS AND TIRES
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SECTION 9 STEERING

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GENERAL DESCRIPTION

The regular production steering gear (fig. 1) is the recirculating ball type.

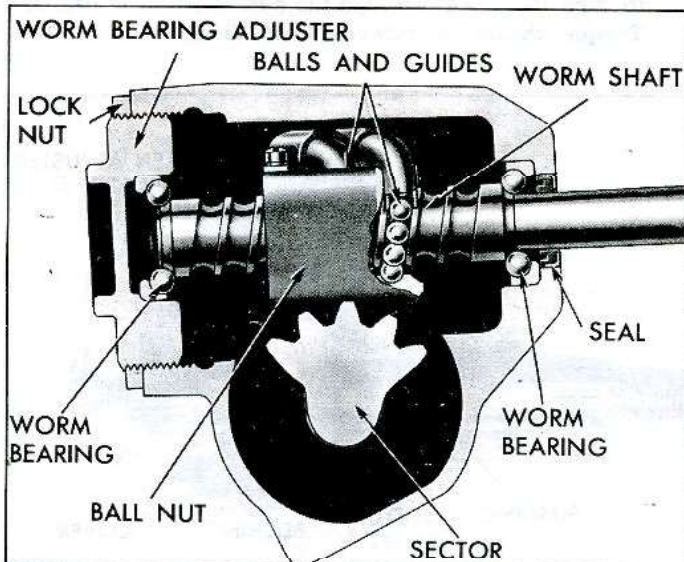


Fig. 1—Steering Gear Worm and Ball Nut Circuits

This gear provides for ease of handling by having forces transmitted from worm to sector gear through ball bearings. The steering linkage (fig. 2) is of the relay type, and extended interval lubrication design, with the pitman arm connected to a relay rod by means of a self-adjusting ball and stud joint. The relay rod is connected to an idler arm which in turn, is connected to a support bolted to the frame side rail opposite the steering gear.

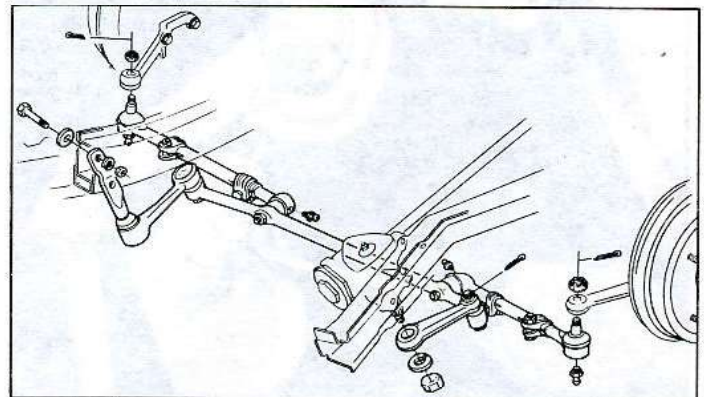


Fig. 2—Steering Linkage

Pivoting at the relay rod end of the idler arm is accomplished in rubber insulated nylon bushings. Connecting the relay rod to the steering arms are two adjustable tie rods with self-adjusting ball and socket type joints.

The hole for lubrication fittings in the replacement tie rod sockets, front suspension ball studs, steering connecting rods and various other parts will not be threaded. This will make it necessary to use the new self-threading lubrication fittings where applicable.

MAINTENANCE AND ADJUSTMENTS

LUBRICATION

The steering gear is filled at the factory with a special all-season gear lubricant. Seasonal change is unnecessary and the housing should not be drained. Lubricant level should be checked every 36,000 miles. When required, add water resistant E.P. lubricant. Refer to Lubrication, Section 2, for lube points and intervals.

ADJUSTMENTS

Steering Gear

Before attempting steering gear adjustments in an attempt to correct such conditions as shimmy, loose or hard steering, or road shocks, make a careful check of front end alignment, shock absorbers, wheel balance and tire pressure for possible causes.

Correct adjustment of the steering gear is very important. Only two adjustments are possible but they must be made in the following manner, step by step, in the order given. The lash adjusting screw is accessible through the trunk compartment floor pan plug.

1. Remove pitman arm nut and lock washer and, using Tool J-6627, pull pitman arm from pitman shaft (fig. 3).
2. Loosen pitman shaft lash adjuster screw locknut (fig. 4) and turn the lash adjuster screw a few turns counter-clockwise to remove overcenter load (increase lash). Gently turn the wheel in one direction

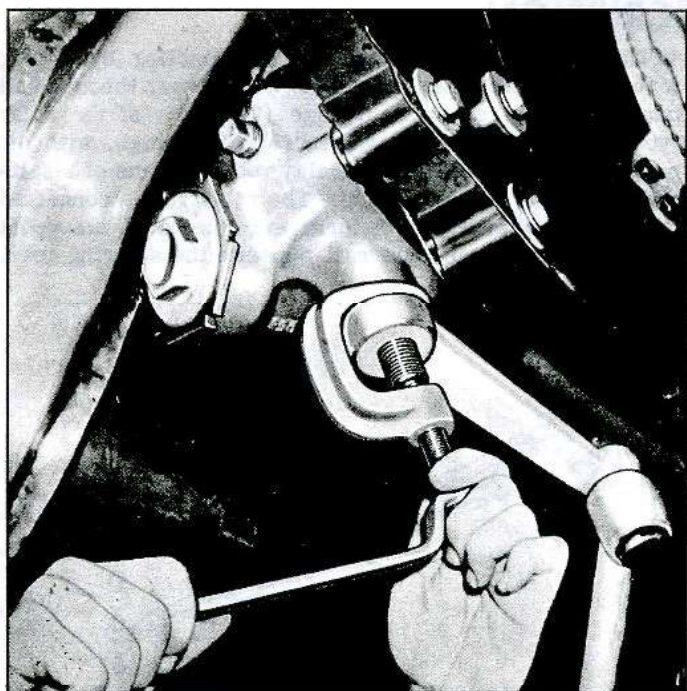


Fig. 3—Removing Pitman Arm With Tool J-6627

until stopped by gear and then back off one turn of the steering wheel.

CAUTION: Do not turn the wheel hard against the stops when the pitman arm is disconnected since this may damage the ball guides.

3. Pry off the horn button. Using a suitable size socket and a low reading (in. lbs.) torque wrench on the steering shaft nut, measure the torque needed to keep the wheel in motion. This should be between 3-1/2 and 4-1/2 in. lbs. If the torque does not fall within these limits, adjustment of the worm bearing is necessary.
4. To adjust the worm bearings (See Figure 1): loosen the worm bearing adjuster locknut and turn worm bearing adjuster down until there is no perceptible end play in worm. Check the pull at the torque wrench, readjusting the adjuster nut as necessary to obtain proper pull. Tighten the locknut and recheck pull. If the gear feels "lumpy" after worm bearing adjustment, the bearings are probably damaged and the gear should be removed and disassembled for replacement of the damaged parts. See "Service Operations".
5. After proper worm adjustment is obtained, and all mounting bolts are securely tightened, adjust the lash adjuster screw (fig. 4). First turn the steering wheel gently from one stop all the way to the other, counting the total number of turns. Then turn the wheel back exactly half way to the center position. The mark on the steering shaft should be at the 12 o'clock position. Turn the lash adjuster screw clockwise to take out all lash in the gear teeth, then tighten the locknut. Check the highest torque needed to turn the wheel through the center position (fig. 5). Torque should be between 8 and 10 in. lbs. in excess

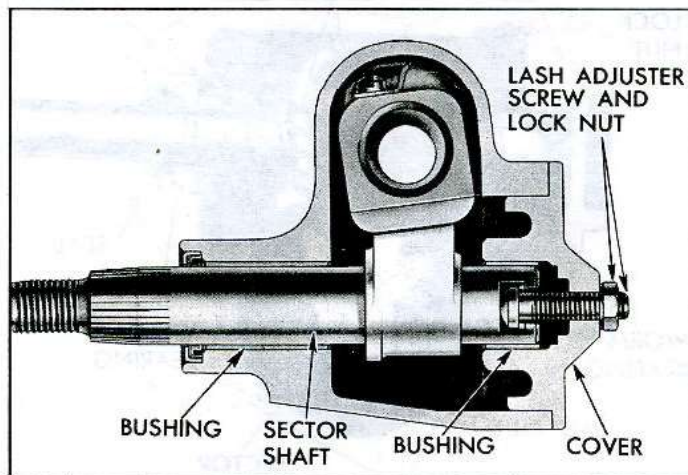


Fig. 4—Sector Gear and Pitman Shaft

of worm bearing preload, but not more than a total of 14 in. lbs. Readjust if necessary to obtain proper pull.

