

SECTION C

STEERING COLUMN ASSEMBLIES

ALL SERIES

CONTENTS

Division	Paragraph	Subject	Page
I	90-21	SPECIFICATIONS AND ADJUSTMENTS Specifications	90-43
II	90-22	DESCRIPTION AND OPERATION Description	90-43
III	90-23 90-24 90-25 90-26 90-27 90-28	SERVICE PROCEDURES Checking Steering Column for Damage Removal and Installation of Steering Column Assembly (43-44000) Removal and Installation of Steering Column Assembly (45-46-48-49000) Removal and Installation of Horn Actuator Bar and Steering Wheel Disassembly and Reassembly of Standard (Non-Tilt) Steering Column Assembly Disassembly and Reassembly of Tilt Steering Column Assembly	90-44 90-45 90-50 90-52 90-53 90-57
IV		TROUBLE DIAGNOSIS Not Applicable	

DIVISION I

SPECIFICATIONS AND ADJUSTMENTS

90-21 SPECIFICATIONS

Part	Location	Torque Ft. Lbs.
Nut	Steering Wheel Hub.	50
Screws(4)	Mounting Bracket to Steering Column	15
Nuts (2)	Flexible Coupling Halves.	20
Bolt	Flexible Coupling Upper Half.	30
Bolts or Nuts (3)	Mounting Bracket to Instrument Panel.	20 16

DIVISION II

DESCRIPTION AND OPERATION

90-22 DESCRIPTION

The Energy Absorbing Steering Column assembly is used on all series cars. This column is designed to compress under impact. When an automobile is being driven, the forward movement of the automobile and the forward movement of the

driver both constitute a form of energy or force. When an automobile is involved in a frontal collision, the primary force (forward movement of the car) is suddenly halted, while the secondary force (the driver) continues its forward direction. A severe collision generally involves these two forces - the primary and the secondary forces. The secondary impact occurs when the driver is thrust forward onto the steering wheel and column.

The Energy Absorbing Column is designed to absorb these primary and secondary forces to the extent that the severity of the secondary impact is reduced. During a collision the steering column compresses and thereby reduces its tendency to move rearward into the driver's compartment. A split second later when the driver is thrown forward (the secondary impact) his energy is also partially absorbed by the compression characteristics of the column.

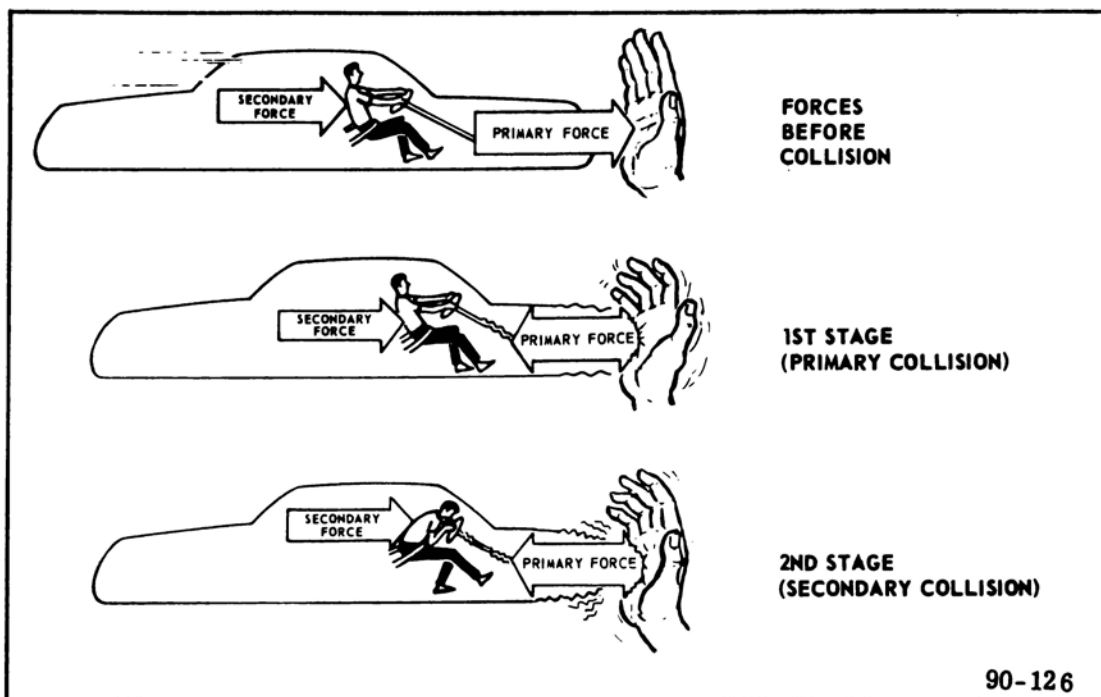


Figure 90-74 Reaction of Forces in a Collision

The Energy Absorbing Column assembly may be easily disassembled and reassembled. The serviceman should be aware that it is important that only the specified screws, bolts and nuts be used as designated during reassembly, and that they are tightened to their specified torque. This precaution will insure the energy absorbing action of the assembly. Particular care should be exercised to avoid using overlength bolts as they may prevent a portion of the assembly from compressing under impact. Equally as important is correct torquing of all bolts and nuts. In particular care should be taken to assure that the bolts or nuts securing the column mounting bracket to the instrument panel are torqued to the proper specification in order that the bracket will break away under impact.

When the Energy Absorbing Column is installed in a car it is no more susceptible to damage through usage than an ordinary column; however, when the column is removed, special care must be taken in handling this assembly. Only the specified wheel puller should be used. When the column is removed from the car, such actions as a sharp blow on the end of the steering shaft or shift levers, laying things across or on top of the column assembly, leaning on the

column assembly, or dropping of the assembly could shear or loosen the plastic fasteners that maintain column rigidity or possibly bend the assembly causing a binding condition. It is therefore important that the removal and installation, and the disassembly and reassembly procedures be strictly followed when servicing this assembly.

In 1968 the 43-44000 Series Buicks incorporate a pot joint in the lower end of the steering shaft. The pot joint acts as a universal joint to compensate for misalignment of the steering column. To insure proper operation of the pot joint, the capsule bracket and toe pan covers have been redesigned to provide exact alignment of the column in the body. It is absolutely necessary that the installation of this column be followed exactly as outlined in par. 90-24, sub-par. b.

DIVISION III SERVICE PROCEDURES

90-23 CHECKING STEERING COLUMN FOR DAMAGE (All Series)

NOTE:

Cars involved in accidents resulting in frame damage, major body or sheet metal damage, or where the steering

column has been impacted may also have a damaged or misaligned steering column.

1. Check capsules on steering column bracket assembly; they should be within 1/16" of bottom of the slots.

IMPORTANT:

If only one capsule has moved more than 1/16", there is no need to replace bracket. If all three capsules have moved approximately the same amount, some column collapse may have occurred, and the bracket must be replaced. In this case the steering column must be checked as outlined below.

2. On cars with automatic transmission and column shift, check operation of the shift lever. If you are able to move lever to "Park" position without raising lever, it is an indication that the upper shift tube plastic bearing is broken.

3. Check for mast jacket collapse by measuring the mesh portion of the jacket. The length of mesh must not be less than 9-5/8". Plastic cover need not be removed for this measurement. Edges of plastic may be trimmed back to expose mesh area.

4. Check for broken plastic bearing adapter at lower end of steering shaft. (All except column shift manual transmission.) If adapter is cracked or broken, it must be replaced and the column aligned.

5. Check steering gear flexible coupling for stretching, compression, tears, excessive angularity or for no pin engagement. This indicates possible misalignment or frame damage. If flexible coupling damage is evident, the coupling is to be replaced and the steering column is to be realigned.

6. (43-44000 Series Only) Check for lower shaft end-play clearance in pot joint by grasping shaft and pushing into pot joint. Some end-play must be present. If no end-play is present, disconnect lower shaft assembly at flexible coupling and measure the distance from the lower face of the steering shaft flange to the end of the inner shaft. This dimension must be

measured inside the lower tube and flange assembly and must not be less than 5-1/8" on all models except G.S. 400 and Sportwagon 400. If there is any question that the lower shaft assembly has collapsed, remove it from pot joint and check dimension from lower face of steering shaft flange to end of shaft. This measurement must not be less than 17-3/8" on all models except G.S. 400 and Sportwagon 400. On G.S. 400 and Sportwagon 400 models dimension inside tube must not be less than 4-9/16". Overall length must not be less than 16-1/2".

NOTE:

If the above checks indicate the column has been damaged, the column must be disassembled for further inspection of internal components, such as shift tube, upper steering shaft injection molding, and turn signal switch. Refer to Paragraphs 90-27 or 90-28 for disassembly procedure.

IMPORTANT:

After all repairs have been made or inspection completed, the column must be reinstalled according to the procedures outlined in Paragraphs 90-24 or 90-25.

90-24 REMOVAL AND INSTALLATION OF STEERING COLUMN ASSEMBLY (43-44000 Series Only)

a. Removal**NOTE:**

When the steering column is removed from the car the column is extremely susceptible to damage. Dropping of the mast jacket on its end or leaning on mast jacket could collapse the steering shaft, bend the mast jacket or otherwise loosen the plastic injections that maintain column rigidity.

1. Disconnect battery ground cable. Remove air cleaner.
2. On column shift cars, disconnect shift linkage from shift levers. On manual transmission cars, also remove clutch pushrod which extends

through toe pan. Do not discard clutch pushrod.

3. Remove two (2) nuts and lock washers that retain flexible coupling to steering shaft flange. See Figure 90-75. On G.S. 400's and Sportwagon 400's remove upper pinch bolt that retains flexible coupling to steering shaft.

4. Remove horn cap or actuator bar. On deluxe steering wheels, pull horn wire from steering wheel and back off steering wheel nut flush with top of steering shaft. Remove steering wheel using puller J-3274. See Figure 90-76.

5. Remove lower instrument panel plate and air conditioning duct if so equipped.

6. Disconnect all steering column electrical connections.

7. On column shift automatic transmission cars, remove shift indicator wire. See Figure 90-77.

8. Remove two (2) screws securing plastic cover to toe pan cover.

9. Remove two (2) clamp screws, "E" securing column to toe pan covers. See Figure 90-81.

10. Remove five (5) toe pan screws.

11. Remove bolt at adjusting wedge and loosen the two (2) nuts securing the bracket to instrument panel. See Figure



Figure 90-75 Flexible Coupling Installation

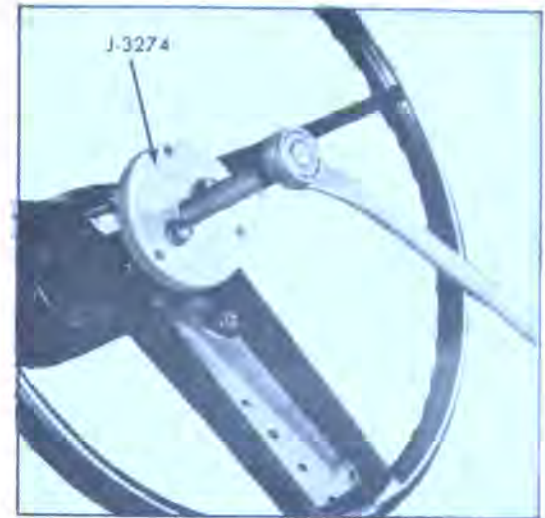


Figure 90-76 Removing Steering Wheel

- 90-81. On tilt wheel columns, also remove the support screw "H" shown in Figure 90-81.

