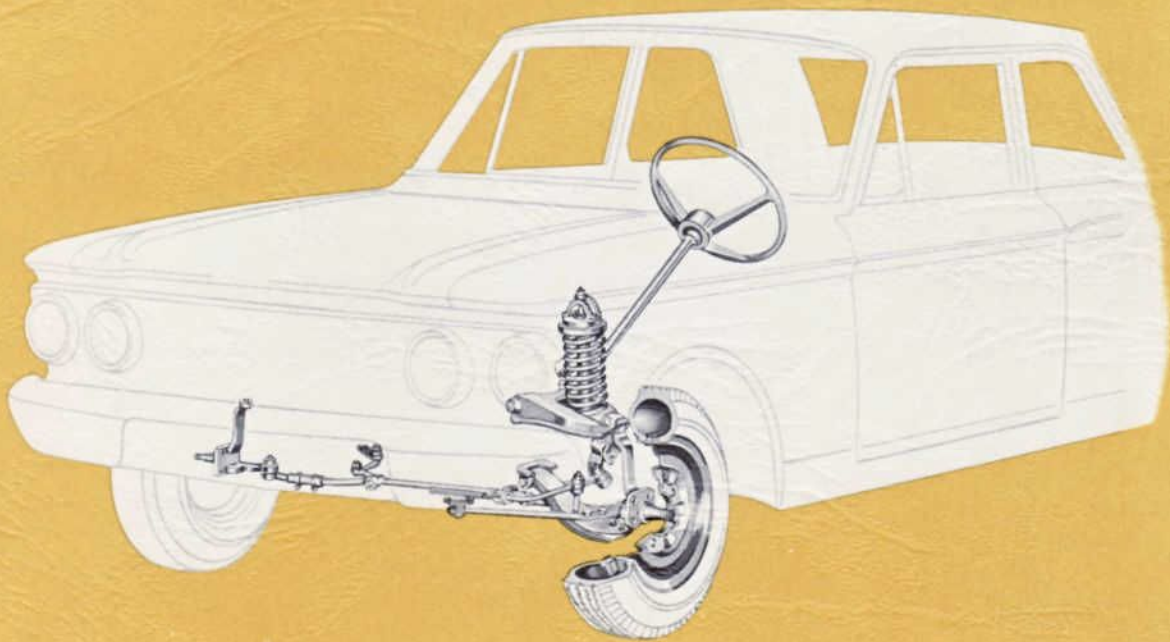


FORD

Service Handbook

3003



**CAR STEERING, SUSPENSION,
WHEELS and TIRES**

table of contents

PART 1 IDENTIFICATION

	Page
Steering Gear.....	1
Power Steering.....	1
Steering Column.....	3
Front Suspension.....	3
Rear Suspension.....	3
Wheels and Tires.....	4

PART 2 STEERING

Steering Linkage.....	7
Steering Column Assembly.....	9
Steering Gear.....	13
Pump and Fluid Reservoir.....	15
Control Valve.....	18
Power Cylinder.....	21
Thunderbird Power Steering Gear.....	22
Power Steering Linkage Repair.....	27

PART 3 WHEELS AND TIRES

Wheel and Tire Replacement.....	28
Hubs, Bearings, and Oil Seals or Grease Retainers.....	29

PART 4 FRONT SUSPENSION

Falcon Front Suspension.....	32
Fairlane Front Suspension.....	36
Galaxie Front Suspension.....	41
Thunderbird Front Suspension.....	45

PART 5 REAR SUSPENSION

Falcon Rear Suspension.....	51
Fairlane Rear Suspension.....	52
Galaxie Rear Suspension.....	53
Thunderbird Rear Suspension.....	55

PART 6 SERVICE SPECIFICATIONS AND SPECIAL TOOLS

Steering.....	57
Front Suspension.....	60
Rear Suspension.....	61
Special Tools.....	62

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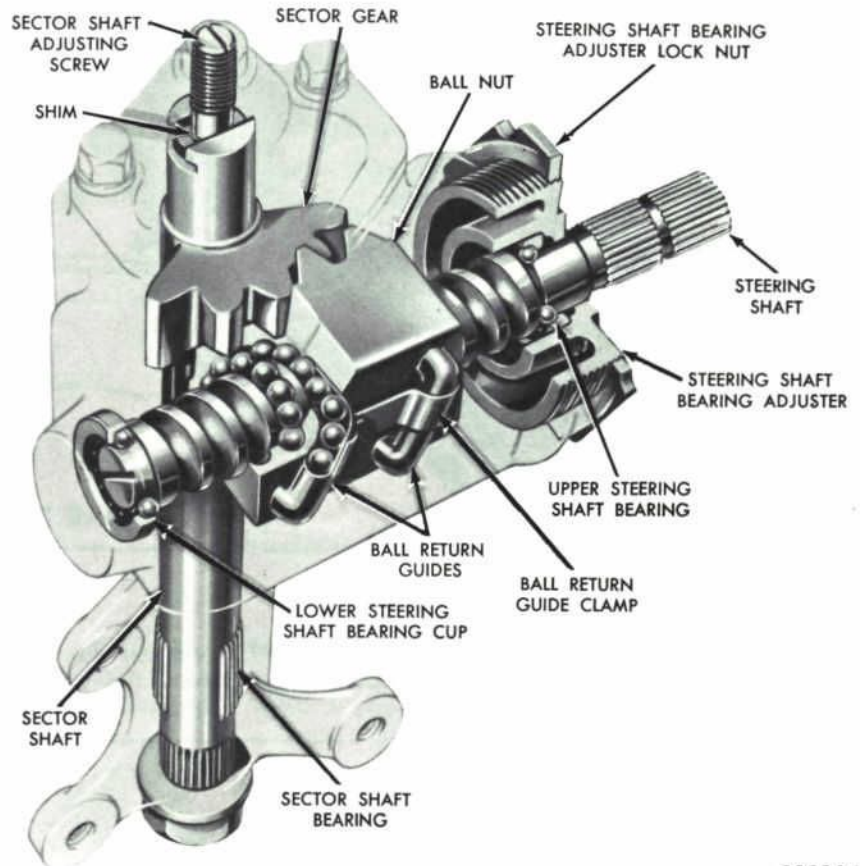
SERVICE DEPARTMENT
FORD DIVISION
 MOTOR COMPANY

FIRST PRINTING—OCTOBER, 1961

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DEARBORN, MICHIGAN

1 STEERING GEAR

Fig. 1 is a sectional view of a typical steering gear. The steering system combines the low friction parallelogram linkage and the conventional recirculating ball-nut steering gear. Friction is minimized by the ball-nut, which is mounted on the steering worm (or shaft), where all steering action is accomplished by free rolling ball bearings between the nut and worm. There is no direct contact between the steering worm and the ball-nut assembly. As the steering worm turns, the rack moves along on the spiral row of balls. Steering effort is transferred to the steering components which are attached directly to the pitman and idler arms. The spindle connecting rods and the steering arm-to-idler arm rod are parallel and are connected to the pitman arm and the idler arm. The basic difference between the steering gears is the number of recirculating balls within the ball return guides. Table 1 lists the differences between the various steering mechanisms on the various car line models.



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FIG. 1 – Typical Steering Gear

2 POWER STEERING

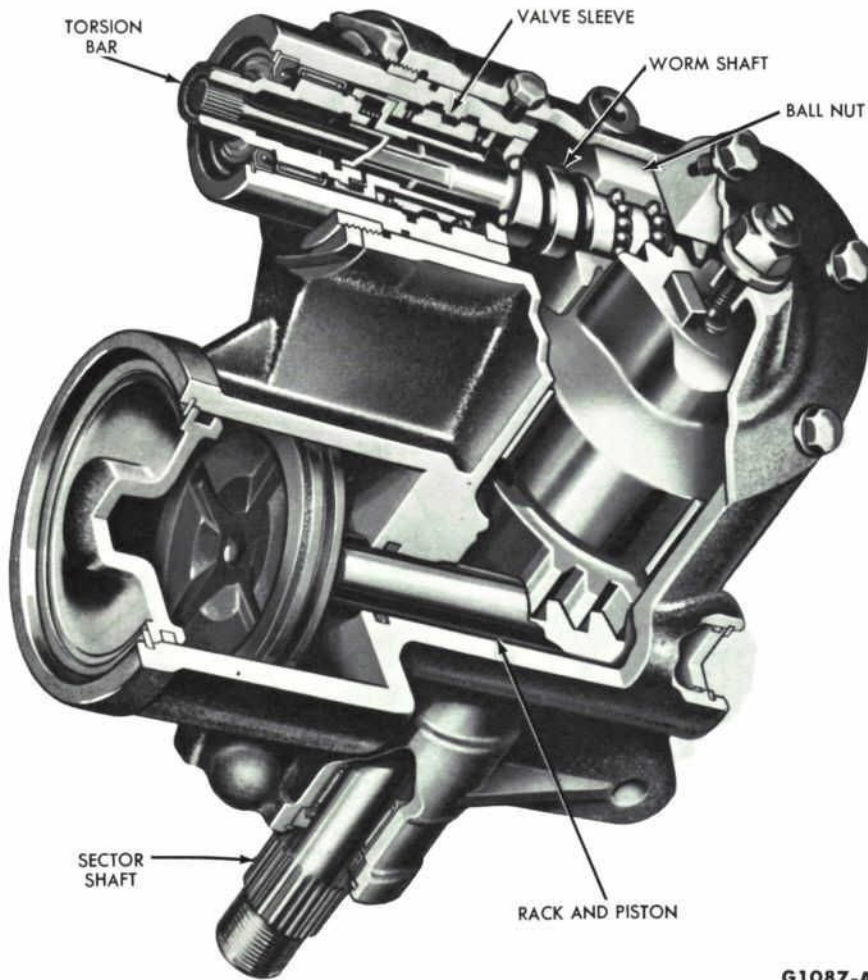
The power steering utilized on the Fairlane and Galaxie is a hydraulically controlled linkage type (Fig. 3) which includes a fluid reservoir and pump, a control valve, a power cylinder, the fluid connecting lines, and the steering linkage.

The power steering pump is a roll-type hydraulic pump which is belt driven from the engine crankshaft. The pump draws fluid

from the reservoir and provides fluid pressure for the system. Within the pump itself is a pressure-relief valve which governs the pressures within the steering system according to the varying conditions of operation. After fluid has passed from the pump to the control valve and the power cylinder, it returns to the reservoir.

The control valve, operated by steering wheel movement, directs

the pressure developed by the pump. When the front wheels are in the straight-ahead position, the control valve spool is held in the center (neutral) position by the centering spring. Within the control valve body, there is a reaction limiting valve which reduces parking effort. When pressure of about 4 pounds is exerted for a left turn, the valve spool overcomes the pressure of the center-



G1087-A

FIG. 2—Thunderbird Power Steering Gear

ing spring and moves toward the right-hand end of the valve. As a result, pressure is exerted on the right-hand side of the power cylinder piston, and fluid in the left-hand end of the cylinder returns to the reservoir.

The torsion bar type of power steering is designed with all components in one housing (Fig. 2). This permits internal fluid passages between the valve and cylinder, thus eliminating all external lines and hoses, except the pressure and return hoses between the pump and gear assembly.

If, for any reason, the pump fails to deliver fluid pressure, the car may be steered without pump pressure.

The power steering utilized on the Thunderbird is a torsion-bar type of hydraulic assisted system. The torsion bar power steering unit includes a rack and piston, and a worm and ball nut assembly which is meshed to the gear on the steering sector shaft. The unit also includes a hydraulic valve, valve sleeve, and torsion bar assembly which are mounted on the worm shaft and are operated by the twisting action of the torsion bar.

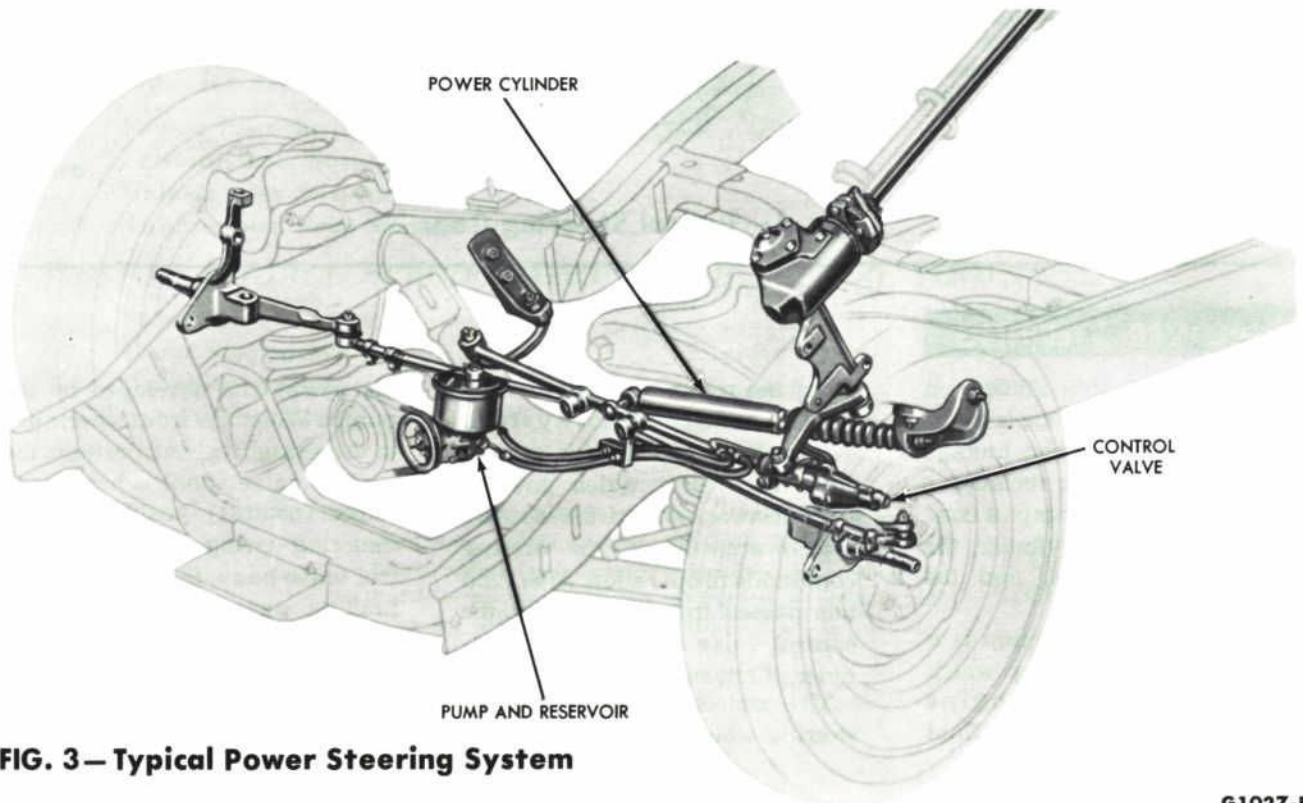


FIG. 3—Typical Power Steering System

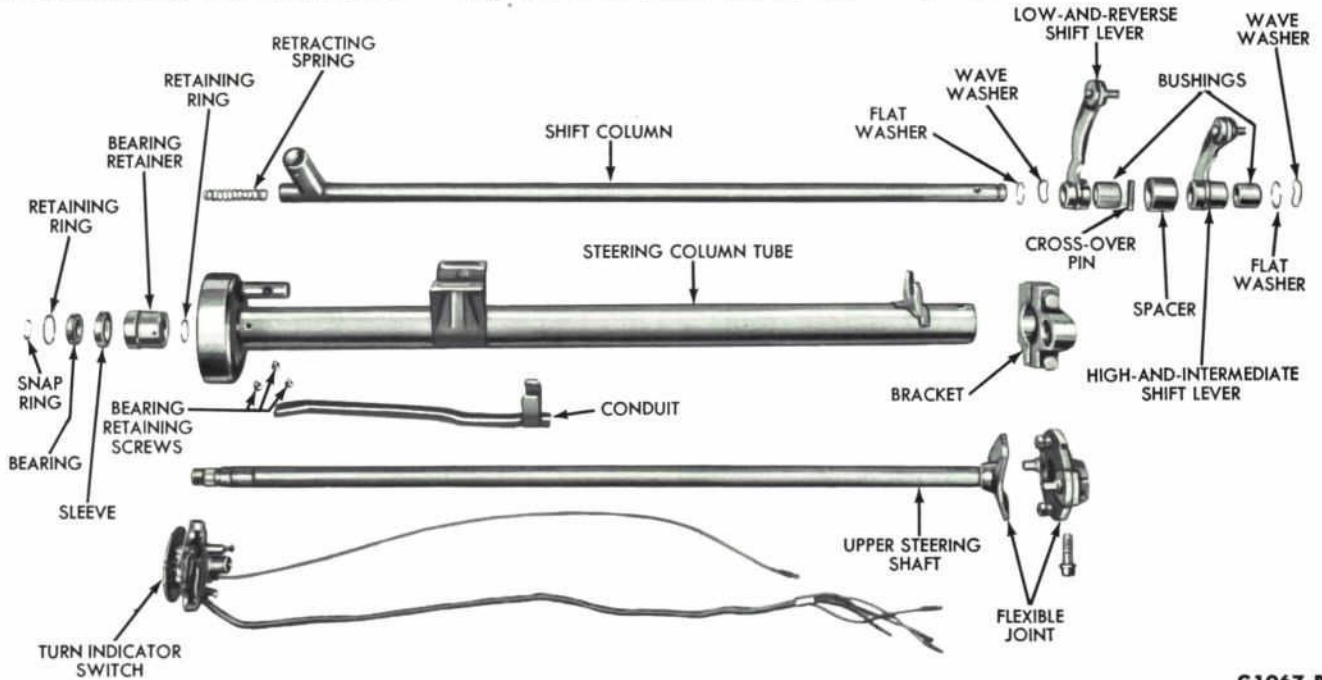
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3 STEERING COLUMN

The three basic steering column assemblies used are the one piece steering column, the one

piece flexible joint steering column, and the flexible joint steering column that is movable.

Fig. 4 is a typical flexible joint steering column tube and related parts.



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FIG. 4— Steering Column Tube and Related Parts

4 FRONT SUSPENSION

Ball joint independent front suspension (Fig. 5, Page 4) is standard equipment on all cars.

In some vehicles, the ball joints are pre-lubricated with a special long life lubricant. Table 2 lists

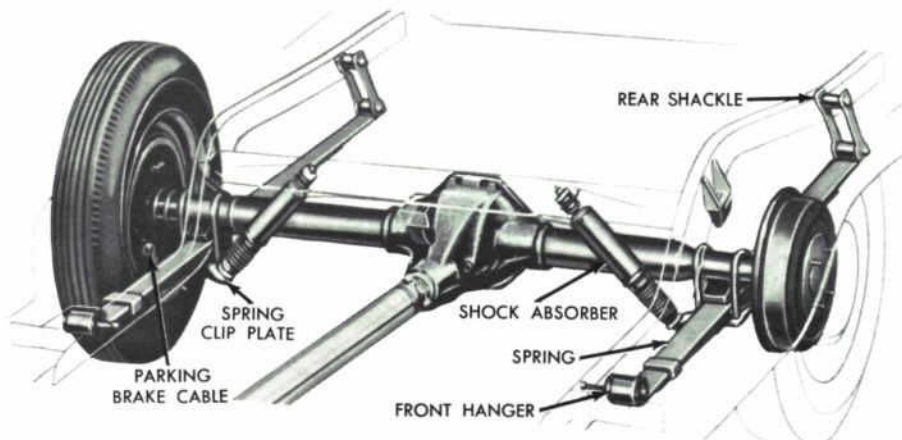
the differences between the various front and rear suspension components.

5 REAR SUSPENSION

The rear suspension consists of semi-elliptic leaf springs, spring hangers, and shock absorbers (Fig. 6). The various rear suspen-

sion components differ in the number and length of spring leaves and the method or location of spring suspension. Table 2 lists

the differences between the various rear suspension components and Table 3 lists the differences between shock absorber assemblies.



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FIG. 6— Rear Suspension Assembly

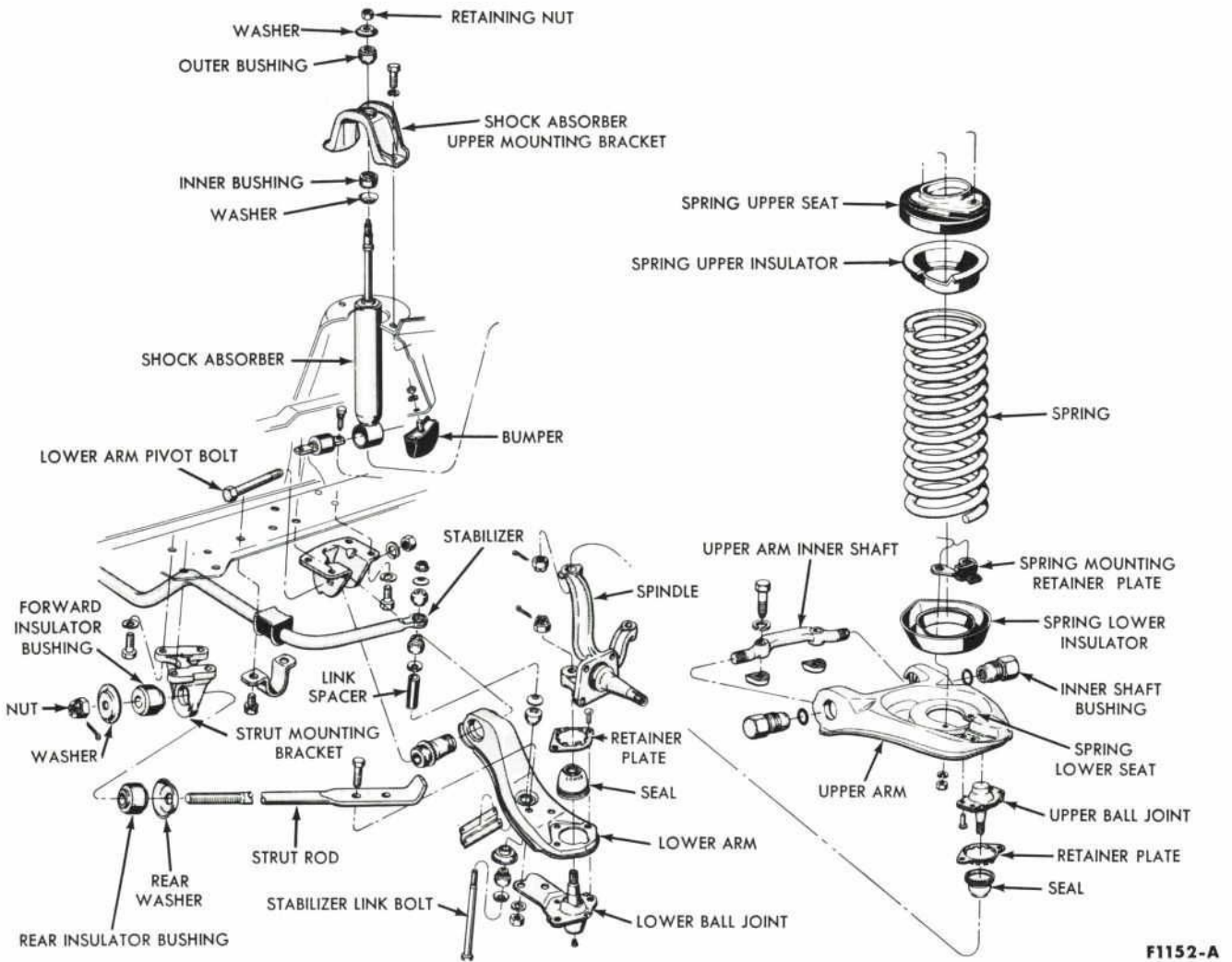


FIG. 5—Typical Front Suspension—Disassembled

6 WHEELS AND TIRES

All wheels are of the drop center safety rim type. All tires used are

tubeless. Table 4 list the differences between wheels and tires. Fig.

7 shows a typical Front Hub, Bearings, and Grease Retainer.

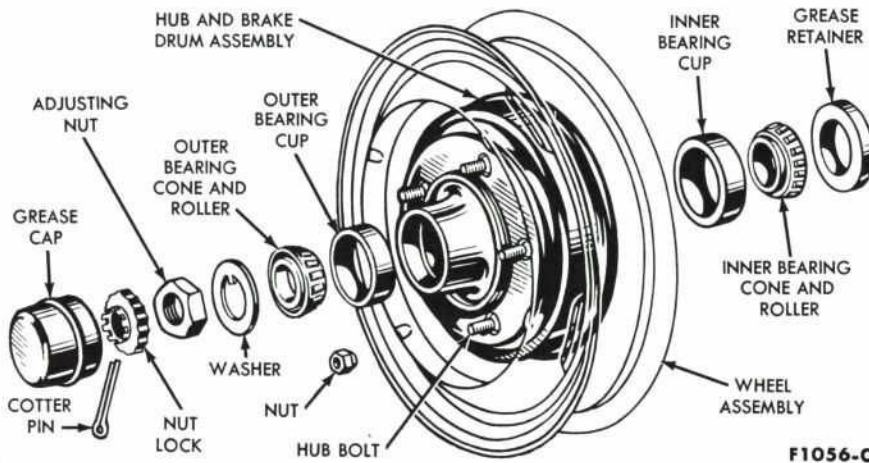


FIG. 7—Front Hub, Bearings, and Grease Retainer

TABLE 1 – Steering Mechanisms

GEAR TYPE	FALCON	FAIRLANE	GALAXIE	THUNDERBIRD
	RECIRCULATING BALL	RECIRCULATING BALL	RECIRCULATING BALL	INTEGRAL
No. of Recirculating Balls	62	54	54	62
No. of Teeth on Sector Shaft	5	5	5	5
Sector Shaft OD at Bushing	1.00	1.125	1.125	1.2495-1.2505
Steering Shaft OD	0.75	0.72	0.72	2.25
Length of Spindle Connecting Rod	6.5	Std 14.28 Power 19.28	Std 22.20 Power 22.19	4.5
Length of Steering Arm-to-Idler Arm Rod	24	Std 25.57 Power 23.98	Std 27.88 Power 26.14	26.91-27.03
Steering Column Type	One Piece	Flex Joint	Flex Joint	Flex Joint (Moveable)

TABLE 2 – Front and Rear Suspension

	FALCON		FAIRLANE		GALAXIE		THUNDERBIRD
	CAR	STATION WAGON	6 CYL.	8 CYL.	6 CYL.	8 CYL.	
Coil Spring Free Height Manual-Shift Automatic Transmission	15.65 15.65	15.30 15.30	18.51 18.32	18.74 18.83	16.10 16.10	16.35 16.35	17.52
No. of Coils Manual-Shift Automatic Trans.	9.50 9.50	8.83 8.83	9.75 9.75	9.80 9.80	10.40 10.40	10.40 10.40	9.92
Length of Upper Arm Inner Shaft	8.69		9.25		10.60		10.295-10.385
Rear Spring Length at Normal Load Car Station Wagon	50.0 50.0		55.12-54.88 NA		59.88-60.12 59.88-60.12		60.05
Rear Spring Width Car Station Wagon	2.0 2.0		2.0-2.03 NA		2.50-2.53 2.50-2.53		2.5
No. of Rear Spring Leaves- Standard Spring 2-Door 4-Door Station Wagon	5 5 5		5 5 NA		3 4 5		4
No. of Rear Spring Leaves- Heavy Duty 2-Door 4-Door Station Wagon	5 5 5		4 4 NA		5 5 5		NA

TABLE 3 — Shock Absorbers

	FALCON		FAIRLANE		GALAXIE		THUNDERBIRD
	CAR	STATION WAGON			CAR	STATION WAGON	
Length of Standard Front Shock Absorber							
Extended	13.58	13.58	16.0		13.5	13.4	14.55
Collapsed	8.90	8.90	10.5		8.8	8.8	9.33
Length of Heavy Duty Front Shock Absorber							
Extended	13.58	13.58	16.08		13.3	13.4	NA
Collapsed	8.90	8.90	10.48		8.8	8.7	
Length of Standard Rear Shock Absorber							
Extended	17.7	17.7	18.7		18.3	18.5	18.65
Collapsed	10.6	10.6	11.2		11.2	11.4	11.43
Length of Heavy Duty Rear Shock Absorber							
Extended	17.7	17.8	18.7		18.5	18.5	NA
Collapsed	10.6	10.6	11.3		11.4	11.4	

TABLE 4 — Wheels and Tires

	FALCON		FAIRLANE		GALAXIE		THUNDERBIRD
	CAR	STATION WAGON	6 CYL.	8 CYL.	CAR	STATION WAGON	
Tire Size	6.00x13		6.50x13	6.50x13	7.00x13	8.00x14	7.50x14
No. of Wheel Retaining	4	4	5		5		5
Wheel Type	Stamped Riveted		Stamped Disc		Steel Disc		Steel Disc Special Ledge

STEERING

The illustrations shown are generally for a specific car line and are to be considered only as typical for the repair operation being performed.

1 STEERING LINKAGE

SPINDLE CONNECTING ROD END REPLACEMENT

1. Raise the car and install safety stands. Remove the cotter pin and nut from the rod end ball stud (Fig. 8). Loosen the connecting rod sleeve clamp bolts and remove the rod end from the spindle arm, as shown in Fig. 9.

2. Turn the rod end out of the sleeve. Count the number of turns needed to remove the rod end from the sleeve for assembly purposes. Discard all rod end parts that were removed from the sleeve. All new parts should be used when a spindle connecting rod end is replaced.

3. Thread a new rod end into

the sleeve, but do not tighten the sleeve clamp bolts at this time. Install a seal on the rod end ball stud, insert the stud in the spindle arm hole, and install the stud nut. Torque the nut to specifications and install the cotter pin.