6. Tighten locknut and recheck. Torque must lie between the specified limits.

NOTE: Always make the final lash adjustment in the clockwise direction.

7. Reassemble pitman arm to pitman shaft, first making sure that wheels are straight ahead and that the steering wheel and gear are centered.

Steering Wheel Alignment and High Point Centering

1. Set front wheels in straight ahead position. This can be checked by driving vehicle a short distance to determine steering wheel position at which vehicle follows a straight path.
2. With front wheels set straight ahead and horn button removed, check position of mark on the wormshaft designating steering gear high point, should be at the top side of the shaft at 12 o'clock position.

Remove steering wheel, if necessary, and align wheel with mark on bottom of steering shaft (wheel should be set in straight ahead position).

3. If gear has been moved off high point when setting wheels in straight ahead position, loosen adjusting sleeve clamps on both left and right hand tie rods, then turn each sleeve an equal amount in the same direction to bring gear back on high point.

CAUTION: Turning the sleeves an unequal number of turns or in different directions will disturb the toe-in setting of the wheels.

4. Tighten all sleeve clamp bolts and torque to specifications.

CAUTION: Tie rod clamp bosses must be pointing down and the bolt parallel with the ground.

Steering Shaft and Mast Jacket Relationship and Alignment

The proper relationship between mast jacket, steering

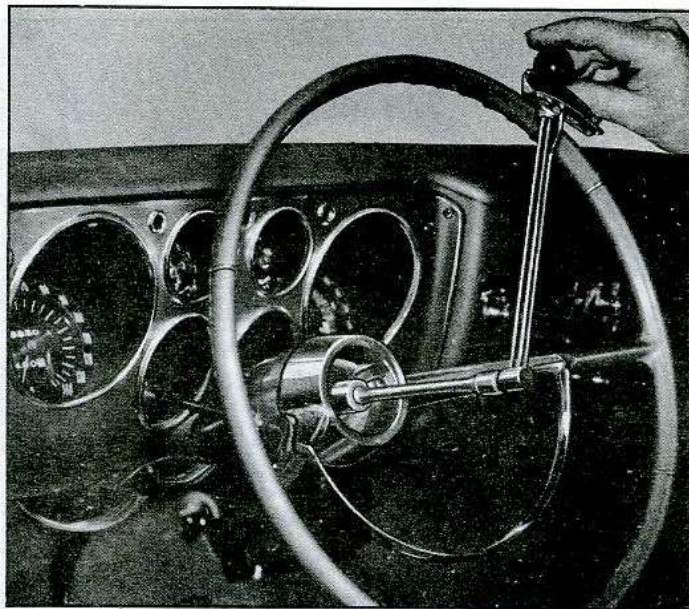


Fig. 5—Checking Steering Gear Turning Torque

shaft and steering gear is determined by the location of the mast jacket and the steering gear.

The steering shaft is centered in the upper mast jacket by a bearing.

Adjustment is secured by shifting the lower end of the mast jacket so that the jacket runs concentric to the steering shaft. Oversize bolt holes are provided for this purpose. The mast jacket should be positioned axially to obtain .080" clearance between the steering wheel and directional housing. When adjustment is completed, tighten all mast jacket attaching bolts.

Toe-In Adjustment

A procedure for adjusting the steering linkage for proper toe-in setting is described in Section 3.

SERVICE OPERATIONS

STEERING GEAR (REGULAR PRODUCTION)

Removal

1. Disconnect directional signal switch harness from chassis wiring harness at connector.
2. Pull out horn button on standard series models. On remaining models pull out center ornament from horn ring.
3. Remove three screws from the receiving cup or horn ring.
4. Remove the receiving cup or horn ring, Belleville spring, bushing and on deluxe wheel the pivot ring.
5. Remove steering wheel nut and washer from steering shaft.
6. Use Tool J-2927 and J-2927-6 to remove steering wheel (fig. 6).

NOTE: Do not lose the sleeve and spring located on the shaft under the steering wheel.

7. Direction signal canceling cam may be removed if desired.

Installation

1. Replace all components in the order removed. Make sure that the mark on the steering shaft lines up with the mark on the steering wheel. Torque wheel nut 35-40 ft. lbs.

STEERING WHEEL (SIMULATED WOOD Fig. 7)

Removal

1. Disconnect horn wire at chassis wiring harness.
2. Remove horn cap by pulling up.
3. Remove three contact assembly attaching screws and remove contact assembly.
4. Remove steering wheel attaching nut and washer.
5. Using Tool J-2927 install centering adapter (J-2927-6) on steering shaft, thread puller anchor screws (4" long) into threaded holes provided in hub assembly. Turn center bolt of tool clockwise to remove hub assembly.
6. The steering wheel may be separated from the hub assembly at this time if necessary by removing the six attaching rivets.

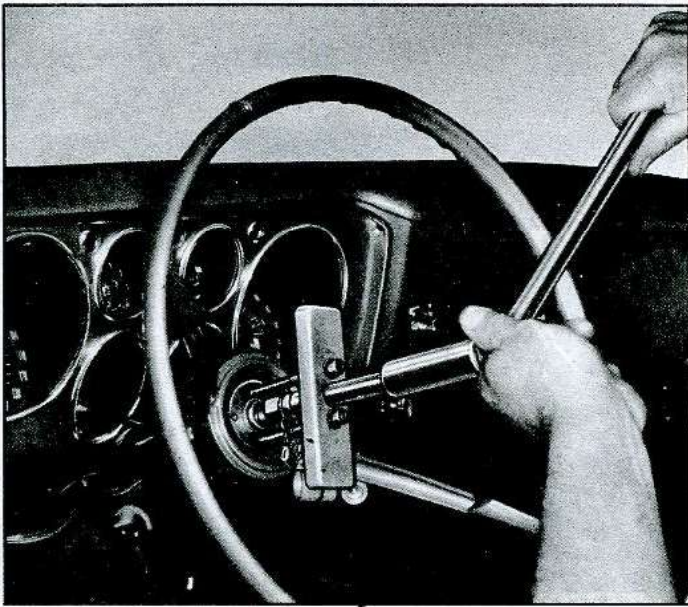


Fig. 6—Steering Wheel Removal

Installation

1. If the steering wheel and hub assembly were separated, replace the original rivets with special flat head attaching screws, nuts and lock washers.
2. Replace all components in the reverse order of removal.

NOTE: Align mark on steering wheel hub assembly with mark on steering shaft when assembling.

STEERING GEAR (REGULAR PRODUCTION)

Removal

1. Remove steering wheel as previously outlined.
2. Raise front end of vehicle and remove pitman arm from pitman shaft using Tool J-6627.
3. Remove the three mounting bolts from the steering gear while supporting gear.
4. Remove steering gear and shaft from the bottom of the vehicle.

STEERING GEAR (W/TELESCOPING MAST JACKET)

Removal

1. Raise front of vehicle and drill a 2" diameter hole in the left front wheel splash shield (fig. 18).
2. Remove the upper steering coupling bolt and nut.
3. Remove the pitman arm from the pitman shaft using Tool J-6627.
4. Remove the three mounting bolts from the steering gear while supporting the gear.
5. Remove steering gear from the bottom of the vehicle.

Disassembly

All steering gear parts must be kept clean and free from dirt. Spread clean paper or rags on the bench before starting disassembly of the steering gear. Figure 8 shows a disassembled view of the gear.

1. Loosen locknut on end of pitman shaft and turn the lash adjuster a few turns counter-clockwise. This will remove the load from the worm bearings caused by the close meshing of the rack and sector teeth.
2. Loosen the locknut on the worm bearing adjuster and

- turn the adjuster counter-clockwise a few turns.
3. Place a pan under the assembly to catch the lubricant and remove the three bolts and washers attaching side cover to housing.
4. Pull the side cover, with the pitman shaft, from the housing (fig. 9).

NOTE: If the sector does not clear the opening in the housing easily, turn the wormshaft by hand until the sector will pass through the opening in the housing.

5. Remove the worm bearing adjuster, adjuster locknut and lower ball bearing from housing.
6. Draw wormshaft and nut assembly from housing (fig. 10). Remove upper ball bearing.

CAUTION: Use care that the ball nut does not run down to either end of the worm. Damage will be done to the ends of the ball guides if the nut is allowed to rotate until stopped at the end of the worm.

7. Remove locknut from lash adjuster and unscrew adjuster from side cover by turning adjuster clockwise. Slide adjuster and shim out of slot in end of pitman shaft.