12. Being careful to support the column assembly, remove the two (2) nuts loosened in step 11.

NOTE:

If shims are present note position and retain for installation.

13. In all 43-44000 Series (except G.S. 400 and Sportwagon 400) it is necessary to raise the lower end of the shaft (with flexible coupling) over the upper control arm in order to remove the column assembly.

NOTE:

Use care not to damage toe pan cover seal, speedo cable, or



Figure 90-77 Removing Shift Indicator Wire

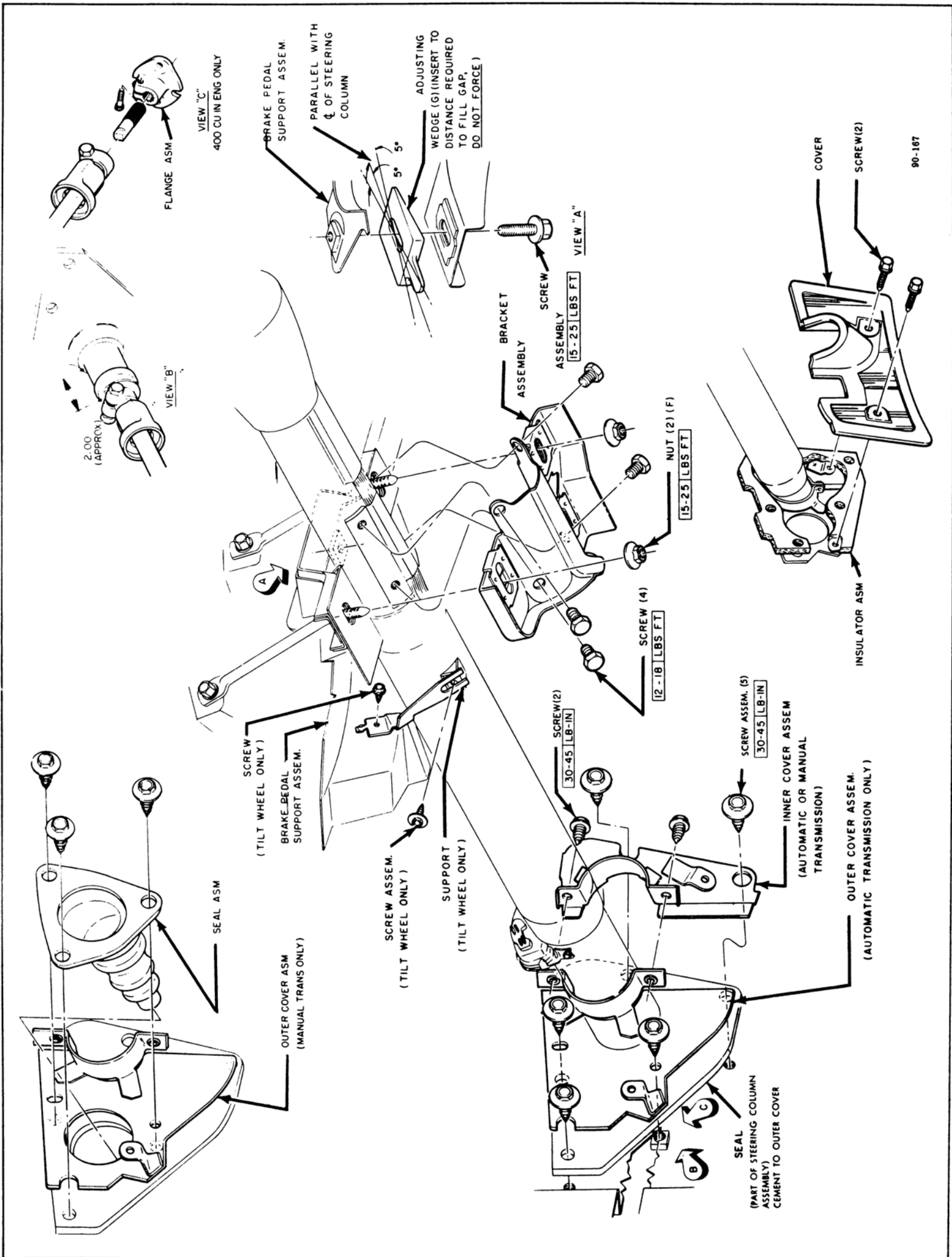
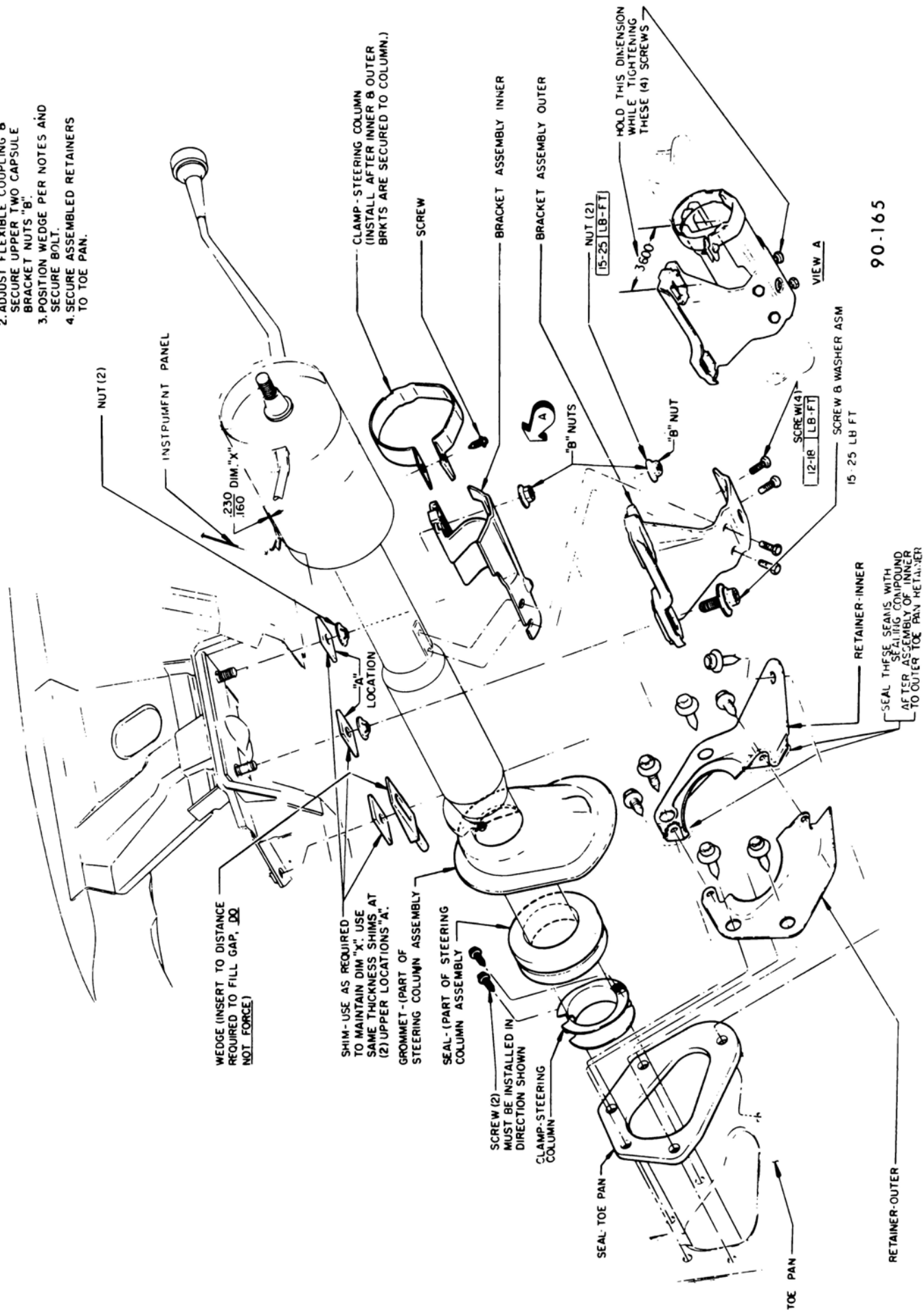


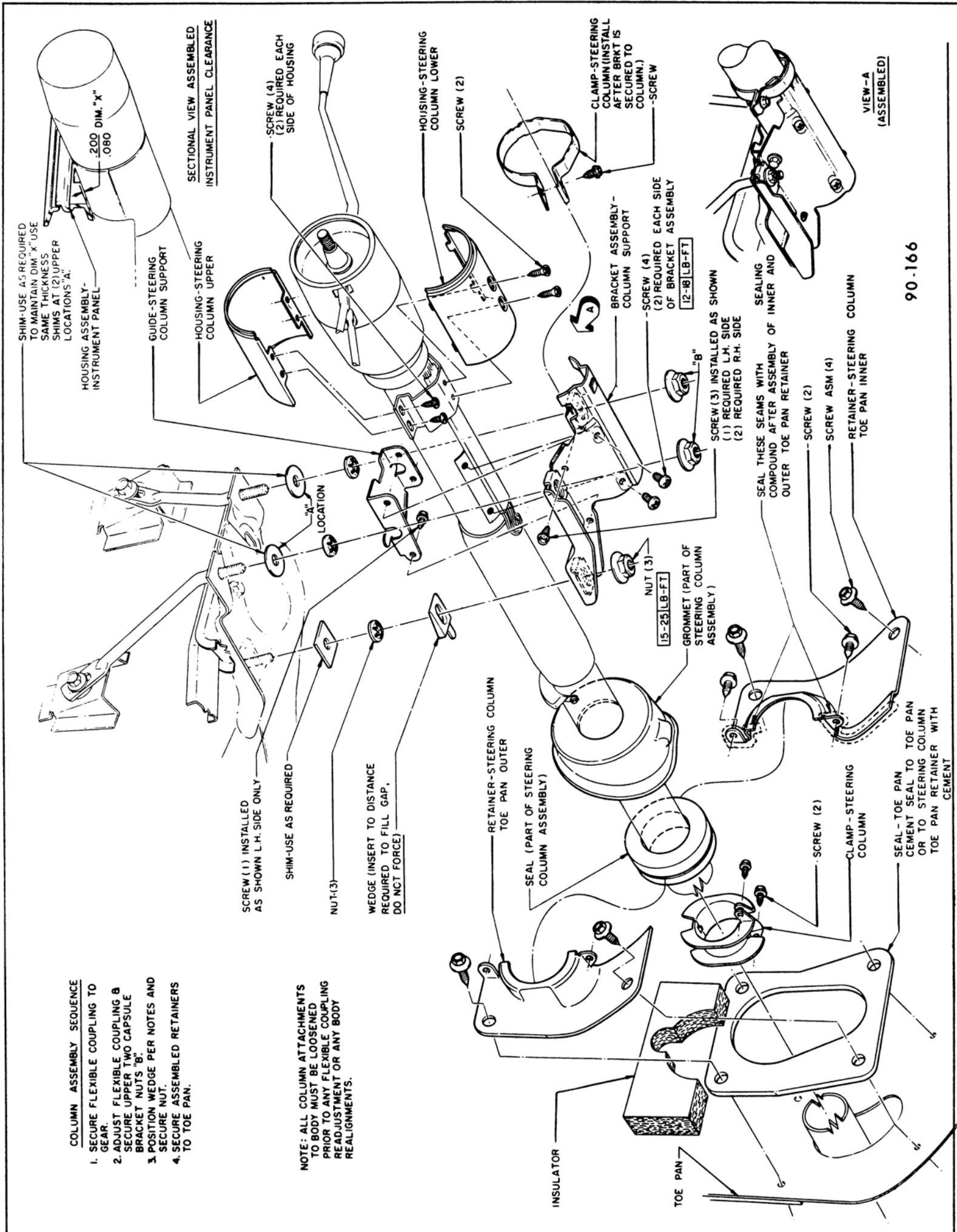
Figure 90-78 Steering Column Installation (43-44000 Series)