4. Lubricate the rod end ball stud, if required, and check the toe-in.

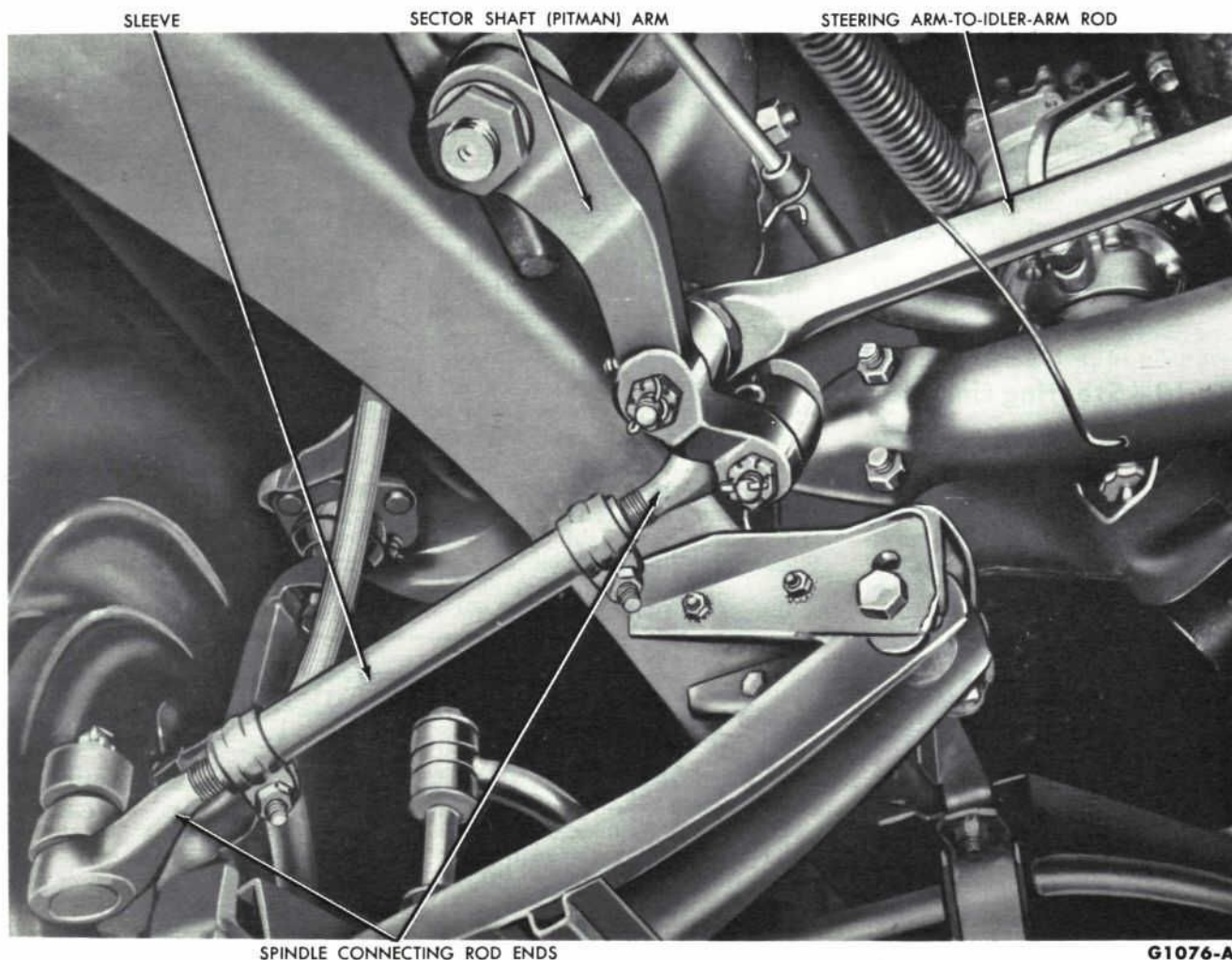


FIG. 8— Spindle Connecting Rod

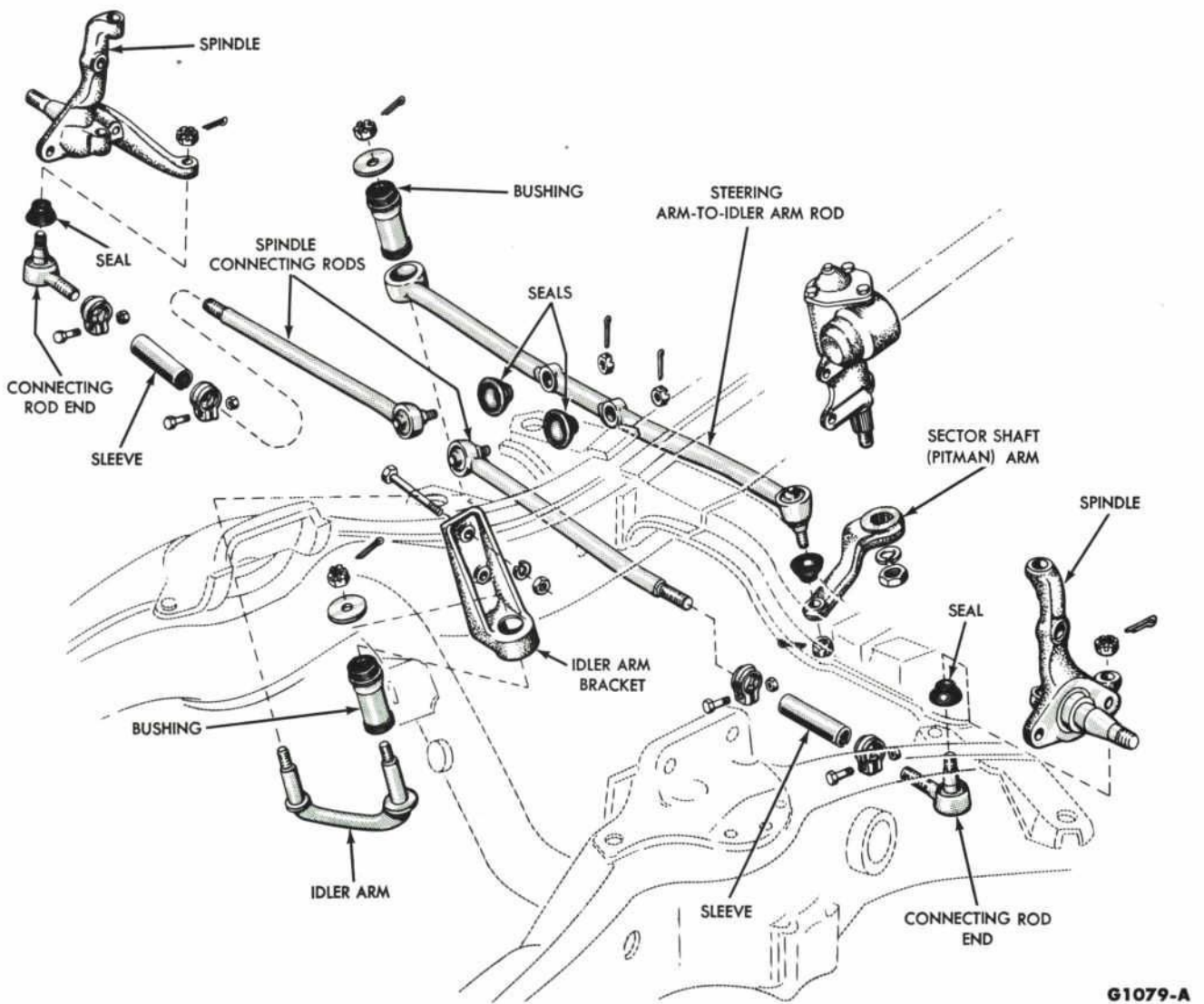


FIG. 10—Steering Linkage

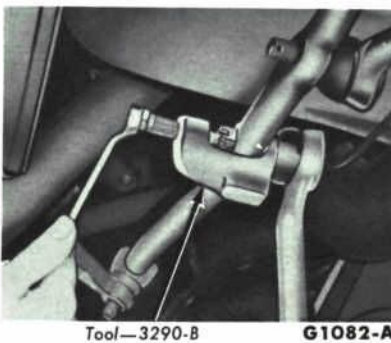


FIG. 9—Ball Stud Removal

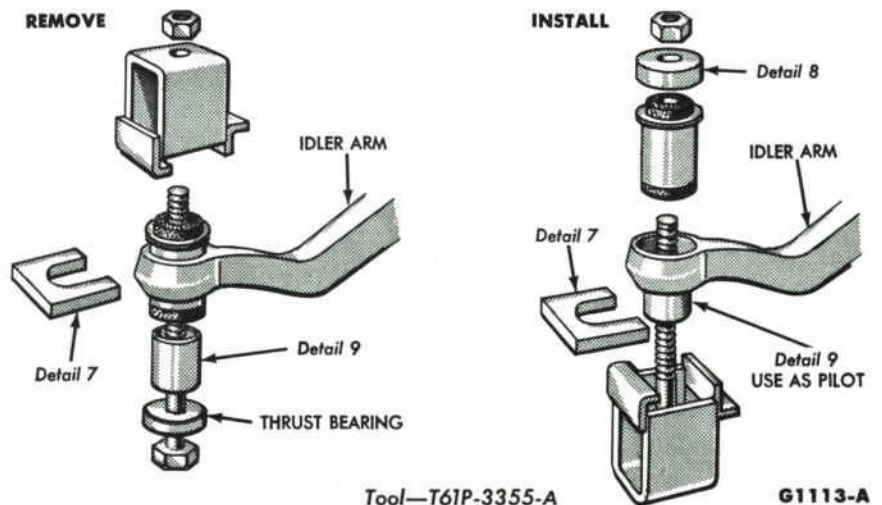


FIG. 11—Idler Arm Bushing Replacement

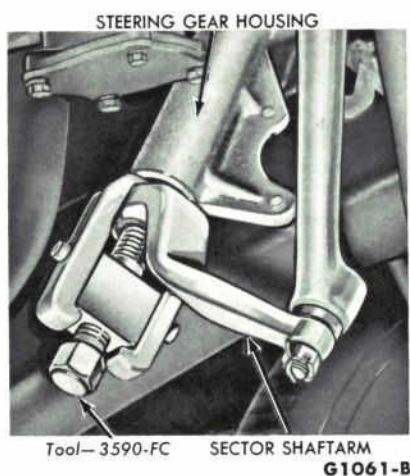


FIG. 12 — Sector Arm Shaft Removal

SPINDLE SLEEVE REPLACEMENT

1. Disconnect the rod ends. Screw the spindle rod ends into the new sleeve the same number of turns as was required to remove them. Do not tighten the clamp bolts at this time.

2. Place the seal on the rod ends and position the sleeve assembly on the sector shaft arm (or the idler arm) and the spindle arm. Install the retaining nut. Torque the nut to specifications and install the cotter pin. Check and adjust toe-in.

SPINDLE CONNECTING ROD - GALAXIE AND FAIRLANE

1. Remove the cotter pin and nut which attach the spindle connecting rod ball stud to the steering arm to idler arm rod (Fig. 10). Remove the ball stud from the rod (Fig. 9). Be careful not to loosen or bend any other parts on the steering arm to idler arm

rod. Loosen the connecting rod sleeve clamp bolts, and remove the rod from the sleeve.

2. Thread a new connecting rod into the sleeve, but do not tighten the sleeve clamp bolts at this time. Install the connecting rod ball stud in the steering arm to idler arm rod, and install the nut on the ball stud. Torque the nut to specifications and install a new cotter pin.

3. Check and adjust the toe-in. If the car has power steering, be sure that there is no interference between the sleeve bolts and the control valve.

STEERING ARM TO IDLER ARM ROD REPLACEMENT

The rod connecting the sector shaft arm and the idler arm has non-adjustable ball studs. The rod should be replaced when damaged or when worn at the ball studs.

1. Remove the cotter pins and nuts from the joints at the sector shaft arm and the idler arm, (Falcon and Thunderbird) or from the spindle connecting rod ends (Fairlane and Galaxie). Remove the steering arm to idler arm rod assembly using the appropriate puller.

2. Install new seals on the ball studs, and position the new steering arm to idler arm rod on the idler arm and the steering arm. On Fairlane or Galaxie, install a new bushing in the replacement steering arm to idler arm rod, using the appropriate tool. If there is apparent wear in the other idler arm bushing, it should be replaced at this time. Position the rod on the idler arm and the sector shaft arm.

3. Install the retaining nuts. Torque the nuts to specifications and install the cotter pins. Check and, if necessary, adjust toe-in.

STEERING IDLER ARM BUSHING REPLACEMENT

The steering idler arm bushing can be replaced when the arm is still connected to the spindle connecting rod and/or the steering arm to idler arm rod. If one idler arm bushing is worn, replace both bushings. Using the basic tool shown in Fig. 11, and the necessary attachments, replace the bushings. Torque the retaining nut to specifications. Check and adjust the toe-in.

SECTOR SHAFT ARM REPLACEMENT

1. Raise the front of the car and install safety stands. Remove the nut securing the sector shaft arm to the steering gear. Separate the sector shaft arm from the steering gear (Fig. 12).

2. Remove the cotter pin and nut securing the sector shaft arm to the steering arm to idler arm rod and remove the sector shaft arm.

3. Position the sector shaft arm on the steering arm to idler arm rod stud and secure in place with the nut. Torque the nut to specifications and install the cotter pin.

4. With the front wheels in the straight ahead position, position the sector shaft arm to the steering gear and secure in place with the nut. Torque the nut to specifications.

2 STEERING COLUMN ASSEMBLY

STEERING WHEEL REPLACEMENT

1. Disconnect the horn to battery bullet connector. Remove the horn button or ring by pressing down evenly and turning counterclockwise approximately 20° or until it can be lifted off the steering wheel. Mark the steering shaft and

steering wheel hub before removal. Remove the nut from the end of the steering shaft, and using the appropriate puller, remove the steering wheel from the shaft, (Fig. 13).

2. Lubricate the horn switch brush plate and the upper surface of the steering shaft upper bushing with Lubriplate. With the front

wheels in the straight ahead position, place the steering wheel on the steering shaft so that the spokes are properly centered and the marks on both parts are properly aligned.

Make sure the clearance between the steering column tube and the steering wheel is within specifications.

Steering Wheel Puller—3600N

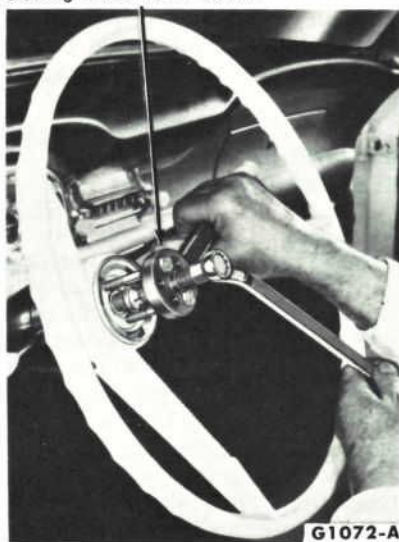


FIG. 13—Steering Wheel Removal

3. Install the steering wheel nut on the shaft and torque the nut to specifications. Stake the nut securely. Install the horn and connect the horn to battery bullet connector.

4. On a car with power steering, hook a spring scale to the rim of the steering wheel and measure the pull required to turn the steering wheel in both directions with the engine idling. The steering effort must be within limits and should be approximately the same in both directions.

STEERING SHAFT UPPER BEARING REPLACEMENT

FALCON

1. Remove the steering wheel. Unscrew the turn indicator lever. Remove the indicator switch screws, and pull the switch to one side.

2. Remove the steering column tube flange retainer nut allowing the bolts to drop into the gear shift lever socket assembly. Remove the turn indicator switch, the steering column tube flange, the sleeve, and the turn indicator wiring assembly from the steering column tube.

3. Remove the steering column tube flange from the turn indicator switch and wiring assembly. Pull the steering column upper bearing from the flange. Remove the bolts from the gear shift lever socket.

4. Apply Lubriplate to the new bearing and position it in the steering column. Feed the turn indicator switch wiring through the hole provided in the flange, through the steering column, and out through the routing hole under the instrument panel.

5. Position the flange retaining bolts and start the nuts flush with the end of the bolts. Position the flange and tighten the nuts. Install the turn indicator switch. Install the turn indicator lever and position the bearing sleeve and spring.

6. Apply Lubriplate to the horn switch brush plate. Refer to "Steering Wheel Replacement", and install the steering wheel. Slide the plastic insulating tube over the wiring, starting the end into the steering column under the instrument panel. Connect the turn indicator and horn wires.

FAIRLANE

1. Remove the flexible coupling lower clamp bolt and disconnect the horn wires at the horn relay. Remove the horn ring (or button) by pressing and turning counterclockwise.

2. Mark the steering shaft and steering wheel hub before removal. Remove the steering wheel. Do not lose the horn ground brush and spring. Remove the retaining screws from the turn signal switch and plate. Do not disturb the other horn ground brush. Push the turn signal wiring harness up into the outer column tube (lower left side of column) approximately one inch. Pull the turn signal switch over the steering shaft.

3. Remove the snap ring from the steering shaft (Fig. 14). Pull the steering shaft up far enough to grasp the bearing and remove it from the shaft. Work Lubriplate into the new bearing assembly and place it over the shaft with the seal side up.

4. Pull up on the steering shaft and install the snap ring. Position the turn signal switch, retaining plate, and secure in place with the retaining screws. Pull gently on the lower end of the wiring harness as the switch is positioned.

5. Place the horn ground brush and spring in position. Align the marks on the steering wheel hub and shaft and install the steering

wheel and secure in place with the retaining nut. Torque the nut to specifications, and stake securely.

6. Install the horn spring and ring (or button). Install the steering flexible coupling lower bolt. Torque to specifications. Connect the horn wires.

GALAXIE

1. Disconnect the shift levers from the shift rods and loosen the steering column lower clamp. If the car has an automatic transmission, disconnect the neutral switch wires. Refer to "Steering Wheel Replacement", and remove the steering wheel.

2. Remove the floor cover plate retaining screws and position both halves of the floor plate out of the way. Disconnect the steering column bracket.

On a car with a manual-shift transmission, remove the instrument panel cover at the column.

On a car with an automatic transmission, remove the selector or dial indicator.

3. After pulling out the steering column tube assembly, lift the bearing out of its housing.

4. Apply Lubriplate to the new bearing and place it in its housing. Position the steering column tube assembly and install the steering column bracket bolts loosely.

On a car with a manual-shift transmission, install the instrument panel cover.

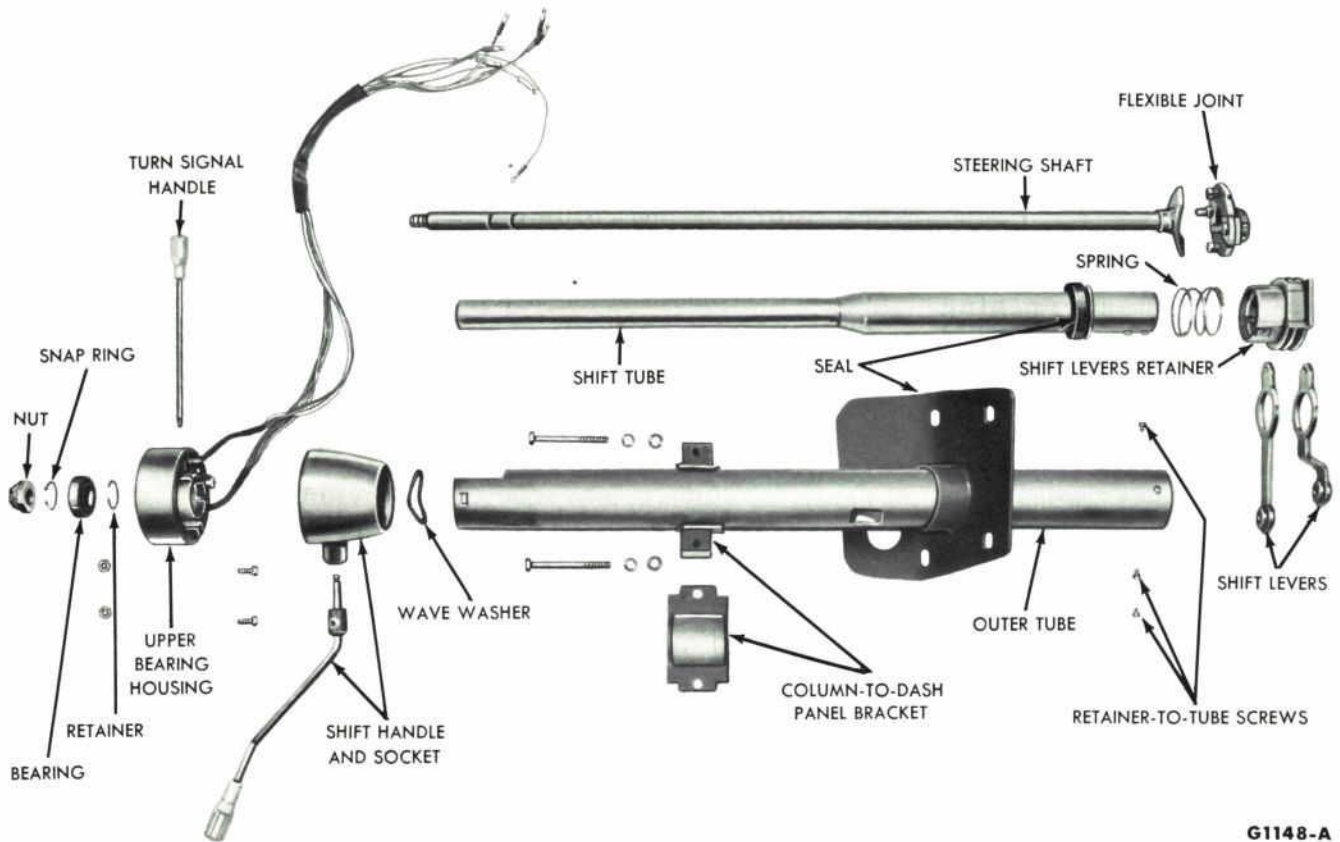
On a car with an automatic transmission, install the selector dial indicator and cover.

5. Position both halves of the floor plate and secure with the retaining screws. Position the insulation and floor mat. Position the bearing sleeve and spring. Install the steering wheel. The clearance between the steering wheel and the steering column tube must be within specifications. Tighten the column lower clamp.

6. Connect the neutral switch wires, and connect the shift levers.

On a car with a manual shift transmission, check the shift cross-over operation.

Torque the steering column bracket bolts to specifications.



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FIG. 14—Fairlane Steering and Shift Column Parts

THUNDERBIRD

1. Remove the steering wheel. Remove the plastic shift indicator dial, and then remove the turn indicator switch actuating arm. Lift the bearing retainer plate out of the steering column.

2. Remove the snap ring securing the bearing in the housing. Remove the turn indicator lever. Disconnect the steering upper shaft from the steering gear worm shaft, and pull up on the upper shaft until the steering column upper bearing is free of its housing.

3. Remove the rubber insulator from the bearing, and then remove the bearing from the upper shaft, using a suitable puller.

4. Place the bearing on the shaft and position the rubber insulator on the bearing. Push the shaft and bearing down until the bearing and insulator are positioned in the housing. Be sure that the steering shaft and worm shaft splines mate correctly.

5. Install the bearing snap ring, the retainer plate, and the turn

indicator lever. Install the switch actuating arm and shift indicator dial. Be sure that the dial is correctly aligned.

6. Install the steering wheel. Connect the upper shaft and the steering gear worm shaft.

FAIRLANE STEERING AND SHIFT COLUMN TUBES, LEVERS, AND SHAFT REPLACEMENT

1. Remove the nuts securing the shift rods to the shift levers. Remove the steering wheel. Using snap ring pliers, remove the steering shaft upper bearing snap ring. Remove the floor plate clamp screws at the steering column. Remove the right and left floor plate retaining screws and remove the right floor plate.

2. Slide the clip off the clutch rod to clutch pedal. Disconnect the turn signal wires at the harness connectors (left lower side of the steering column). Remove the bolts that secure the steering column assembly to the instrument panel.

3. Separate the left floor plate from the clutch rod. Slide the steer-

ing column assembly off the steering shaft. If the steering shaft is being replaced, remove the lower flexible joint clamp bolt and pull the shaft through the floor opening. Change the joint before installing the shaft in the vehicle.

4. On the bench, remove the screws (on the bottom of the outer tube) that secure the shift tube assembly to the outer tube. Remove the shift handle and pull the shift tube assembly out of the outer tube.

5. Align the shift levers and hold them in position, and then turn the shift lever retainer counterclockwise (as viewed from the bottom) until the levers, retainer and spring can be removed from the tube.

6. Remove the nuts securing the steering shaft upper bearing housing to the outer column tube. Pull the turn signal wires through the column as the housing is removed. Remove the shift handle bezel (socket) and the wave washer.

7. Clean all parts and inspect for burrs, cracks, scoring, corrosion, and proper fit. Use only new parts for replacement.

8. Place the wave washer and shift bezel (socket) on the outer tube (Fig. 14). Tape the turn signal harness wires to form a single cable. Insert a wire into the outer tube lower harness opening and route it up to the top opening through the column and shift bezel (socket). Tie the wire to the end of the turn signal harness and pull the harness through the lower opening.

9. Position the two bolts through the upper bearing housing holes from the under side. Start the nuts until they are flush with the bolt ends. Hold the bolts down so that the nuts bear against the housing. Position the housing on the outer tube with the bolt heads aligned with the slots in the tube. Tighten the nuts while holding the bolts down to force the bolt heads into the slots in the tube.

10. Lubricate the shift levers and retainer friction surfaces with Lubriplate or chassis grease and insert the shift levers into the retainer in their proper position (Fig. 14). Install the spring over the lower end of the shift tube. Align the shift levers with the corresponding lugs on the tube, and the retainer with the locking lug on the tube. Press the retainer and levers against spring tension onto the shift tube until clockwise rotation of the retainer will lock the retainer onto the tube.

11. Apply Lubriplate to the upper end of the shift tube. Position the felt seal and slide the shift tube into the outer column tube. Be sure that the lug on the shift tube indexes with the slot in the shift handle bezel (socket). Install the screws that retain the shift levers and retainer to the outer tube (Fig. 14).

12. Install the steering shaft and flexible joint. Install the steering and shift column assembly over the steering shaft. Start the cap and bolts that retain the column assembly to the instrument panel. Position the left and right floor-to-column plates and secure in place with the retaining screws. Be sure the clutch rod is inserted through the left plate and seal. In-

stall the steering shaft upper bearing retaining snap ring.

13. Position the horn ground brushes and install the steering wheel. Torque the nut to specifications and stake securely. Install the horn ring (or button). Torque the floor plate and column to clamp bolts to specifications. Install the turn signal and shift handles and check their operation for interference. Connect the turn signal wires. Connect and adjust the shift rods. Connect the horn wire.

THUNDERBIRD STEERING COLUMN REPLACEMENT

1. Remove the pivot bracket (Fig. 15), and remove the cotter pin and the steering shaft retaining spring pin. Disconnect the manual shift lever at the connecting rod. Disconnect the right and left supports from the track.

2. Remove both steering column opening shrouds at the instrument panel, and disconnect the wiring harness connectors. Remove the steering wheel and the steering column upper bearing. Remove the steering column track to pedal support bolts (Fig. 16).

3. Remove the steering column opening cover plate screws and pull the plate loose. Remove the stop bracket (Fig. 16) and the



FIG. 15—Moveable Column

detent spring. Pull the column out part way so that the track is on the passenger side of the instrument panel. Then remove the track by sliding it out to the right. If necessary, loosen the column lower bracket. Remove the steering column.

4. Position the steering column assembly in the car, mating the sleeve splines with the worm shaft splines. Be sure the wheels are straight ahead. Position the track in the movable column assembly and install the stop bracket and the detent spring. Be sure the two assist coil springs are in position.

5. Position the steering column

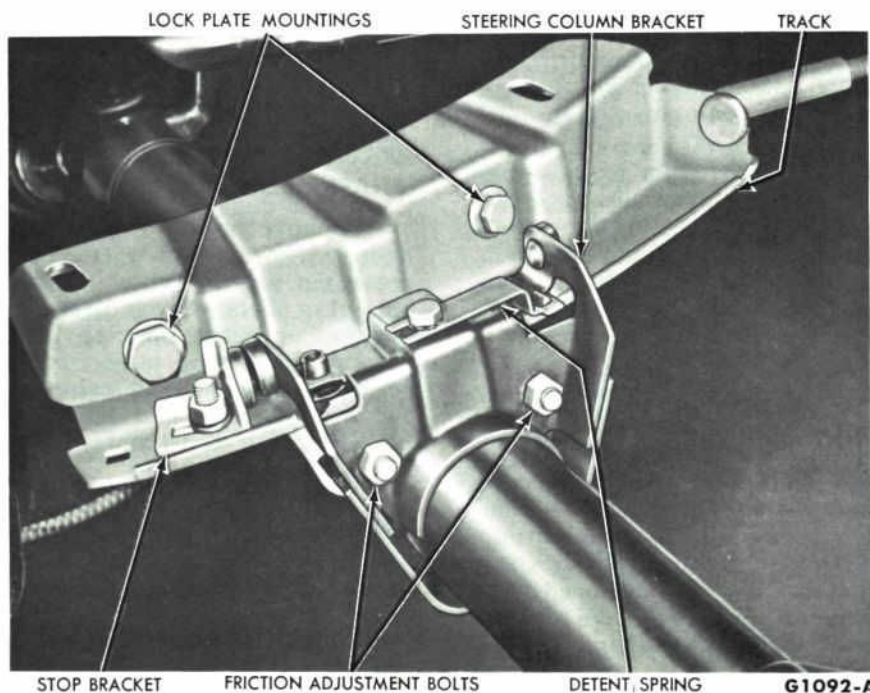


FIG. 16—Moveable Steering Column Adjustments

opening cover plate and secure with the retaining screws. Install the track to pedal support bolts. Connect the wiring harness connectors, and check the operation of all electrical circuits routed

through the harness. Install the steering column upper bearing and the steering wheel.

6. Install the steering column shrouds at the instrument panel. Install the steering shaft retaining

pin and cotter pin, and connect the gear shift lever. Install the pivot bracket clamp. Check the operation of the column to be sure that it locks, unlocks, and moves properly.

3 STEERING GEAR

REMOVAL

FAIRLANE, GALAXIE AND THUNDERBIRD

1. Raise the front of the car and install safety stands. On a car with power steering, remove the power steering cylinder mounting bracket from the frame. Remove the sector shaft arm from the steering gear housing. If necessary, disconnect the muffler inlet pipe.

2. Remove the flexible joint clamp bolts. Remove the steering gear housing attaching bolts and remove the steering gear.

FALCON

1. Raise the front of the car and install safety stands. Remove the steering gear attaching bolts and disconnect the transmission shift rod(s) at the gear shift lever(s). Pull the rubber seal up on the steering column, fold the floor mat aside, and move the dash panel insulation out of the way.

2. Remove the retaining screws from the steering column weather seal on the dash panel. Remove the steering column cover plates and gasket. Disconnect the horn and turn indicator wires under the instrument panel. Also, on a car with a Fordomatic transmission, disconnect the neutral switch wires.