Ball Nut Disassembly

As a rule, disassembly of the ball bearing nut will not be necessary if it is perfectly free with no indication of binding or tightness when rotated on the worm. However, if there is any indication of binding or tightness, the unit should be disassembled, cleaned and inspected as follows:

1. Remove screws and clamp retaining ball guides in nut. Draw guide out of nut.
2. Turn the nut upside down and rotate the wormshaft back and forth until all 48 balls have dropped out of the nut into a clean pan. With the balls removed, the nut can be pulled endwise off the worm.

Inspection

With the steering gear completely disassembled, wash all parts in cleaning solvent. Dry them thoroughly with clean rags. With a magnifying glass inspect the ball bearings, bearing cups, worm and nut grooves and the surface of all balls for signs of indentation. Also check for any signs of chipping or breakdown of the surface.

Any parts that show signs of damage should be replaced. Balls must be replaced with genuine Chevrolet parts made according to specifications for this steering gear.

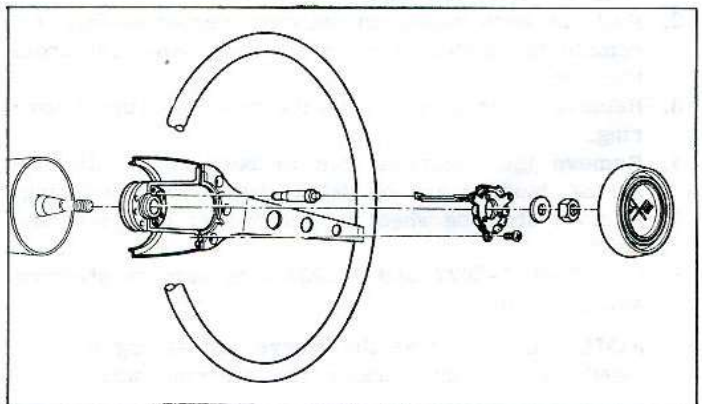


Fig. 7—Simulated Wood Steering Wheel and Attaching Parts

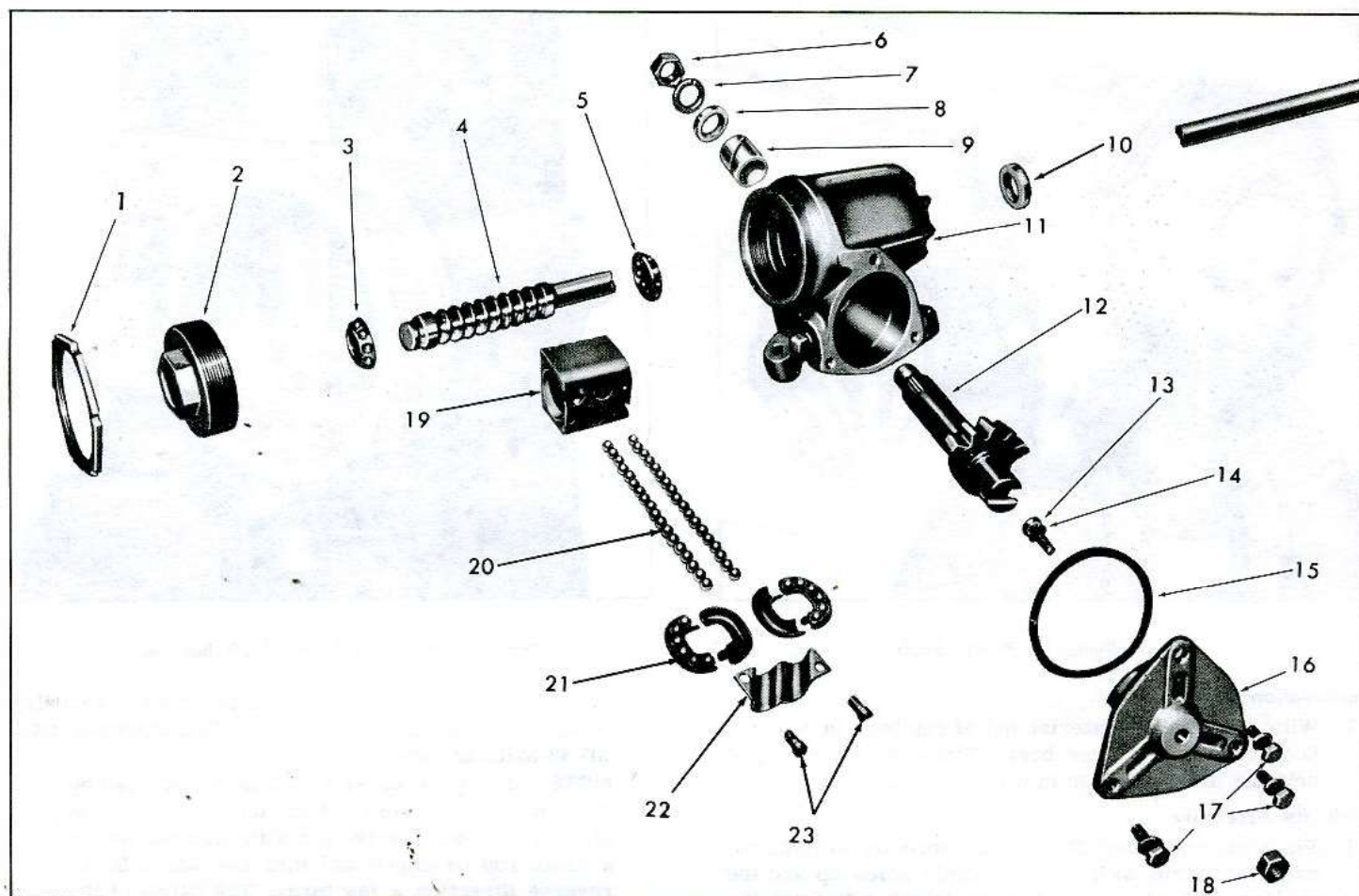


Fig. 8—Exploded View of Steering Gear

- | | | | |
|---------------------------------------|---------------------------|--|---------------------------------|
| 1. Wormshaft Bearing Adjuster Locknut | 6. Pitman Arm Nut | 12. Pitman Shaft | 18. Lash Adjuster Screw Locknut |
| 2. Wormshaft Bearing Adjuster | 7. Pitman Arm Lock Washer | 13. Lash Adjuster Screw | 19. Ball Nut |
| 3. Wormshaft Bearing | 8. Pitman Shaft Seal | 14. Lash Adjuster Screw Shim | 20. Balls |
| 4. Wormshaft | 9. Pitman Shaft Bushing | 15. "O" Ring | 21. Ball Guides |
| 5. Wormshaft Bearing | 10. Wormshaft Outer Seal | 16. Side Cover | 22. Ball Guide Retainer |
| | 11. Steering Gear Housing | 17. Side Cover Screws and Lock Washers | 23. Ball Guide Retainer Screws |

Inspect wormshaft seal for defects.

Inspect the pitman shaft for wear and check the fit of the shaft in the housing bushings.

Inspect the fit of the pilot on the end of the pitman shaft in its bushing in the side cover. If this bushing is worn, a new side cover and bushing assembly should be installed.

Check ball guides for damage at ends where they pick up the balls from the helical path. Any damaged guides should be replaced.

Check steering gear wormshaft assembly for bent or damaged shaft.

Repairs

Sector Shaft Bushing Replacement

1. Support steering gear housing in an arbor press and press sector shaft bushing from housing with Tool J-8366-2, inserted from lower end of housing (fig. 11).
2. Press new bushing into position using Tool J-8366-1 (fig. 12).

NOTE: Service bushings are diamond bored to size and require no further reaming.

Side Cover Bushing Replacement

The entire side cover assembly, including bushing, is serviced as a unit and should be replaced where it is desired to replace the bushing.

Wormshaft and Sector Shaft Seal Replacement

If either of the above seals indicates need of replacement, it should be removed and a new seal pressed into position in the housing. A suitable socket pressing on outer diameter of seal may be used.

NOTE: Care should be taken to insure that seal is not assembled in a cocked position.

Worm Bearing Cup

The worm bearing cup in the steering gear housing may be serviced as follows:

Removal

1. With gear dismantled and seal removed, cup may be tapped out of housing with a punch and hammer.
2. Use care to avoid damaging housing. Support it on a wood block while driving out old cup.