- COLUMN ASSEMBLY SEQUENCE**
1. SECURE FLEXIBLE COUPLING TO GEAR.
 2. ADJUST FLEXIBLE COUPLING & SECURE UPPER TWO CAPSULE BRACKET NUTS "B".
 3. POSITION WEDGE PER NOTES AND SECURE BOLT.
 4. SECURE ASSEMBLED RETAINERS TO TOE PAN.



90-165

Figure 90-79 Steering Column Installation (45-46-48000 Series)



90-166

Figure 90-80 Steering Column Installation (49000 Series)

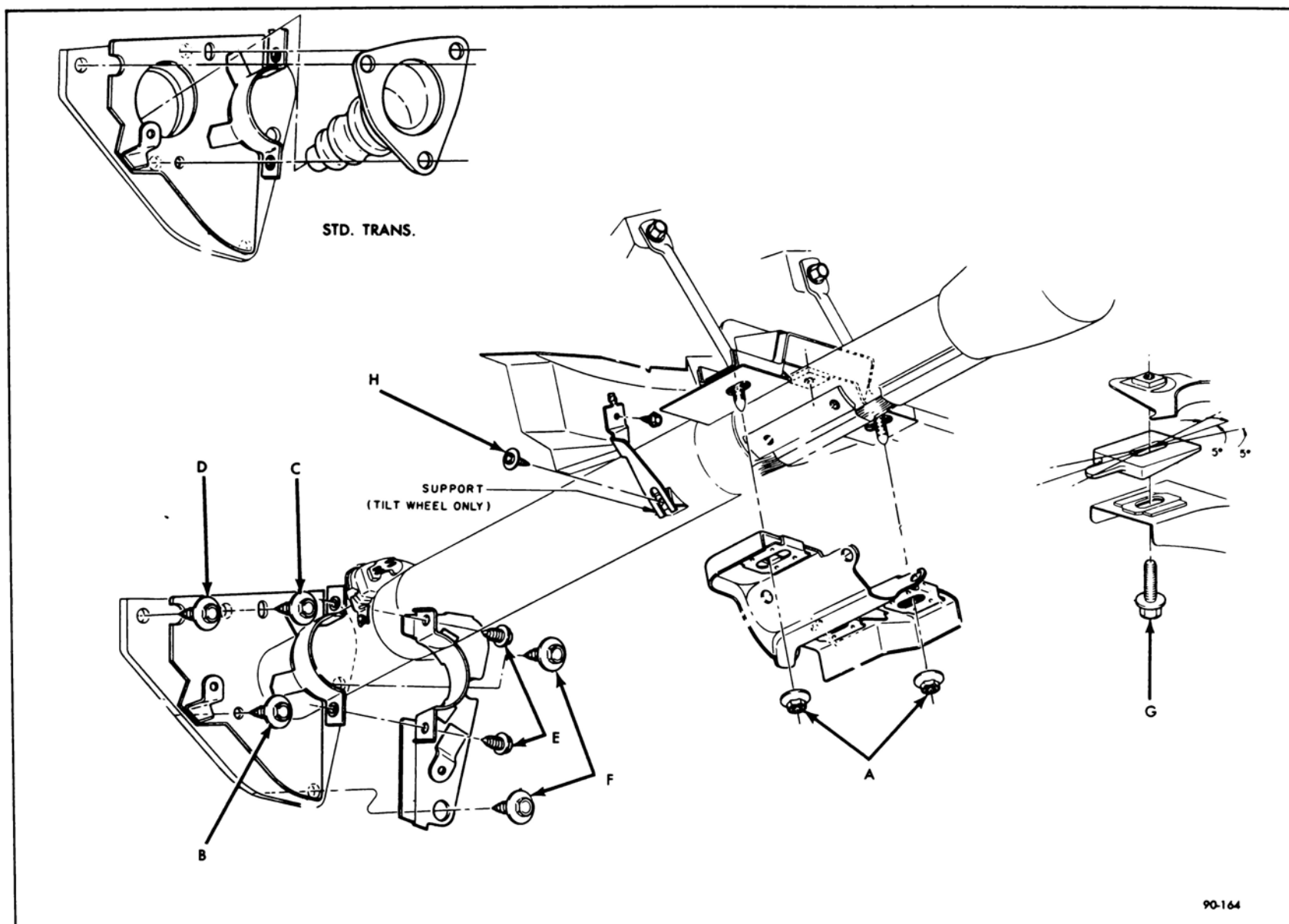


Figure 90-81 Mandatory Installation Sequence For 43-44000 Series

electrical switches. A damaged seal may result in a water leak.

b. Installation

1. Loosely assemble inner and outer toe pan covers on column by installing two (2) clamp screws. The toe pan covers must be free to slide on column.

2. Position the rolled portion of the dash seal two inches from the bottom of the jacket. See Figure 90-78 (View "B"). The seal must remain in this position during and after column installation.

3. Install column assembly through hole in toe pan, being careful to avoid any sharp blows to the assembly.

NOTE:

In 43-44000 Series EXCEPT G.S. 400 and Sportwagon 400, the following procedure is needed to assemble the flexible coupling. The G.S. 400 and Sportwagon 400 have splines on the lower end of the steering shaft and must be correctly aligned to allow installation of the pinch bolt.

4. In all 43-44000 Series (except G.S. 400 and Sportwagon 400) it is necessary when installing the column assembly in the car to position the lower end of the steering shaft (1) forward and over the upper control arm, (2) rearward and down, and (3) forward onto the lower half of the flexible coupling.

NOTE:

This procedure is mandatory!

5. Loosely assemble two nuts "A" at instrument panel. See Figure 90-81.

6. Position the lower steering shaft so that flexible coupling pins are approximately 1/16" above rear side of the steering shaft flange. The flexible rubber ring should be straight and not distorted. Torque pinch bolt to 30 lb.ft. or flexible coupling nuts to 20 lb.ft.

7. Position outer toe pan cover to the toe pan being sure that dash seal is correctly aligned. See step 2. Loosely install screw "B" shown in Figure 90-81.

8. Install screw "C" and torque to 40 lb.in. See Figure 90-81. Torque screw "B" to 40 lb.in. then torque screw "D" to 40 lb. in.

9. Torque two clamp screws "E" to 40 lb. in. See Figure 90-81.

10. Install inner toe pan screws "F" and torque to 40 lb.in. also install plastic toe pan cover.

11. Tighten two nuts "A" in Figure 90-81 to 20 lb.ft.

12. Insert wedge and tighten screw "G" to 20 lb.ft. Reconnect all electrical connections.

13. (Tilt only) Install column to instrument panel support screw "H". See Figure 90-81.

14. Reconnect shift indicator wire. See Figure 90-77.

15. Reconnect A/C duct (if so equipped) and lower instrument panel plate.

IMPORTANT:

Turn signal switch and hazard flasher must be in "OFF" position before installing plastic cancelling cam or mechanism may be damaged.

16. Reinstall spring and turn signal cancelling cam on steering shaft. Align mark on steering wheel with mark on steering shaft and torque steering wheel nut to 30 lb.ft.

17. Reinstall either horn cap, or if deluxe steering wheel, the spring and horn contact of the horn bar.

18. Reconnect and adjust shift linkage on all column shift cars.

19. Reinstall air cleaner, and connect battery ground cable. Readjust neutral-safety switch (see step 9, Par. 90-25).

20. With engine running check steering shaft clearances while turning steering wheel from full left to full right. The minimum clearances are:

a) Steering shaft to upper control arm shaft - 1/8 inch min.

b) Pot joint to exhaust manifold - 3/4 inch min.

c) Pot joint to shift linkage - 3/4 inch min.

d) Flexible coupling pins 1/16 inch above rear side of coupling. (See Figure 90-75)

NOTE:

Pot joint operating angle must not exceed 5°.

21. Check operation of turn signals, horn, and hazard flasher system.

90-25 REMOVAL AND INSTALLATION OF STEERING COLUMN ASSEMBLY (45-46-48-49000 Series)

a. Removal

1. Remove 2 nuts securing halves of flexible coupling together (see Figure 90-75).

2. On column shift cards disconnect shift linkage(s) from shift lever(s) on lower end of steering column assembly.

3. On manual transmission equipped cars remove clip or pin securing clutch release rod to clutch pedal and disengage rod from pedal.

4. Fold back floor carpet, remove screws securing toe pan cover to floor. On automatic transmission equipped cars also position the shift lever to low and disconnect shift indicator wire.

5. Disconnect all electrical wires and harnesses from steering column assembly.

6. Remove 3 bolts and/or nuts securing bracket to instrument panel and carefully withdraw column.

b. Installation

NOTE:

It is important that the specified length bolts or screws be used when reinstalling the column. If screws or bolts which are too long are used, the breakaway action of the column could be restricted.

NOTE:

On 45000, 46000 and 48000 Series cars be sure the two halves of the column mounting bracket are bolted to the column so that the centerline distance between the 2 front bolt holes of the bracket is 3-19/32 inches.

1. Reassemble inner and outer toe pan covers in position about lower end of steering column.

2. Install column under instrument panel and position flexible coupling halves together. With shims, (if provided) in location over the bracket mounting holes, position bracket into the instrument panel mounting studs and thread nuts loosely onto two studs closest to driver. Torque flexible coupling nuts to 30 lb.ft.

NOTE:

If shims have been provided at the instrument panel studs, make certain they are reinstalled and that all studs have the same thickness of shims. On 45000, 46000 and 48000 Series, it is necessary to first feed the left ear of the column bracket into the instrument panel opening (see Figure 90-79), then rock the bracket into position. On 49000 Series cars, be sure speed nut used to hold the wedge (and shim, if provided) onto rearmost instrument panel mounting stud (see Figure 90-80) does not restrict full adjustment of wedge.