3. Remove the horn ring (or button) and spring. Remove the steering wheel retaining nut and the steering wheel. Remove the upper bearing sleeve and spring.

4. Remove the steering column clamp to instrument panel bolts and remove the clamp (upper and lower halves) and the insulator. Slide the steering column tube assembly from the steering gear shaft, guiding the shift lever(s) up through the rubber seal at the dash panel. Remove the steering gear and shaft assembly out through the engine compartment.

INSTALLATION

FAIRLANE, GALAXIE, AND THUNDERBIRD

1. With the steering wheel spokes aligned and the worm shaft in mid-position, place the worm gear shaft into the flexible coupling and install the mounting bolts. Torque the bolts to specifications.

2. With the wheels straight ahead, connect the sector shaft arm. Install the power cylinder bracket, if so equipped. If necessary, connect the muffler inlet pipe. Torque the bolts to specifications. Install the flexible joint clamp bolt. Torque the bolt to specifications.

FALCON

1. Position the steering gear and shaft, and loosely install the steering gear mounting bolts. Position the steering column tube and attaching parts, and loosely install the mounting bracket bolts at the instrument panel. Torque the steering gear mounting bolts to specifications.

2. Position the sector shaft arm and secure it in place with the nut. Torque the nut to specifications. Position the upper bearing sleeve and spring. Apply Lubriplate to the upper surface of the steering shaft upper bearing and the horn switch brush plates. Install the steering wheel.

3. Adjust the position of the steering column tube for the specified clearance between the steering wheel and the steering column tube. Install the steering column opening cover plates, and position the insulation, floor mat, and grommet.

4. Lower the car and torque the steering column upper and lower clamp bolts to specifications. Connect the shift lever, and neutral

switch wires. Check the neutral switch operation. Turn the steering wheel to the left to move the ball nut below the filler hole and fill the steering gear with the specified lubricant. Fill the gear until lubricant comes out of the housing cover lower bolt hole. Install the filler plug and the cover bolt. Torque the bolt to specifications.

DISASSEMBLY

FALCON, FAIRLANE, AND GALAXIE

1. Rotate the steering or worm shaft the number of turns given in Part 6 Specifications. Remove the sector adjusting screw lock nut and the housing cover bolts. Lift the sector shaft and cover from the housing. Remove the cover from the shaft by turning the screw clockwise. **Keep the shim with the screw.**

2. Loosen the adjuster nut, and remove the adjuster assembly and the steering shaft upper bearing. Carefully pull the steering (or worm) shaft and ball nut from the housing, and remove the steering (or worm) shaft lower bearing. **To avoid possible damage to the ball return guides, keep the ball nut from running down to either end of the worm. Disassemble the ball nut only if there is an indication of binding or tightness.**

3. Remove the ball return guide clamp and the ball return guides from the ball nut. **Keep the ball nut clamp side up until ready to remove the balls.** Turn the ball nut over, and rotate the worm shaft from side to side until all the balls have dropped out of the nut into a clean pan. With the balls removed, the ball nut will slide off the worm. **Remove bearing cups, seals, or bushings only if preliminary inspection shows damage.**

4. Place the bearing adjuster in a vise, and remove the upper

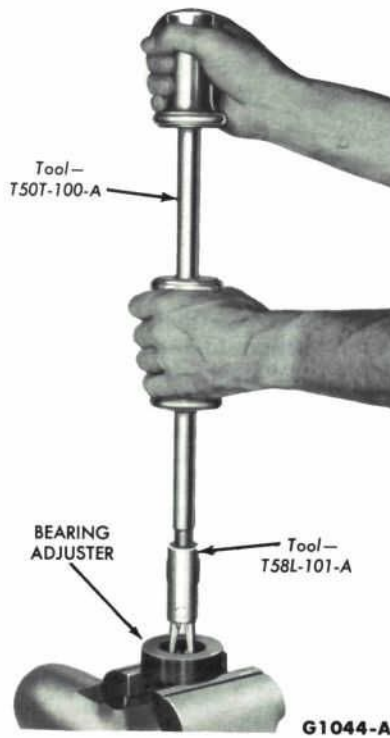


FIG. 17—Steering Shaft Upper Bearing Cup Removal

bearing cup (Fig. 17). The lower bearing cup is removed with the same puller. Press both sector shaft bushings or bearings out of the housing (Fig. 18 or 19).

CLEANING AND INSPECTION

Wash all parts in a cleaning solvent, and dry with a lint-free

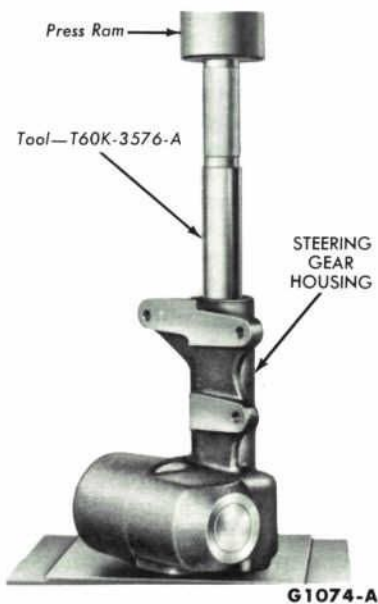


FIG. 18—Sector Shaft Bearing Removal

cloth. The bearings should not be spun dry with compressed air. Inspect the shaft and worm for scoring, cracks, or checks, and for straightness of the shaft. Check the splines on the worm shaft and sector shaft for nicks, burrs, or scoring. Inspect the gear teeth for scoring, pitting, or chipping. Check the bearings for free movement, and the cups for scoring or irregular surfaces. Check the housing for cracks and the caged needle bearings (Galaxie and Fairlane) for scoring, pitting, or other damage. Check the bushings (Falcon) for scoring, pitting, or other damage.

ASSEMBLY

1. If the sector shaft bushings (Falcon) or caged needle bearings (Galaxie and Fairlane) have been removed, press new parts into the housing (Fig. 20 or 21). Apply steering gear lubricant B8A-19578-A to the caged bearings. If the steering shaft upper and/or lower bearing cups were removed, press new bearing cups into the housing (Fig. 22 or 23).

2. If the seal in the bearing adjuster was removed, install a new seal. Lay the steering shaft on a bench, and position the ball nut

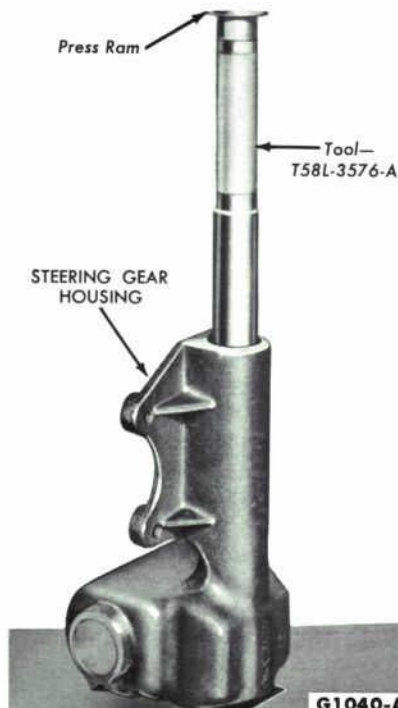


FIG. 19—Sector Shaft Bearing Removal

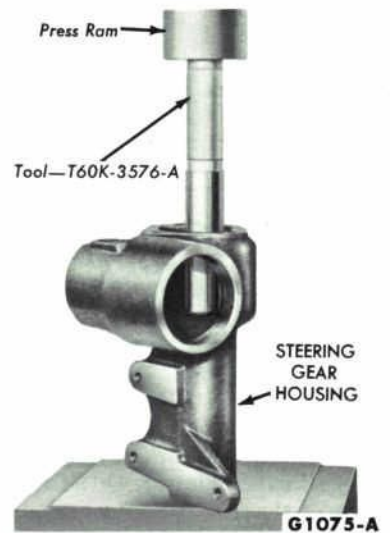


FIG. 20—Sector Shaft Bushing Installation

on the shaft with the guide holes up and the shallow end of the teeth to the left of the steering wheel position. Align the grooves in the worm and in the ball nut by sighting through the ball guide holes.

3. Take half the balls, and drop as many of them as possible into one of the guide holes, slowly turning the worm away from the hole, until that circuit is full or until rotation is stopped by the end of the worm. If the balls are stopped by the end of the worm, hold those already positioned in the circuit, and turn the worm in the opposite direction. The filling of the circuit can then be continued until most of the balls are in place.

4. Lay one half of the ball return guide on the bench, and place the remaining balls in it. Position the second half of the guide and, while holding the two halves together, plug each open end with multi-purpose lubricant so the balls will stay in the guide when it is installed.

5. Push the guide into the guide holes of the ball nut, tapping lightly with the wooden handle of a screwdriver if necessary. Assemble the second ball return circuit in the same manner. Install the ball return guide clamp, and check the ball nut to see that it rotates freely.

6. Coat the threads of the steering shaft bearing adjuster, the housing cover bolts, and the sector adjusting screw with a suitable oil resistant sealing com-

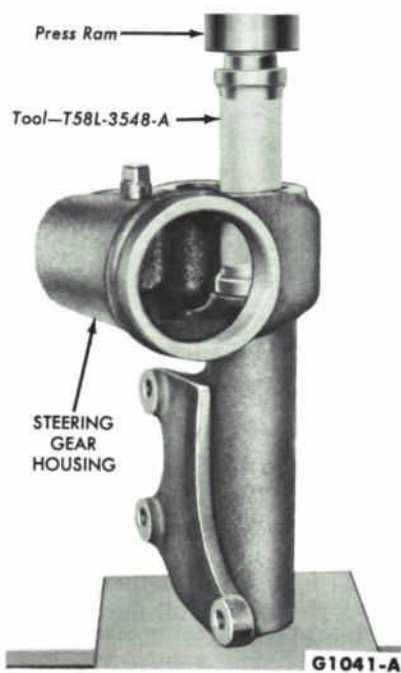


FIG. 21—Sector Shaft Bearing Installation

pound. Do not apply sealer to female threads, and especially avoid getting any sealer on the steering shaft bearings. Coat the bearings and gear teeth with steering gear lubricant.

7. Clamp the housing in a vise, with the sector shaft axis horizontal, and position the worm gear lower bearing in its cap. Position the steering or worm shaft and upper bearing on the top of the worm, and install the steering or worm shaft bearing adjuster and the adjuster nut. Leave the nut loose.

8. Install the steering wheel nut (or an 11/16 twelve point socket

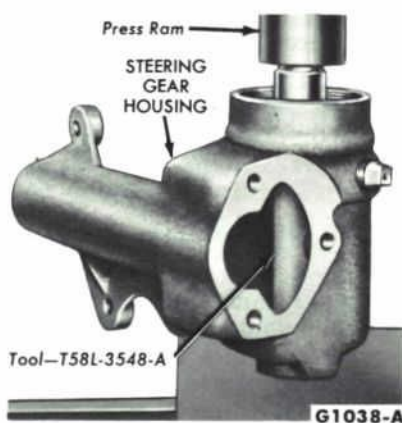


FIG. 22—Lower Bearing Cup Installation

on a worm gear used with a flexible joint) on the steering shaft and adjust the worm bearing preload to specifications using an inch-pound torque wrench. New steering gear assemblies are factory-adjusted to specifications. Place the sector adjusting screw and shim in position and check the end clearance. If the end clearance between the screw head and the end of the sector shaft is not within specifications, replace the shim.

9. Start the sector shaft into the housing cover. Insert a screwdriver through the hole in the cover and turn the adjusting screw counterclockwise to pull the gear into the cover. Place a new gasket on the housing cover.

10. Rotate the steering (or worm) shaft until the ball nut teeth are in position to mesh with the sector gear. Tilt the housing so that the ball nut will tip toward

the housing cover opening. Push the housing cover and sector shaft assemblies into place, and install the housing cover bolts. Do not tighten the cover bolts until it is certain there is some lash between the ball nut and the sector (or worm) gear. Torque the cover bolts to specifications.

11. After loosely installing the sector shaft adjusting screw lock nut, adjust the sector shaft mesh (backlash) to specifications. Turn the steering wheel to the left to move the ball nut below the filler hole, and fill the steering gear with specified lubricant. Fill the gear until lubricant comes out of the housing cover lower bolt hole. Install the filler plug and the cover bolt. Torque the bolt to specifications.

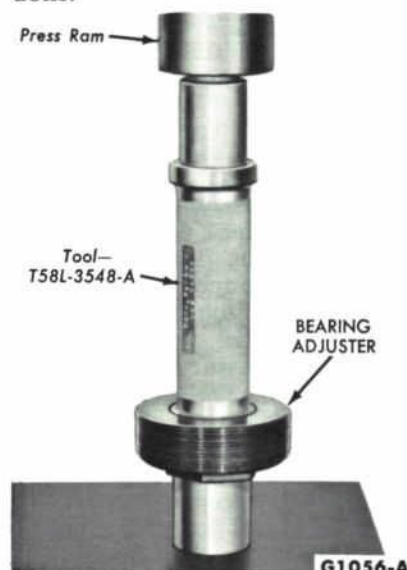


FIG. 23—Upper Bearing Cup Installation

4 PUMP AND FLUID RESERVOIR

On cars without air conditioning, the reservoir is mounted on the pump. On cars with air conditioning, the reservoir is mounted on the left fender apron.

PUMP AND FLUID RESERVOIR REMOVAL

GALAXIE MILEAGE MAKER SIX ENGINE

1. Using a suction gun, remove as much fluid as possible from the reservoir. Disconnect the hoses at the reservoir and at the

pump. If the reservoir is to be replaced, remove it from the fender apron.

2. Loosen and remove the pump belt. Remove the pivot bolt and the adjusting bolt, and lift out the pump, reservoir, and bracket.

ALL V-8 ENGINES

1. Using a suction gun, remove as much fluid as possible from the reservoir. Disconnect the hoses at the pump, and fasten

them in a raised position to prevent fluid from draining.

2. Loosen and remove the pump belt. Remove the pivot bolt and the adjusting bolt, and lift out the pump, reservoir, and bracket.

PUMP AND FLUID RESERVOIR INSTALLATION

GALAXIE MILEAGE MAKER SIX ENGINE

1. Position the pump and bracket in the engine compart-

ment, and install the adjusting bolt and the pivot bolt finger-tight. Position the pump belt, and check the alignment of the crankshaft and pump pulleys. If the pulleys are not aligned, the pump may be incorrectly installed, or spacers may be necessary.

2. Adjust the belt tension. If the reservoir was removed, position it and the mounting bracket on the fender apron, and install the mounting bolts and nuts. Torque the nuts to specifications. Replace the cover gasket.

3. Connect the lines at the pump and at the reservoir. Fill the reservoir to a point 1/4-inch from the top. Start the engine and operate it at idle speed for about 2 minutes to warm the fluid in the power steering system. Cycle the steering wheel full right and full left several times and check for leaks.

4. Increase the engine speed to about 1000 rpm, and cycle the steering wheel full right and full left several times. Stop the engine, and check the pump, reservoir, and hose connections for fluid leaks. Check the fluid level, and add additional fluid to the reservoir if necessary.

ALL V-8 ENGINES

1. Position the pump, reservoir, and bracket in the engine compartment, and install the mounting bolts finger-tight. Position the pump belt, and check the alignment of the crankshaft and pump pulleys. If the pulleys are not aligned, the pump may be incorrectly installed, or spacers may be necessary. Adjust the belt tension.

2. Connect the hoses at the pump and fluid reservoir. Fill the reservoir to the F mark on the dip stick. Be sure that the cover is seated evenly and tightly around the edge of the reservoir.

3. Start the engine and operate it at idle speed for about 2 minutes to warm the fluid in the power steering system. Cycle the steering wheel full right and full left several times, and check the system for leaks.

4. Increase the engine speed to about 1000 rpm, and cycle the steering wheel full right and full

left several times. Stop the engine and check the pump, reservoir, and hose connections for fluid leaks. Check the fluid level, and add fluid if necessary.

PUMP DISASSEMBLY

All parts must be handled carefully to avoid nicking, burring, or scratching which could make the parts unfit for use.

1. Drain as much of the remaining fluid from the pump and reservoir as is possible, and then clamp the pump adjusting bracket in a vise. Remove the retaining nut and lift the cover off the reservoir. Remove the reservoir retaining nut and the reinforcement from inside the reservoir (Fig. 24) and lift the reservoir off the pump.

2. Remove and discard the O-rings from the top of the pump. Remove the retaining nut, and slide the pulley and pulley key off the carrier shaft. Remove all the bolts from the pump and separate the bracket, pump housing, and housing cover. If the parts do not pull apart easily, tap them gently with a soft hammer to loosen them. Lift the cover vertically from the housing to prevent internal parts from falling out.

3. Remove the O-rings from the flow director and the carrier insert (Fig. 25). Using a feeler gauge and a straight-edge, check the end clearance of the carrier and the rollers in the pump housing (Fig. 26). If the clearance is not within specifications, replace the worn

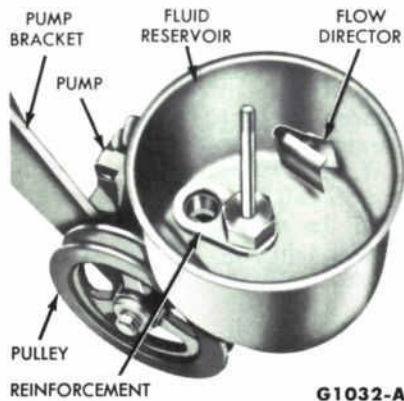


FIG. 24—Fluid Reservoir

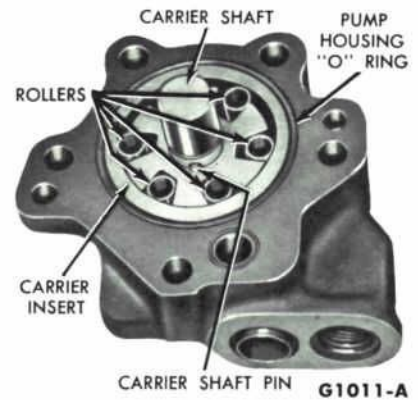


FIG. 25—Pump Housing, Carrier, and Shaft

parts. Do not replace a roller, carrier, or insert individually. A repair kit is available for servicing these parts, and all parts of the kit must be used.

4. Lift the rollers out of the housing, and carefully pull out the carrier and shaft to avoid damage to these parts or the oil seal. Remove the carrier insert only for replacement. Expand the carrier retaining ring and slip it off carefully to avoid scratching the shaft. Slide the carrier off the shaft and push the carrier shaft pin out of the carrier shaft (Fig. 25).

5. Remove the relief valve retainer (Fig. 27) from the housing cover, and remove the O-ring from the retainer. Lift the valve spring out of the valve bore and slide the valve out. If the valve does not slide out, tap the cover with a soft hammer. Do not scratch or nick the valve when removing it from the cover.

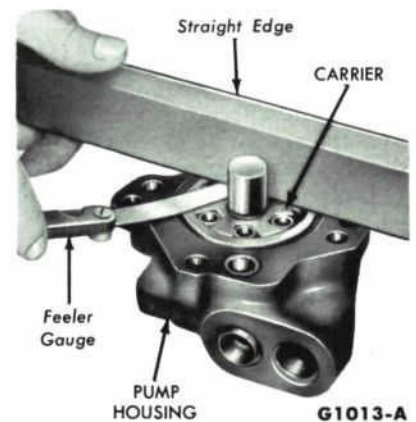


FIG. 26—End Clearance Check

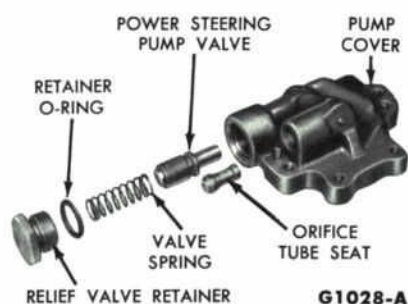


FIG. 27 — Pump Cover

PUMP CLEANING AND INSPECTION

Wash all pump and reservoir parts in cleaning solvent and then wipe dry with a lint-free cloth. Inspect the pump housing and cover for nicks or scoring caused by the rotation of the rollers and carrier. Check the carrier shaft bushings in the housing and the cover for metal pick up, nicks, or scoring. If bushing damage is apparent, the housing and/or cover must be replaced.

Inspect the carrier, shaft, and rollers for nicks, burrs, scoring, or distortion. Replace all parts found to be defective. Do not replace a roller, carrier or insert individually. A repair kit is available for servicing these parts, and all parts of the kit must be used.

Inspect the valve for scoring or burrs. Crocus cloth may be used to remove burrs from the valve. When removing burrs, care should be taken to avoid rounding the sharp corners. Inspect the valve bore for scratches or galling. With the valve and valve bore dry, check the valve for freedom of movement in the valve bore. The valve should drop into the valve bore of its own weight.

Inspect the carrier shaft seal in the pump housing for nicks, metal pick up, or scoring. If the seal is damaged it must be replaced.

CARRIER SHAFT SEAL REPLACEMENT

1. Carefully remove the seal with a punch, avoiding damage to the shaft bushing. Coat the lip

of a new seal with Lubriplate or an equivalent lubricant.

2. Position the seal in the bore of the housing. The lip of the seal must face toward the pump housing carrier chamber. Press the seal into the housing (Fig. 28) until it seats firmly and evenly against the shoulder in the bore.

ORIFICE TUBE SEAT REPLACEMENT

If damage or leakage makes replacement of the seat necessary, use the following procedure.

1. Tap the existing hole in the seat, using a starting tap of suitable size. Be sure to remove all metal chips from the seat port after tapping. Place a nut and large flat washer on a bolt of the same size as the tapped hole. The washer must be large enough to cover the seat port.

2. Insert the bolt in the tapped hole and, using it as a puller, remove the seat. Place a new seat in the port, and thread a bolt of suitable size in the port. Tighten the bolt enough to bottom the seat in the port.

PUMP ASSEMBLY

Before assembling the pump and reservoir, coat all parts with automatic transmission fluid. If the carrier insert is to be replaced, the new insert must be installed so that the slot in the edge of the insert engages the small pin in the pump housing.

1. Position the key and slide the pulley on the shaft. Place the washer on the shaft and install the retaining bolt finger-tight. To avoid damaging the oil seal in the housing cover, coat the shaft with automatic transmission fluid. Then carefully insert the shaft (with pulley attached) through the housing. Position the carrier shaft pin, and slide the carrier onto the shaft. Install the retaining ring and the rollers.

2. Place a new O-ring, pre-soaked in automatic transmission fluid, in the groove around the insert in the pump housing, and install a new flow director O-ring in the face of the housing (Fig. 25). Secure the cover to the pump housing.

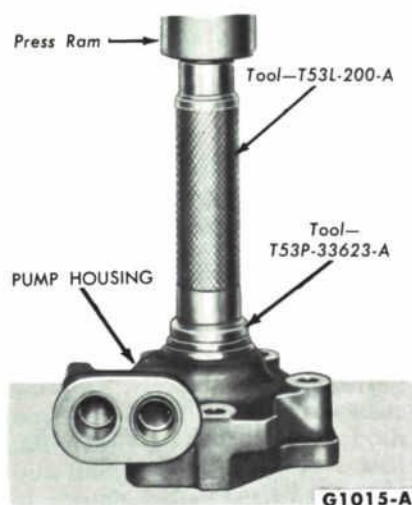


FIG. 28—Carrier Shaft Seal Installation

3. Remove the pulley retaining bolt and pull the washer, pulley, and key from the carrier shaft. To avoid damage to the seal, be sure the shaft does not move back and forth in the housing. Place the valve assembly spring in the bore, install a new O-ring on the pump valve retainer, and install the retainer in the pump housing. Torque the retainer to specifications.

4. Clamp the adjusting bracket in a vise, and install the pump on the bracket. Torque all bolts to specifications. Position the key, slide the pulley and washer on the shaft, and install the retaining bolt. Torque the retaining bolt to specifications. The carrier shaft should turn freely when the bolt is properly tightened.

5. Place new O-rings, pre-soaked in automatic transmission fluid, in the grooves on top of the pump housing. For a Galaxie 6-cylinder engine, install the reservoir adapter, and torque the nut to specifications. For all V-8 engines, hold the reservoir on the pump housing and install the reinforcement in the reservoir. The ears on the reinforcement should be facing upward over the outer hole in the reservoir.

6. Position a new cover gasket around the inside of the cover. Install the cover and retaining bolt on the reservoir and tighten the retaining bolt. The cover must be seated evenly and tightly on the reservoir.

5 CONTROL VALVE

REMOVAL

1. Disconnect the 4 fluid line fittings at the control valve, and drain the fluid from the lines. Turn the front wheels to the left and right several times to force all the fluid from the system. Loosen the clamping nut and bolt at the right-hand end of the sleeve.

2. Drive the roll pin from the steering arm to idler arm rod through the slot in the sleeve. Remove the control valve ball stud nut. Using the puller shown in Fig. 29, remove the ball stud from the sector shaft arm. Turn the front wheels fully to the left and unthread the control valve from the steering arm to idler arm rod.

INSTALLATION

1. Thread the valve onto the steering arm to idler arm rod until about four threads are still visible on the rod. Position the ball stud in the sector shaft arm. Measure the distance between the center of the grease plug in the sleeve and the center of the stud at the inner end of the left-hand spindle connecting rod (Fig. 30). Be sure that the measurement is taken parallel to the centerline of the control valve.

2. If the distance is not within specifications, disconnect the ball stud from the sector shaft arm and turn the valve on the steering arm to idler arm rod to increase or decrease the distance. When the correct distance is obtained and the ball stud is positioned in the sector shaft arm, align the



FIG. 29—Control Valve Ball Stud Removal

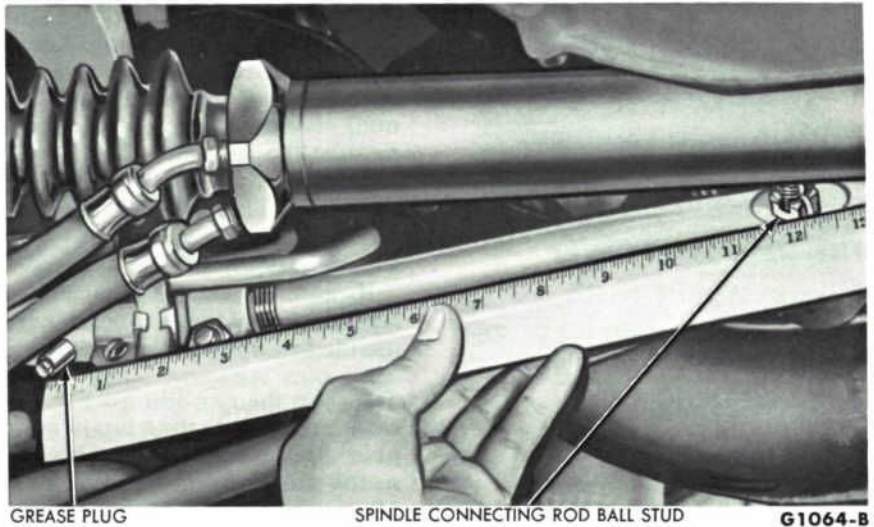


FIG. 30—Valve Installation Measurement

hole in the steering arm to idler arm rod with the slot near the end of the valve sleeve. Install the roll pin in the rod hole to lock the valve in position on the rod. Torque the valve sleeve clamp bolt to specifications.

3. Install the nut on the ball stud. Torque the nut to specifications. Install a new cotter pin. Connect the fluid to the control valve, and tighten all fittings securely. Do not over-tighten.

4. Fill the fluid reservoir with the specified fluid to the F (full) mark or to a point 1/4 inch from the top. Start the engine and operate it at idle speed for about two minutes to warm the fluid in the power steering system. Turn the steering wheel full left and full right several times, and check system for fluid leaks.

5. Increase the engine speed to about 1000 rpm, and turn the steering wheel full left and full right several times. Stop the engine and check the control valve and hose connections for fluid leaks. Check the fluid level, and re-fill the reservoir if necessary. Refer to "Steering Wheel Replacement", and check the pull required to turn the steering wheel in both directions.

DISASSEMBLY

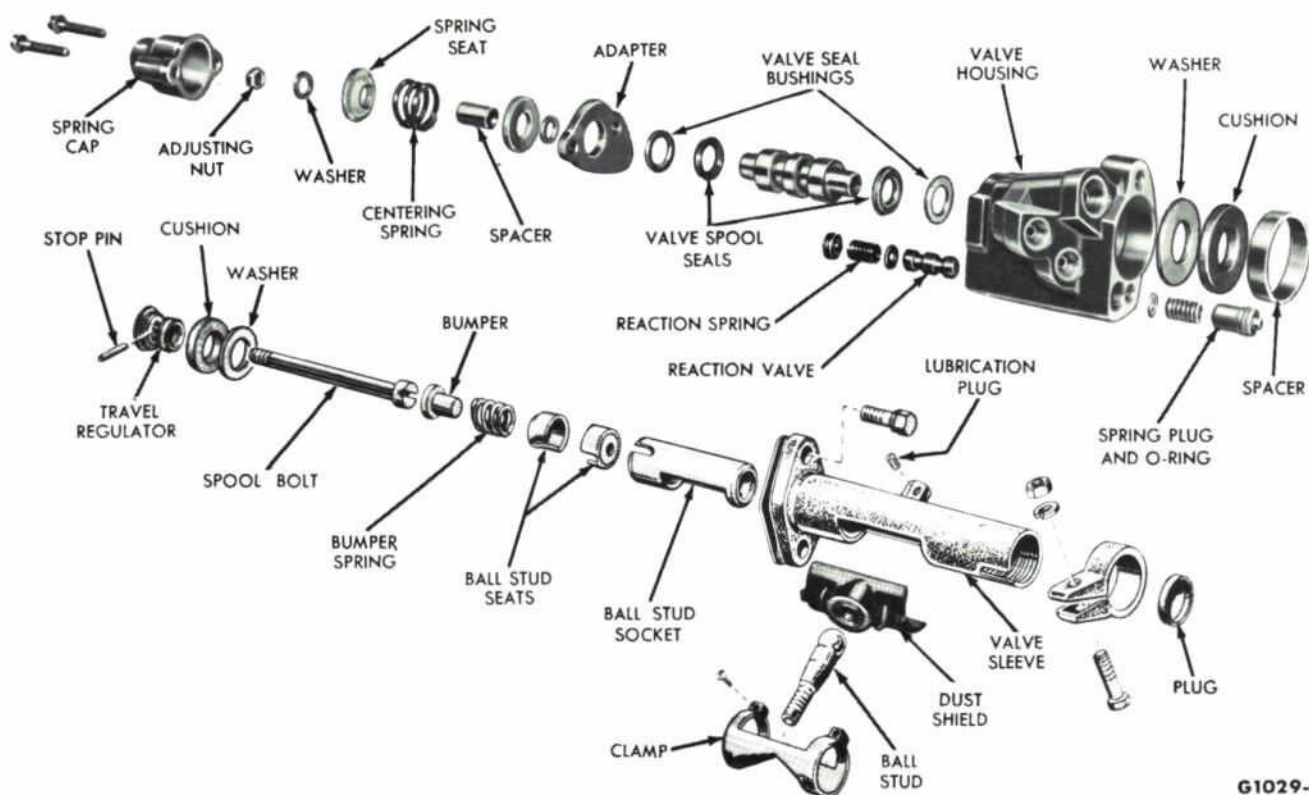
1. Wipe all fluid and loose dirt from the outside of the control

valve. Remove the centering spring cap retaining bolts and lift the cap off the valve housing (Fig. 31). When holding the control valve for disassembly, use a soft-jawed vise, and clamp the valve only around the sleeve flange to prevent damage to the housing, spool, or sleeve.