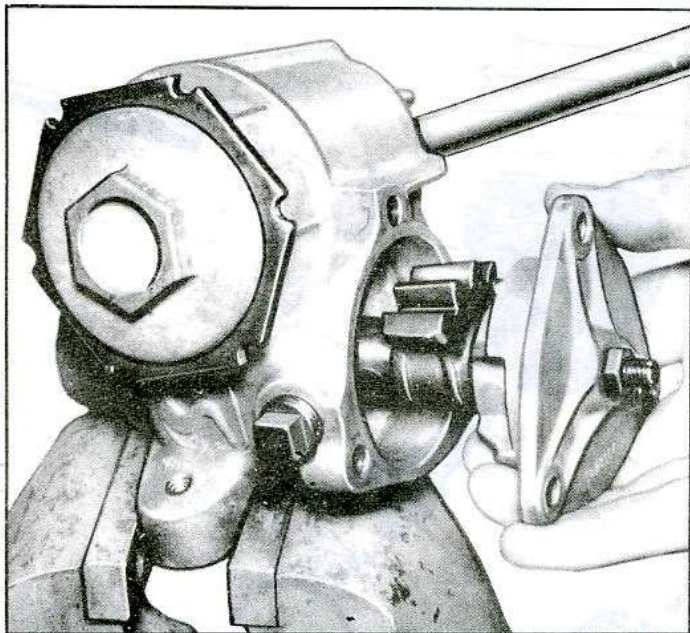


Fig. 9—Removing Pitman Shaft

Installation

1. With all foreign material out of cup bore in housing, position new cup over bore. Place old cup on top of new and press new cup in with arbor press.

Ball Nut Assembly

1. Place the wormshaft flat on the bench and slip the nut over the worm with the ball guide holes up and the shallow end of the rack teeth to the left from the steering wheel position. Align the grooves in the worm and nut by sighting through the ball guide holes.
2. Count 48 balls into a suitable container. This is the proper number of balls for this ball nut. Drop 18 balls into each of two holes on the same side of nut (this operation may be performed from either side of nut, but two holes on the same side must be used, not

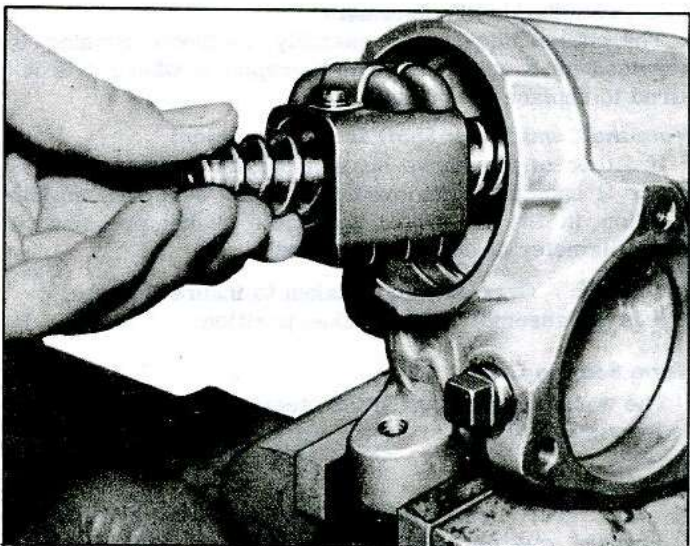


Fig. 10—Removing Wormshaft and Ball Nut

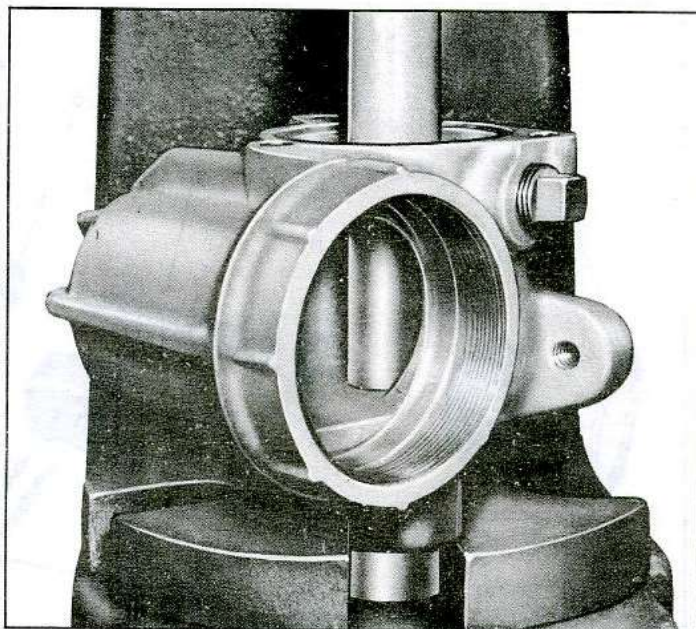


Fig. 11—Removing Sector Shaft Bushing

two holes on same end). Turn the worm gradually away from hole being filled (fig. 13). Continue until all 36 balls are installed.

NOTE: In cases where the balls are stopped by the end of the worm, hold down those balls already dropped into the nut with the blunt end of a clean rod or punch and turn the worm in the reverse direction a few turns. The filling of the circuit can then be continued. It may be necessary to work the worm back and forth, holding the balls down first in one hole then the other, to close up the space between the balls and fill the circuit completely and solidly.

3. Place remaining 12 balls in halves of ball guides, six in each of two halves (fig. 14).
4. Close this half of guide with the other half. Hold the

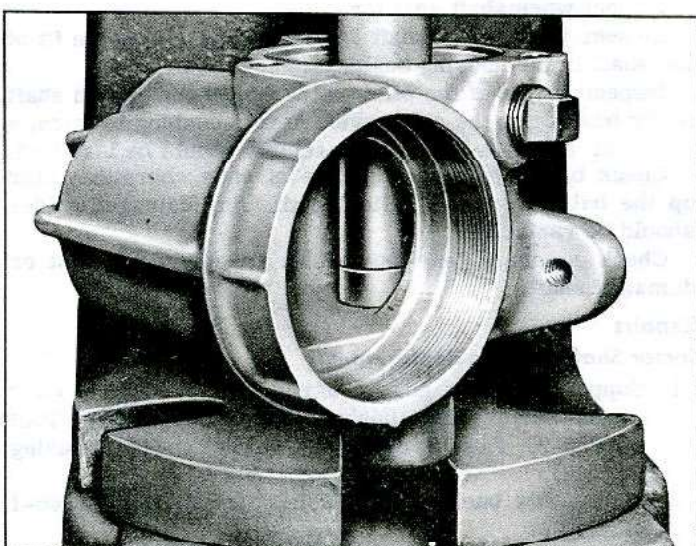


Fig. 12—Installing Sector Shaft Bushing

two halves together and plug each open end with vaseline so balls will not drop out while installing guide.

5. Push the guides into the guide holes of the nut (fig. 15). If the guides do not push all the way down easily, tap lightly into place.
6. Assemble the ball guide clamp to the nut, being sure to use a lock washer under the clamp screw, then tighten the screw securely.

Check the assembly by rotating the nut on the worm to see that it moves freely. Do not rotate the nut to the end of the worm threads as this may damage the ball guides. If there is any "stickiness" in the motion of the nut, some slight damage to the ends of the ball guides or to other gear components may have been overlooked.

Assembly

After a major service overhaul where all of the original factory installed lubricant has been washed out of the steering gear assembly, the thread of the adjuster, side cover bolts and lash adjuster should be coated with a suitable non-drying, oil resistant sealing compound such as Permatex No. 2. This is to prevent leakage of gear lubricant from the steering gear assembly. The compound should not be applied to female threads and extreme care should be exercised in applying this compound to the bearing adjuster, as the compound must be kept away from the wormshaft bearing. Also apply grease to the worm bearings, pitman shaft bushing, and ball nut teeth.

1. With wormshaft and pitman shaft seals and bearing cups installed and ball nut assembly installed on wormshaft, slip upper ball bearing over wormshaft and insert wormshaft and nut assembly into housing, feeding end of shaft through upper ball bearing cup and seal.
2. Place ball bearing in adjuster cup and install adjuster and locknut in lower end of housing.



Fig. 14—Filling Ball Guides

3. Assemble the lash adjuster with shim in the slot in the end of sector shaft. Check the end clearance which should not be greater than .002" (fig. 16). For the purpose of adjusting this end clearance, a steering gear lash adjuster shim unit is available. It contains four shims—.063", .065", .067" and .069" thick.
4. After lash adjuster end clearance has been adjusted, start shaft pilot into side cover. Then, using a screw driver, through the hole in cover, turn lash adjuster in a counter-clockwise direction to pull sector shaft pilot into side cover as far as it will go.
5. Rotate wormshaft by hand until ball nut is about in the center of travel. This is to make sure that the rack and sector will engage properly with center tooth of the sector entering center tooth space of the nut.