3. Adjust the position of the column laterally in order to provide the adjustment of flexible coupling shown in Figure 90-75, and maintain adjustment by torquing two instrument panel mounting stud nuts nearest driver to 20 lb.ft.

NOTE:

Make certain that wedge at third (rearmost) mounting stud remains loose when two forward stud nuts are tightened.

4. Position wedge at third (rearmost) mounting stud to fit snugly (do not force) and torque bolt (or nut) 20 lb.ft.

NOTE:

It is important to reinstall wedge (and shims, if necessary) so as to provide the proper thickness or adjustment at each mounting stud. Proper locating of shims and wedges eliminates the possibility of break-away capsule breakage, bending of the steering column, or misalignment of the column when the bolts and/or nuts are tightened.

The two halves of the toe pan covers must be secured and tightened prior to being secured to the toe pan. Place body sealer along seam of toe pan covers as shown in Figures 90-79 and 90-80.

5. Reinstall and tighten toe pan cover bolts.

NOTE:

Do not force column out of its natural alignment with

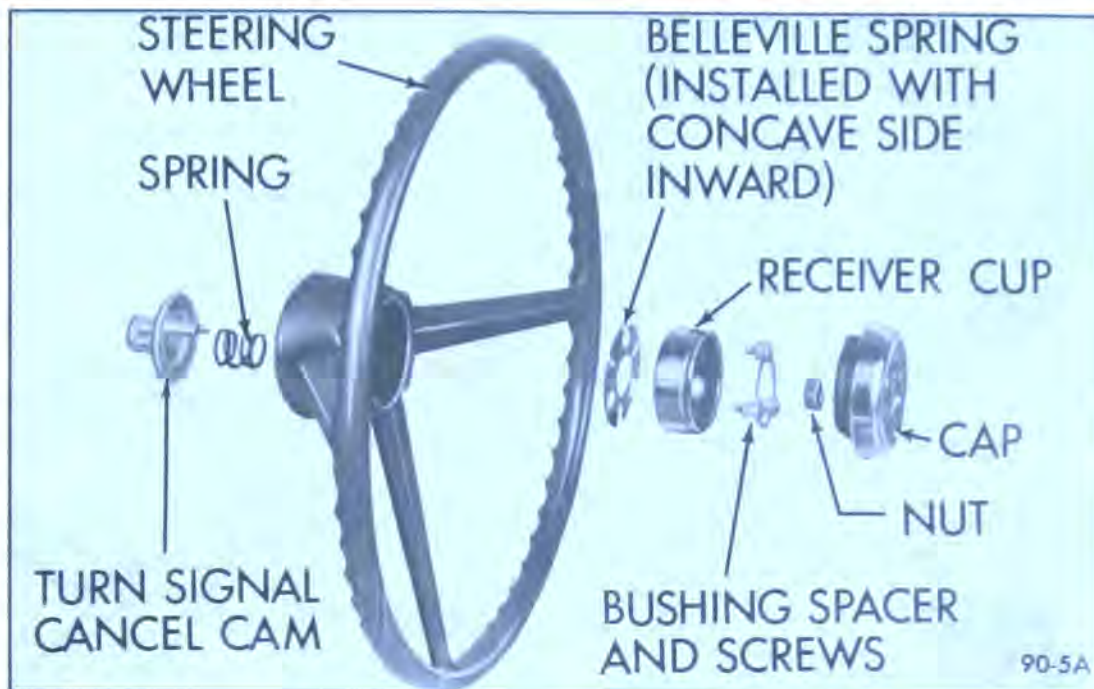


Figure 90-82 Horn Actuator Cap Installation (43-44000 Series)

flexible coupling in order to align toe pan cover with screw holes in toe pan. If necessary, widen holes in toe pan cover.

6. Reconnect shift linkage and shift indicator wire.

7. Adjust shift linkage if necessary.

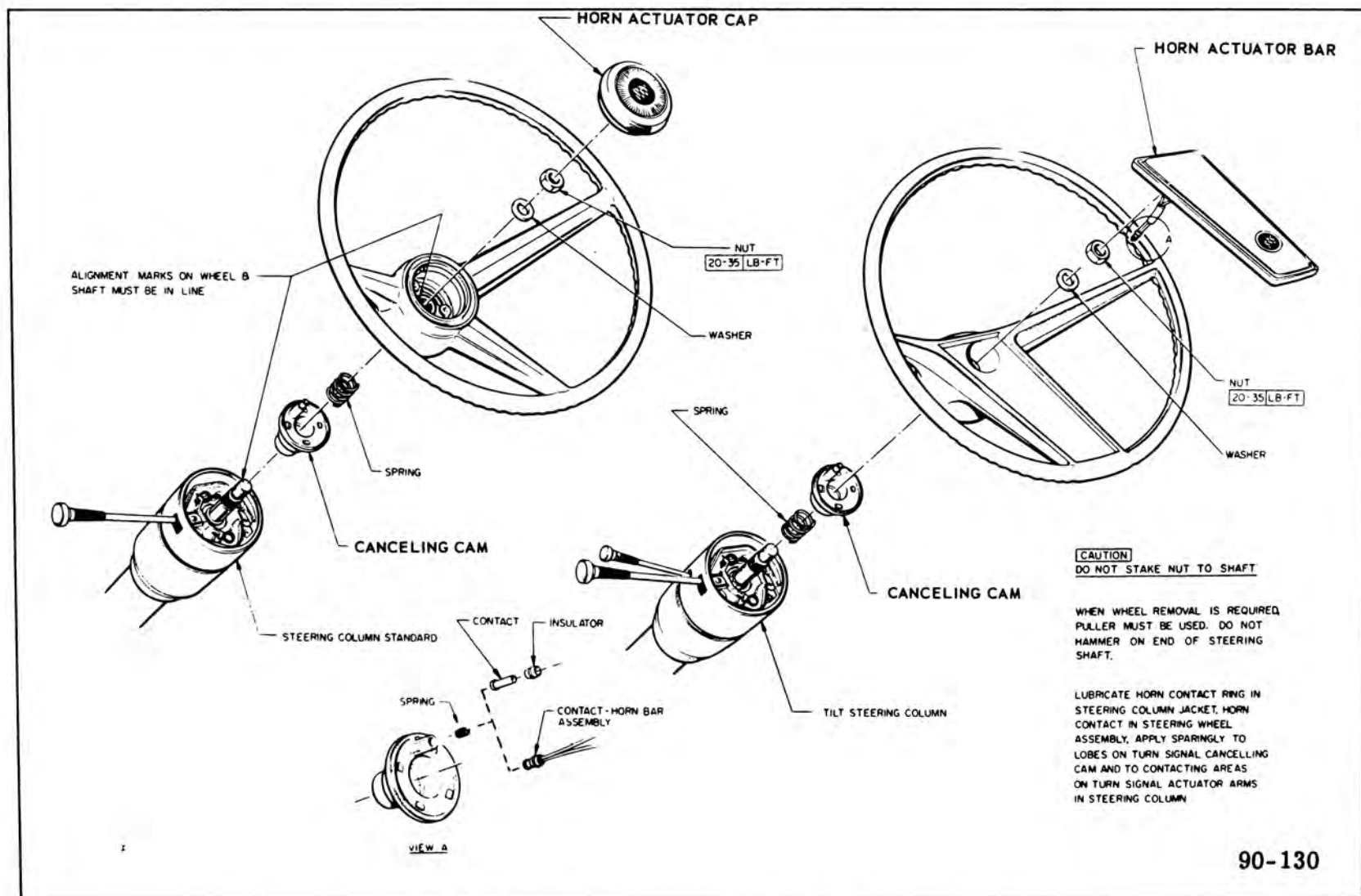


Figure 90-83 Steering Wheel Installation (43-44000 Series)

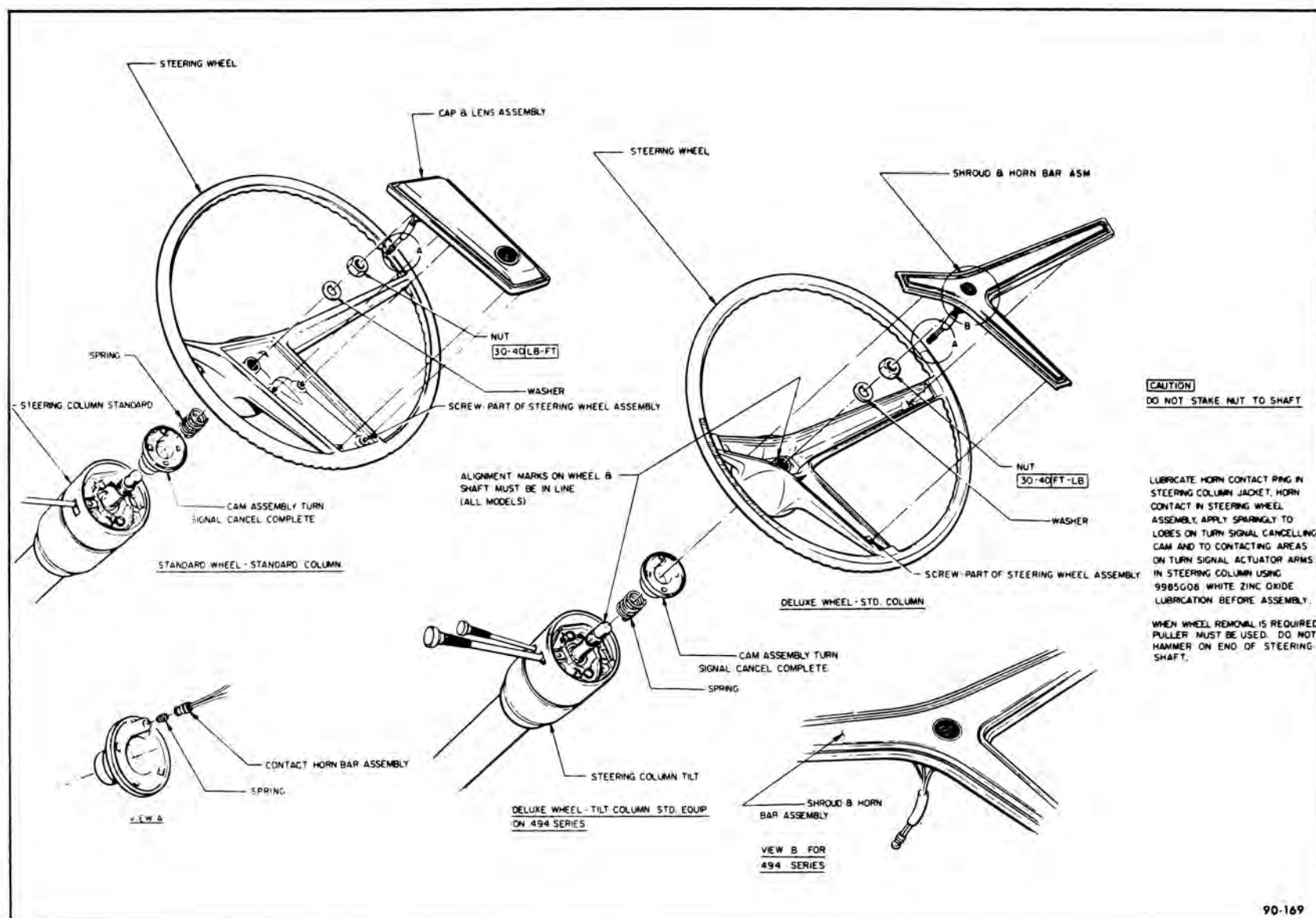


Figure 90-84 Steering Wheel Installation (45-46-48-49000 Series)

8. On columns used with 3 speed manual transmission install the back-up light switch so that mounting slots are centered. Adjust as required to assure that lights are on when shift lever is in

reverse and off in any other position.