2. Remove the nut from the end of the valve spool bolt. Remove the washers, spacer, rubber cushion, centering spring, adapter, and bushing from the bolt and the valve housing. Remove the bolts that hold the valve housing and the sleeve together, and separate the housing from the sleeve. Pull the plug from the valve sleeve.

3. Push the valve spool out of the centering spring end of the valve housing, and lift the seals from the spool. Lift the rubber cushion, spacer, bushing, and seal out of sleeve end of the valve housing. Drive the stop pin out of the travel regulator stop with a punch and hammer (Fig. 32). Pull the head of the valve spool bolt tightly against the travel regulator stop before driving the pin out of the stop.

4. Turn the travel regulator stop counterclockwise in the valve sleeve to remove the stop from the sleeve. Remove the valve spool bolt, spacer, and rubber washer from the travel regulator stop. Lift the rubber boot and clamp off the valve sleeve. Slide the



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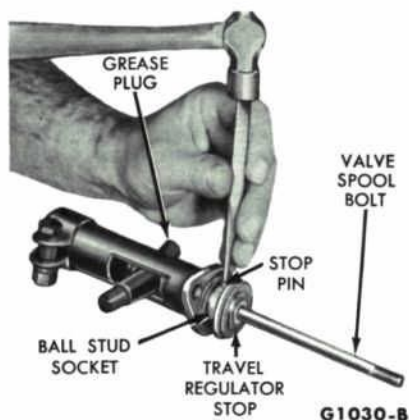
FIG. 31—Control Valve and Sleeve

bumper, spring, and ball stud seat out of the valve sleeve, and remove the ball stud socket from the sleeve.

5. Remove the return port hose seat and remove the return port relief valve. Remove the spring plug and O-ring and remove the reaction limiting valve (Fig. 33).

CLEANING AND INSPECTION

Wash all control valve parts in a cleaning solvent, and wipe them dry with a lint-free cloth. Inspect



G1030-B

FIG. 32—Stop Pin Removal

the valve seals and bushing for scoring, nicks, and scratches. Examine the lips of the seals carefully for nicks or scratches that could allow fluid to escape from the valve.

Examine the bushings for nicks or scores. Inspect the valve housing and spool carefully for burrs or scoring. Burrs may be removed with crocus cloth. Be careful not to round off the sharp edges of the spool with the crocus cloth because the operation of the valve may be affected.

If the spool or the inside of the housing is badly scored, the valve assembly should be replaced. Use a small brass rod and check the ball in the return port relief valve for free movement. Dry the spool and housing thoroughly, and insert the valve into the housing. The spool should fall freely of its own weight in the housing. The clearance between the spool and housing must be within specifications.

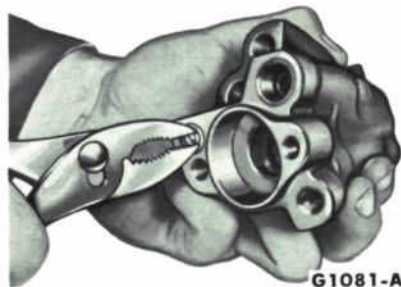
Inspect the mating surfaces of the ball stud socket and the valve sleeve for scratches, scoring, or nicks. Minor burrs and scores may be removed with crocus cloth. Check the fit of the socket in the sleeve. The socket should

slide freely in the sleeve.

TUBE SEAT REPLACEMENT

If a hose seat is worn or damaged, it should be replaced. It can be removed with an Easy-Out tool, or by using a bolt of appropriate size as a puller.

1. Tap the existing hole in the hose seat, using a starting tap of suitable size. Be sure to remove all metal chips from the hose seat port after tapping. Place a nut and large flat washer on a bolt of the same size as the tapped hole. The washer must be large enough to cover the hose seat port.



G1081-A

FIG. 33—Reaction Valve Plug Removal

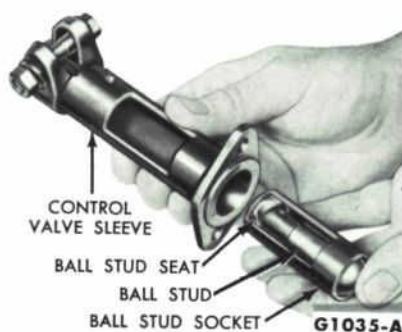


FIG. 34—Ball Stud, Seal, and Socket Installation

2. Insert the bolt in the tapped hole, and using the nut as a puller, remove the hose seat. Place a new hose seat in the port, and thread a bolt of suitable size into the port. Tighten the bolt enough to bottom the seat in the port.

ASSEMBLY

Before assembling the control valve, coat all parts with Ford Automatic Transmission Fluid.

1. Install the reaction limiting valve, spring, and plug. Insert the return port relief valve and hose seat in the bore. Insert one of the ball stud seats (flat end first) into the ball stud socket, and insert the threaded end of the ball stud into the socket.

2. Place the socket in the control valve sleeve so that the threaded end of the ball stud can be pulled out through the slot in the sleeve (Fig. 34). Place the other ball stud seat, spring, and bumper (Fig. 31) in the socket. Install one rubber cushion, the flat washer, and the travel regulator stop on the spool bolt. Securely tighten the travel regulator stop into the socket.

3. Loosen the stop just enough to align the nearest hole in the stop with the slot in the ball stud socket, and install the stop pin in the ball stud socket, travel regulator stop, and valve spool bolt (Fig. 32). Position the rubber boot, clamp, and plug on the control valve sleeve. Make sure that the lubrication fitting is turned on tightly and does not bind on the ball stud socket.

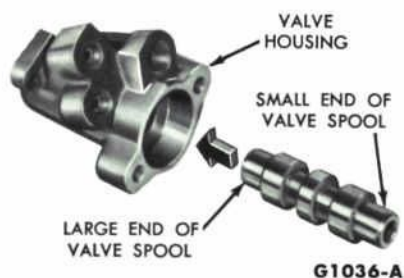


FIG. 35—Valve Spool Installation

4. Insert the valve spool in the valve housing so that the large end of the spool (the grooved valley end of the spool) will be at the centering spring end of the housing and the small end of the spool (both ends are the same size on Fairlane) will face the sleeve end of the housing (Fig. 35). Rotate the spool while inserting it in the housing.

5. Move the spool toward the centering spring end of the housing, and place the small seal, bushing, flat washer, rubber cushion, and spacer in the sleeve end of the housing. Press the valve spool against the inner lip of the seal and at the same time, guide the lip of the seal over the spool with a small screwdriver. Do not nick or scratch the seal or the spool during installation.

6. Place the sleeve end of the housing on a flat surface so that the seal, bushing, and spacer are at the bottom end, and push down on the valve spool until it stops. Carefully install the spool seal and bushing in the centering spring end of the housing around the large end of the spool. Press the seal against the end of the spool, guiding the seal over the spool with a small screwdriver. Do not nick or scratch the seal or the spool during installation.

7. Pick up the housing and slide the spool back and forth in the housing to check for free movement. Place the valve sleeve on the housing so that the ball stud is on the same side of the housing as the ports for the two power cylinder lines. Install the bolts in the sleeve and torque them to specifications.

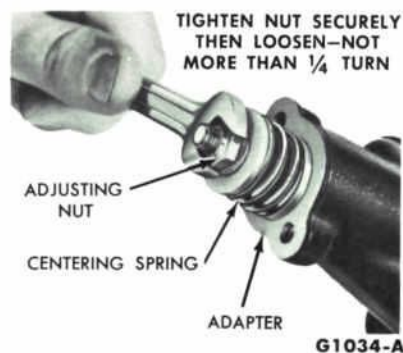


FIG. 36—Centering Spring Adjustment

8. Place the adapter on the centering spring end of the housing, and install the bushing, washers, spacers, and centering spring on the valve spool bolt. Compress the centering spring, and install the nut on the bolt. After tightening the nut securely, loosen it not more than 1/4 turn (Fig. 36). Excessive tightening of the nut may break the stop pin at the travel regulator stop.

9. Move the ball stud back and forth in the sleeve slot to check the spool for free movement. Control valve travel must be within specifications. Apply COAZ-19553-A (silicone) grease at the sealing areas. Install the centering spring cap on the valve housing. Torque the cap bolts to specifications.

10. Install the nut on the ball stud so that the valve can be positioned in a vise as shown in Fig. 37. Push forward on the cap end of the valve to check the valve spool for free movement. Turn the valve around in the vise, and push forward on the sleeve end to check the spool for free movement.

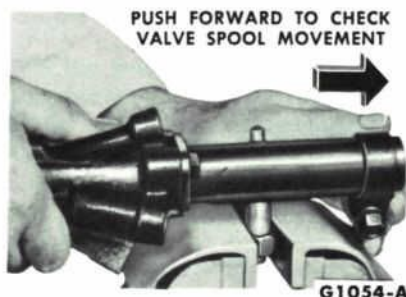


FIG. 37—Valve Spool Movement

6 POWER CYLINDER

REMOVAL

1. Remove the lines from between the power steering valve and the power cylinder. Move the front wheels to the left and right several times to force all the fluid from the power cylinder. Remove the nut, washer, and insulator (Fig. 38) from the outer end of the piston rod. Do not remove the rod from the idler arm bracket at this time.

2. Remove the lock nut that holds the cylinder mounting stud to the steering arm to idler arm rod. Pull the piston rod out of the bracket and remove the outer washer, bushing, and cylinder from the stud. Remove the boot, inner bushing, and washer from the stud, and pull the inner insulator and washer from the piston rod.

INSTALLATION

1. Install the inner washer and bushing on the mounting stud in the steering arm to idler arm rod. Install the inner insulator, washer, and boot on the power cylinder piston rod. Position the cylinder mounting stud into the steering arm-to-idler arm rod with the piston rod in its bracket. Install the outer bushing, washer, and lock nut on the mounting stud. Torque the nut to specifications.

2. Install the outer insulator, washer, and nut on the piston rod. Torque the nut to specifications. Connect the lines to the control valve, and tighten the fittings.

CLEANING AND INSPECTION

Clean the outside of the power cylinder and piston rod and wipe the parts dry. Inspect the cylinder and piston rod for cracks, distortion, or other visible damage. With the exception of the seals and the hose seats, the internal parts of the cylinder and the rod cannot be repaired or replaced. If either the cylinder or rod is damaged, or if the piston is leaking internally, the entire power

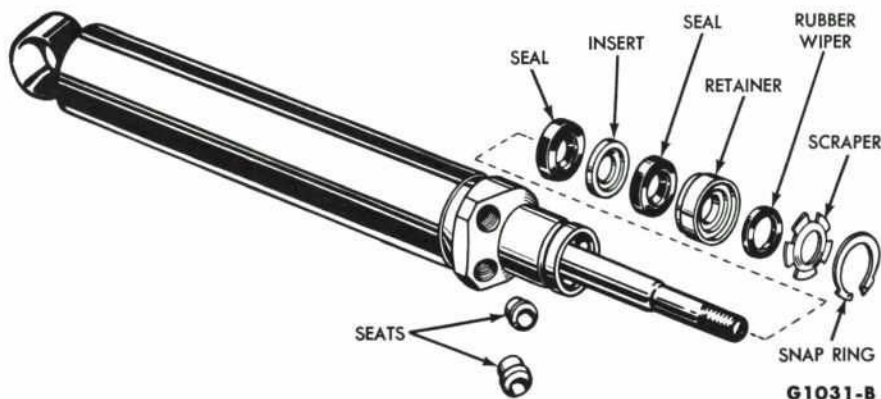


FIG. 38—Power Steering Cylinder

cylinder assembly must be replaced as a unit.

The cylinder seals and cylinder fitting seats are replaceable. Inspect the mounting bushings and insulators for cracks, scoring, or other visible damage. If the mounting bracket is cracked or otherwise damaged, replace it. Use a new rivnut and, after it is collapsed, spot weld it to the bottom of the frame at three points.

SEAL REPLACEMENT

When replacing the power cylinder seals, install all of the parts supplied in the repair kit.

1. Clamp the power cylinder in a vise, and using snap ring pliers, remove the snap ring from the end of the cylinder. Be careful not to distort or crack the cylinder in the vise. Pull the piston rod out all the way to remove the scraper, bushing, and seals. If necessary, apply compressed air to the ports in the other end of the cylinder to force the seals out of the cylinder.

2. Coat the new seals with lubricant C1AZ-19582-A and place the parts (Fig. 38) on the piston rod which has been coated with the same lubricant. Push the rod in all the way, and install the parts in the cylinder with a deep socket slightly smaller than the cylinder opening (Fig. 39). In-

stall the snap ring in the end of the cylinder.

HOSE SEAT REPLACEMENT

If either cylinder fitting seat is worn or damaged, both seats should be replaced. Remove the seats with an Easy-Out tool or by the following method.

1. Tap the hose seats with a tap of suitable size, and remove all metal chips from the hole. Place a nut and a flat washer, large enough to cover the seat port, on a bolt of appropriate size. Then insert the bolt in the tapped hole and turn it to pull the seat out of the port.

2. Position a new seat in the port, and thread a bolt of the same size into the port and tighten the bolt until the seat bottoms. Do not apply excessive torque, as a distorted tube seat orifice will limit oil flow and cause noise.

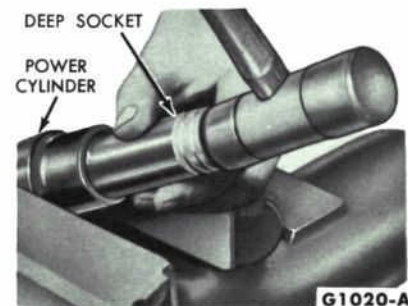


FIG. 39—Power Cylinder Seal Installation

7 THUNDERBIRD POWER STEERING GEAR

REMOVAL AND INSTALLATION

1. Loosen the nuts and disconnect the pressure and return lines from the steering gear housing. Plug the openings and cap the lines. Remove the pivot bracket upper mounting nut and flat washer, and remove the pivot bracket.

2. Remove the cotter pin and the steering shaft retainer pin (Fig. 15). Remove the sector shaft arm from the sector shaft. Remove the steering gear housing bolts and remove the gear.

3. Position the steering gear and install the retaining bolts. Torque the retaining bolts to specifications. Place the front wheels in the straight ahead position and attach the sector shaft arm to the sector shaft with the lock washer and nut. Torque the nut to specifications.

4. Lower the car and remove the plugs and caps from the pressure and return lines. Connect the pressure and return lines to the steering gear housing.

5. Install the steering shaft retainer pin and its cotter pin. Position the pivot bracket and torque the clamp bolts to specifications. Install the bracket upper mounting flat washer and nut. Torque the nut to specifications. Operate the engine at idle speed, cycle the steering wheel full right and full

left several times, and check for leaks. Do not hold the wheel against its stops. If the gear has been overhauled, adjust the position of the valve spool as follows:

VALVE SPOOL CENTERING

1. Operate the engine until the power steering fluid is at normal operating temperature. Rotate the steering wheel several times. With the engine idling, and the front wheels straight ahead, read the force necessary to make a right turn and a left turn (Fig. 40). The difference should not be more than 3 in-lbs or 1/2 pound at the wheel rim.

2. If the difference is more than 3 in-lbs (or 1/2 pound at the wheel rim), remove the valve spool adjuster cap (Fig. 41). Loosen the lock nut and turn the adjuster (using the tools shown in Fig. 42) in the direction of the lesser reading. Tighten the lock nut. For example: If a left turn requires a 7 in-lb pull, and a right turn requires a 12 in-lb pull turn the adjuster to the left until equal effort is required for a turn in either direction. Install the adjuster cap.

OVERHAUL

1. Drain the hydraulic fluid from the ports, and thoroughly clean the exterior of the unit with a suitable solvent. Place the unit on a stand adapter or in a vise for disassembly purposes. Using snap ring pliers, remove the cylinder plug snap ring. Use compressed air to remove the cylinder plug. Using snap ring pliers, remove the cylinder cap snap ring and lift the cylinder cap from the piston bore (Fig. 43). Remove and discard the O-ring from the cylinder cap.

2. Position a dial indicator against the piston. Locate the dial indicator shaft on the machined surface at the OD of the piston and set the dial at zero (Fig. 44). While holding the sector shaft firmly, push the piston by hand as far as it will go (Fig. 44). Maintain the hand pressure and note the indicator reading. If the



FIG. 40—Load Check

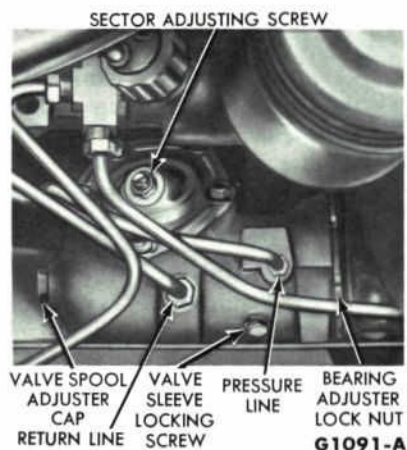


FIG. 41—Pressure and Return Lines

backlash is not within specifications, install a new piston rack when assembling the gear.

3. Turn the worm shaft all the way to the stop and back it off about one and three-quarters turns (Fig. 45). Loosen the sector shaft adjusting screw lock nut and adjusting screw. Remove the cap screws that retain the steering housing cover to the housing. Tap on the lower end of the sector shaft with a soft faced hammer until the sector shaft and cover can be removed (Fig. 46). Remove and discard the housing cover gasket. Slide the cover to one side to release the adjusting screw from the sector shaft, and remove the adjusting screw from the cover.

4. Push the piston out of the housing and remove the piston D-ring. Remove the piston rack bore O-ring (Fig. 47). Loosen

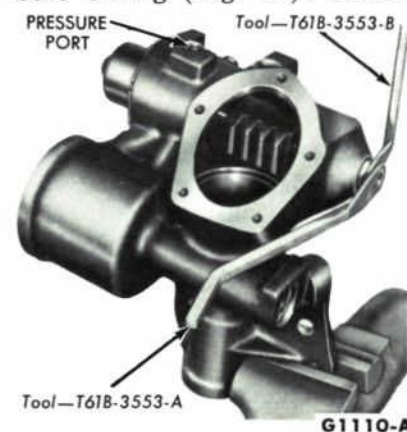


FIG. 42—Valve Spool Preliminary Centering

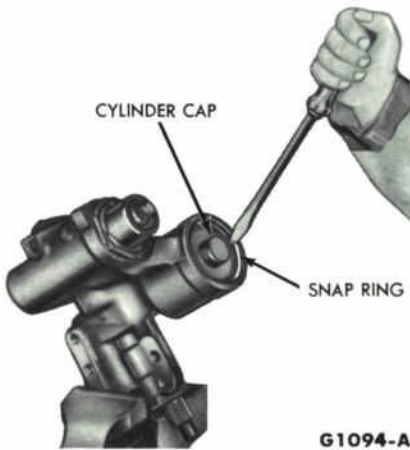


FIG. 43—Cylinder Cap Snap Ring Removal

the valve sleeve locking screw and remove the valve adjuster cap. Remove and discard the O-ring from the cap.

5. Remove the bearing adjuster lock nut and the bearing adjuster. Remove the torsion bar and sleeve assembly (Fig. 48) by lightly tapping on the lower end of the torsion bar with a soft-faced hammer. Remove the snap ring securing the sector shaft in the bore, and pull the seal from the bore (Fig. 49).

DISASSEMBLY, INSPECTION, AND ASSEMBLY OF TORSION BAR AND SLEEVE

1. Place the ball nut assembly in a vise. Use a clean cloth between the assembly and the jaws of the vise to protect the ball nut assembly from damage. Pull the valve spool sleeve from the torsion bar assembly (Fig. 50). Remove and discard the O-ring from the sleeve.



FIG. 44—Piston Backlash Check



FIG. 45—Load Check

2. Remove the valve spool adjuster lock nut from the lower end of the torsion bar and remove the valve spool adjuster from the torsion bar. Pull the torsion bar, valve spool, actuator, seal, bearing, and rack from the worm shaft (Fig. 51). Tap the end of the torsion bar with a soft-faced hammer, if necessary. The valve spool and the actuator assembly are spring-loaded. Discard the lower bearing race seal. Separate the valve spool and the actuator assembly from the torsion bar by turning the valve spool and actuator while turning the torsion bar.

3. Remove the snap ring securing the valve spool to the actuator and pull the valve spool off the actuator. Check the ball nut assembly for evidence of binding or rough spots in the assembly itself. Do not disassemble unless there is evidence of binding or rough spots. Be sure, however, that there is sufficient lubrication throughout the ball nut. The ball nut is not preloaded and should move freely throughout the entire



FIG. 46—Sector Shaft Removal



FIG. 47—Piston O-ring Removal

travel. Do not rotate the ball nut against the end of the worm shaft as damage will result. To disassemble the ball nut proceed as follows.

4. Remove the ball nut guide retainer and the ball guides. Turn the nut over and remove the balls by rotating the worm shaft from side to side. Catch the balls in a clean pan or a clean cloth. Remove the ball nut from the worm shaft. Note the position of the ball nut on the worm shaft (Fig. 52).

5. Wash all parts in a clean solvent and blow dry with moisture-free compressed air. Inspect the worm and ball nut grooves and all of the balls for nicks, scratches, or scoring. If either the worm or ball nut need replacing, both must be replaced as a matched assembly. Inspect the ball nut teeth for pitting, chips or scoring.

6. Inspect the ball return guides at the ends where the balls enter and leave the guides for nicks, scoring, or other visible damage. Slide the ball nut over the worm. See Fig. 52 for correct position.

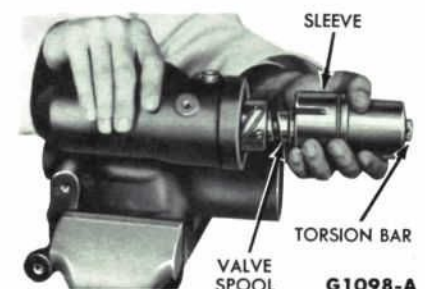
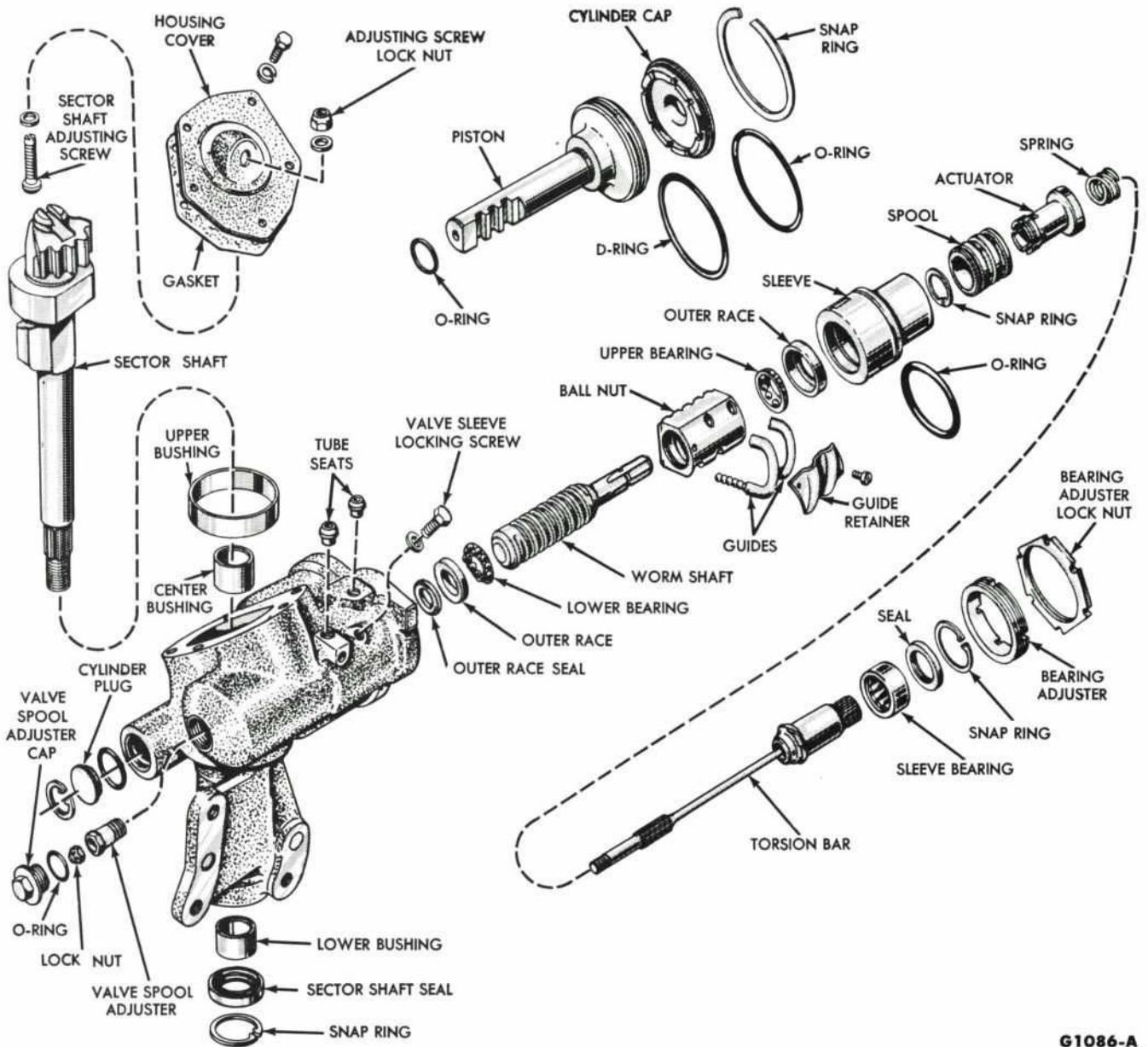


FIG. 48—Torsion Bar and Sleeve Removal



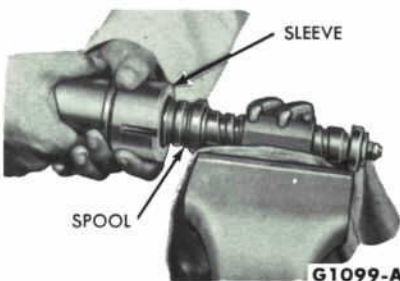
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FIG. 49— Power Steering Gear Disassembled

Align the ball return guide holes with the worm groove. Count 31 balls (one half the total number of balls) into a suitable container.

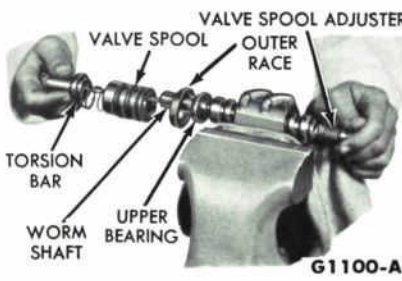
This is the number of balls required to fill one circuit. Drop these balls into both guide holes of one circuit, while alternately

turning the worm in opposite directions. Fill the circuit from the bottom of one guide hole to the bottom of the other guide hole. The remaining balls should fill the return guide.



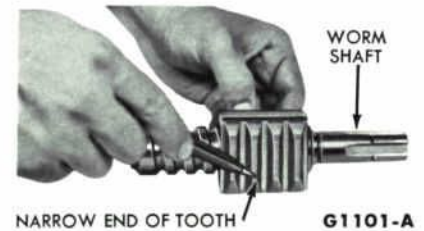
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FIG. 50— Valve Spool Sleeve Removal



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FIG. 51— Valve Spool Adjuster Removal



G1101-A

FIG. 52— Ball Nut Position

7. Coat the groove of one half of a return guide with clean oil-solvent grease and place the remaining balls in the guide. Place the other half of the guide over the balls. While holding the two halves together, push the guide into the guide holes in the gear rack. If the guide does not push all the way down easily, tap it lightly with a soft-faced hammer to seat it. Fill the second ball circuit in the same manner and then attach the guide clamp with the lock washer and retaining screws.

8. Inspect the torsion bar splines for nicks, pitting, wear, or scoring. Make sure the blind spline on the torsion bar lines up with the punch dot on the upper end of the assembly (large splined end). If they do not line up, replace the torsion bar assembly. Inspect the worm shaft bearings for pitting, chipped balls, or other visible damage.

9. Check the fit of the actuator on the torsion bar assembly, with the spring in place. Hold the torsion bar while turning the actuator. When the actuator is released, the spring should cause the actuator to pop off the threads. If it does not pop off, replace the spring and check the gear teeth for burrs. If there are any burrs that cannot be removed, replace the defective parts.

10. Check the sleeve bearing for freedom of rotation. If the bearing is satisfactory, remove the snap ring and replace the oil seal. If the bearing must be replaced, remove the seal, and then remove the bearing, using the tools shown in Fig. 53.

11. Install the sleeve bearing in the sleeve, using the tool shown in Fig. 54. The bearing must be pressed in so that there is a specified clearance between the upper surface of the bearing and the seal seat surface of the sleeve. To install the seal, use the tool shown in Fig. 54. Install the snap ring and check the bearing rotation. Lubricate the parts with automatic transmission fluid.

12. Check the fit of the upper bearing outer race. The race is a slip fit in the sleeve. Install the bearing race on the worm shaft. Slide the valve spool on the actuator and secure in place with a new snap ring. Check the valve spool for free rotation.