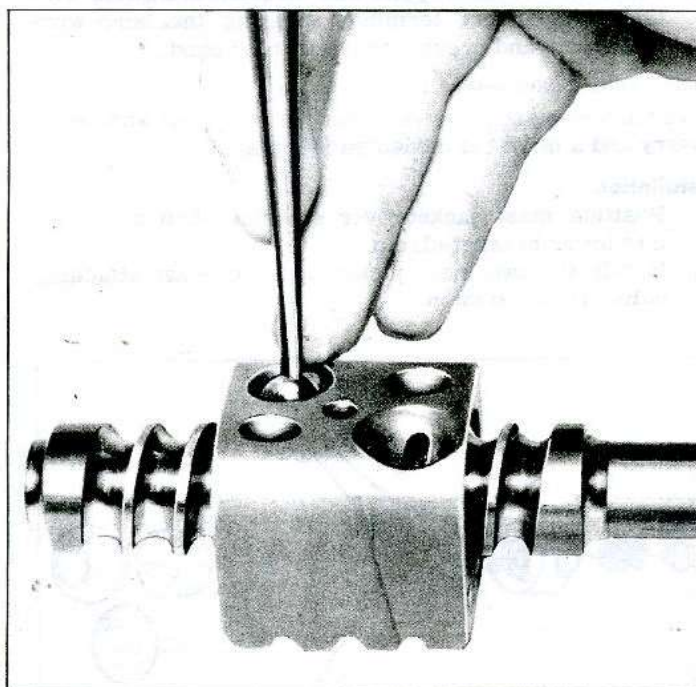


Fig. 13—Installing Balls in Nut

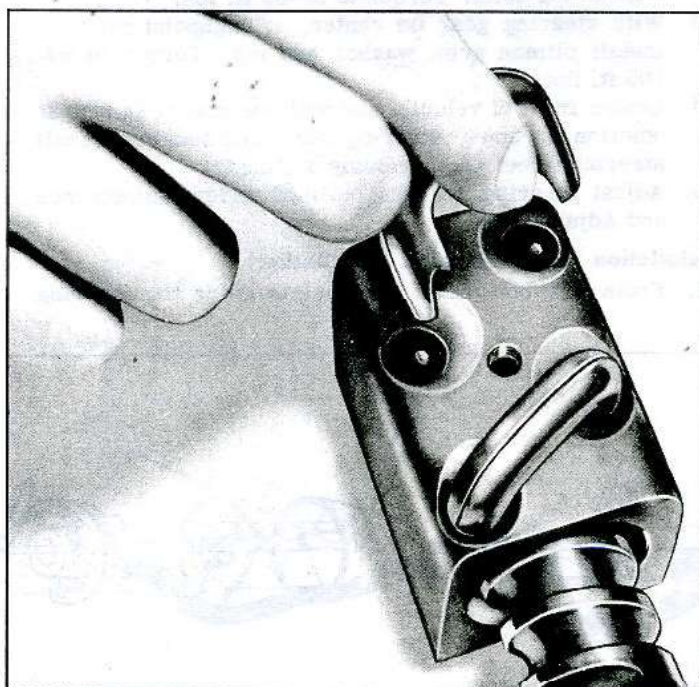


Fig. 15—Inserting Ball Guides in Nut

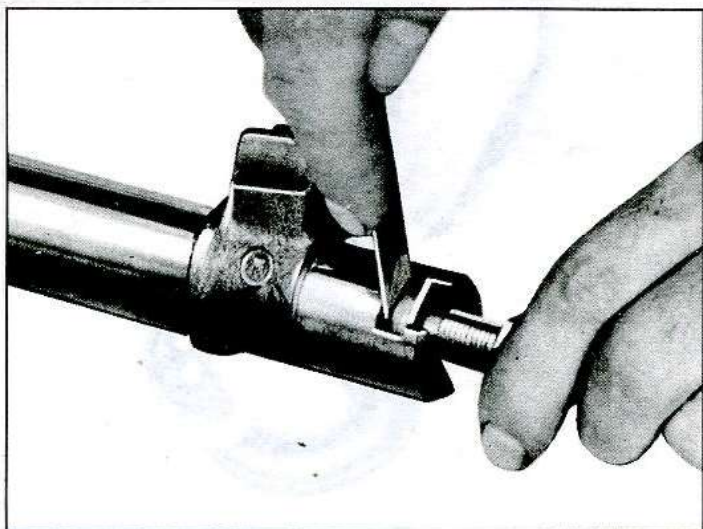


Fig. 16—Checking Lash Adjuster End Clearance

6. Place a new gasket on side cover, then push side cover assembly including sector shaft into place. After making sure there is some lash between rack and sector teeth, assemble and tighten side cover bolts.

NOTE: After gear is assembled, it is suggested that it be installed in the vehicle and adjusted instead of adjusted on the work bench. Adjust as outlined in this section, under Maintenance and Adjustments.

Installation (Regular Production)

1. From the bottom of the vehicle guide the steering shaft up through the mast jacket being careful not to damage the upper bearing.
2. Position steering gear in place and secure with the 3 mounting bolts. Torque to 25-35 ft. lbs.
3. With steering gear on center, or highpoint position, install pitman arm, washer and nut. Torque to 80-105 ft. lbs.
4. Lower front of vehicle, and with the spacer in proper position on upper steering shaft and bearing, install steering wheel as previously outlined.
5. Adjust steering gear as outlined under Maintenance and Adjustments.

Installation (W/Telescoping Mast Jacket)

1. From the bottom of the vehicle guide the steering

- gear and shaft into position being careful to align the coupling with the notch in the upper steering shaft.
2. Secure the steering gear in place with the 3 mounting bolts. Torque to 25-35 ft. lbs.
3. With steering gear on center, or high position, install pitman arm, washer and nut. Torque to 80-105 ft. lbs.
4. Install steering coupling upper bolt and torque to 22-27 ft. lbs.
5. Adjust steering gear as outlined under Maintenance and Adjustments.

MAST JACKET

Removal

1. Remove steering wheel, as outlined under Steering Wheel Removal, also remove the sleeve and spring located around the shaft just under the steering wheel.
2. Disconnect directional signal wires from chassis wiring harness.
3. Remove the clamp bolt at the lower mast jacket bracket.
4. While supporting the mast jacket remove the 2 attaching bolts at the upper mast jacket bracket.
5. Pull the mast jacket up through the lower bracket clamp and out of the vehicle.

Repairs

Upper Bearing Replacement

1. Carefully pry out horn contact plate from directional signal switch.

CAUTION: Contact plate will bend easily.

2. Pull upper mast jacket bearing from directional signal switch assembly.

Installation

1. Position bearing into directional signal switch and press by hand into place.
2. Place horn contact plate into directional switch, with the horn contact terminal engaging the horn wire connector, and press into position by hand.

Lower Seal Replacement

The lower mast jacket seal may be pried out when necessary and a new seal cemented into place.

Installation

1. Position mast jacket over steering shaft and slide into lower bracket clamp.
2. Install the two mast jacket upper bracket attaching bolts. Do not tighten.

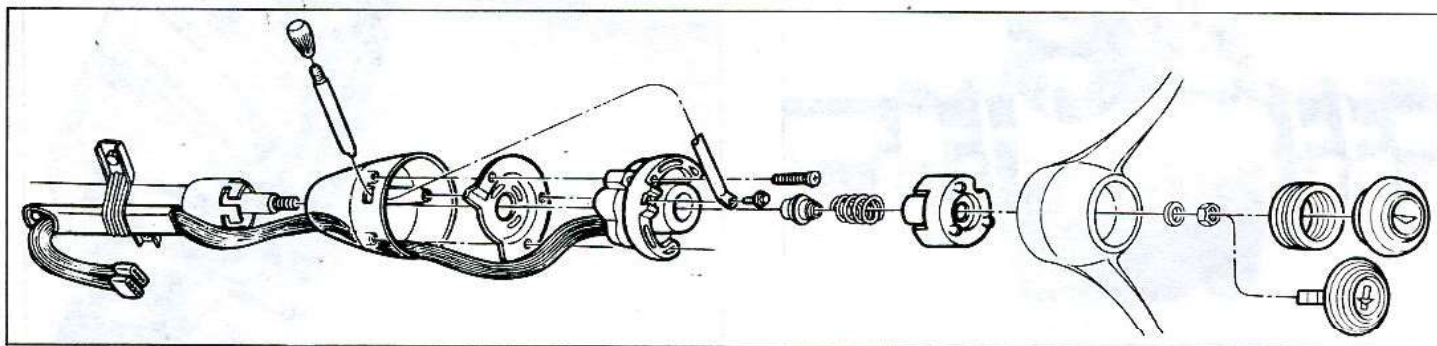


Fig. 17—Exploded View of Mast Jacket and Steering Wheel

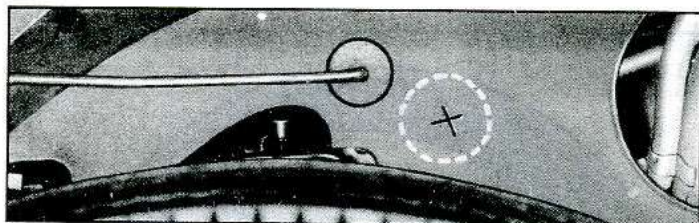


Fig. 18—Splash Shield Access Hole Location

3. Install lower bracket clamp bolt. Do not tighten.
4. Connect directional wiring to chassis wiring harness.
5. With the spring and sleeve in place, install steering wheel as outlined under Steering Wheel Installation.
6. Adjust mast jacket as outlined under Steering Shaft and Mast Jacket Relationship and Alignment in this section.