9. On cars equipped with automatic transmissions adjust the neutral-start and back-up light switch by positioning shift lever in drive and adjust switch so that alignment holes of switch are aligned.

NOTE:

A 3/32 drill or rod may be used to align the two holes.

90-26 REMOVAL AND INSTALLATION OF HORN ACTUATOR AND STEERING WHEEL

a. Removal of Horn Actuator Cap or Bar

1. Unplug curved connector from switch on lower end of steering column.

2. On 43000 and 44000 Series cars with standard steering wheel pry off cap, remove 3 Phillips head screws and take off bushing spacer, receiver cup and Belleville spring (see Figure 90-82).

3. On all other Series cars remove screws from underside of steering wheel that secure horn actuator bar, partially lift off bar, pull lead connector from canceling cam, then fully lift off bar. See Figures 90-83 and 90-84.

b. Installation of Horn Actuator Cap or Bar Install Reverse of Removal.

Install reverse of removal.

c. Removal of Steering Wheel

1. Remove horn actuator cap or bar (ref. subparagraph a).

2. Loosen steering wheel retaining nut several turns. Do not remove nut.



Figure 90-85 Removing Steering Wheel

3. Attach Wheel Puller J-3274 to steering wheel and pull wheel up to nut (see Figure 90-85).

CAUTION:

Do not rap on end of puller in order to free wheel from shaft as this would very likely loosen plastic injections that maintain steering shaft rigidity. Striking of underside of steering wheel to jar it loose must also never be done. The only recommendation for freeing frozen steering wheels is to use a penetrating lubricant.

d. Installation of Steering Wheel

1. Install reverse of removal and align location mark on end of steering shaft with mark on hub of steering wheel.

2. Torque steering wheel nut 30 lb.ft.

90-27 DISASSEMBLY AND REASSEMBLY OF STANDARD (Non-Tilt) STEERING COLUMN ASSEMBLIES

a. Disassembly of Upper Half of Steering Column (Column Removed from Car)

NOTE:

It is presumed during the following procedure that the column is removed from the car, however, it is possible to disassemble the upper half of the column down to the shift bowl while the column is still in the car.

NOTE:

It is important that the specified exact length bolts or screws be used when reassembling the column. If screws or bolts are used which are too long, the breakaway action of the column could be obstructed.

1. Remove steering wheel (ref. Par. 90-26) and take off spring and turn signal cancelling cam.

CAUTION:

Do not hammer on end of steering shaft as hammering could collapse steering shaft

or otherwise loosen plastic injections that maintain shaft rigidity.

2. Remove 4 screws securing column mounting bracket to column, take off bracket and set it aside to protect "break-away" capsules of bracket (see Figure 90-78, 90-79, and 90-80).

3. Mount column in a vise using special tool J-22573-1 (see Figure 90-86).

CAUTION:

The mesh section (the area enclosed by black plastic cover) of the steering column assembly should never be clamped in a vise.

4. Remove turn signal lever and hazard warning knob.

5. Remove retaining ring from upper portion of steering shaft using special tool J-22569. Index tool into retaining ring opening, twist tool to force retaining ring out of groove and remove ring, thrust washer, wave washer and (if necessary) steering shaft assembly (see Figures 90-87 and 90-88).

NOTE:

When these procedures are being performed with column removed from car the shaft should be withdrawn to avoid possibility of shaft falling out.

NOTE:

If procedure is being performed in a car, insert a screwdriver between flexible coupling halves to hold steering shaft fully into steering column. This procedure facilitates both the



Figure 90-86 Steering Column Installed in Vise



Figure 90-87 Removing Steering Shaft Retaining Ring

removal and installation of the retaining ring.

6. Remove the switch assembly, housing assembly, cover, springs, and lockplate as a unit by loosening (but not removing) the three screws in cover. Push in on cover and then rotate cover in a counterclockwise direction (see Figure 90-90). Lift off unit as an assembly (see Figure 90-91).

NOTE:

If these procedures are being performed with column installed in a car, the curved connector attached to the switch assembly electrical harness can be freed from between the mounting bracket and the steering column as follows: Hold the steering column against the instrument panel, loosen the bracket nuts and/or bolts until the bracket drops far enough to withdraw connectors thru opening, then



Figure 90-88 Partial Disassembly of Upper Half of Steering Column

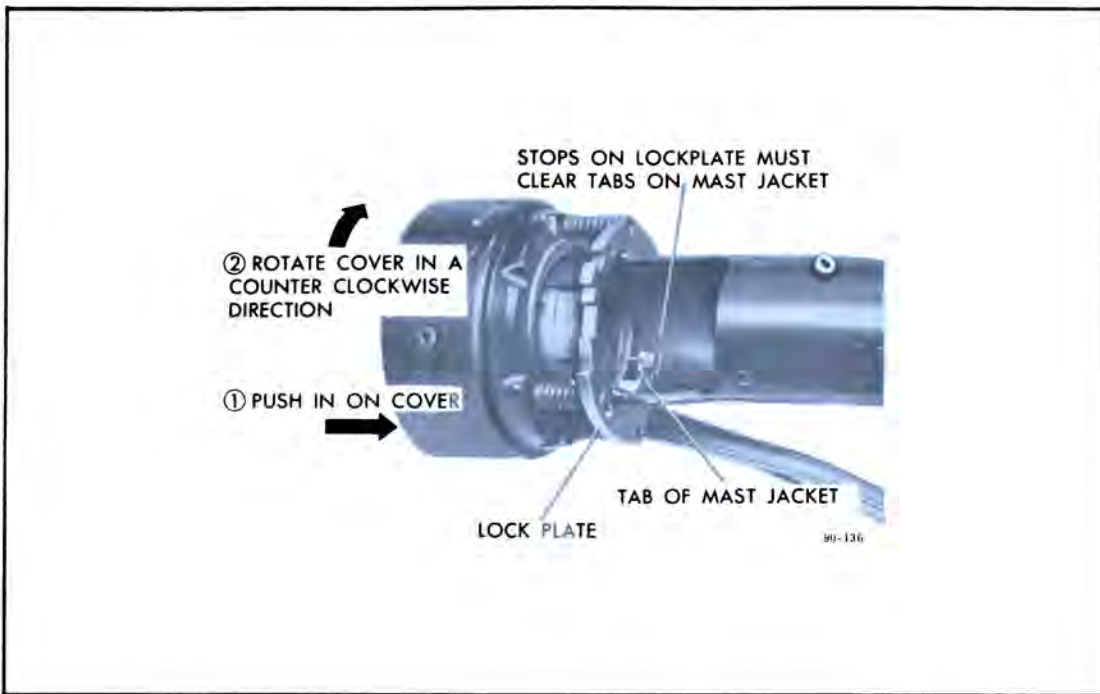


Figure 90-90 Releasing Lockplate From Mast Jacket

snug up bolts and/or nuts. Care should be taken not to allow the column to move downward.

7. On automatic transmission and console shift steering columns remove bowl by lifting off.

8. On column shift steering columns remove shift lever, then lift off bowl.

NOTE:

When driving out shift lever pin be sure to rigidly support bowl to avoid undue stress to shift tube and bowl.

b. Reassembly of Upper Half of Steering Column

1. Reassemble reverse of removal and note the following special procedures.



Figure 90-91 Removing Switch, Cover, Springs, and Lockplate as a Unit

NOTE:

If shift lever spring is replaced press fit spring into bowl until spring bottoms in bowl.

2. Apply a thin coat of lithium grease to all friction surfaces.

NOTE:

If bearing housing assembly was replaced, check "stack-up" condition (ref. Note in subparagraph "d").

3. On columns used with 3 speed manual transmission, position lower shift levers in line during reassembly to prevent piloting of shift tube.

4. Torque the screws securing the switch assembly 35 pound inch.

5. Reassemble column mounting bracket onto column and torque 15 lb.ft.

6. Reassemble steering wheel onto column and torque nut 30 lb.ft. (ref. Par. 90-26).

7. Reassemble turn signal lever and torque 20 pound inch.

8. Reinstall hazard warning knob and torque 3 pound inch.

9. Compress upper shift lever

spring prior to installation of shift lever.

c. Disassembly of Lower Half of Steering Column (Column Removed from Car)

1. Remove 4 screws securing column mounting bracket, take off bracket and mount column in a vise using special tool mounts J-22573-1 (see Figure 90-86).

NOTE:

Set bracket aside to protect "break-away" capsules of bracket (see Figures 90-78, 90-79, 90-80).

2. Remove steering wheel (ref. Par. 90-26), take off retaining ring (see Figure 90-87), thrust washer and wave washer (see Figure 90-88) and withdraw steering shaft out of column.

3. On only 43-44000 Series columns disassemble clamp, thrust washer, and spring from lower portion of steering shaft (see Figure 90-92).

NOTE:

Mark location of open portion of clamp so that clamp can be reinstalled in same position.

4. On only 45-46-48000 Series cars disassemble inner washer, "C" ring spacer(s), outer washer and wave washer from lower portion of steering shaft (see Figure 90-93).

5. On only 49000 Series cars disassemble sleeve and adjuster assembly and spring (see Figure 90-102).

6. Remove neutral-start or back-up light switch from steering column. Also on column shift columns used with automatic transmissions remove all shift indicator components attached to the shift tube.

7. On all columns except those used with 3-speed manual transmissions remove wire retainer securing plastic bearing and adapter assembly to lower end of steering column, and remove bearing and adapter assembly, spring and washer (if used). See Figure 90-93. Withdraw shift tube from column.