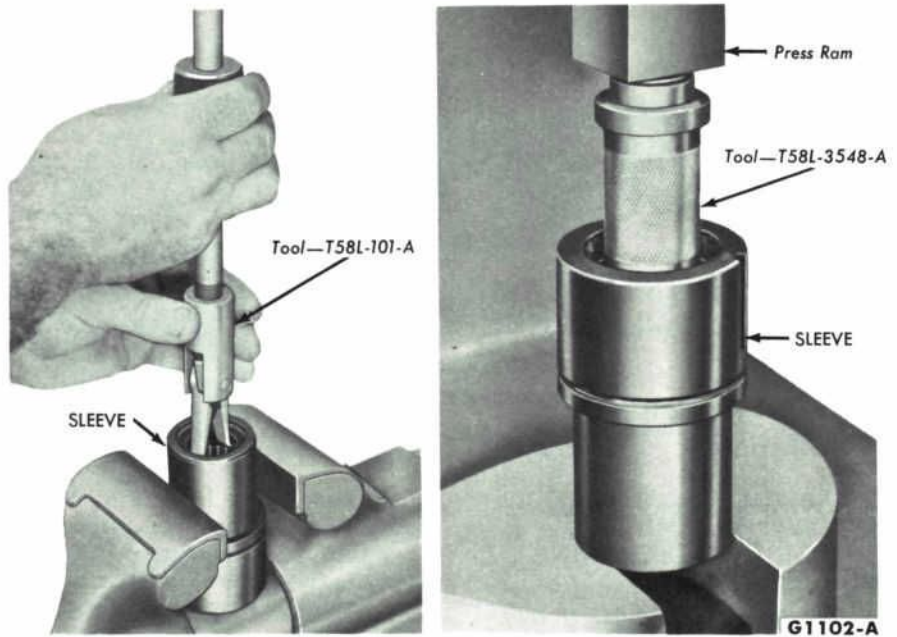


FIG. 53— Sleeve Seal and Bearing Removal

13. Slide the torsion bar spring and the actuator on the torsion bar. Turn the lower end of the shaft so that the two identifying punch marks are aligned (Fig. 55). Hold the assembly together and insert the torsion bar into the worm shaft, aligning the blind spline on the torsion bar with the scribed line on the end of the worm shaft. The torsion bar assembly is properly installed when the valve spool bottoms against

the upper bearing and race.

14. Install the valve spool adjuster on the torsion bar, but do not tighten. Install the lock nut and lubricate the lip of the torsion bar seal with automatic transmission fluid. Slide the valve sleeve into position over the valve spool so that the upper bearing outer race is seated in the recess of the sleeve. Install a new O-ring seal on the sleeve.

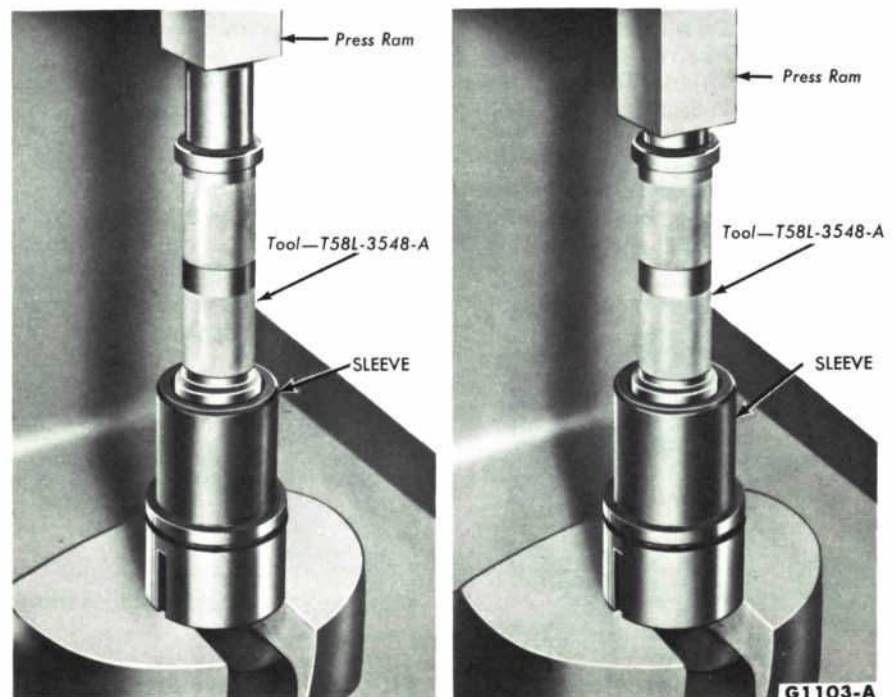


FIG. 54— Sleeve Bearing and Seal Installation

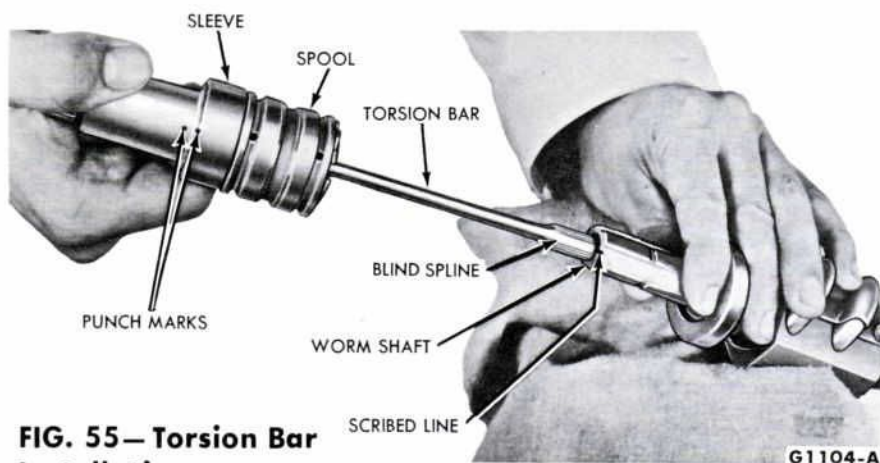


FIG. 55—Torsion Bar Installation

DISASSEMBLY, CLEANING, INSPECTION AND ASSEMBLY OF STEERING GEAR HOUSING

1. Clean the housing thoroughly, using clean solvent. Blow out all passages with moisture-free compressed air. Inspect the housing for cracks and stripped threads, and mating surfaces for nicks or burrs.

2. Check the fluid passages for obstruction. A small brass rod or copper wire will not cause damage to metal surfaces and can be used for checking for obstructions. Inspect the housing bore for scoring, nicks, or other visible damage.

3. Inspect the sector shaft bushings for scoring, grooves, or metal pick-up. If the bushings are worn or damaged, remove the upper bushing with the removing tools shown in Fig. 56, and/or remove the sector shaft lower and center bushings with the bushing driver shown in Fig. 57.

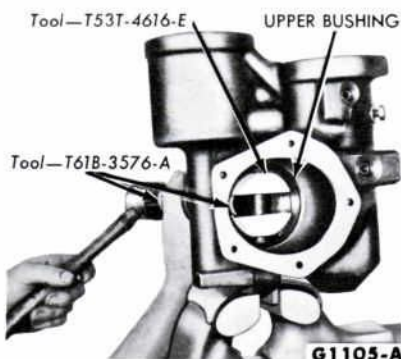


FIG. 56—Upper Bushing Removal

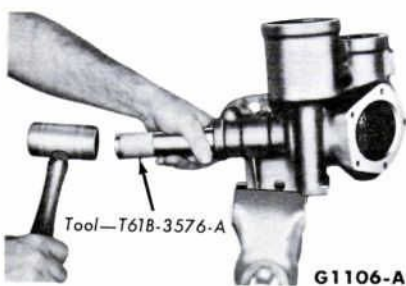


FIG. 57—Lower and Center Bushing Removal

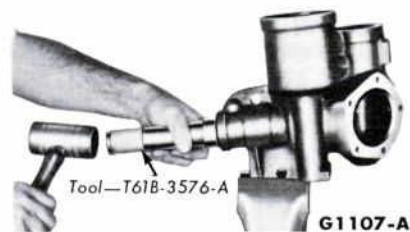


FIG. 58—Lower Bushing Installation

and nicks. Check the cylinder cover for nicks.

ASSEMBLY

1. Align the slot in the sleeve with the lock screw in the housing, and slide the torsion bar and sleeve assembly in the housing. Be sure that the seal and the lower bearing outer race are properly seated. Tap on the sleeve until it bottoms. Torque the lock screw to specifications. The lock screw and brass washer will be seated against the housing when they are properly installed.

2. Install the bearing adjuster and lock nut, and check the worm bearing preload (Fig. 45). Always make final adjustment while tightening the adjuster. Install the valve spool centering wrench (Fig. 42) on the valve spool adjuster, and locate the valve spool so that the valley between the lands can be seen through the pressure port. Lock the adjuster with the lock (Fig. 42). This is only a preliminary adjustment. Make final adjustment on the car.

3. Center the ball nut with the centerline of the sector shaft opening. Install a new O-ring in the piston rack bore of the housing,

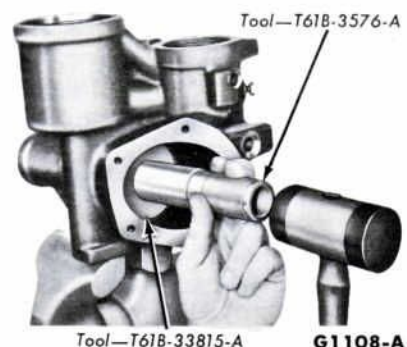


FIG. 59—Upper Bushing Installation

4. Install new lower and center sector shaft bushings using the bushing driver shown in Fig. 58. Install the upper bushing using the bushing driver shown in Fig. 59.

5. Carefully position the lower worm bearing seal and outer race in the housing.

INSPECTION OF SECTOR SHAFT AND PISTON

Inspect the sector shaft bearing surfaces for scoring, cracks, or pitting. Inspect the sector shaft teeth for pitting, chipped teeth, or other damage. Check the end play of the adjusting screw in the slot of the sector shaft as shown in Fig. 60. If the end play is not within specifications, select the proper shim to provide the desired end play. Service shims are available in various sizes.

Check the O-ring grooves in the piston rack bore and in the piston and cylinder cover for burrs.

Inspect the piston rack teeth for pitting, scoring, or chipped teeth. Check the piston for cracks.

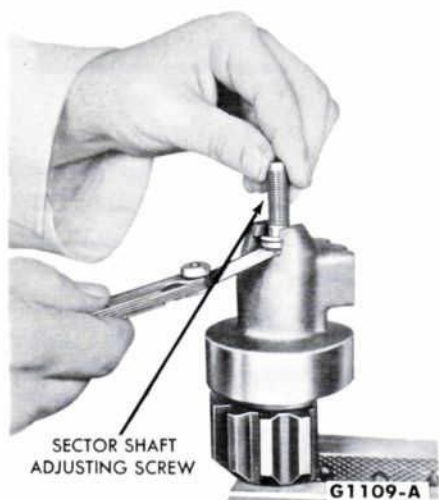


FIG. 60—Adjusting Screw Clearance Check

and lubricate the parts with automatic transmission fluid. Carefully hone the edges of the piston rack teeth with a hand stone to prevent cutting the piston rack

bore O-ring during installation.

4. Install a new O-ring on the piston and install the piston in the housing by rotating it as it is being inserted. Lubricate the parts thoroughly with automatic transmission fluid. Align the center rack teeth with the sector bore in the housing. Grease the sector shaft splines and install the shaft. Make sure that the sector shaft is centered by rotating the worm shaft. When rotating the worm shaft, count the turns from one stop to the other. If the number of turns does not conform to specifications, the sector shaft is installed incorrectly.

5. Install the sector shaft seal (Fig. 61) and secure in place with the snap ring. Install the sector shaft adjusting screw with the proper shim. Place the housing cover, over the adjusting screw, and turn the screw until the cover is seated.

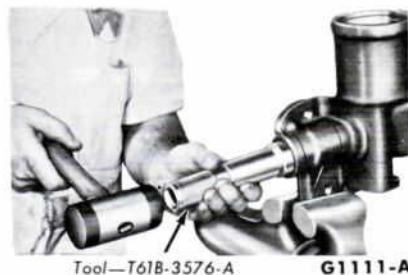


FIG. 61—Sector Shaft Seal Installation

Install the cover attaching screws. Torque the screws to specifications.

Adjust the mesh load by centering the gear and adjusting mesh load to specifications at center (high point). Refer to "Overhaul" (step 3), and check the piston rack backlash. Install a new cylinder plug O-ring. Install the cylinder plug and secure in place with the snap ring.

8—POWER STEERING LINKAGE REPAIR

STEERING ARM TO IDLER ARM ROD REPLACEMENT

1. Remove the cotter pin and nut from the cylinder mounting stud and disconnect the cylinder from the steering arm to idler arm rod. Disconnect the spindle connecting rods from the steering arm to idler arm rod, using the tool shown in Fig. 9.

2. Disconnect the steering arm to idler arm rod from the idler arm. Loosen the control valve clamp and unthread and remove the rod.

3. Install a new idler arm bushing in the replacement rod, using tool T61P-3355-A. If there is apparent wear in the idler arm bracket bushing, it should also be replaced. Thread the rod into the control valve, but do not tighten the clamp at this time.

4. Measure the distance between the points shown in Fig. 30, and thread or unthread the steering arm to idler arm rod to obtain the specified distance. Torque the clamp bolt to specifications.

5. Connect the rod to the idler arm and torque the idler arm nut to specifications. Connect the

spindle connecting rods and torque the stud nuts to specifications. Connect the cylinder at its mounting end, and torque the self-locking nut to specifications.

6. Check the power steering fluid level and add fluid as required. Fill the reservoir and check for leaks.

STEERING IDLER ARM BUSHING REPLACEMENT

Refer to Section 1 "Steering Linkage", for procedures for replacing the steering idler arm bushing.

PART 3

WHEELS AND TIRES

1 WHEEL AND TIRE REPLACEMENT

WHEEL AND TIRE ASSEMBLY REMOVAL

Pry off the wheel hub cap or wheel cover. Loosen but do not remove the wheel hub retaining nuts. Raise the car until the wheel and tire clear the floor. Remove the wheel hub nuts from the studs, and pull the wheel and tire assembly from the hub and drum.

WHEEL AND TIRE ASSEMBLY INSTALLATION

Clean all dirt from the hub and drum. Position the wheel and tire assembly on the hub and drum. Install the wheel hub nuts and tighten alternately, in order to draw the wheel evenly against the hub and drum. Lower the car to the floor, torque the hub nuts to specifications, and install the hub cap or wheel cover.

DEMOUNTING TIRE FROM WHEEL

The tire can be demounted on a mounting machine. If a mounting machine is used, be sure to demount the tire from the back side. If tire irons are used, follow the procedure given here.



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FIG. 62—Bead Loosening Tool

1. Remove the valve cap, unscrew and remove the valve core, and allow the tire to deflate completely. Use the bead loosening tool (Fig. 62) to break the tire side walls loose from both sides of the wheel.

2. Position the outer side of the wheel downward, and insert two tire irons about 8 inches apart between the tire inner bead and the back side of the wheel rim. Use only tire irons with rounded edges or irons designed for demounting tubeless tires. Other tire irons may seriously damage the tire bead.

3. Leave one tire iron in position, and pry the rest of the bead over the rim with the other iron. Take small "bites" with the iron around the tire in order to avoid damaging the sealing rings on the side of the tire bead.

4. Stand the wheel and tire upright with the tire outer bead in the drop center well at the bottom of the wheel. Insert the tire iron between the bead and the edge of the rim, and pry the wheel out of the tire.

MOUNTING TIRE TO WHEEL

1. If a used tire is being installed, remove all dirt and old mounting compound from the tire.

If a tire is being mounted to the original wheel, clean the rim with emery cloth or fine steel wool. Check the rim for dents. Dents or foreign material around the wheel rim will usually cause air leakage.

If a new wheel is being installed, coat a new valve with RUGLYDE or a similar rubber lubricant and

position the valve to the new wheel. Use a rubber hammer or a valve replacing tool to seat the valve firmly against the inside of the rim.

2. Apply RUGLYDE or a similar rubber lubricant to the sealing rings on both tire beads. With the outer side of the wheel down, pry the beads over the wheel rim with two tire irons. Do not use a hammer or mallet to force the beads over the rim as serious damage may be caused to the tire beads.

3. Hold the beads against the rim flanges by positioning a tire mounting band over the tire (Fig. 63). If a mounting band is not available, tie a tourniquet of heavy cord around the circumference of the tire. Tighten the cord with a tire iron. Center the tire on the wheel with a rubber mallet.

4. Give the tire a few quick bursts of air to seat the beads properly, then inflate the tire to 40 pounds pressure. Check to see that the bead positioning rings (outer rings near the side walls) are evenly visible just above the rim flanges all the way around the tire. If the rings are not even, deflate the tire completely and inflate it again. When the rings are properly positioned, deflate the tire to the recommended pressure.



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FIG. 63—Tubless Tire Mounting Band

2 HUBS, BEARINGS, AND OIL SEALS OR GREASE RETAINERS

FRONT WHEEL BEARING REPLACEMENT

1. Remove the hub cap or wheel cover. Pry the grease cap off the hub, remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle, then remove the outer bearing cone and roller assembly (Fig. 7).

2. On a car without self adjusting brakes, back off the brake adjusting screw so that the shoes do not contact the brake drum. Pull the wheel, hub, and drum assembly off the wheel spindle.

If the brake drum will not come off, on a car with self adjusting brakes, insert a narrow screwdriver through the brake adjusting hole at the inner side of the brake carrier plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 75). Back off the adjustment only if the drum cannot be removed. Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise the self adjusting mechanism will not function properly.

3. Remove the grease retainer and the inner bearing cone and roller assembly from the hub. If the bearing cup(s) are damaged, remove them using a drift.

4. If a new grease retainer is of the leather type, soak it in light engine oil for at least 30 minutes before installation. Thoroughly clean the spindle and the inside of the hub. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) with the replacing tool (Fig. 64). Be sure to seat the cups properly in the hub. The cup(s) will be properly seated when it is fully bot-

5. Pack the inside of the hub with wheel bearing grease. Fill the hub until the grease is flush with the inside diameter of both bearing cups. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much grease as possible between the rollers and cages. Lubricate the cone surfaces with grease.

6. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer with the reverse end of the tool (Fig. 64). Be sure that the retainer is properly seated. The retainer will be properly installed when it is fully seated.

7. Install the wheel, hub, and drum assembly on the wheel spindle. Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.

8. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut (Fig. 7).

9. While rotating the wheel, hub, and drum assembly, torque the adjusting nut to specifications to seat the bearings. Locate the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle (on cars with self adjusting brakes). On a car without self adjusting brakes, back off the adjusting nut and nut lock together, 2 castellations.

10. Install a new cotter pin, and bend the ends of the cotter pin around the castellated flange of the

nut lock. This will prevent interference with the radio static collector in the grease cap. Install the grease cap, adjust the brakes, and install the hub cap or wheel cover.

FRONT HUB AND DRUM ASSEMBLY REPLACEMENT

When the hub and drum assembly is replaced, new bearings, cups, and oil seal must be installed in the new assembly. The new grease retainer should be soaked in light engine oil at least 30 minutes before installation if it is of the leather type.

1. Remove the wheel and tire assembly. Remove the hub and drum assembly. Clean the new hub and drum assembly.

2. Install new inner and outer bearing cups in the new hub with the replacer tool (Fig. 64). Be sure to seat the cups properly in the hub. The cups will be properly seated when the cup is fully bottomed.

3. Grease and install any new parts as outlined in steps 5 and 6 of the foregoing procedure. Install the new hub and drum assembly to the wheel spindle. Keep the hub centered on the spindle to prevent damage to the grease retainer.

4. Install the outer bearing cone and roller assembly and the flat

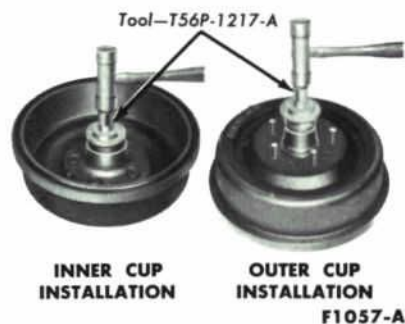
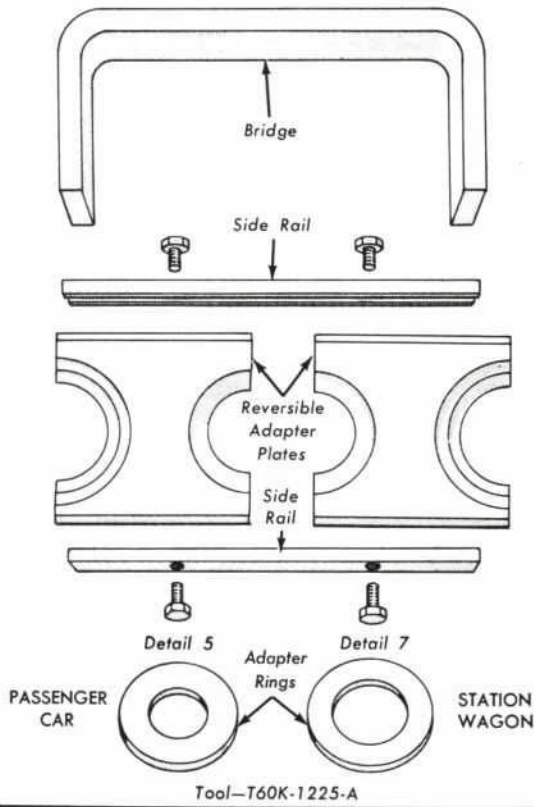
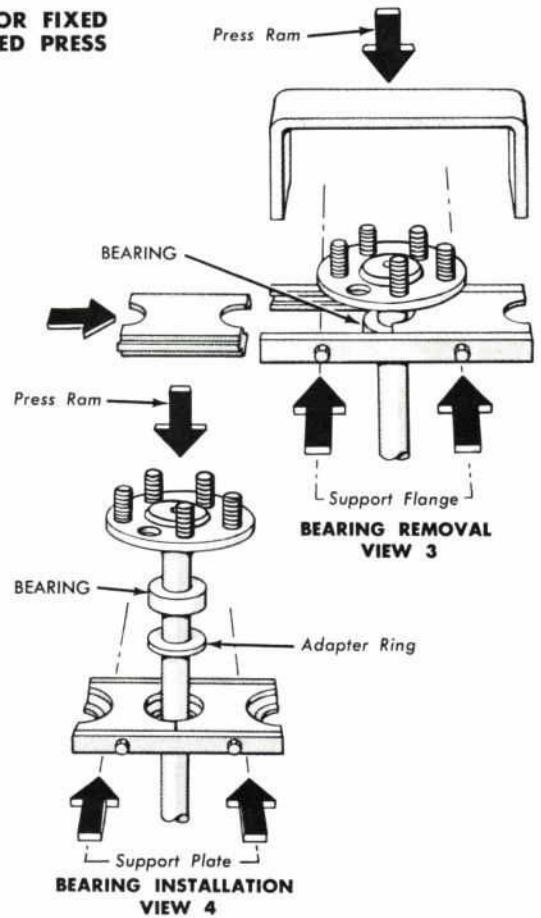


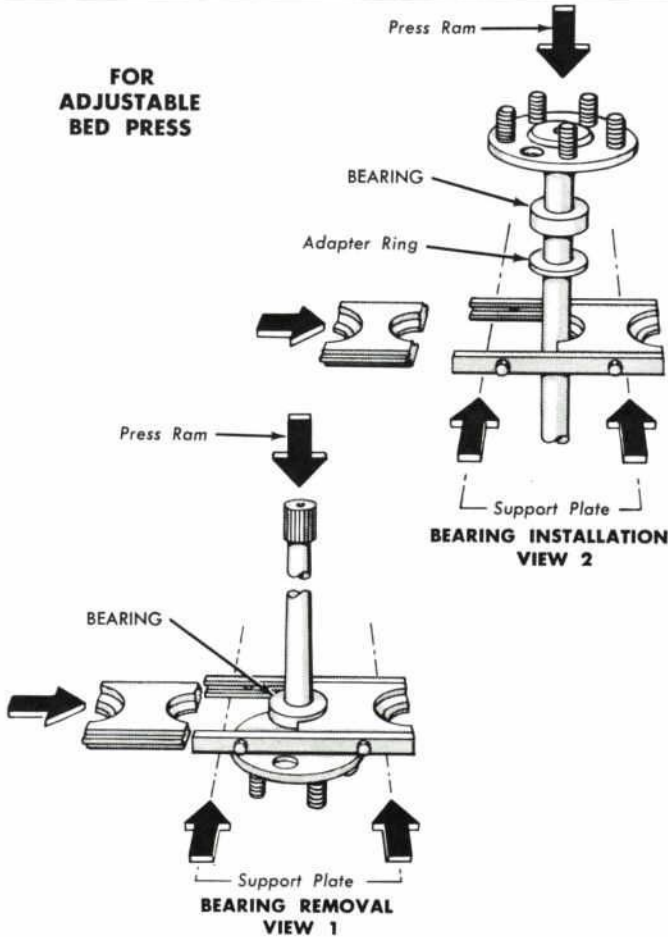
FIG. 64—Wheel Bearing Cup Installation



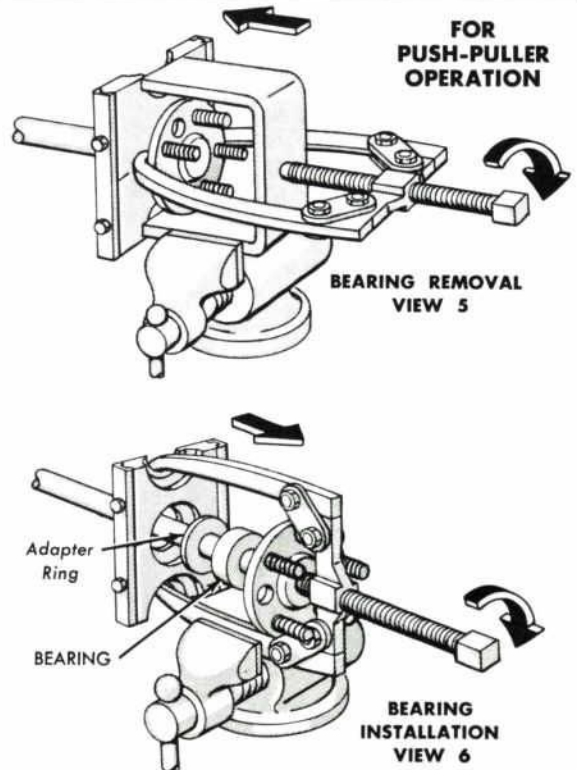
FOR FIXED BED PRESS



FOR ADJUSTABLE BED PRESS



FOR PUSH-PULLER OPERATION



E1211-C

FIG. 65—Rear Wheel Bearing Removal and Installation

washer on the spindle, then install the adjusting nut. Adjust the wheel bearings, and install a new cotter pin. Bend the ends of the cotter pin around the castellated flange of the nut lock. This will prevent interference with the radio static collector in the grease cap. Install the grease cap.

5. Position the wheel and tire assembly on the new hub and drum assembly. Install the wheel hub nuts and tighten them alternately in order to draw the wheel evenly against the hub and drum. Adjust the brake shoes and install the hub cap or wheel cover.

REAR WHEEL BEARING REPLACEMENT

1. Remove the hub cap or wheel cover. Remove the wheel retaining

nuts and remove the wheel and tire assembly. Remove the nuts that secure the brake drum to the axle flange, and then remove the drum from the flange.

2. Working through the hole provided in the axle shaft flange, remove the nuts that secure the wheel bearing retainer. Then pull the axle shaft assembly out of the axle housing. **The brake carrier plate must not be dislodged. Install one nut to hold the plate in place after the axle shaft is removed.**

3. Loosen the inner bearing retainer by nicking it deeply with a cold chisel in several places. It will then slide off easily. Remove the bearing from the axle shaft with the bearing replacing tool (Fig. 65). If the "push-puller" operation is used, be sure that the

puller arms contact the **flat surface** of the axle shaft flange rather than the bolt heads. Also with this method, be careful not to damage or burr the oil seal journal as the bearing breaks loose.

4. Lightly coat wheel bearing bores with ball joint grease. Install the new rear wheel bearing on the axle shaft with the bearing replacing tool (Fig. 65). The bearing should seat firmly against the shoulder on the shaft. With the bearing replacer tool, press the bearing inner retainer on the shaft until the retainer seats firmly against the bearing.

5. Install the axle shaft. Install the brake drum and the drum retaining nuts. Position the wheel and tire on the drum and secure with the retaining nuts. Install the hub cap or wheel cover.

PART 4

FRONT SUSPENSION

1 FALCON FRONT SUSPENSION

UPPER BALL JOINT REPLACEMENT—ARM IN CAR

1. Position a support between the upper arm and frame side rail as shown in Fig. 66, then raise the car and position safety stands. Remove the hub cap or wheel cover. Remove the wheel and tire assembly from the hub.

2. Using a large chisel, cut off the three upper ball joint retaining rivets. Remove the cotter pin and nut from the upper ball joint stud. Place the ball joint remover tool in position as shown in Fig. 67. The tool should seat firmly against the ends of both studs, and not against the lower stud nut. It may be necessary to remove the lower ball joint cotter pin if it prevents the tool from seating on the lower stud.

3. Turn the tool with a wrench until both studs are under tension; and then, with a hammer, tap the spindle near the upper stud to loosen the stud from the spindle. Do not loosen the stud with tool pressure only. Remove the ball joint.

4. Clean the end of the arm and remove all burrs from the hole edges. Check for cracks around the holes and replace the arm if it is cracked.

5. Secure the new ball joint to the upper arm with the specified bolts, nuts, and washers. Do not rivet the new ball joint to the arm. Torque the nuts to specifications. Position the ball joint stud in the spindle bore and install the retaining nut. Torque the nut to specifications and install the cotter pin. Tighten the nut if necessary, to align the cotter pin hole.

6. Lubricate the ball joint, install the wheel and tire, and adjust the brakes. Remove the safety stands and lower the car. Remove

the support from between the upper arm and the frame. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT WHEEL SPINDLE REPLACEMENT

1. Position a support between the upper arm and frame as shown in Fig. 66, then raise the car and position safety stands.

2. Remove the hub cap or wheel cover. Remove the cover from the brake adjusting hole, and back off the brake adjustment by prying upward against the teeth of the brake adjusting screw.

3. Remove the grease cap from the hub, then remove the nutlock, adjusting nut, washer and outer wheel bearing. Pull the wheel, hub, and drum assembly off the wheel spindle.