7. Install battery ground cable.

TELESCOPING MAST JACKET

Removal

1. Disconnect battery ground cable from battery.
2. Raise front of vehicle and drill a 2" diameter hole in the left front wheel splash shield (fig. 18). Then remove the upper steering coupling bolt and nut.
3. Lower vehicle and disconnect the two directional signal wiring connectors from chassis harness.
4. Remove the clamp bolt at the lower mast jacket bracket.
5. While supporting the mast jacket remove the 2 attaching bolts at the upper mast jacket bracket.
6. With the mast jacket in the full collapsed position, pull it up through the lower bracket. It may be necessary to rotate the mast jacket slightly to allow the

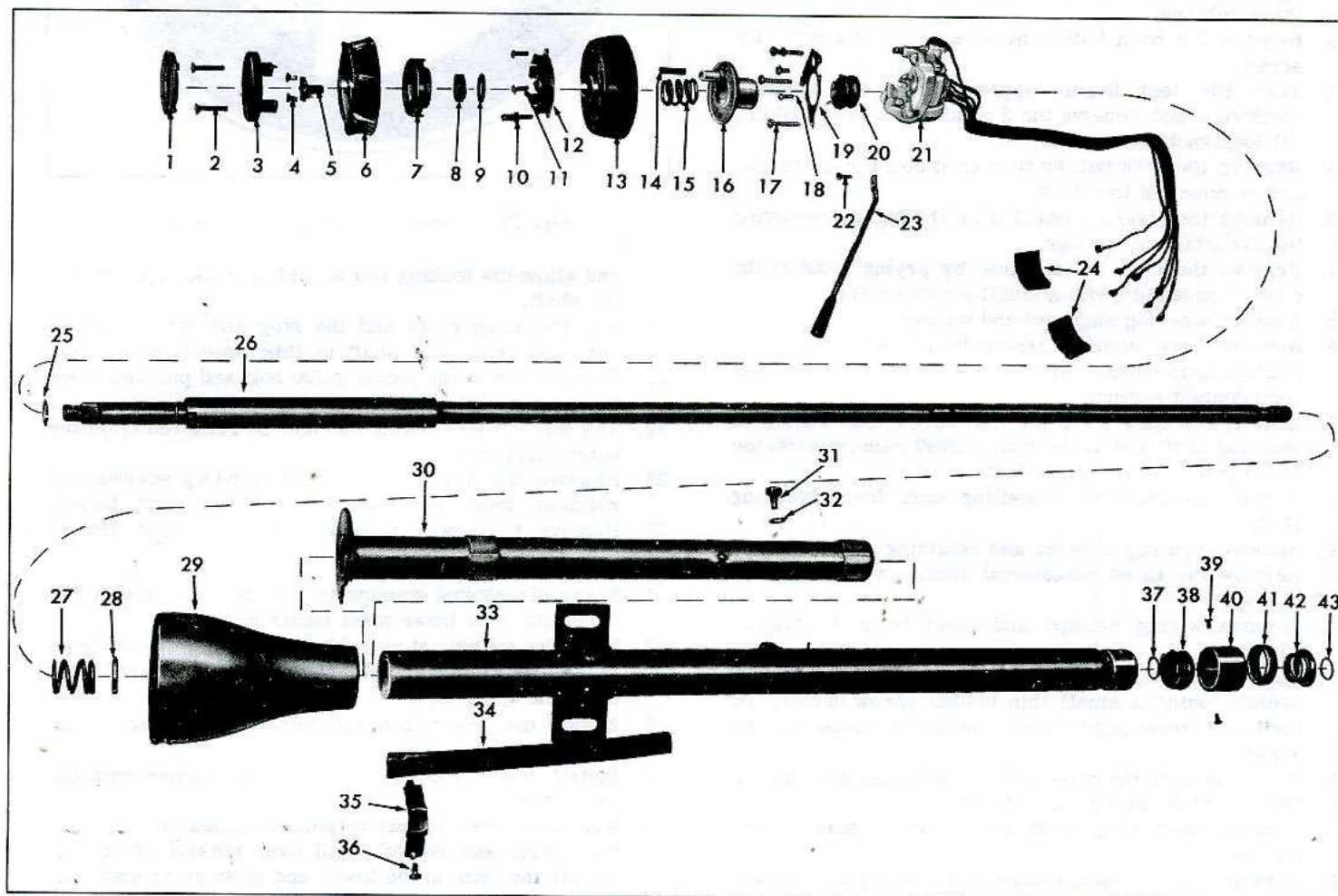


Fig. 19—Exploded View of Telescoping Mast Jacket

- | | | | |
|----------------------------------|-------------------------------|-----------------------------------|-------------------------------|
| 1. Horn Button Ornament Assembly | 12. Horn Contact Assembly | 23. Directional Lever | 34. Directional Wiring Cover |
| 2. Retaining Screws | 13. Steering Wheel Hub | 24. Directional Wiring Connectors | 35. Directional Wiring Clamp |
| 3. Horn Button | 14. Horn Contact Spring | 25. Upper Snap Ring | 36. Screw |
| 4. Lock Screws | 15. Steering Shaft Spring | 26. Steering Shaft Assembly | 37. Lower Snap Ring |
| 5. Lock Bolt | 16. Cancelling Cam | 27. Damper Spring | 38. Lower Bearing |
| 6. Locking Knob | 17. Directional Switch Screws | 28. Damper Washer | 39. Screws |
| 7. Horn Button Plate | 18. Upper Bearing Screws | 29. Directional Housing | 40. Lower Bearing Retainer |
| 8. Steering Shaft Nut | 19. Upper Bearing Plate | 30. Inner Mast Jacket | 41. Felt Seal |
| 9. Steering Shaft Washer | 20. Upper Bearing | 31. Stop Bolt | 42. Lower Spring and Retainer |
| 10. Stop Stud | 21. Directional Switch | 32. Lock Washer | 43. Lower Spring Snap Ring |
| 11. Screws | 22. Lever Screw | 33. Outer Mast Jacket | |



Fig. 20—Removing Lower Snap Ring

lower bearing retaining screws to pass through the notches provided in the lower bracket.

Disassembly (Fig. 19)

1. Clamp mast jacket in vise by dash bracket.
2. Remove horn button ornament and retaining ring by prying up with a small screw driver at one of the three notches.
3. Remove the horn button by removing the 2 retaining screws.
4. Turn the lock handle approximately 90° counter-clockwise and remove the 2 retaining screws holding the lock knob to the lock bolt.
5. Remove the lock bolt by turning it counter-clockwise and remove the lock knob.
6. Remove the steering wheel from the hub by removing the six attaching screws.
7. Remove the horn button plate by prying it out of the contact assembly with a small screw driver.
8. Remove steering shaft nut and washer.
9. Remove horn contact assembly by removing the 2 phillips head screws and the stopping stud and lift out horn contact spring.
10. Install a 5/16 x 18 x 1/4 cap screw into center of steering shaft and using Tool J-2927 remove steering wheel hub from steering shaft.
11. Remove spring and cancelling cam from steering shaft.
12. Remove turn signal lever and retaining screw.
13. Remove the three directional signal switch retaining screws.
14. Remove wiring clamps and cover from directional wires.
15. Remove the wire terminals from the two plastic connectors using a small thin bladed screw driver. To facilitate reassembly note the color codes of the wires.
16. Carefully pull the directional signal switch out of the housing while guiding the wiring.
17. Remove snap ring from lower end of mast jacket (fig. 20).
18. Remove the retainer, felt seal and spring from lower end of mast jacket.
19. Pull steering shaft out of the upper end of the mast jacket, remove the cap screw previously installed