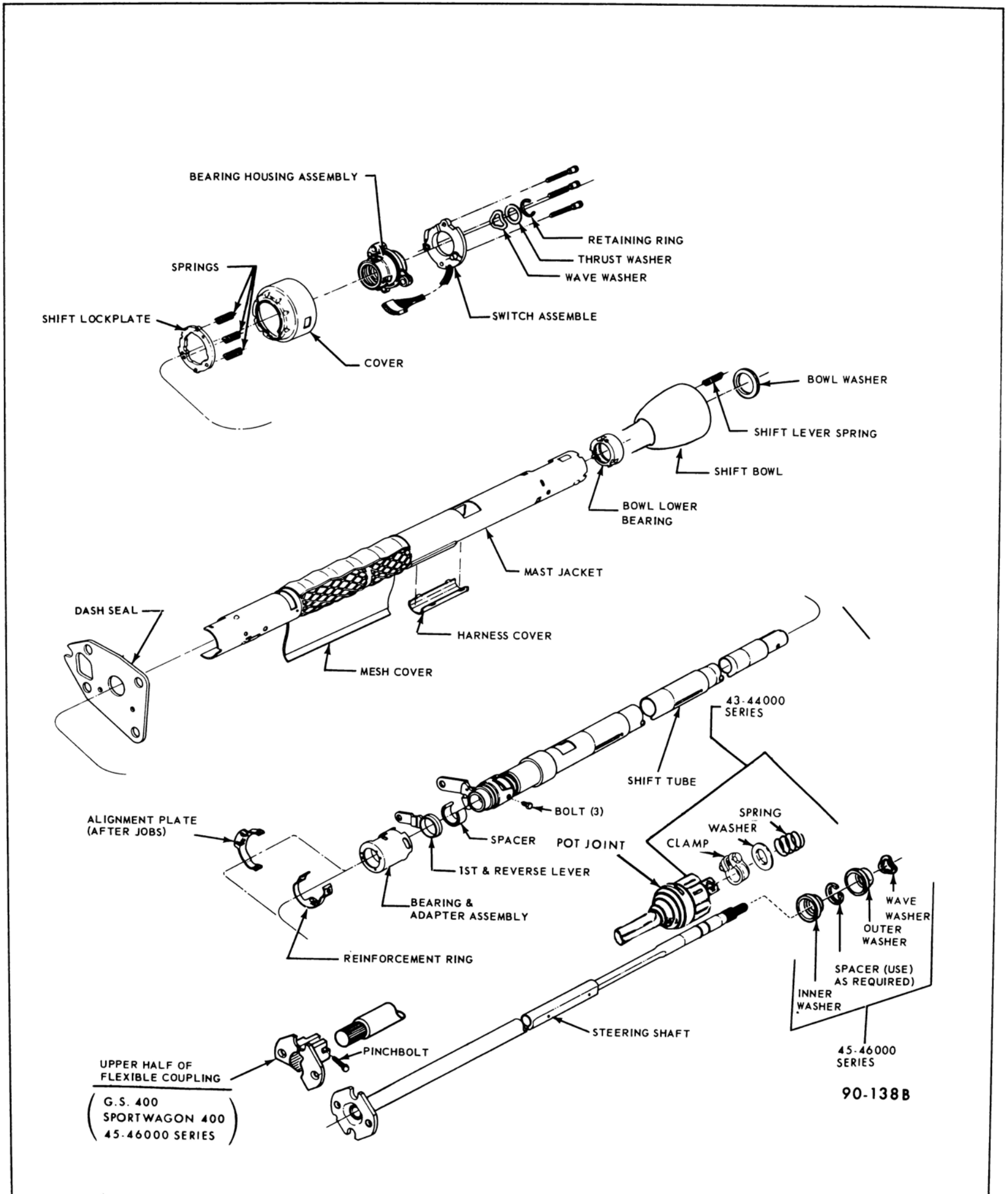


Figure 90-92 Standard (Non-tilt) Steering Column Assembly
Used With Column Shift Manual Transmission (Typical)

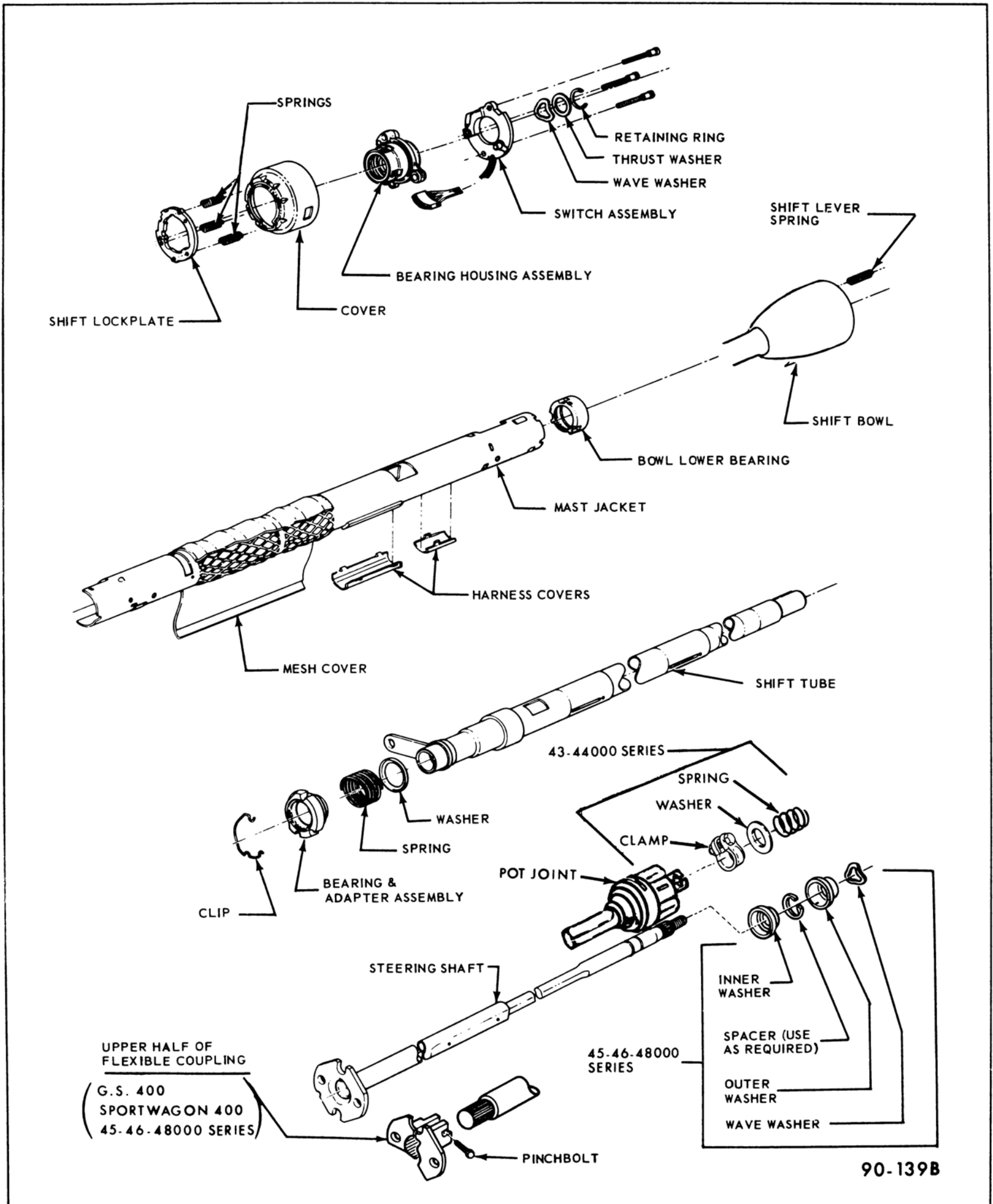


Figure 90-93 Standard (Non-tilt) Steering Column Assembly
Used With Column Shift Automatic Transmission (Typical)

8. On only columns used with 3 speed manual transmissions drive out shift lever pin and remove shift lever. On lower end of column remove screws securing reinforcement ring (or alignment plate) and disassemble reinforcement ring (or alignment plate), bearing and adapter assembly, 1st and reverse lever, and spacer. See Figure 90-92. Withdraw shift tube from column.

NOTE:

If it is necessary to replace the bowl lower bearing, it is necessary to disassemble both the upper and lower halves of the steering column. The bearing may easily be pushed out of the mast jacket by use of a suitable rod. Use installer J-22572 (see Figure 90-94) when inserting new bearing. The bearing keys into the mast jacket.

d. Reassembly of Lower Half of Steering Column

1. Reassemble reverse of removal procedures and note the following special procedures. See Figures 90-92, and 90-93, for reassembly sequence.

2. Apply a thin coat of lithium grease to all friction surfaces.

3. On only column shift columns used with 3 speed

manual transmissions, reassemble shift tube into mast jacket (rotate shift tube to align with keyway in bowl) and reinstall spacer, 1st and reverse lever, adapter assembly, reinforcement ring (or alignment plate) and screws. Using special tool J-22568 and a .003 inch feeler gage or shim stock installed as shown in Figure 90-95, turn adapter in a clockwise direction until looseness of 1st and reverse lever is taken up, then tighten reinforcement ring screws 10 lb.ft. and remove feeler gage or shim stock. Recheck adjustment by trying to slide a piece of .005 inch shim stock between 1st reverse lever and spacer. If adjustment is correct, shim stock should not fit.

4. On all columns except those used with 3 speed column shift manual transmissions reinstall shift tube into mast jacket (rotate shift tube to align with keyway in bowl) and reassembly washer (if used), spring, bearing and adapter assembly and secure in position with wire clip.

NOTE:

On 45-46-48000 Series only, if the steering shaft assembly, bearing housing assembly or bearing and adapter assembly is replaced, the "stack-up" condition ("stack-up" is affected by inner and outer washers, "C" ring spacers and

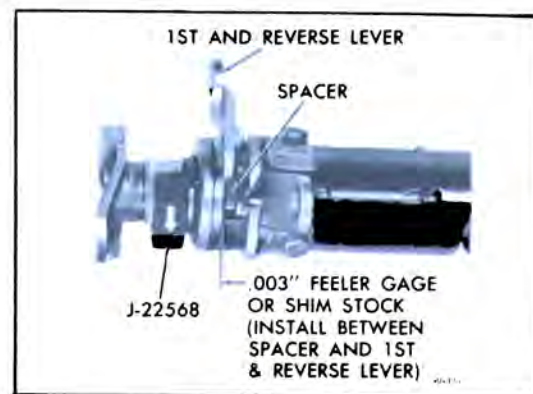


Figure 90-95 Adjusting Shift Lever Lash at Lower End of Steering Column

wave washer) on the lower end of the column must be readjusted. It is strongly recommended that any "stack-up" checking or adjusting be started with all "C" ring spacers removed as it is possible to shear the plastic injections in the shaft if the "stack-up" is too tight. Install special tool J-22686 on upper end of steering shaft, install steering wheel nut onto end of shaft and tighten nut until steering shaft is drawn tight against special tool. "Stack-up" corrections can be made by adding or subtracting "C" ring spacers (Service kit 6.524-7801263) as required.

5. Reassembly steering wheel onto column and torque nut 30 lb.ft.

6. If disassembly necessitated removal of neutral-safety or back-up light switches, reinstall switches after column is installed in car and linkage is reconnected. Torque fasteners 15 pound inch.