4. Remove the brake carrier plate assembly from the spindle by removing the four carrier

plate-to-spindle bolts and nuts. Support the brake carrier plate to prevent damage to the brake hose. Using the removing tool OCT-462, disconnect the spindle connecting rod end from the spindle arm.

5. Remove the cotter pins from both ball joint stud nuts and loosen the nuts one or two turns. Do not remove the nuts from the studs at this time. Place a box wrench over the lower end of the ball joint remover tool and position the tool between the upper and lower ball joint studs (Fig. 67). The tool should seat firmly against the ends of both studs and not against the stud nuts.

6. Turn the wrench until the tool places the studs under tension. Tap the spindle near the studs with a hammer to loosen them in the spindle. Do not loosen the studs in the spindle with tool pressure only. Support the lower

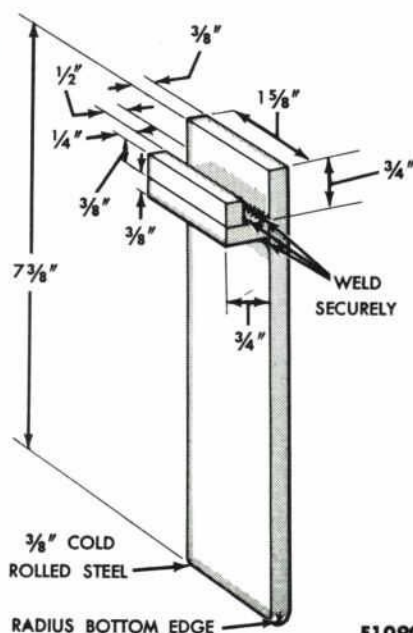
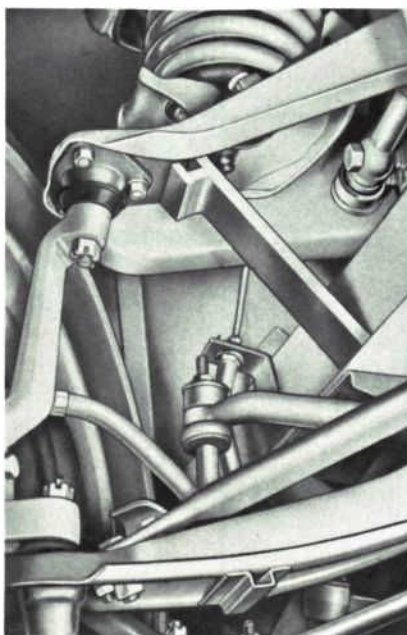
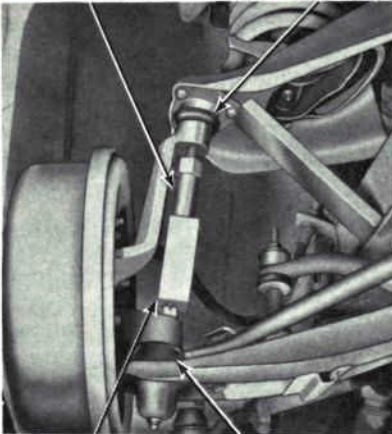


FIG. 66—Upper Arm Support

F1090-B

Tool—T60K-3006-A UPPER BALL JOINT



Tool—T57P-3006-A LOWER BALL JOINT F1077-A

FIG. 67—Loosening Ball Joint Stud in Spindle

suspension arm with a floor jack. Remove both ball joint stud nuts, and remove the spindle from both studs, by lowering the floor jack and arm.

7. Position the spindle on the lower ball joint stud and install the stud nut. Using a floor jack, raise the lower suspension arm and guide the upper ball joint stud into the spindle. Secure in place with the stud nut. Torque the stud nuts to specifications. Continue to tighten the stud nuts until the cotter pin holes and slots are aligned and install new cotter pins.

8. Connect the spindle connecting rod end to the spindle arm and install the retaining nut. Torque the nut to specifications and install the cotter pin. Position the brake carrier plate on the spindle and install the retaining bolts and nuts. Torque the nuts to specifications.

9. Install the wheel, hub, and drum assembly. Adjust the brakes, remove the safety stands, and lower the car. Remove the support from between the upper arm and the frame. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT SPRING REPLACEMENT

REMOVAL

1. Position a support between the upper arm and frame side rail (Fig. 66), then raise the car and remove the wheel and tire assembly from the hub.

2. Remove the shock absorber lower retaining nuts. Remove the shock absorber upper mounting bracket retaining bolts and lift the bracket and shock absorber out of the suspension housing (Fig. 68).

3. Install a safety stand at the front end of the underbody. Insert the spring compressing tool through the top of the spring housing so that the tool lower studs fit into the shock absorber lower mounting holes. Secure the tool to the spring seat with two nuts.

4. Fit the tool pilot into the spring upper seat, then compress the spring by tightening the nut on the threaded shaft of the tool (Fig. 69). Tighten the nut until the spring is loose in its housing. Remove the spring lower seat retaining nuts and lift the assembly to disengage the spring seat from the suspension arm. Guide the spring and tool down and out the forward end of the wheel housing.

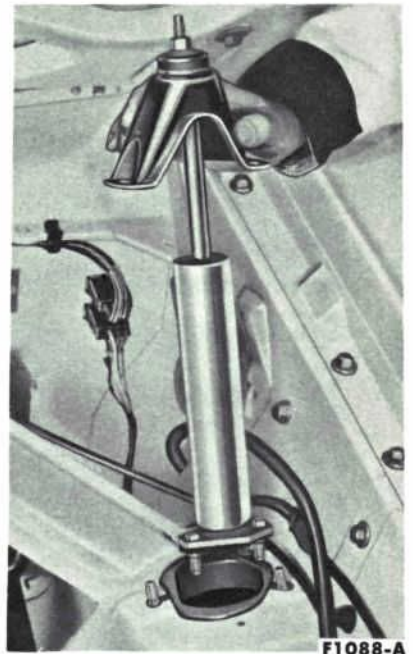
INSTALLATION

1. If the spring is to be replaced, measure the spring height compressed in the tool. Place the tool nut in a vise and rotate the assembly by hand until the spring is decompressed (Fig. 70). Transfer the tool to the new spring. Be sure that the pilot of the tool fits into the spring upper seat and that the spring coil is firmly seated in both grooves of the spring lower seat. Place the tool nut in a vise, and rotate the spring until the previously measured spring height is attained.

2. Lift the spring and tool into place and position the assembly so that the spring seat groove containing the lower end of the spring coil is to the outboard side.

3. Install the spring lower seat-to-suspension arm retaining nuts. Loosen the spring removal tool nut until the spring is properly seated, and then remove the tool.

4. Insert the shock absorber and bracket down through the front suspension housing and position the assembly to the spring lower seat. Secure in place with the nuts. Attach the upper mounting bracket to the body and secure in place with nuts. Torque



F1088-A

FIG. 68—Front Shock Absorber Removal

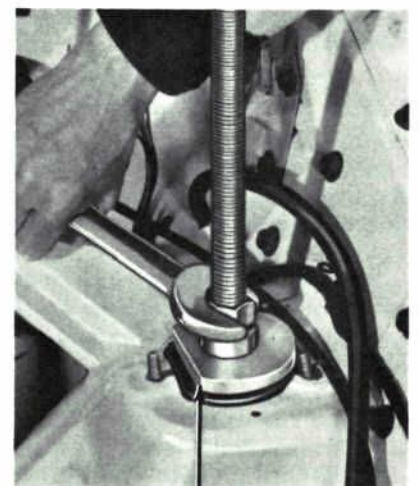
the shock absorber mounting nuts to specifications.

5. Install the wheel and tire assembly, remove the safety stand, and lower the car. Remove the support from between the upper arm and the frame.

FRONT SHOCK ABSORBER REPLACEMENT

REMOVAL

1. Raise the front end of the car and place supports under both suspension lower arms. Be sure



Tool—T60K-5310-A F1087-A

FIG. 69—Coil Spring Removal



FIG. 70— Spring Replacement

that the lower end of the shock absorber remains accessible for servicing. Remove the shock absorber to spring lower seat retaining nuts.

2. Remove the shock absorber upper mounting bracket retaining nuts. Lift the bracket and shock absorber out of the suspension housing (Fig. 68). Remove the retaining nut from the mounting bracket, and the bushings and washers from the shock absorber upper mounting stud.

INSTALLATION

1. Assemble to the shock absorber upper mounting stud in the following order: a washer, a rubber bushing, the upper mounting bracket, a bushing, a washer, and the mounting nut.

2. Assemble rubber bushings to the shock absorber lower mounting bolts, then extend the shock absorber and insert it down through the suspension housing (tower) so that the lower mounting bolts are inserted through the bolt holes in the lower spring seat. Install the rubber bushings, washers and nuts to the mounting bolts and torque the nuts to specification.

3. Position the upper mounting bracket to the mounting studs on the suspension housing (tower), install the retaining nuts, and torque to specifications. Torque the shock absorber-to-upper mounting bracket nut to specifications.

UPPER ARM REPLACEMENT

REMOVAL

1. Remove the front coil spring. Place a safety stand under the lower arm. Remove the cotter pin from the nut on the upper ball joint stud, and loosen the nut one or two turns. Do not remove the nut from the stud at this time.

2. Place the ball joint remover tool in position as shown in Fig. 67. The tool should seat firmly against the ends of both studs and not against the stud nut. Turn the tool with a wrench until both studs are under tension, and then tap the spindle near the upper stud with a hammer to loosen the stud in the spindle. Do not loosen the stud in the spindle with tool pressure only. If both arms are being removed, loosen the lower stud in the same manner as the upper stud.

3. Remove the nut from the upper stud and lift the stud out of the spindle. Remove the upper arm inner shaft retaining nuts from the engine compartment and remove the upper arm. Measure the total shim thickness at each inner shaft bolt for assembly reference.

4. Wipe off all loose dirt from the upper arm parts. Do not wash the ball joint with a solvent.

INSTALLATION

1. Position the upper arm on the underbody mounting bracket, and install but do not tighten the nuts and lock washers on the two inner shaft retaining bolts. The specified keystone-type lock washers must be used. Install the adjusting shims on both bolts between the inner shaft and the underbody. Install the same shim thicknesses that were removed from both bolts during disassembly. Torque the nuts to specifications.

2. Position the upper ball joint stud in the top of the wheel spindle, and install the stud nut. Torque the nut to specifications. If necessary, turn the nut enough to align the cotter pin hole and the slots. Install a new cotter pin and lubricate the upper ball joint.

3. Install the front coil spring. Remove the support (from between the upper arm and the frame). Check and, if necessary, adjust caster, camber, and toe-in.

UPPER ARM PARTS INSPECTION

Inspect the upper arm and the inner shaft for cracks, distortion, or other damage. Check the bushing and the rubber seal on the ball joint stud for cracks, tears, distortion, or other visible defects. Replace all parts found to be defective.

Replacement arms are equipped with bushings, inner shaft, and the ball joint. If the original arm is to be used, these components should be installed on the bench.

UPPER ARM OVERHAUL— ARM REMOVED

BUSHING AND INNER SHAFT REPLACEMENT

Always replace both upper arm bushings if either bushing is worn or damaged. Install only new bushings when replacing the inner shaft.

1. Unscrew the bushings from the inner shaft and suspension arm, then remove the shaft from the arm.

2. Position the shaft in the arm, and install the new bushings on the shaft and the arm. Turn the bushings so that the shaft is exactly centered in the arm. The shaft will be properly centered when located at the dimensions shown in Fig. 71. Position the

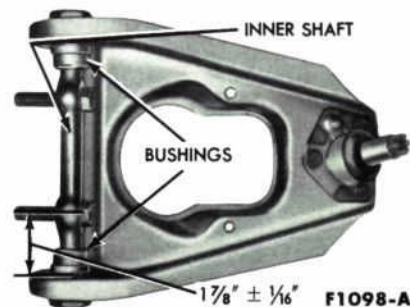


FIG. 71— Upper Arm Bushing Removal and Installation

bushings carefully to avoid damaging the O-rings inside the bushings. Torque the bushings to specification.

UPPER BALL JOINT REPLACEMENT

The upper ball joint cannot be repaired and must be replaced if it is worn or damaged. The existence of "slop" or free-play is normal when the upper ball joint is unloaded.

1. Remove the ball joint from the arm. If the ball joint is riveted to the arm, drill a 1/8-inch pilot hole completely through each rivet, and then drill off the rivet head through the pilot hole with a 3/8-inch drill. Drive all rivets out of the holes.

2. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal around the holes, and replace the arm if it is cracked.

3. Install a new ball joint on the arm. Use only the specified bolts, nuts, and washers. Do not attempt to rivet the new ball joint to the arm. Torque the ball joint retaining nuts and bolts to specifications. Lubricate the ball joint.

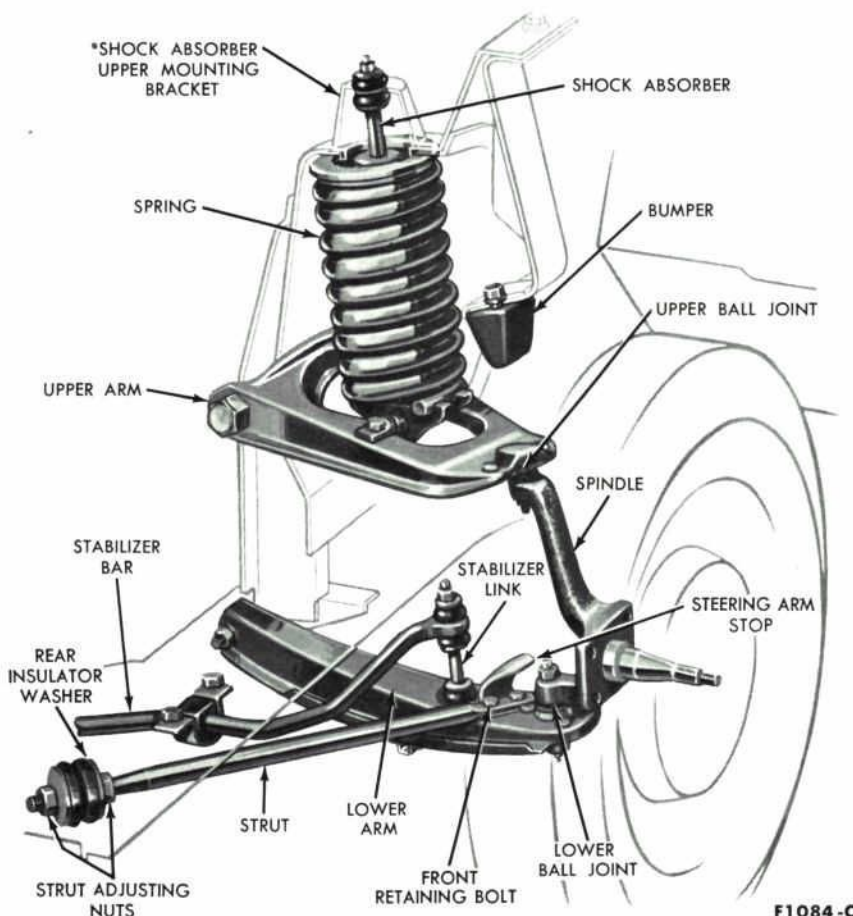
LOWER ARM REPLACEMENT

REMOVAL

1. Position a support between the upper arm and the frame side rail (Fig. 66), then raise the car and remove the wheel and tire assembly from the hub.

2. Remove the stabilizer link retaining nut (Fig. 72) and disconnect the stabilizer bar from the link. Remove the link bolt. Remove the strut to lower arm retaining nuts and bolts, and remove the steering arm stop.

3. Remove the cotter pin from the nut on the lower ball joint stud, and loosen the nut one or two turns. Do not remove the nut from the stud at this time. Straighten the cotter pin on the upper ball joint stud nut. Position the ball joint remover tool between the upper and lower ball joint studs in the reverse position from that shown in Fig. 67. The tool should seat firmly against



F1084-C

FIG. 72—Front Suspension Assembly

the ends of both studs and not against the stud nuts.

4. Turn the tool with a wrench until both studs are under tension, and tap the spindle near the lower stud with a hammer to loosen the stud in the spindle. Do not loosen the stud in the spindle with tool pressure only. If both arms are being removed, loosen the upper stud in the same manner as the lower stud. Remove the nut from the lower ball joint stud, and lower the arm.

5. Remove the lower arm to underbody pivot bolt, nut, and washer. Remove the lower arm.

INSTALLATION

1. Position the lower arm to the underbody and install the pivot bolt, washer, and nut. Torque the nut to specifications. Install the stabilizer link bolt, washers, bushings, and spacer. Connect the stabilizer bar to the link. Position the link, install the

retaining nut, and torque to specifications.

2. Using a floor jack, raise the lower suspension arm, and guide the lower ball joint stud into the spindle. Install the stud nut and torque to specifications. Position the strut and steering arm stop to the lower control arm. The stop installed position is between the arm and strut. Install the retaining bolts and nuts and torque to specifications.

3. The distance from the back face of the strut rear insulator washer to the center of the strut-to-lower arm front retaining bolt must be within specifications. Check the distance and, if necessary, adjust by turning the strut adjusting nuts.

4. Install the lower ball joint retaining nut and cotter pin. Bend the upper ball joint retaining nut cotter pin. Lubricate the lower ball joint. Do not lubricate the lower arm bushings.

5. Install the wheel and tire, remove the safety stands, and lower the car. Remove the tool supporting the upper arm. Check and, if necessary, adjust caster, camber and toe-in.

LOWER ARM PARTS INSPECTION

The replacement arm comes with ball joint and components installed. The ball joint cannot be installed separately.

Inspect the lower arm for cracks, bends, or other damage, and replace the arm if necessary.

Check the condition of the ball joint and socket, the bushings, and the rubber seal on the ball joint stud. If any of these parts are cracked, torn, distorted, or worn, replace the lower arm.

Also check the ball joint for looseness as outlined in the following procedure.

LOWER ARM BALL JOINT CHECK

Use a frame contact hoist, or raise the car until the wheel falls to the full down position and support the underbody with floor jacks. While an assistant grasps the lower edge of the tire and moves the wheel in and out, observe the lower end of the spindle and the lower arm.

Any movement between the lower end of the spindle and the

lower arm indicates ball joint wear and loss of preload. If any such movement is observed, replace the lower arm. During the foregoing check, the upper ball joint will be unloaded and may move. Disregard all such movement of the upper ball joint. Also, do not mistake loose wheel bearings for a worn ball joint.

STABILIZER REPLACEMENT

1. Raise the car high enough to provide working space, and place supports under both front wheels. Disconnect the stabilizer from each link. Remove the screws securing both stabilizer retaining brackets and remove the stabilizer.

2. Coat the necessary parts of the stabilizer with RuGLYDE or a comparable lubricant, and slide new insulators onto the stabilizer. Connect the stabilizer retaining brackets, and connect the stabilizer to both links. Torque the bracket retaining screws and the link bolt nut to specifications. Remove the supports and lower the car.

LOWER ARM STRUT AND/OR BUSHING REPLACEMENT

1. Position a support between the upper arm and the frame side rail (Fig. 66), then raise the car and remove the wheel and tire assembly from the hub.

2. Remove the strut-to-bracket forward retaining nut, washer, and insulator bushing. Remove the two strut-to-lower arm retaining nuts and bolts. Remove the steering arm stop, and lift the strut with the rear insulator bushing, washer, and nut from the car (Fig. 72).

3. Install the rear nut, washer and insulator bushing on the strut. Thread the nut on the strut so that the distance from the back face of the strut rear insulator washer to the center of the strut-to-lower arm front retaining bolt hole is to specifications.

4. Position the strut into the mounting bracket and to the lower suspension arm. Position the steering arm stop between the strut and the arm and install the strut-to-arm retaining bolts and nuts. Torque the nuts to specifications.

5. Install the outer insulator bushing, washer, and nut on the forward end of the strut, and torque the strut rod nuts to specifications. Recheck the distance between the rear insulator washer and the center of the front retaining bolt in the arm. Adjust if necessary, by turning the strut adjusting nuts.

6. Install the wheel and tire, remove the safety stands, and lower the car. Remove the tool supporting the upper arm.

2 FAIRLANE FRONT SUSPENSION

UPPER BALL JOINT REPLACEMENT—ARM IN CAR

Fig. 5 is a disassembled view of the Fairlane front suspension. Both the ball joint and the plate that retains the rubber seal, are attached to the arm with the same rivets. Therefore, the entire ball joint assembly will have to be removed when replacing the rubber seal.

1. Position a support between the upper arm and the frame side rail as shown in Fig. 73, then raise the car and position safety stands. Remove the hub cap or wheel cover. Remove the wheel and tire assembly from the hub.

2. Remove the cotter pin from the upper ball joint stud and loosen the stud retaining nut. Position the ball joint remover tool as shown in Fig. 73. The tool should seat firmly against the ends of both studs, and not against the lower stud nut. It may be necessary to remove the lower ball joint cotter pin if it prevents the tool from seating on the lower stud.

3. Turn the tool with a wrench until both studs are under tension; and then, with a hammer, tap the spindle near the upper stud to loosen the stud from the spindle. Do not loosen the stud with tool pressure only. Remove the ball

joint stud retaining nut, and lift the stud out of the spindle.

4. Remove the ball joint from the arm. If the ball joint is riveted to the arm, drill a 1/8-inch pilot hole completely through each rivet, and then drill off the rivet head through the pilot hole with a 3/8-inch drill. Drive all rivets out of the holes. Do not bend the arm when driving out the rivets.

5. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

6. Position the new ball joint and seal (or old ball joint with a

new seal) to the upper arm and secure in place with the specified bolts, nuts, and washers. Do not rivet the ball joint and seal retainer to the arm. Torque the nuts to specifications. Position the ball joint stud in the spindle bore and install the retaining nut. Torque the nut to specifications and install a new cotter pin. Tighten the nut if necessary, to align the cotter pin hole with the slots in the nut. Lubricate the ball joint.

7. Install the wheel and tire assembly, remove the safety stands, and lower the car. Remove the support from between the upper arm and the frame. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT WHEEL SPINDLE REPLACEMENT

1. Position a support between both the left and the right suspension upper arms. Fig. 73 shows the support under one arm. Raise the car and position safety stands.

2. Remove the wheel cover or hub cap. Remove the wheel bearing grease cap, cotter pin, nut lock, adjusting nut and washer. Pull the wheel, hub, and drum assembly approximately 2 inches forward and push back into position. Remove the outer bearing and withdraw the wheel and drum assembly.

If the drum will not come off, insert a narrow screwdriver through the brake adjusting hole in the carrier plate and disengage the adjusting lever from the brake adjusting screw. While thus holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 74). **Back off the adjustment only if the drum cannot be removed. Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise, the self adjusting mechanism will not function properly.**

3. Remove the brake carrier plate assembly from the spindle by removing the mounting bolts

and nuts. Support the brake carrier plate to prevent damage to the brake hose. Remove the cotter pin and stud nut, and then disconnect the spindle connecting rod end from the spindle arm with the remover tool OTC-462.

4. Remove the cotter pins from both ball joint stud nuts and loosen the nuts one or two turns. **Do not remove the nuts from the studs at this time.** Position the ball joint remover tool between the upper and lower ball joint studs (Fig. 73). The tool should seat firmly against the ends of both studs and not against the stud nuts.

5. Turn the wrench until the tool places the studs under tension. Tap the spindle near the studs with a hammer to loosen them in the spindle. **Do not loosen the studs in the spindle with tool pressure only.** Remove both stud nuts and remove the spindle from both ball joint studs.

6. Position the spindle on the lower ball joint stud and install the stud nut. Raise the lower suspension arm and spindle assembly so that the upper bore of the spindle is guided onto the upper ball joint stud. Install the stud nut. Torque both ball joint stud nuts to specifications. Continue to tighten the stud nuts until the cotter pin holes and slots are aligned, and install new cotter pins.

7. Connect the spindle connecting rod end to the spindle arm and install the retaining nut. Torque the nut to specifications and install the cotter pin. Position the brake carrier plate assembly on the spindle and install the retaining bolts and nuts. Torque the nuts to specifications.

8. Install the wheel, hub, and drum assembly. Adjust the brakes, remove the safety stands, and lower the car. Remove the supports from between the upper arms and the frame. Check and, if necessary, adjust caster, camber, and toe-in.

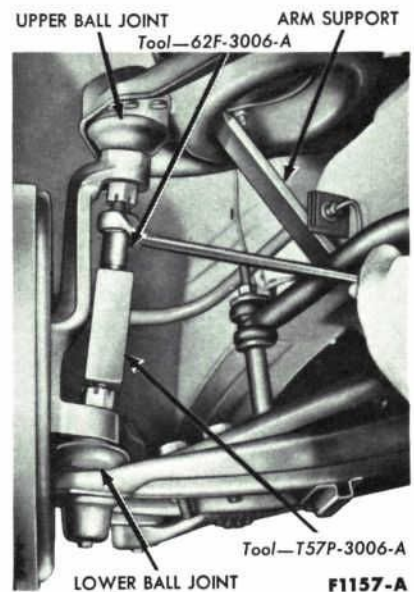


FIG. 73—Loosening Ball Joint Studs in Spindle

FRONT SPRING REPLACEMENT

REMOVAL

1. Raise the car, position safety stands under the suspension lower arms, and remove the wheel and tire assembly from the hub.

2. Remove the retaining bolts and washers, then remove the suspension bumper and bracket assembly (Fig. 5). Remove the shock absorber lower retaining nuts (Fig. 75). Remove the shock absorber upper mounting bracket

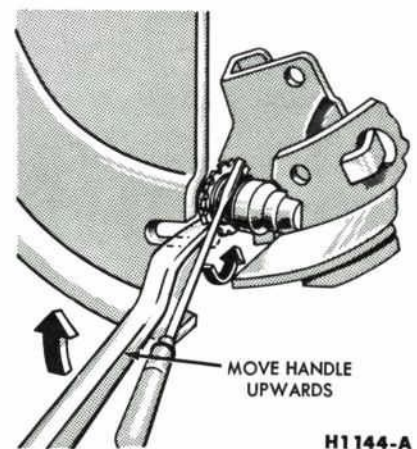


FIG. 74—Releasing Brake Adjustment

retaining bolts and washers. Move the mounting bracket-to-dash panel brace to one side, then remove the bracket and shock absorber from the car.

3. Install one mounting bracket bolt and washer to hold the spring upper seat to the spring housing while the spring is being compressed (Fig. 76). Position the spring compressing tool to the coil spring. Fit the tool pilot (Part D-3) into the spring upper seat, place the tool bearing over the pilot, and insert the tool shaft (Part D-1) through the bearing and pilot (Fig. 76). Install the tool plate (Part D-2) under the third coil from the bottom then secure the plate to the coil and tool shaft with the tool retainer (Part D-4). See Fig. 77.

4. Compress the coil spring by turning the tool shaft (Fig. 76). Remove the bolt and washer that holds the spring upper seat to the housing, then lower the spring and tool from the spring housing as an assembly (Fig. 77).

5. Place the spring and tool assembly in a vise. Scribe two marks on the narrow side of the spring upper seat for proper alignment with the replacement spring (Fig. 78). The first mark should be aligned with the centerline of the caged nut. The second mark should be 3/4-inch from the first mark and in alignment with the end of the bottom coil. Release the spring tension by turning the tool shaft and remove the tool and seat assembly from the spring.

INSTALLATION

1. Place the new spring in a vise, and position the upper seat and insulator assembly to the spring so that the mark made during removal is aligned with the end of the bottom coil (Fig. 78). If a new seat is being installed, first scribe a mark at the centerline of the caged nut on the narrow side of the seat. Position the seat to the spring with the

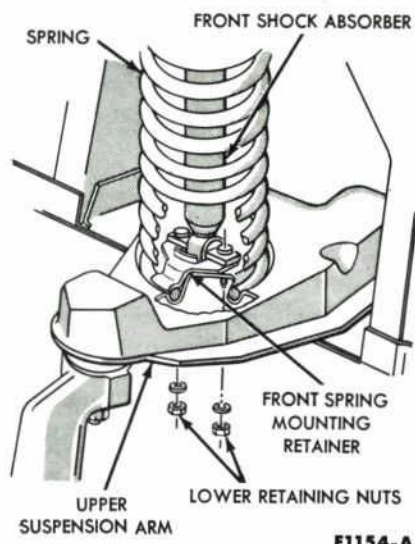


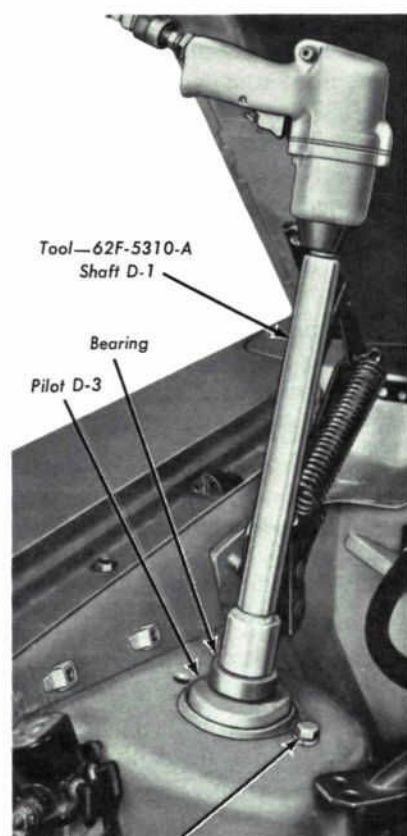
FIG. 75—Front Shock Absorber Lower Mounting

caged nut mark aligned with the end of the bottom coil. Scribe a second mark 3/4-inch clockwise from the first, then turn the seat counterclockwise until the second line is aligned with the end of the bottom coil (Fig. 78). Install the spring compressing tool (Fig. 78), and compress the spring by turning the tool shaft.

2. Position the spring and tool assembly in the spring housing with the end of the bottom coil bearing against the punched end of the recess in the spring lower seat (Fig. 77). Secure the spring upper seat to the top of the spring housing with two bolts and washers. This will hold the spring in correct position while it is being released. Release the spring by turning the tool shaft (Fig. 76).

3. Remove the bolts and washers securing the spring upper seat to the top of the spring housing. Remove the tool from the spring. Install the spring mounting retainer over the bottom coil of the spring so that the retainer holes are aligned with the shock absorber lower retaining bolt holes in the spring lower seat (Fig. 5).

4. Position the shock absorber and upper mounting bracket assembly in the car (Fig. 79). The



UPPER SEAT-TO-HOUSING BOLT F1148-A

FIG. 76—Compressing or Releasing Spring in Car

shock absorber lower retaining bolts should go through the holes in the small retaining plate and the spring lower seat.