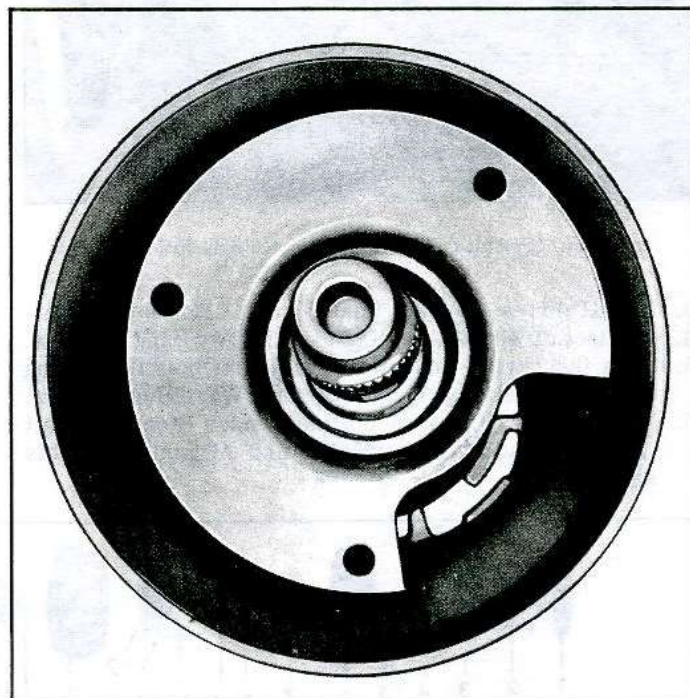


Fig. 22—Directional Housing Guide Position

and allow the locking rod to slide out the upper end of the shaft.

20. The two snap rings and the stop and spring may be removed from the shaft at this time if necessary.
21. Remove the mast jacket guide bolt and pull the inner mast jacket out of the outer mast jacket.
22. The directional housing can now be removed from the outer mast jacket.
23. Remove the lower bearing retaining screws and retainer from the lower end of the mast jacket.
24. Remove the lower bearing from the mast jacket.

Assembly

1. Place directional housing on to outer mast jacket and carefully slide inner mast jacket into place.
2. With the spring, stop and both snap rings in place as in Figure 21. Insert steering shaft into mast jacket from the upper end.
3. Install the lower bearing into the mast jacket and carefully tap in place.
4. Install lower bearing retainer and secure with the two screws.
5. With the lower spring retainer snapped into place on the spring and the felt seal over outside of spring, install the unit on the lower end of steering shaft and slide into place. Secure with snap ring.
6. By sighting through guide bolt hole align groove of inner mast with the hole and install guide bolt.

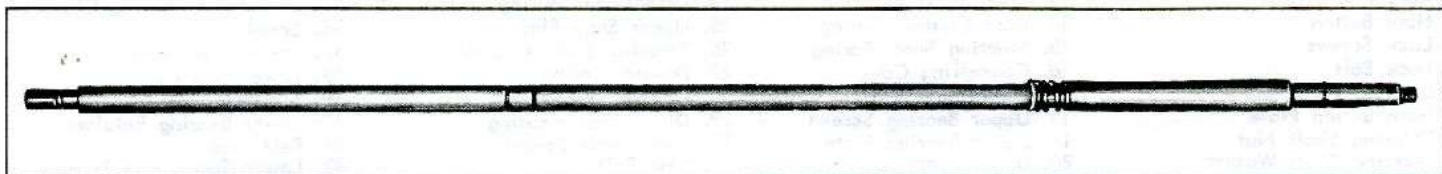


Fig. 21—Steering Shaft Assembly

NOTE: If upper bearing was removed from directional switch reinstall bearing, retaining plate and the 2 attaching screws.

7. Align wire guide in directional housing with cutout in inner mast jacket (fig. 22) and install directional signal switch into housing. Secure with the three retaining screws.

CAUTION: Be sure directional wiring is routed properly through guide in housing.

8. Install directional wiring cover over wires and slide it up into place in the directional housing guides.
9. Engage wiring clamp tang into hole provided in mast jacket and secure with retaining screw.
10. Install directional switch lever and screw.
11. Place cancelling cam and spring in position.
12. Install horn contact plate assembly into steering wheel hub, be sure mark on contact plate is in line with mark on hub. Secure with the two retaining screws and the stop bolt. The stop bolt goes into the hole opposite of the marks.
13. Place contact spring into cancelling cam tower and align cancelling cam tower with hole in steering wheel hub and alignment mark on steering shaft with mark on steering wheel hub then position hub on upper steering shaft secure with washer and nut.
14. Install the horn button plate making sure the mark on it lines up with the mark on the steering wheel hub.
15. Position steering wheel on the hub, aligning the marks and secure with the six attaching screws.
16. Position locking rod into upper end of steering shaft and place lock handle into position. Screw lock bolt into upper end of steering shaft.
17. Using a phillips head adapter and an in. lb. torque wrench torque the lock bolt to 40 in. lbs., and position handle fully clockwise. Align the nearest holes in the handle with the lock bolt by backing off the handle slightly counter-clockwise, and secure with retaining screws.

NOTE: Handle must lock the telescoping mechanism in the lock or full clockwise position and release it when fully counter-clockwise. Adjustment of this lock is made as in Step 17.

18. Install horn button onto horn cap. Be sure lug on



Fig. 23—Freeing Ball Stud

horn button is in line with the double hole in the cap. Then secure with the two retaining screws.

19. Install the horn cap to the horn button making sure the top of the ornament is in line with the marked screw hole of the horn button.
20. Install directional wires into connectors using color code noted on removal.

Installation

1. With the steering column locked in full down position, slide the steering shaft and mast jacket down through the lower bracket. Align the lower bearing retainer screws with the notches in the bracket.
2. With the front of the vehicle raised and using an assistant to guide the steering shaft into the coupling, insert the steering shaft into the coupling until the slot on the shaft aligns with the bolt hole. Secure with bolt and nut, torque to 22-27 ft. lbs.
3. Lower vehicle and install dash bracket mounting bolts.
4. Install lower bracket clamp bolt and torque 100-140 in. lbs.
5. Connect the directional wiring connectors to the chassis wiring harness.
6. Install battery ground cable.

STEERING LINKAGE

Tie Rods

There are two tie rods used on all models. Each tie rod is of three piece construction, consisting of the tie rod and two tie rod end assemblies. The ends are threaded into the rod and locked with clamps. Right and left hand threads are provided to facilitate toe-in adjustment and steering gear centering.

The tie rod ends are self adjusting for wear and require no attention in service other than periodic lubrication and occasional inspection to see that ball studs are tight. Replacement of tie rod ends should be made when excessive up and down motion is evident or if any lost motion or end play at ball end of stud exists.

Removal

1. Remove cotter pins from ball studs and remove castellated nuts.
2. Free ball stud from steering arm by backing up boss with a large hammer or dolly and striking opposite side with hammer of slightly lighter weight (fig. 23).
3. Remove inner ball stud from relay rod, using same procedure as described in Step 2.
4. To remove tie rod ends from tie rods, loosen clamp bolts and unscrew end assemblies.

Installation

1. If the tie rod ends were removed, install ends on tie rod making sure both ends are threaded an equal distance into the tie rod.
2. Make sure that threads on ball studs and in ball stud nuts are perfectly clean and smooth. Install neoprene seals on ball studs.

NOTE: If threads are not clean and smooth, ball studs may turn in tie rod ends when attempting to tighten nut.

3. Install ball studs in steering arms and relay rod.
4. Install ball stud nut, tighten securely and install cotter pins. Lubricate tie rod ends.

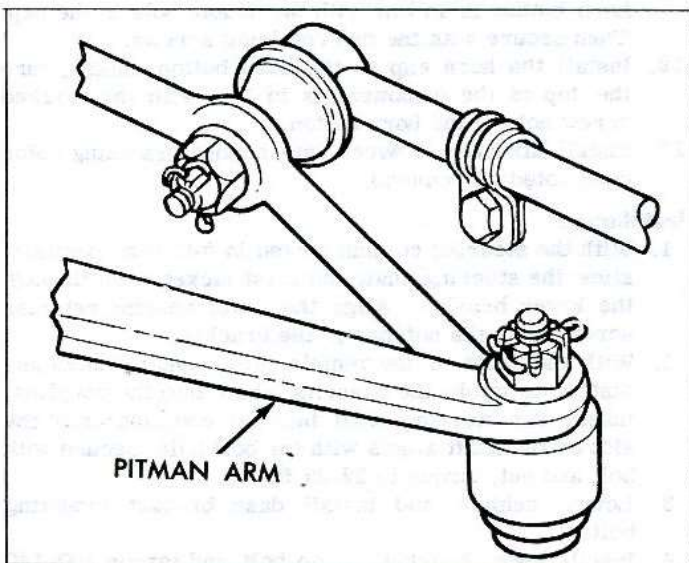


Fig. 24—Clamp Flange Position

- Adjust toe-in as described in Section 3.