7. Reassembly instrument panel mounting bracket to steering column assembly and torque screws 12 lb.ft.

90-28 DISASSEMBLY AND REASSEMBLY OF TILT STEERING COLUMN ASSEMBLY**a. Disassembly****NOTE:**

It is presumed during the following procedure that the column is removed from the

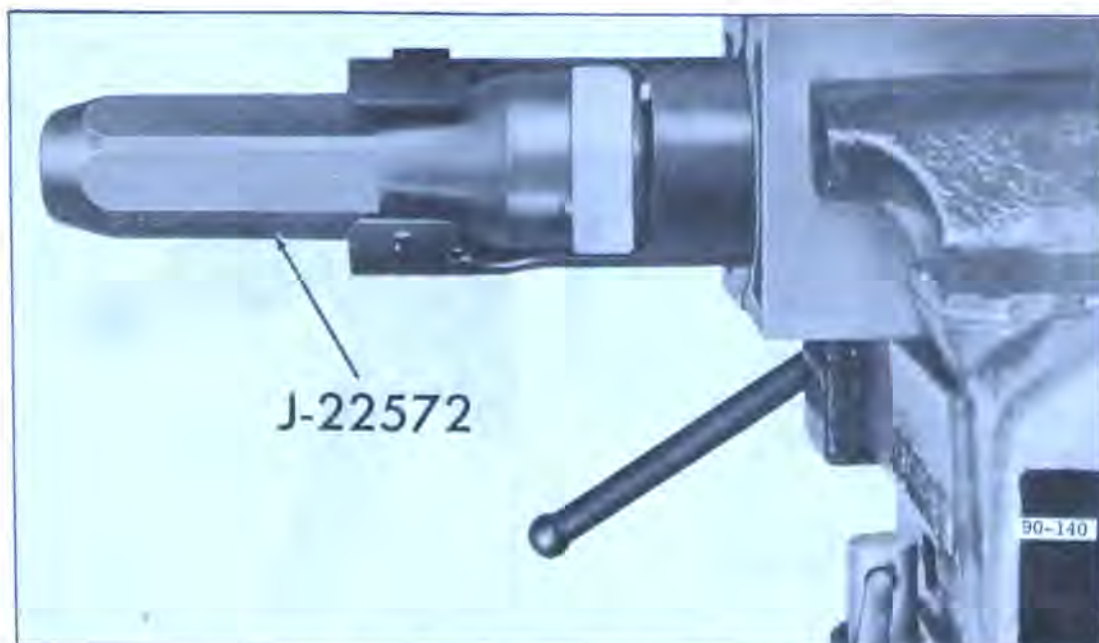


Figure 90-94 Installing Bowl Lower Bearing

car, however, it is possible to disassemble the upper half of the column down to the support assembly with the column still in the car.

1. Remove steering wheel and take off turn signal cancelling cam and spring (ref. Par. 90-26).

CAUTION:

Do not hammer on end of steering shaft or otherwise jar steering wheel with a sharp blow as these actions could collapse steering shaft or loosen plastic injections that maintain shaft rigidity.

2. Remove 4 screws securing column mounting bracket to column take off bracket and set it aside to protect "break-away" capsules of bracket (see Figures 90-78, 90-79 and 90-80).

3. Mount column in a vise using special tool J-22573-1 (see Figure 90-96).

CAUTION:

The mesh section of the steering column assembly should never be clamped in a vise.

4. Remove tilt release and turn signal levers, and also hazard warning knob.

5. Push in on hazard warning switch and remove cover using special tool J-22598 (see Figure 90-96).

6. On 45000, 46000, 48000 Series cars remove 3 screws and take off signal switch assembly by working switch connector up thru bowl and housing.

NOTE:

On 43000 and 44000 Series cars it will be necessary to disassemble down to the shift bowl in order to withdraw the electrical connector. An alternate method of withdrawing the switch assembly harness would be to bend back the prongs on the terminals in the curved connector, pull the terminals out of the connector, tape them together and withdraw the harness up thru the bowl and housing.

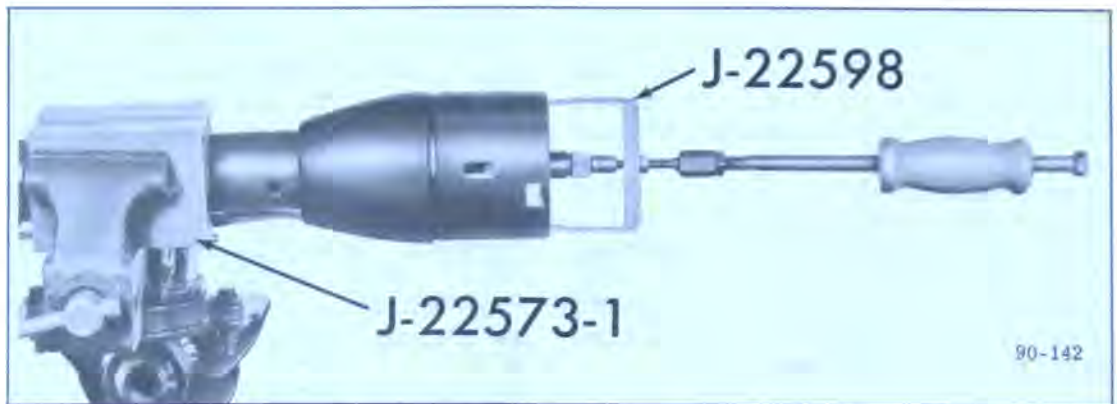


Figure 90-96 Cover Removal

NOTE:

If subject procedures are being performed with column installed in car, the curved connector attached to the switch assembly electrical harness can be freed from between the mounting bracket and the instrument panel as follows: Physically hold the steering column against the instrument panel, loosen the mounting bracket bolts and/or nuts until the bracket drops far enough to remove harness cover. Withdraw the connector thru the opening, then snug up the bolts and/or nuts. Care should be taken not to allow the column to drop downward during this procedure.

7. Remove 12 sided nut using special tool socket J-22599.

8. Install tilt release lever and place bearing housing assembly in full up position. Remove tilt spring retainer using screwdriver (see Figure 90-97). Depress retainer approximately 3/16 inch,

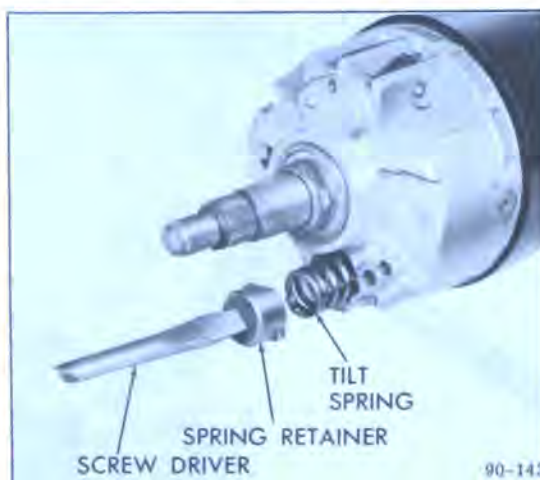


Figure 90-97 Releasing Tilt Spring

rotate retainer 1/8 turn clockwise and allow retainer to move outward. Remove tilt spring and retainer.

WARNING:

Care should be taken when releasing tilt spring due to high compression rate of the spring.

9. Remove 2 pivot pins using special tool J-21854-01 (see Figure 90-98).

10. Pull up on tilt lever to disengage lockshoes and lift off bearing housing assembly.

NOTE:

To service lockshoes, release springs or shoe release, drive lockshoe pin flush with housing face if there is not enough clearance for driving out of release pin. Drive out release pin using special tool J-22635 (see Figures 90-100 and 90-101). Further



Figure 90-98 Removing Pivot Pins

disassembly will be obvious upon inspection.

11. Remove upper half of flexible coupling from lower end of steering shaft.

12. From lower end of steering column remove retaining ring or clamp and take off following parts (see Figure 90-102) and pull out steering shaft assembly.

a. On 43000 and 44000 Series cars remove thrust washer and spring.

b. On 45000, 46000 and 48000 Series cars remove sleeve, spacer, and wave washer.

c. On 49000 Series cars remove sleeve and adjuster assembly, and spring.

13. Disassemble steering shaft assembly as follows:

a. Turn upper shaft slightly from centerline of lower shaft.

b. Using a narrow blade screwdriver work preload spring out from upper shaft (see Figure 90-103) and remove spring.

c. Turn upper shaft 90° from centerline of lower shaft and lift off upper shaft.

d. Rotate centering spheres and remove spheres and wave washer from lower shaft assembly.

15. Remove four screws securing support assembly and take off support assembly (see Figure 90-102).

16. Remove shift tube retaining ring and thrust washer from upper end of steering column.

17. From lower end of column assembly pry up on plastic fingers on lower bearing adapter and remove bearing and adapter assembly.

18. Insert the blade end of special tool J-22551 in notch of shift tube which is below the bowl key. Turn nut of J-22551 to pilot sleeve into upper end of shift tube, force the shift tube out of the bowl (see Figure 90-104) and

withdraw shift tube from mast jacket.

NOTE:

On columns used with automatic transmission equipped cars care should be taken when forcing shift tube out of bowl that the lever on the lower end of the shift tube does not hit the "T" slot in lower end of mast jacket.

NOTE:

Special tool J-22551 does not completely push bowl off of shift tube. Shift tube can be separated from bowl by working it out of bowl by hand.

19. Lift off lockplate, wave washer and bowl from mast jacket.

NOTE:

Removal of lockplate may be facilitated by sliding it out of the jacket notches, tipping it downward and withdrawing it thru the opening at the side of the mast jacket.

b. Reassembly

1. Reassemble reverse of removal procedure and note the following special procedures. See Figure 90-102 for reassembly sequence.



Figure 90-100 Driving Lockshoe Pin Flush With Housing Face

NOTE:

If shift lever spring is replaced, press fit the replacement spring into the bowl until spring bottoms in bowl.

2. Apply a thin coat of lithium grease to all friction surfaces.

NOTE:

If lockshoes were disassembled from bearing housing assembly, reassemble as follows: With tilt lever opening on the left side and lockshoes facing down, install the four-slotted shoe on the right side.

3. Draw switch assembly electrical connector thru bearing housing assembly and bowl.

4. Reassemble bowl onto mast jacket, install wave washer and lockplate into mast jacket and carefully install shift tube up thru lower end of mast jacket.

5. Align keyway in shift tube with key in bowl and use special tool J-22549 to pull shift tube into bowl (see Figure 90-105) and install thrust washer and retaining clip.