5. Install the shock absorber lower retaining nuts (Fig. 75). Position the bracket-to-dash panel brace to the wide leg of the shock absorber mounting bracket, then install the upper mounting bracket retaining bolts and washers (Fig. 79). Install the suspension bumper and bracket assembly, and secure with retaining bolts and washers. Torque the bolts to specifications. Install the wheel and tire assembly to the hub, remove the safety stands, and lower the car. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT SHOCK ABSORBER REPLACEMENT

REMOVAL

1. Raise the front end of the car and position safety stands

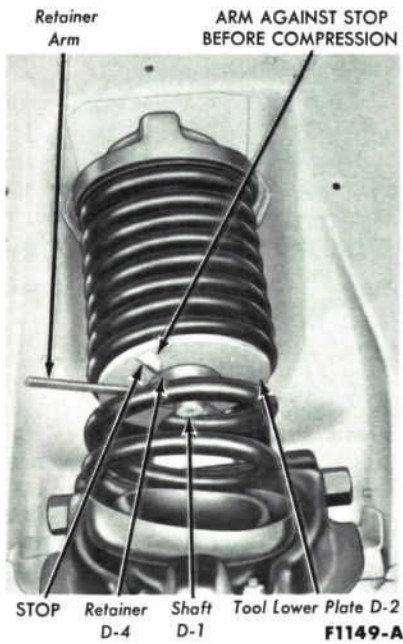


FIG. 77—Front Coil Spring Removal or Installation

under the suspension lower arms. Be sure the lower end of the shock absorber remains accessible for servicing. Remove the shock absorber lower retaining nuts and washers (Fig. 75).

2. Open the hood, then remove the two shock absorber upper mounting bracket retaining bolts. Move the mounting bracket-to-dash panel brace to one side, then remove the mounting bracket and shock absorber as an assembly (Fig. 79). Remove the shock absorber upper retaining nut, bushing, and washer, then separate

the shock absorber from the upper mounting bracket (Fig. 5). Remove the inner bushing.

INSTALLATION

1. Place the inner washer and bushing on the shock absorber shaft. Position the upper mounting bracket to the shock absorber shaft. Place the outer bushing and washer on the shock absorber shaft and install the bracket-to-shaft retaining nut. Torque the nut to specifications.

2. Install the shock absorber and upper mounting bracket assembly in the car. The shock absorber lower retaining bolts should go through the holes in the front spring mounting retainer and through the holes in the spring mounting retainer and through the holes in the spring lower seat (Fig. 75). Install the shock absorber lower retaining nuts. Torque the nuts to specifications.

UPPER ARM REPLACEMENT

REMOVAL

1. Remove the front coil spring.
2. Remove the cotter pin from the nut on the upper ball joint stud, and loosen the nut one or two turns. Do not remove the nut from the stud at this time. Position the ball joint remover tool

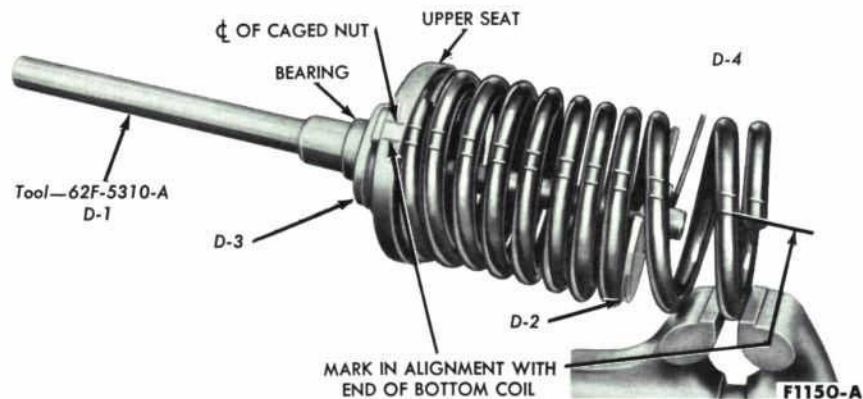


FIG. 78—Removal or Installation Tool and Upper Seat on Bench

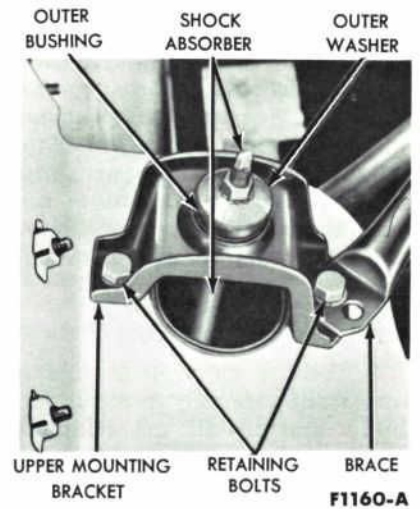


FIG. 79—Front Shock Absorber Upper Mounting

between the upper and lower ball joint studs. The tool should seat firmly against the ends of both studs and not against the stud nut (Fig. 73). Turn the tool with a wrench until the tool places the studs under tension. Tap the spindle near the upper stud with a hammer to loosen the stud in the spindle. Do not loosen the stud in the spindle with tool pressure only. If both arms are being removed, loosen the lower stud in the same manner.

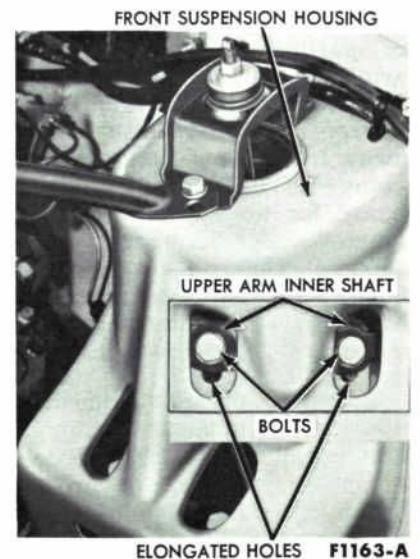


FIG. 80—Removing Upper Arm Shaft

3. Working from the engine compartment, remove the upper arm inner shaft retaining bolts and lockwashers (Fig. 80). Remove the nut from the upper ball joint stud, lift the stud out of the spindle, and remove the arm from the car. Wipe off all loose dirt from the upper arm parts. Do not wash the ball joint with a solvent.

INSTALLATION

1. Position the suspension arm and shaft assembly to the underbody and install the retaining bolts and lockwashers. The arm and shaft assembly should be positioned so that the bolts and caged nuts are centered in the elongated bolt holes. The bolts should be snug, not torqued.

2. Position the upper ball joint stud in the top of the wheel spindle, and install the stud nut. Torque the nut to specifications. If necessary, continue to tighten the nut until the cotter pin hole and the slots in the nut are aligned, and install the cotter pin. Lubricate the upper ball joint.

3. Torque the arm and shaft assembly retaining bolts to specifications. Install the front coil spring.

UPPER ARM SHAFT AND/OR BUSHING REPLACEMENT

1. Remove the front coil spring.

2. Working from the engine compartment, remove the upper arm inner shaft retaining bolts and lock washers (Fig. 80). Pull the upper arm and shaft assembly away from the underbody and swing the assembly 180° outboard for accessibility. Position a stand under the upper arm for support. Unscrew the bushings from the shaft and suspension arm, then remove the shaft from the arm.

3. Position the shaft in the arm, apply grease to the new bushings, and install the bushings loosely on the shaft and arm. Turn the bushings so that the shaft is exactly centered in the arm. The shaft will be properly centered when dimensions A and B (Fig. 81) are equal.

4. Fabricate an 8-inch spacer from a section of 3/4-inch diameter pipe or metal of comparable size and strength. Position the spacer parallel with the inner shaft, and force the spacer between the flanges of the upper arm (Fig. 82). If the spacer cannot be forced between the arm flanges due to excessive distortion, replace the upper arm assembly.

5. With the spacer positioned in the arm, torque the bushings to specifications. Move the arm on the shaft to be sure that no binding exists, then remove the spacer. Swing the arm and shaft assembly inboard to the underbody, and install the retaining bolts and lock washers. The arm and shaft assembly should be positioned so that the bolts and caged nuts are centered in the elongated bolt holes (Fig. 80). With the arm and shaft properly positioned, torque the retaining bolts to specifications. Install the front coil spring.

LOWER ARM REPLACEMENT

REMOVAL

1. Position a support between both the left and the right suspension upper arms and the frame. Fig. 73 shows the support under one arm. Raise the car and position safety stands. Remove the stabilizer bar and link retaining nut. Disconnect the bar from the link and remove the link bolt (Fig. 83).

2. Remove the strut to lower arm retaining nuts and bolts. Remove the cotter pin from the nut

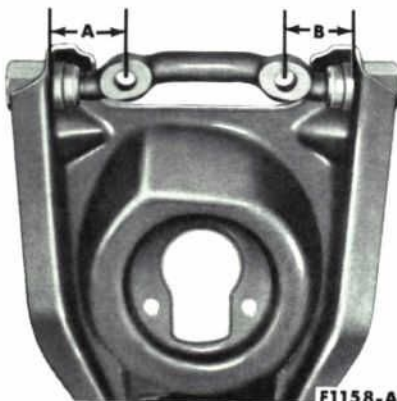


FIG. 81 — Centering Shaft in Arm

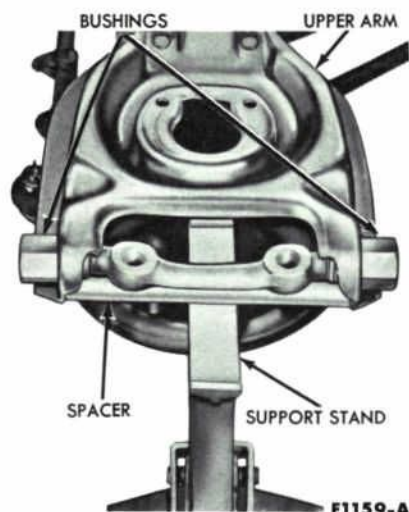


FIG. 82 — Upper Arm Shaft

on the lower ball joint stud, and loosen the nut one or two turns. Do not remove the nut from the stud at this time.

3. Straighten the cotter pin on the upper ball joint stud nut. Position the ball joint remover tool between the upper and lower ball joint studs in the reverse position from that shown in Fig. 73. The tool should seat firmly against the ends of both studs and not against the stud nuts. Turn the tool with a wrench until the tool places the studs under tension. Tap the spindle with a hammer

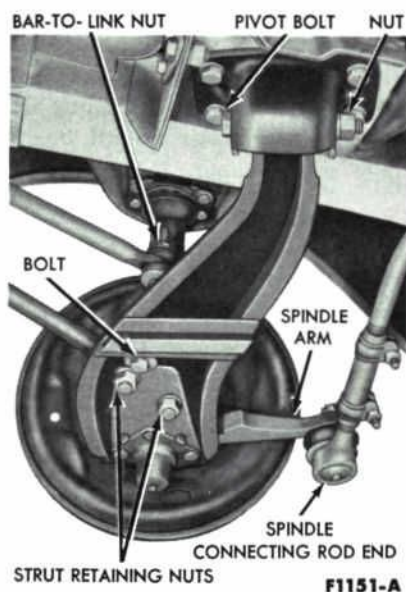


FIG. 83 — Lower Suspension Arm Installed

near the lower stud to loosen the stud in the spindle. Do not loosen the stud in the spindle with tool pressure only.

4. Remove the nut from the lower ball joint stud, and lower the arm. Remove the lower arm to underbody pivot bolt, nut, and washer. Remove the lower arm.

INSTALLATION

1. Position the lower arm to the underbody bracket and loosely install the pivot bolt, washer, and nut (Fig. 83). Raise the lower arm and guide the lower ball joint stud into the spindle bore. Loosely install the stud retaining nut.

2. Install the stabilizer link bolt, washers, bushings, and spacer. Connect the stabilizer bar to the link. Install the nut and torque to specifications.

3. Position the strut to the lower arm and install the retaining bolts and nuts. Torque the nuts to specifications. Torque the lower ball joint stud nut to specifications. If necessary, continue to tighten the nut until the cotter pin hole and the slot in the nut are aligned and install a new cotter pin.

4. Torque the lower arm-to-underbody pivot bolt and nut to specifications. Remove the safety stands and lower the car. Remove the supports from between the

upper arms and the frame. Check and, if necessary, adjust caster, camber, and toe-in.

LOWER ARM PARTS INSPECTION

Replacement arms are equipped with the ball joint and ball joint components. Inspect the lower arm for cracks, distortion, or other visible damage. Check the ball joint, socket, bushings, and the rubber seal for cracks, tears, or other visible damage. If the ball joint is damaged, replace the entire lower arm.

If only the rubber seals are damaged, remove all the rivets, the retaining plate, and the seal. Position the seal on the ball joint, align the rivet holes in the seal retainer and the ball joint with the holes in the arm, and secure the parts with the specified bolts and nuts. Torque the nuts to specifications.

STABILIZER REPLACEMENT

1. Raise the car high enough to provide working space, and place supports under both front wheels. Disconnect the stabilizer from each link. Disconnect both stabilizer retaining brackets, and remove the stabilizer. Coat the necessary parts of the stabilizer with Ru-GLYDE or a comparable lubricant and slide new insulators onto the stabilizer.

2. Connect the stabilizer retaining brackets, and connect the stabilizer to both links. Torque the bracket retaining screws and the link bolt nuts to specifications.

LOWER ARM STRUT AND/OR BUSHING REPLACEMENT

1. Position the block (Fig. 73) under the upper arm for support. Raise the car, position safety stands, and remove the wheel and tire.

2. Remove the cotter pin and the strut-to-bracket forward retaining nut, washer, and insulator bushing. Remove the strut-to-lower arm retaining nuts and bolts, then lift the strut with the rear insulator bushing and washer from the car.

3. Install the new rear washer and insulator bushing on the forward end of the strut rod. Position the strut into the mounting bracket and to the lower suspension arm. Install the strut-to-arm retaining bolts and nuts. Torque the nuts to specifications.

4. Install the forward insulator bushing, washer, and nut to the forward end of the strut. Torque the strut rod nut to specifications. Install a new cotter pin. Install the wheel and tire, remove the safety stands, and lower the car. Remove the block supporting the upper arm.

3 GALAXIE FRONT SUSPENSION

UPPER ARM REPLACEMENT

REMOVAL

1. Raise the car until the front wheel clears the floor, and place a support under the lower arm. Remove the wheel and tire. Remove the cotter pin from the nut on the upper ball joint stud, and loosen the nut one or two turns. Do not remove the nut from the stud at this time.

2. Place a box wrench over the lower end of the ball joint remover tool, and insert the tool between the upper and lower ball joint studs (Fig. 84). The tool should seat firmly against the ends of both studs and not against the stud nuts. Turn the wrench until

tension is exerted on each stud, and then tap the spindle near the upper stud with a hammer to loosen the stud in the spindle. Do not loosen the stud in the spindle with tool pressure only. If both arms are being removed, loosen the lower stud in the same manner as the upper stud.

3. Remove the nut from the upper stud and lift the stud out of the spindle. Support the spindle to prevent damage to the brake hose. Remove the nuts from the retaining bolts on the upper arm inner shaft, using the tool shown in Fig. 85.

4. Remove the upper arm from the mounting bracket, and measure the total shim thickness at each

inner shaft bolt for assembly reference. Wipe off all loose dirt from the upper arm parts. Do not wash the ball joint with a solvent.

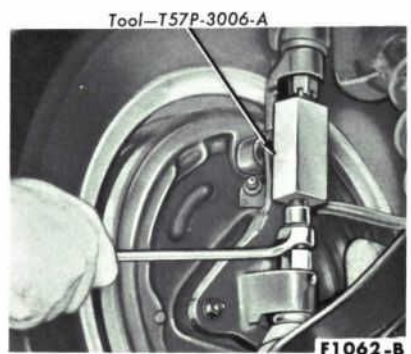


FIG. 84—Ball Joint Remover Tool

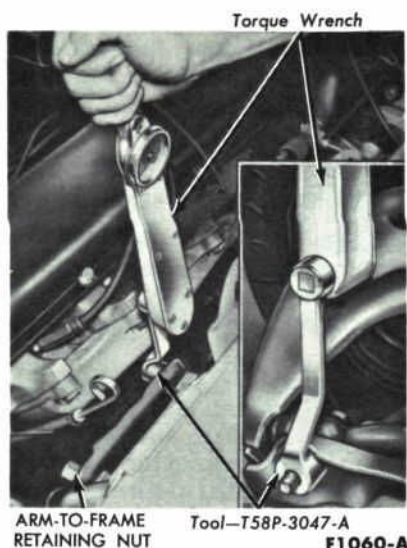


FIG. 85—Inner Shaft Retaining Nut Installation

INSTALLATION

1. Position the upper arm on the frame mounting bracket, and install but do not tighten the nuts and lock washers on the two inner shaft retaining bolts. Be sure to use the specified keystone-type lock washers. Install the adjusting shims on both bolts between the inner shaft and the frame bracket. Install the same shim thicknesses that were removed from both bolts during disassembly.

2. Using the tool shown in Fig. 85, torque the nuts to specifications. The wrench and tool must stay in line (as shown) during the tightening operation. Position the upper ball joint stud in the top of the wheel spindle, and install the stud nut. Torque the nut to specifications. If necessary, turn the nut further to align the cotter pin hole and slots. Install a new cotter pin.

3. Install the wheel and tire, and then remove the support from under the lower arm. Check and, if necessary, adjust the caster, camber, and toe-in. Whenever any part of the front suspension has been removed and installed, be sure to check the front wheel alignment.

UPPER ARM PARTS INSPECTION

Inspect the upper arm and the inner shaft for cracks, distortion, or other visible damage. Check the bushings, the rubber seal on

the ball joint stud, and the rubber bumper on the arm for cracks, tears, distortion, or other visible damage. Replace all parts found to be defective.

Install the nut on the ball joint stud and turn the stud in the ball joint with a torque wrench. If the turning effort is not within specifications, replace the ball joint.

UPPER BALL JOINT REPLACEMENT—ARM IN CAR

1. Raise the car high enough to provide working space, and place a support under the lower arm. If a chain hoist or a jack that has a narrow contact pad is to be used on the bumper to raise the car, distribute the load along the bumper by using a steel plate 3 or 4 inches long as a contact pad to prevent damaging the bumper.

2. Remove the wheel and tire. Drill a 1/8-inch hole through each upper ball joint retaining rivet. Use a large chisel and cut off the rivets. Remove the upper arm suspension bumper. Remove the cotter pin and nut from the upper ball joint stud.

3. Refer to "Upper Arm Replacement" (step 2), and remove the ball joint. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

4. Attach the new ball joint to the upper arm. Use only the specified bolts, nuts, and washers. Do not rivet the new ball joint to the arm. Torque the nuts to specifications. Install the upper arm suspension bumper and torque the nut to specifications.

5. Position the ball joint stud in the spindle bore, and torque the retaining nut to specifications. Turn the nut further if required, and install a new cotter pin. Install the wheel and tire. Remove the safety stands, and lower the car. Check and, if necessary, adjust caster, camber, and toe-in.

UPPER BALL JOINT REPLACEMENT—ARM REMOVED

1. Remove the ball joint from the arm. If the ball joint is riveted to the arm, drill a 1/8-inch hole completely through each rivet,

and then drill off the rivet head through the pilot hole with a 3/8-inch drill. Drive all rivets out of the holes.

2. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if cracks are found.

3. Install a new ball joint on the arm. Use only the specified bolts, nuts, and washers. Do not rivet the new ball joint to the arm. Torque the ball joint retaining nuts to specifications.

INNER SHAFT AND/OR BUSHING REPLACEMENT

1. Raise the car to provide working space, and remove the wheel and tire as a unit. After noting the number and location of the adjusting shims, use the tool shown in Fig. 85 to remove the inner shaft retaining nuts, bolts, washers, and shims.

2. Swing the upper arm upward and outward to provide working space. Remove the bushings and shaft from the arm.

3. Lubricate the new bushings. Install the bushings and inner shaft so that the inner shaft is exactly centered in the arm. Use the tool shown in Fig. 86 for centering the shaft in the arm, and position the bushings carefully to avoid damaging the O-rings inside the bushings. Torque the bushings to specifications, then remove the centering tool.

4. Swing the arm back to its normal position, and partially install the inner shaft retaining bolts, shims, washers, and nuts. Install the same shim thicknesses that were removed from both bolts during disassembly. Using the tool shown in Fig. 85, torque the nuts to specifications. To attain the specified torque with the special tool, turn the nut until 50 ft-lbs is shown on the torque wrench.

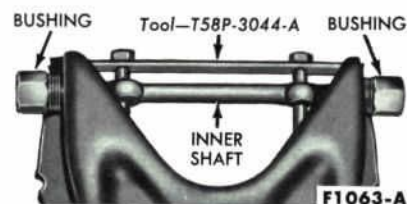


FIG. 86—Upper Arm Inner Shaft Bushing Installation

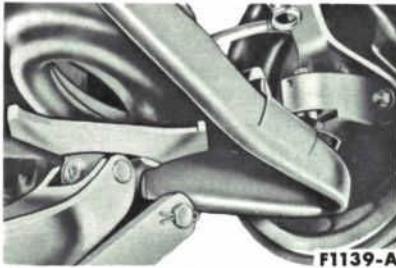


FIG. 87 – Jack Positioned Under Lower Arm

The wrench and tool must stay in line (as shown) during the tightening operation.

5. Install the wheel and tire to the hub, and lower the car. Check and, if necessary, check caster, camber, and toe-in.

LOWER ARM AND COIL SPRING REPLACEMENT

1. Raise the car so that the front wheels are about 8 inches off the floor, and place supports under both frame side members just back of the lower arms. Remove the retaining nuts, and remove the stabilizer.

2. Disconnect the lower end of the shock absorber and push it up to the retracted position. Remove the cotter pin from the nut on the lower ball joint stud and loosen the nut one or two turns. Do not remove the nut from the stud at this time. Straighten the cotter pin on the upper ball joint stud nut.

3. Using the remover tool, loosen the lower stud in the spindle. Place a jack under the lower arm at approximately a 60° angle away from the wheel and toward the center of the car. Hook the saddle of the jack over the outer edge of the spring seat (Fig. 87).

4. Remove the nut from the lower stud, and slowly lower the arm until the spring is fully extended (Fig. 88). Apply foot pressure to the lower suspension arm to push the arm inward so that the spring and insulator assembly may be lifted from the car (Fig. 89).

5. Remove the lower arm retaining bolts, washers, and shims, and remove the arm from the car. Note the respective front and rear position of the 2 different retaining bolts for assembly reference.

6. Mount the lower arm to the frame crossmembers. Insert the

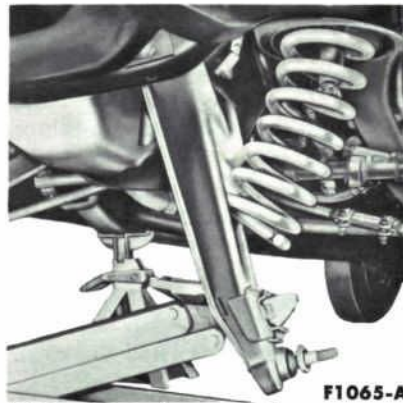


FIG. 88 – Lowering or Raising Lower Arm

large diameter bolt from the rear side of the rear crossmember and through the arm. Position the insulator and washers on the small retaining bolt and turn the small bolt into the internal threads of the large diameter bolt. Do not tighten.

7. Install the forward bolt from the front side of the front crossmember with sufficient shims between the crossmember and arm to prevent forward and backward movement of the arm. Install the insulator, washer, and retaining nut on the bolt but do not tighten.

8. Tape the insulator (and shim assembly, if so equipped) to the top of the coil spring. Position the insulator and spring in the upper suspension arm spring pocket, and hook the lower end over the edge of the lower arm pocket by applying foot pressure inward on the lower arm (Fig. 89). The spring coil end must be seated correctly in the lower pocket.

9. Position the jack directly behind the lower arm at approximately a 60° angle away from the wheel and toward the center of the car. Push the jack outboard as it is raised to align the ball stud with the spindle bore (Fig. 90). Apply downward pressure on the top of the wheel to permit the ball joint shoulder to slip over the edge of the bore into position. Torque the lower ball joint stud nut to specifications and remove the jack. Install the lower ball joint retaining nut cotter pin and bend the upper ball joint retaining nut cotter pin.

10. Torque the lower arm retaining bolts and nut to specifications. The lower arm should be



FIG. 89 – Coil Spring Removal or Installation

in a normal load position when the retaining bolts are tightened.

11. Expand the shock absorber and connect it to the arm. Install the stabilizer assembly with the car weight on the wheels to insure correct seating of the rubber insulator. Install the wheel and tire.

12. Check and, if necessary, adjust caster, camber, and toe-in.

LOWER ARM PARTS INSPECTION

Inspect the lower arm for cracks, distortion, or other visible damage. Check the ball joint and socket, the bushings, the rubber seal on the ball joint stud, and the rubber bumper on the arm for cracks, tears, distortion, or other visible damage. Replace all parts found to be defective.

LOWER ARM BUSHING REPLACEMENT

Always replace both lower arm bushings if either bushing is worn or damaged.



FIG. 90 – Ball Stud and Spindle Bore Alignment

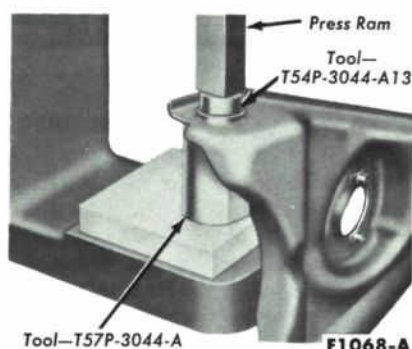


FIG. 91—Lower Arm Bushing Removal

Position the bushing remover tools (Fig. 91) and press both bushings out of the arm. Press new bushings into the arm with the tools shown in Fig. 92. The bushing flanges must be at the inner sides of the lower arm.

LOWER BALL JOINT REPLACEMENT—ARM REMOVED

The lower ball joint is replaced in the same manner as the upper ball joint. Refer to "Upper Ball Joint Replacement — Arm Removed", and follow that procedure to replace the lower ball joint.

LOWER BALL JOINT REPLACEMENT—ARM IN CAR

1. Refer to "Upper Ball Joint Replacement — Arm in Car" (steps 1 and 2), to remove the rivets from the ball joint.

2. Position a jack or safety stand under the lower arm and lower the car about 6 inches to offset the coil spring tension. Remove the cotter pin from the ball joint stud, and remove the nut.

3. Using the remover tool, loosen the lower stud in the spin-

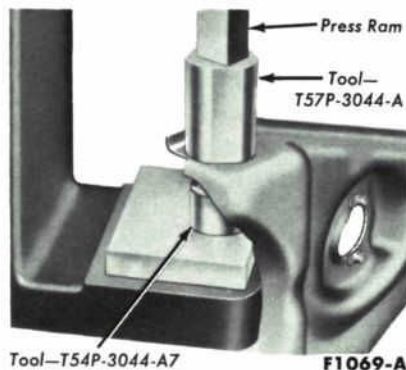


FIG. 92—Lower Arm Bushing Installation

dle and remove the ball joint. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

4. Position the stud of the ball joint to the spindle bore, and install the retaining nut finger-tight. Attach the ball joint to the lower arm. Use only specified bolts, nuts, and washers. **Do not rivet the new ball joint to the arm.** Torque the retaining nuts to specifications.

5. Torque the ball joint stud nut to specifications and install a new cotter pin. Remove the jack. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT WHEEL SPINDLE REPLACEMENT

1. Raise the car until the front wheel clears the floor, and place a support under the lower arm. Remove the cover from the brake adjusting hole and back off the brake adjustment by prying upward on the adjusting screw lugs. Remove the wheel hub, and drum assembly, and remove the brake carrier plate assembly. Support the plate to prevent damage to the brake hose.

2. Disconnect the spindle connecting rod end from the spindle arm with tool CJ 89-1. Remove the cotter pins from both ball joint stud nuts, and loosen the nuts one or two turns. Do not remove the nuts from the studs at this time.

3. Place a box wrench over the lower end of the ball joint remover tool, and insert the tool between the upper and lower ball joint studs (Fig. 84). The tool should seat firmly against the ends of both studs and not against the stud nuts.

4. Turn the wrench until tension is exerted on both studs, and, with a hammer, tap the spindle near the studs to loosen them in the spindle. **Do not loosen the studs in the spindle with tool pressure only.**

5. Remove both ball joint stud nuts, raise the upper suspension arm, and remove the spindle from both studs.

6. Position the spindle on both ball joint studs and install the

stud nuts. Torque the stud nuts to specifications, and install new cotter pins. Connect the spindle connecting rod to the spindle arm.

7. Position the brake carrier plate to the spindle, install the retaining bolts and nuts, and torque the nuts to specifications. Install the wheel, hub, and drum bearings, then adjust the wheel bearings. Adjust the brakes. Check and if necessary, adjust caster, camber, and toe-in.

FRONT SHOCK ABSORBER REPLACEMENT

1. Raise the front of the car and place supports under both suspension lower arms. Be sure that the lower end of the shock absorber remains accessible for servicing. Remove the retaining nut, washer, and rubber bushing from the upper end of the shock absorber shaft (Fig. 93). Remove one lower bushing mounting bolt and loosen the other (Fig. 94). Slide the bushing assembly off the loosened bolt, then lower the shock absorber through the hole in the suspension arm.

2. If the shock absorber is serviceable and the bushing requires replacing, remove the old bushing from the lower end of the shock absorber (Fig. 95). Apply RUGLYDE or a comparable lubricant to the replacement bushing,



FIG. 93—Front Shock Absorber Upper Mounting

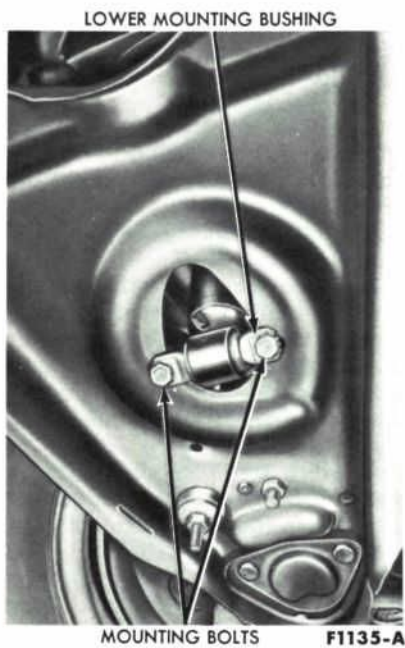


FIG. 94—Front Shock Absorber Lower Mounting

and install the bushing on the shock absorber (Fig. 96) with one quick drive of the press ram.