NOTE: Before locking clamp bolts on tie rods, make sure that the tie rod ends are in alignment with their ball studs (each ball joint is in the center of its travel). If the tie rod is not in alignment with the studs, binding will result. Outer clamps (those closest to wheels) should be installed so that clamp bolts are at right angles to slot in sleeve.

The flanges of the inner clamps must be pointing straight down and the bolt parallel with the ground as shown in Figure 24.

Relay Rod

Removal

- Remove inner ends of tie rods from relay rod as described under Tie Rod—Removal.
- Remove cotter pin and nut from relay rod bolt at pitman arm and idler arm and remove relay rod from both points.

Cleaning and Inspection

Remove accumulated grease and dirt from assembly and inspect for damage or excessive wear.

Repairs

The relay rod has a bushing at the pitman arm end which may be replaced as follows:

Bushing Removal

- Use soft hammer to drive bolt out of bushing (fig. 25).
- Use suitable size socket to press rubber and sleeve out of relay rod.

Bushing Replacement

- Place relay rod on press, resting on a deep socket of suitable size. Use Tool J-8357 to press new bushing into place in relay rod.

Installation

- Install idler arm and pitman arm to relay rod. Install and tighten nuts to 29 to 43 ft. lbs. and install cotter pins.

CAUTION: After relay rod bushing is replaced, care must be taken to install the pitman arm to the relay rod with the steering gear in the straight ahead position. When installing nut on the bushing bolt be sure to hold the hex head of the bolt so that no twisting of the bushing will occur. If the bushing is twisted, or if the pitman arm is not correctly aligned, poor steering will result.

- Adjust tie rod ends to relay rod as previously described under Tie Rods.
- Adjust toe-in (See Section 3) and align steering wheel as described previously in this section under Steering Wheel Alignment and High Point Centering.

Idler Arm

Removal

- Remove cotter pin from the idler arm and remove nut.
- Tap on side of relay rod at idler ball stud while using a heavy hammer or similar tool as a backing. Pull down on relay rod to remove from stud.
- Idler arm assembly can be removed by removing the two attaching bolts, nuts and washers.

Installation

Reverse above removal procedures and torque idler arm nut at relay rod from 29-43 ft. lbs. The idler bracket to frame attaching nuts should be torqued from 14-20 ft. lbs.

Steering Arms

If, through collision or other damage, it becomes necessary to remove and replace either steering arm, proceed as follows:

Removal

- Remove tie rod from steering arm as outlined under Steering Linkage—Tie Rod—Removal, in this section.
- Remove front wheel, hub and brake drum as a unit by removing hub cap and dust cap, cotter pin or locking

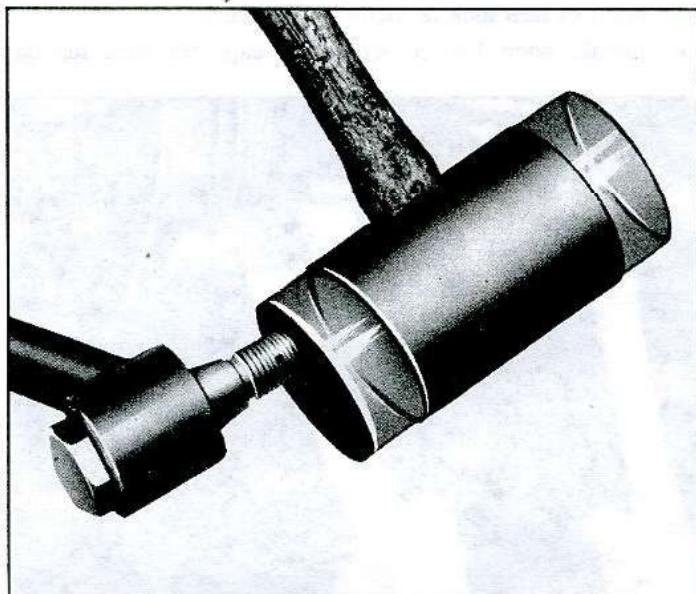


Fig. 25—Removing Pivot Bolt

ring from spindle nut and the spindle nut. Pull assembly toward outside of vehicle. If removal is difficult, it may be necessary to back off brake adjustment to increase brake shoe-to-drum clearance; see "Brake Drum Removal" in Section 5 of this manual.

3. With wheel and drum assembly removed, steering arm retaining bolt heads are accessible and removal of steering arm from vehicle may be accomplished by removing retaining nuts.

Installation

1. Place steering arm in position on vehicle and install retaining bolts. Note that longer bolt is installed in forward hole.
2. Install nuts and torque to 40-50 ft. lbs. Use only the

special locknut listed for this use in the Chevrolet Parts Catalog.

3. Pack wheel bearings using a high quality wheel bearing lubricant. Install bearings and wheel-hub-brake drum assembly removed previously.
4. Install keyed washer and spindle nut. Proceed as outlined under Front Wheel Bearings—Adjust in Section 3 of this manual.
5. Install tie rod ball stud in steering arm. Be sure that the dust cover is in place on ball stud.
6. Install castellated nut on ball stud, tighten securely and install cotter pin.
7. Following directions given in Section 3 of this manual, check cornering wheel relationship and toe-in.

SPECIAL TOOLS

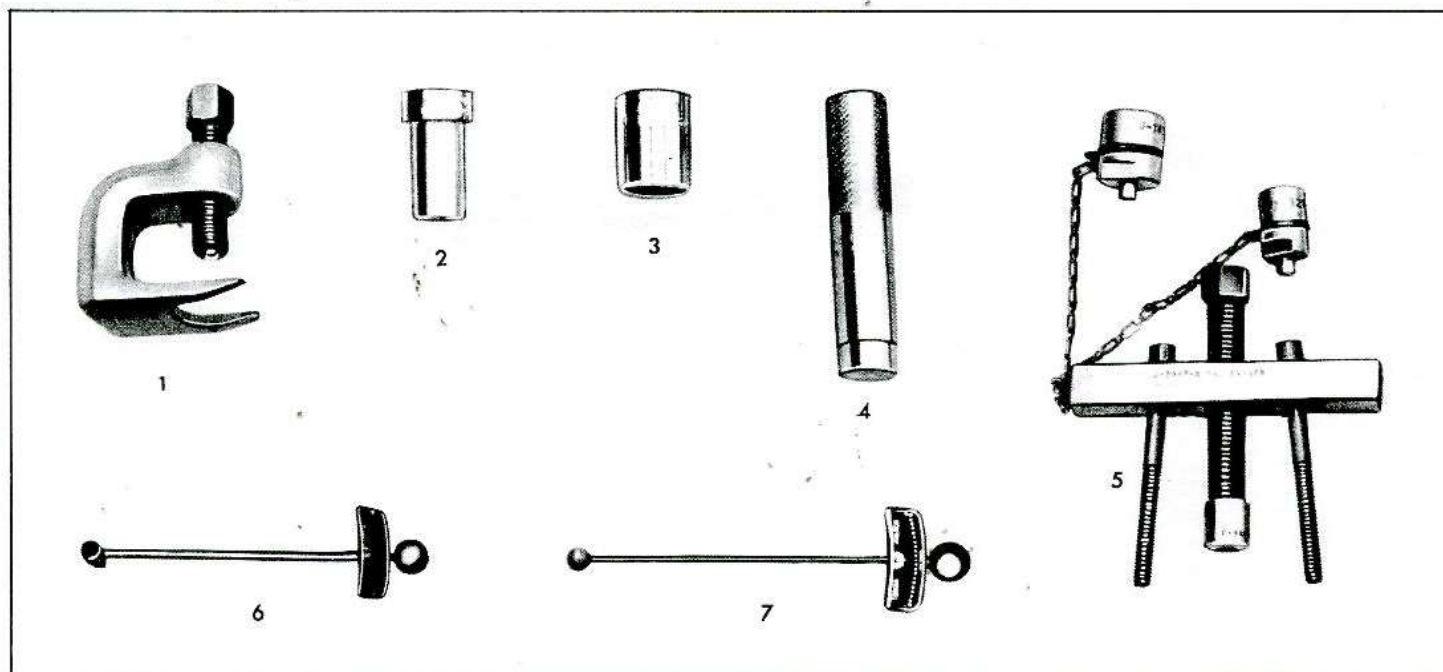


Fig. 26—Special Tools

1. J-6627 Pitman Arm Puller
2. J-8366-1 Sector Shaft Bushing Installer

3. J-8357 Relay Rod Bushing Installer
4. J-8366-2 Sector Shaft Bushing Remover

5. J-2927-A Steering Wheel Puller
6. J-1315 Torque Wrench (in. lbs.)
7. J-1313 Torque Wrench (ft. lbs.)

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