Figure 90-101 Driving Out Release Pin

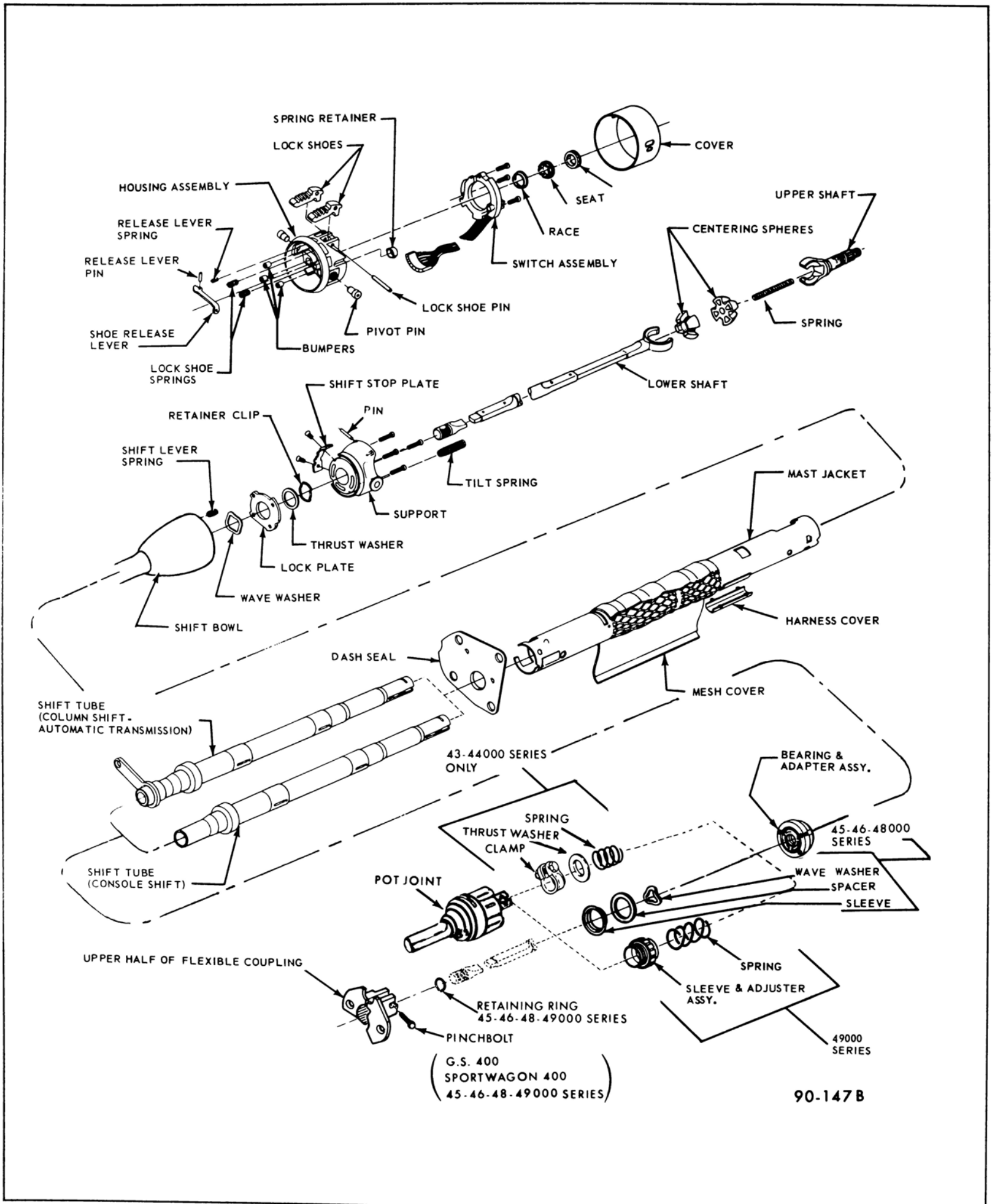


Figure 90-102 Tilt Steering Column Assembly (Typical)

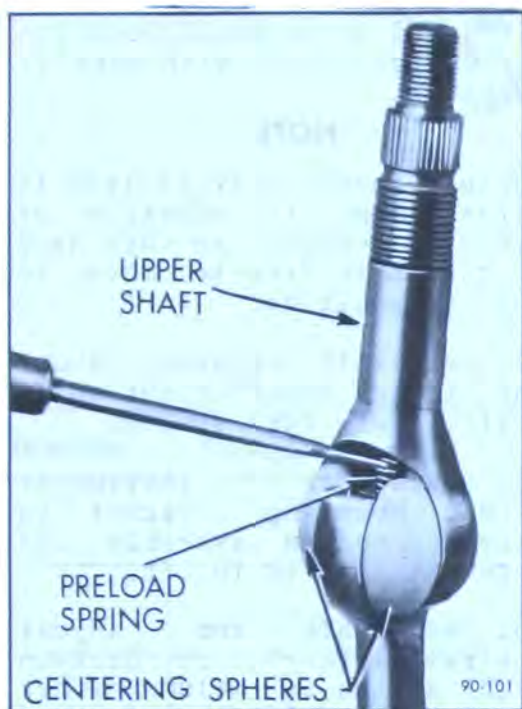


Figure 90-103 Removing Preload Spring

CAUTION:

Do not push or tap on end of shift tube.

NOTE:

Reassembly of retaining clip may be facilitated by pulling up on bowl to compress wave washer.

6. Install support (see Figure 90-102) and torque screws to 50 pound inch.

7. Install steering shaft assembly taking care that

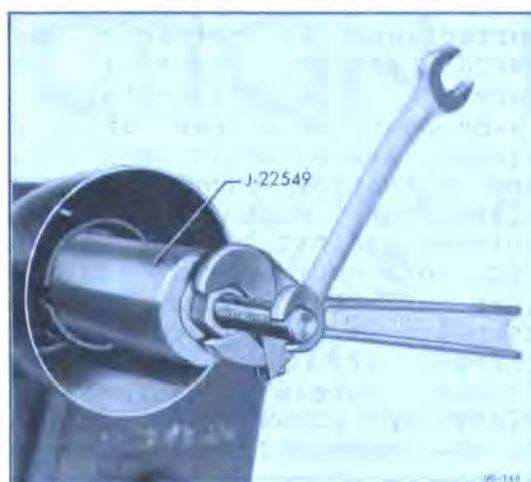


Figure 90-105 Installing Shift Tube into Shift Bowl

shaft does not tear or push out foam seal cemented to inside of lower end of shift tube.

8. Install tilt release lever onto bearing housing assembly. Raise tilt release lever to disengage lockshoes, and assemble bearing housing assembly onto support assembly positioning it so as to align pivot pin holes. Secure housing in position with pivot pins.

9. Position housing in full up position, install tilt spring (tapered end first) and secure spring in compressed position with spring retainer.

10. Secure switch assembly to bearing housing assembly and tighten screws 35 pound inch.



Figure 90-106 Adjusting Steering Shaft Torque

NOTE:

Locate short screw in topmost position.

11. Position tilt column in the center position. Install upper bearing inner race, seat and 12 sided nut using Socket J-22599. See Figure 90-100. Tighten 12 sided nut until there is no end play in shaft while attempting to move shaft in and out. Do not tighten 12 sided nut any more than required to just remove play in shaft as bearing may be damaged by overtightening nut. Temporarily install steering wheel retaining nut on steering shaft and check bearing preload using a pound inch torque wrench. Preload should be 1 to 2 lb. in. Adjust 12 sided nut as required.

IMPORTANT:

Preload check must be made with tilt column in center position to obtain correct adjustment.

12. a. On 43-44000 Series columns, install spring, washer and clamp and align open portion of clamp to mark made during disassembly. Slide clamp up shaft until coil spring bottoms, then back clamp off 1/16". Tighten clamp bolt to 30 lb.ft.

b. On 45-46-48000 Series columns, install wave washer, spacer, sleeve and retainer ring. Adjust "stack-up" as indicated in following NOTE.

c. On 49000 Series columns, install spring, sleeve and adjuster assembly, and retainer ring. Adjust

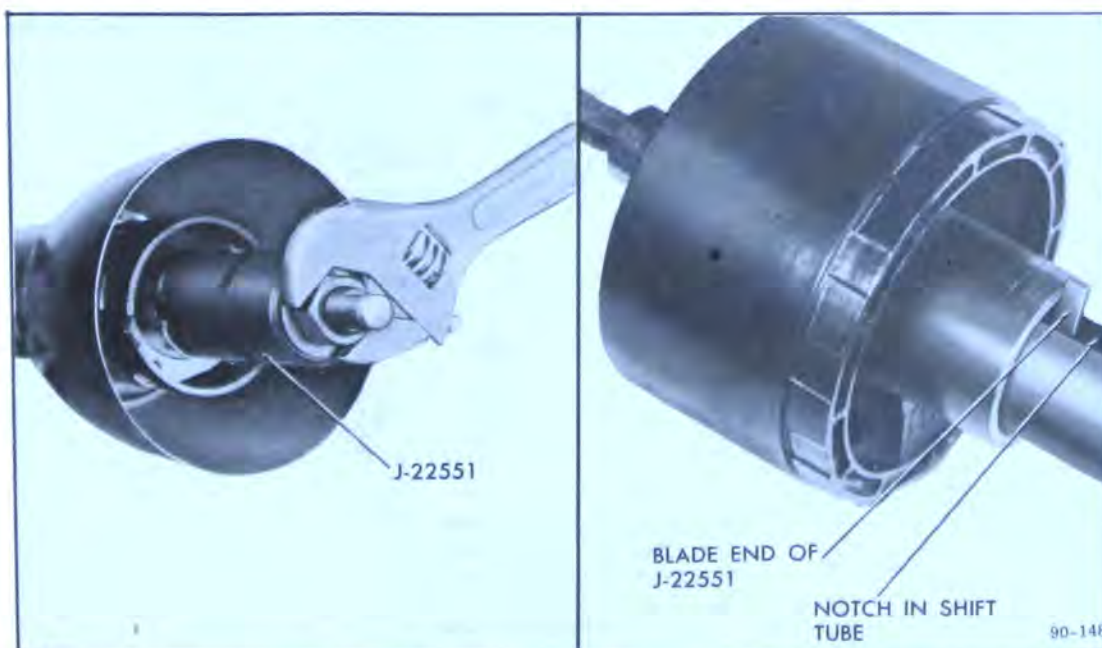


Figure 90-104 Forcing Shift Tube From Bowl

"stack-up" as indicated in following NOTE.

NOTE:

If steering shaft assembly, support, bearing and adapter assembly or housing assembly are replaced (45-46-48-49000 Series), the "stack-up" condition ("stack-up" is affected by thrust washer, sleeve and adjuster assembly, spring, spacer, and wave washer) on the lower end of the column assembly must be checked. If the "stack-up" is too loose it will be possible to move the sleeve, or sleeve and adjuster assembly inward. See Figure 90-102. If the "stack-up" is too tight, the retaining ring will not slip into the steering shaft groove. If a "stack-up"

correction is necessary on 49000 series, install a service kit (6.524-7801219) which contains a new spring, sleeve and adjuster assembly, and retaining ring. Adjust sleeve and adjuster until it bottoms against bearing, then back off adjuster 1/8 to 1/4 turn and fix adjustment by using a soldering gun to melt threads at several points around thread juncture of sleeve and adjuster assembly. On 45-46-48000 Series columns, a "stack-up" correction can be made by adding or subtracting spacers as required using service kit (6.524-7801262).

13. Remove tilt release lever and install cover.

NOTE:

Be sure hazard warning switch

is pushed in to avoid breaking off end of switch with edge of cover.

NOTE:

Be sure enough play is left in wires clamped to underside of steering column so that head of column is free to move to full up position.

14. Reinstall steering wheel and torque securing nut to 30 lb.ft. (ref. Par. 90-26).

15. Reassemble instrument panel mounting bracket to steering column assembly and torque screws 12 lb. ft.

16. Reassemble and adjust neutral-"safety" or back-up light switch to column after it is installed into car and linkage is reconnected.