3. Place the inner washer and bushing on the shock absorber shaft. Expell all air by holding the shock absorber in the normal

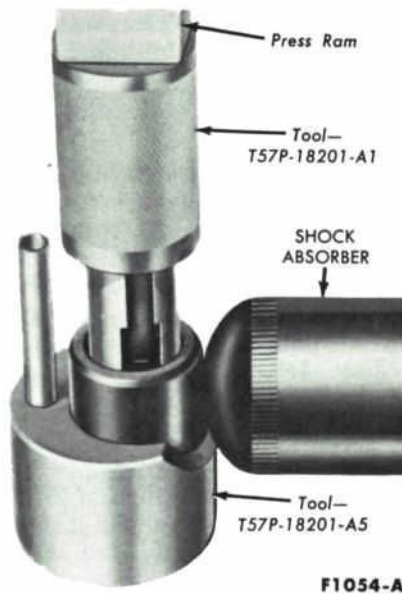


FIG. 95—Front Shock Absorber Bushing Removal

upright position and pulling the shaft out to extend it to its full length. Invert the shock absorber and push the shaft in to compress to its shortest length.

4. Extend the shock absorber and insert it through the hole in the lower arm and through the

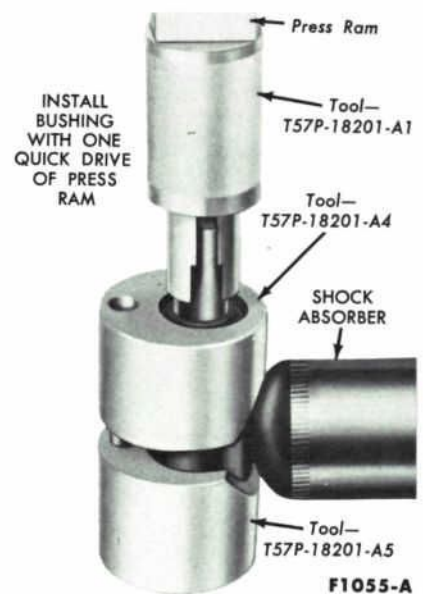


FIG. 96—Front Shock Absorber Bushing Installation

coil spring so that the shaft will go through the hole in the upper mounting bracket. Be sure the mounting bracket is free of burrs. Install the upper bushing and the outer washer on the shaft, and torque the nut to specifications (Fig. 93). Torque the lower mounting bolts to specifications.

4 THUNDERBIRD FRONT SUSPENSION

UPPER BALL JOINT REPLACEMENT—ARM IN CAR

1. Raise the front of the car and position safety stands under the chassis. Remove the wheel and tire assembly from the hub.

2. Using a large chisel, cut off the three upper ball joint retaining rivets. If the rivets can not be removed with a chisel, use a drill. Do not bend the arm when driving out the rivets. Remove the cotter pin and loosen the upper ball joint stud nut. Place a box wrench over the lower end of the remover tool and position the tool as shown in Fig. 97. The tool should seat firmly against the ends of both studs, and not against the lower stud nut. It may be necessary to remove the cotter pin from the lower ball joint stud, if the cotter pin prevents the tool from seating on the lower stud.

3. Turn the tool with a wrench until both studs are under tension, and then, loosen the stud from the spindle by tapping the spindle near the upper stud with a hammer. Do not loosen the stud with tool pressure only. Remove the ball joint.

4. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

5. Position the new ball joint to the upper arm and secure in place with the specified bolts, nuts, and washer. Do not rivet the new ball joint to the arm. Torque the nuts to specifications. Position the ball joint stud in the spindle bore and install the retaining nut. Torque the nut to specifications and install a new cotter pin. If necessary, tighten the nut slightly to align the slots with the cotter pin hole.

6. Lubricate the ball joint, and install the wheel and tire to the hub. Remove the safety stands from under the chassis and lower the car. Check and, if necessary, adjust caster, camber, and toe-in.

FRONT WHEEL SPINDLE REPLACEMENT

1. Raise the front of the car and position safety stands under the chassis. Remove the wheel, hub, and drum assembly.

2. Remove the brake carrier plate assembly from the spindle by removing the four retaining bolts and nuts. Wire the brake carrier plate to a convenient place on the chassis to prevent damage to the brake hose.

3. Remove the cotter pin and retaining nut from the spindle connecting rod end, and separate the rod end from the spindle using

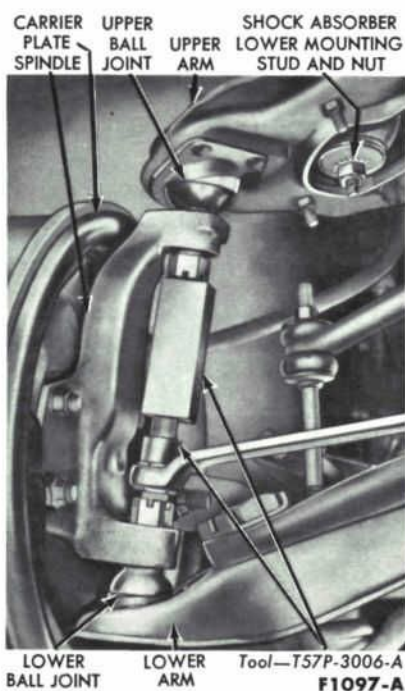


FIG. 97—Loosening Ball Joint Stud

tool CJ 89-1. Remove the cotter pins and loosen the ball joint stud nuts. Place a box wrench over the lower end of the remover tool and position the tool as shown in Fig. 97. The tool should seat firmly against the ends of both studs, not against the stud nuts.

4. Turn the wrench until both studs are under tension, then loosen the studs in the spindle by tapping the spindle near the studs with a hammer. Do not loosen the studs in the spindle with tool pressure only. Remove the stud nuts and the spindle from both ends.

5. Position the new spindle to the upper and lower ball joints studs and install the stud nuts. Torque the stud nuts to specifications. If necessary, slightly tighten the nuts until the slots and the cotter pin hole are aligned, and install new cotter pins.

6. Place the spindle connecting rod end on the spindle arm and install the retaining nut. Torque the retaining nut to specifications and install a new cotter pin. Position the brake carrier plate to the spindle and secure in place with the four retaining bolts and nuts. Torque the nuts to specifications.

7. Assemble the brake carrier plate assembly to the spindle, in-

stall the retaining bolts and nuts, and torque to specifications.

8. Install the wheel, hub, and drum assembly and adjust the wheel bearings.

9. Adjust the brakes. Lubricate the steering stop on the lower arm and the mating flat on the spindle. Remove the safety stands, lower the car, and check camber, caster, and toe-in.

FRONT SHOCK ABSORBER REPLACEMENT

1. Raise the front of the car, position a safety stand under the lower suspension arm, and lower the car slightly. Remove the retaining nut, washer, and insulator securing the shock absorber to the spring lower seat (Fig. 98).

2. In the engine compartment, remove the shock absorber upper mounting plate retaining bolts and the bolts that attach the mounting plate-to-dash panel brace at the dash panel (Fig. 99). Lift the shock absorber, upper mounting plate, and upper

mounting plate-to-dash panel brace from the car as an assembly.

3. Remove the shock absorber upper retaining nut, insulator, and washer, and separate the shock absorber from the upper mounting plate (Fig. 99).

4. Place the mounting plate, washer, and insulator in position on the shock absorber upper mounting stud and secure in place with the retaining nut. Torque the retaining nut to specifications.

5. Place the shock absorber and mounting assembly in position in the engine compartment and secure in place with the upper mounting plate bolts and the dash panel brace bolts. Torque the bolts to specifications.

6. Secure the lower end of the shock absorber to the spring seat by installing the insulator, washer, and retaining nut. Torque the retaining nut to specifications. Remove the safety stands and lower the car.

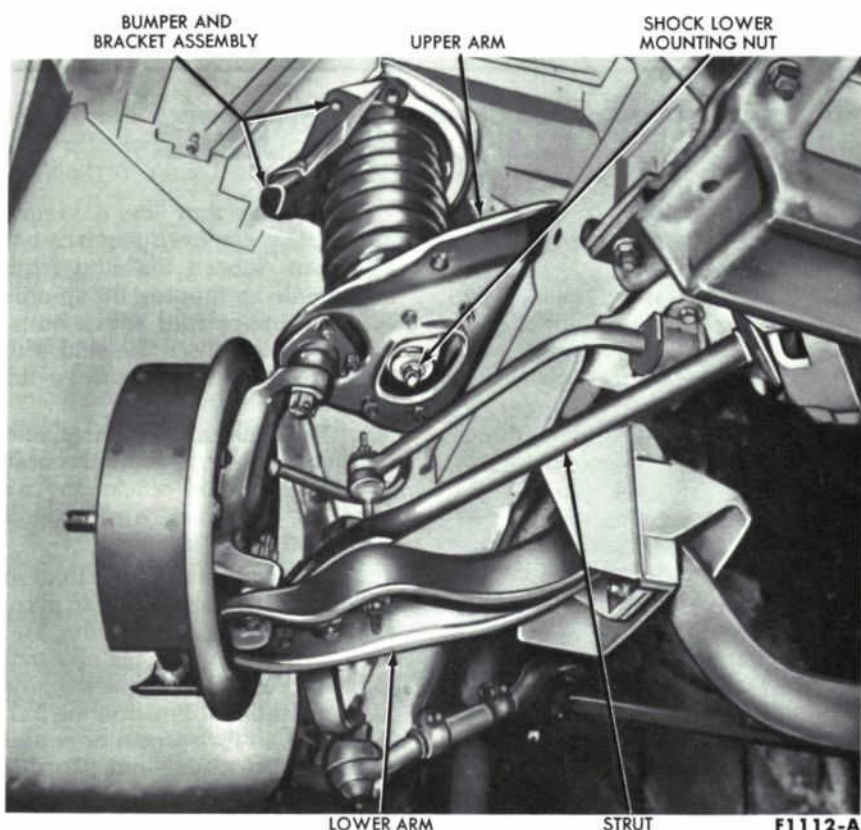
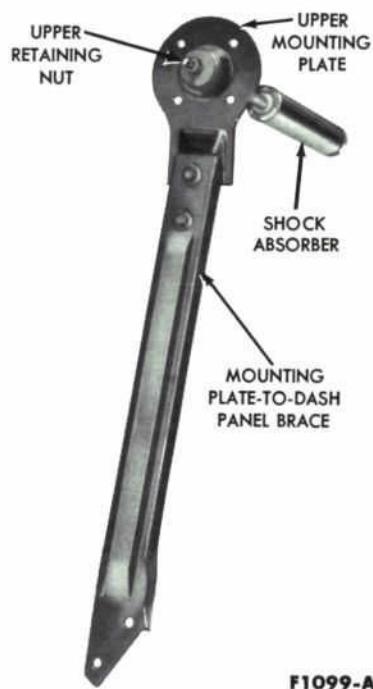


FIG. 98—Front Suspension



F1099-A

FIG. 99—Front Shock Absorber Mounting Assembly

FRONT SPRING REPLACEMENT

REMOVAL

1. Raise the car and position safety stands. Remove the wheel and tire assembly, and remove the shock absorber.

2. Remove the retaining bolts and washers from the upper suspension arm bumper and bracket and remove the bumper and bracket. Insert the lock bar of the spring compressing tool through the top of the spring, and position the bar on the seventh coil from the bottom (Fig. 100). Slide the tool bearing over the tool shaft against the integral nut. Insert the shaft through the shock absorber mounting hole in the spring lower seat, so that the end of the shaft will thread into the lock bar. As the shaft is turned into the lock bar, the spring will be compressed.

3. Compress the spring until the top coils are drawn out of the spring upper seat. Remove the tapered shim, and pivot the spring outward (Fig. 101). Turn the tool shaft out of the lock bar to release the spring. Remove the tool

bar and shaft from the spring, and lift the spring out of the lower seat.

INSTALLATION

1. Place the tapered shim in the top of the spring housing with the thick portion of the shim toward the centerline of the car. Retain the shim in the housing with tape.

2. Insert one helix type insulator between the two top coils of the spring and attach the other to the bottom coil (Fig. 102). Secure both insulators in place with tape. Place the flat rubber insulator over the top of the spring, and secure it in position with tape in three places as shown in Fig. 101.

3. With the tapered shim and insulators in place, set the lower end of the spring in the lower seat. Slide the bearing of the spring compressing tool over the tool shaft against the integral nut. Insert the shaft through the shock absorber mounting hole in the spring lower seat. Insert the lock bar of the tool on the seventh coil from the spring lower end.

4. Thread the shaft of the tool into the lock bar until the spring is completely compressed, then tilt the spring inward so that the top coils are aligned with the spring upper seat. Turn the tool

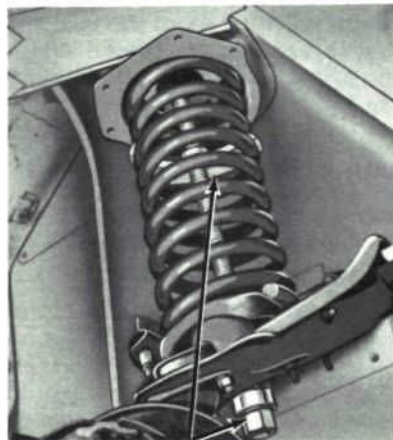
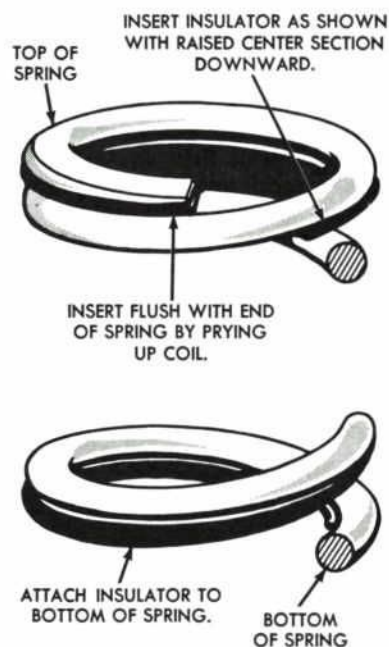


FIG. 100—Front Spring Remover Tool



F1145-A

FIG. 101—Front Spring Insulator Installation

shaft out of the tool lock bar. As the shaft is turned, the spring will start to return to the uncompressed position. Guide the spring into the spring upper seat.

5. Remove the lock bar of the tool through the top of the spring. Slide the tool shaft out of the shock absorber mounting hole in the spring lower seat.

6. Install the shock absorber assembly. Install the upper bumper and bracket assembly. Torque the retaining bolts to specifications. Install the wheel and tire assembly. Remove the safety stands, lower the car, and check caster, camber, and toe-in.

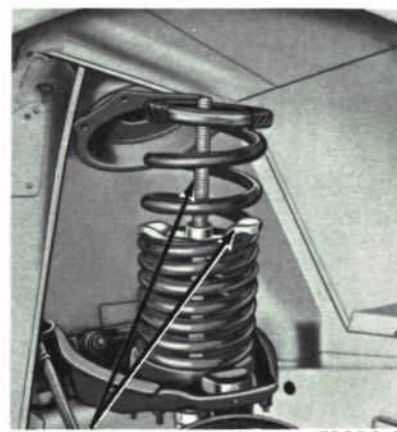


FIG. 102—Front Spring Compressed

UPPER ARM REPLACEMENT

REMOVAL

1. Raise the car, position safety stands, and remove the wheel and tire assembly. Remove the shock absorber and the coil spring.

2. Remove the cotter pin and loosen the upper ball joint stud nut. Place a box wrench over the lower end of the remover tool as shown in Fig. 97. The tool should seat firmly against the ends of both studs and not against the lower stud nut. It may be necessary to remove the cotter pin from the lower ball joint stud, if the cotter pin prevents the tool from seating on the lower stud.

3. Turn the wrench until both studs are under tension, then loosen the upper stud from the spindle by tapping the spindle near the upper stud with a hammer. Do not loosen the stud with tool pressure only. Disengage the upper ball joint stud from the spindle. Remove the upper arm inner shaft retaining nuts and washers, then remove the assembly from the mounting studs on the underbody.

4. Remove the stud nuts that secure the spring lower seat assembly to the upper arm (Fig. 103). Remove the grease fittings from the pivot bolts (spring seat bushings), then remove the spring seat assembly from the arm.

INSTALLATION

1. Insert the studs of the spring seat through the holes in the new upper arm, and secure the seat to the arm with stud nuts. Torque

the stud nuts to specifications. Install the grease fittings in the pivot bolts (spring seat bushings).

2. Position the upper arm and inner shaft assembly on the mounting studs and secure in place with the nuts and washers. Torque the nuts to specifications. Insert the upper ball joint stud in the spindle, and install the stud nut. Torque the nut to specifications. If necessary, slightly tighten the nut until a slot is aligned with the cotter pin hole, and install a new cotter pin.

3. Install the coil spring, the shock absorber, and the bumper and bracket assembly. Remove the safety stand, lower the car, and check the caster, camber, and toe-in.

UPPER ARM PARTS INSPECTION

Inspect the upper arm, the inner shaft, and the spring seats for cracks, distortion, or other visible damage. Replacement arms are equipped with the bushings, inner shaft, and the ball joint. If the original arm is to be used, these components should be replaced on the bench.

UPPER ARM OVERHAUL—ARM REMOVED

BUSHING AND INNER SHAFT REPLACEMENT

Always replace both upper arm bushings, if either bushing is worn or damaged. Install only new bushings when replacing the inner shaft.

1. Position the upper arm inner shaft in a vise, then unscrew the

bushings from the shaft and arm. Remove the assembly from the vise, and separate the inner shaft from the arm.

2. Position the shaft in the arm, apply grease to the new bushings, and install the bushings loose on the shaft and arm. Turn the bushings so that the shaft is exactly centered in the arm. The shaft will be properly centered when located at the dimension shown in Fig. 103.

3. Fabricate a 9 1/2-inch spacer from a section of 3/4-inch diameter pipe or metal of comparable size and strength. Position the arm and inner shaft assembly in a vise. Place the spacer parallel with the inner shaft, and force the spacer between the flanges of the upper arm. If the spacer cannot be forced between the arm flanges, the upper arm assembly must be replaced.

4. With the spacer positioned in the arm, torque the bushings to specifications. Move the arm on the shaft to be sure that no binding exists, then remove the spacer.

BALL JOINT REPLACEMENT

The upper ball joint cannot be repaired and must be replaced if it is worn or damaged.

1. Remove the ball joint from the arm. If the ball joint is riveted to the arm, drill a 1/8-inch pilot hole completely through each rivet, and then drill the rivet head off through the pilot hole with a 3/8-inch drill. Drive all rivets out of the holes.

2. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

3. Install a new ball joint on the arm. Use only the specified bolts, nuts, and washers. Do not attempt to rivet the new ball joint to the arm. Torque the ball joint retaining nuts and bolts to specifications. Lubricate the ball joint.

LOWER ARM REPLACEMENT

REMOVAL

1. Raise the car, position safety stands, and remove the wheel and hub. Disconnect the brake carrier plate and support it to prevent damage to the brake line.

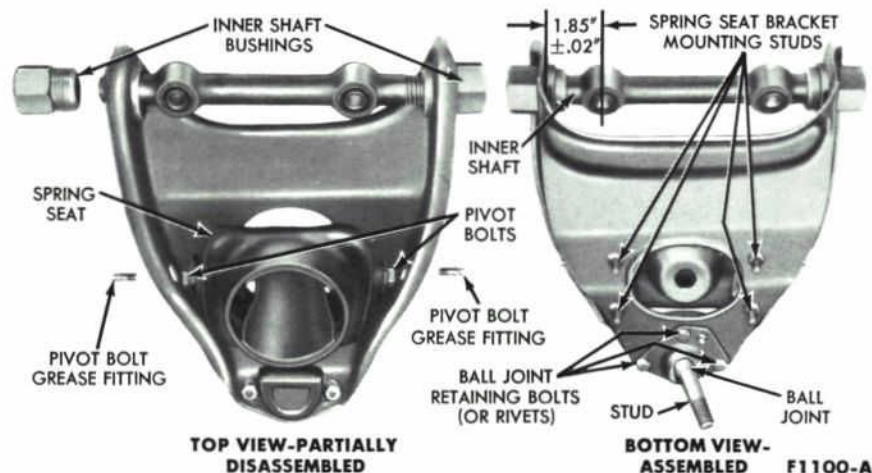


FIG. 103—Upper Suspension Arm

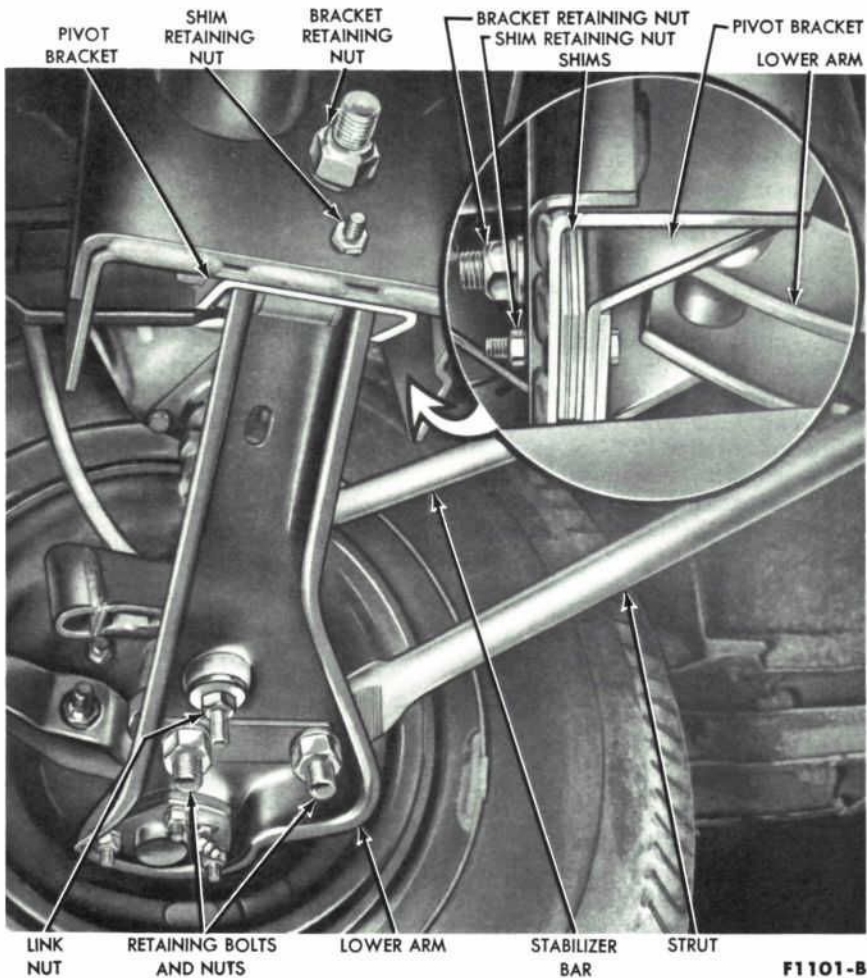


FIG. 104—Lower Suspension Arm Installed

Remove the link nut under the arm (Fig. 104), and disconnect the stabilizer link from the arm.

2. Remove the retaining nuts, bolts, washers, and plates, and then disconnect the strut from the lower arm (Fig. 104).

3. Remove the cotter pin and loosen the lower ball joint stud nut. Place a box wrench over the end of the remover tool, and position the tool 180° from the position shown in Fig. 97 (wrench at the top). The tool should seat firmly against the ends of both studs, not against the upper stud nut. It may be necessary to remove the cotter pin from the upper ball joint stud, if the cotter pin prevents the tool from seating on the upper stud.

4. Turn the wrench until both studs are under tension, then loosen the stud from the spindle by tapping the spindle near the lower stud with a hammer. Do not

loosen the stud with tool pressure only. Disengage the lower ball joint and stud from the spindle.

5. Remove the pivot bracket retaining nut and the shim retaining nut (Fig. 104), then remove the bracket and lower arm assembly from the car. Place the assembly in a vise and remove the nut from the pivot bolt (Fig. 105). Remove the pivot bolt and separate the pivot bracket from the lower arm.

INSTALLATION

1. Attach the pivot bracket to the new lower arm with the pivot bolt. Place the assembly in a vise, and install the pivot bolt nut (Fig. 105). Tighten the nut snug. Do not torque until the lower arm assembly is installed in the car. Slide the shims over the retaining bolts against the pivot bracket (Fig. 105). Position the lower arm and pivot bracket assembly to the

chassis mounting bracket (Fig. 104). Install the pivot bracket and shim retaining nuts. Torque to specifications.

2. Insert the lower ball joint stud in the lower bore of the wheel spindle, and install the stud nut. Tighten the nut to specifications, then continue to tighten until the cotter pin slots are aligned with the cotter pin hole. Install a new cotter pin. Position the lower arm strut to the lower suspension arm and secure in place with the retaining plates, bolts, washers, and nuts (Fig. 104). Torque the nuts to specifications.

3. Connect the stabilizer bar link to the lower suspension arm, and install the washers, bushings and link retaining nut. Torque the nut to specifications. Torque the pivot bolt and nut at the lower arm pivot bracket to specifications. Lubricate the ball joint and steering stop on the lower arm and the mating flat on the spindle.

4. Install the brake carrier plate and dust shield to the spindle and torque the retaining nuts to specifications. Install the wheel, hub, and drum assembly. Remove the safety stands, lower the car, and check the caster, camber, and toe-in.

LOWER ARM PARTS INSPECTION

Inspect the lower arm, the inner bushings, and the pivot bolt for cracks, distortion, or other visible damage. Install the nut on the ball joint stud, and turn the stud in the ball joint with a torque wrench. If the turning effort is not within specifications, replace the ball joint.

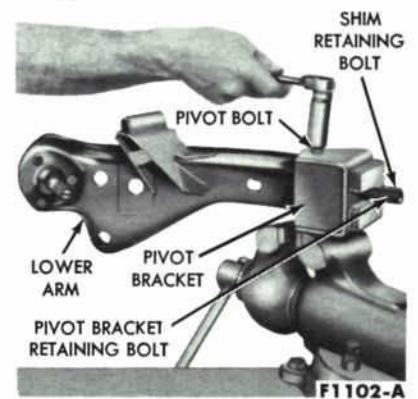


FIG. 105—Lower Suspension Arm Assembly

Replacement arms are equipped with the ball joint. If the original arm is to be used, the ball joint should be replaced on the bench.

LOWER BALL JOINT REPLACEMENT

1. Refer to "Lower Arm Replacement", and remove the lower arm. Remove the ball joint from the arm. If the ball joint is riveted to the arm, drill a 1/8-inch pilot hole completely through each rivet, and then drill the rivet head off through the pilot hole with a

3/8-inch drill. Drive all rivets out of the holes.

2. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

3. Install a new ball joint on the arm. Use only the specified bolts, nuts, and washers. **Do not attempt to rivet the new ball joint to the arm.** Torque the ball joint retaining nuts and bolts to specifications. Refer to "Lower Arm Replacement", and install the lower arm. Lubricate the ball joint.

STABILIZER REPAIR

1. Raise the car on a hoist. Remove the link-to-stabilizer bar retaining nut, washers, and the insulators, and disconnect the link from the bar. Remove the link-to-lower arm retaining nut, washers, and insulators, and remove the link from the arm.

2. Assemble the link and new washers and insulators to the lower arm, then install the link-to-lower arm retaining nut. Torque the nut to specifications. Connect the link to the bar with new washers and insulators and secure with the retaining nut. Torque the nut to specifications and lower the car.

1 FALCON REAR SUSPENSION

REAR SPRING REPLACEMENT

REMOVAL

1. Raise the car on a hoist and place supports beneath the underbody and under the axle. Disconnect the lower end of the shock absorber from the spring clip plate, and push the shock absorber out of the way. Remove the spring clip plate nuts from the U-bolts, then remove the plate (Fig. 6).

2. Remove the retaining nuts, the rear shackle bar, and the two shackle inner bushings. Remove the rear shackle assembly and the outer bushings. Remove the front hanger bolt, washer, and inner rubber bushing from the eye at the forward end of the spring, then lift out the spring assembly. Remove the outer bushing from the eye of the spring.

INSPECTION

Inspect the rubber bushings, shackle, and studs, and hanger and studs for cracks, distortion, stripped threads, or other visible damage. Check the spring leaves for cracks or breaks. Inspect the spring clips (U-bolts) for damaged or stripped threads. Check the spring clip plate for distortion. Check the underbody rail for broken welds at the point where the front hanger is attached.

INSTALLATION

1. Insert the inner bushing in the eye at the forward end of the spring. The forward end is the shorter end of the spring between the center tie bolt and the spring eye. Insert the two outer bushings in the rear shackle assembly.

2. Position the spring under the rear axle and insert the shackle assembly into the rear hanger bracket and the rear eye of the spring. Insert the shackle inner bushings, the shackle plate, and secure in place with the lock nuts. Tighten the lock nuts finger-tight.

3. Position the spring forward eye to the front hanger and insert the front hanger stud through the eye and hanger. Tighten the stud finger-tight. Torque the rear shackle lock nuts to specifications.

4. Lower the rear axle until it rests on the spring. Position the spring clip plate on the clips (U-bolts). Install the U-bolt nuts and torque to specifications. Connect the lower end of the shock absorber to the spring clip plate. Place safety stands under the rear axle, lower the car until the spring is in the approximate curb load position, and torque the front hanger stud lock nut to specifications. Remove the safety stands and lower the car.

REAR SHOCK ABSORBER REPLACEMENT

1. Disconnect the shock absorber from the spring clip plate (Fig. 6).

2. On the passenger car, remove the shock absorber access cover from the luggage compartment (Fig. 106). On the Ranchero, remove the retaining screws, and lift the forward half of the floor panel from the body; then remove the access cover from the opening in the floor pan over the shock absorber. On station wagons, remove the access cover from the opening in the seat riser over the shock absorber.

3. Remove the shock absorber upper retaining nut. Compress the shock absorber and remove it from the car. Remove the bushings and washers from the shock absorber studs.

4. Place the bushings and washers on the shock absorber studs. Connect the upper stud to the bracket, and install the bushings, washer, and nut on the stud. Torque the nut to specifications, and install the cover on a station wagon or car. On a Ranchero, install the access cover in the floor pan, then install the forward half of the floor panel.

5. Connect the lower stud to the spring clip plate, and install the bushing, washer, and nut on the stud. Be sure the spring clip plate is free of burrs. Torque the nut to specifications.

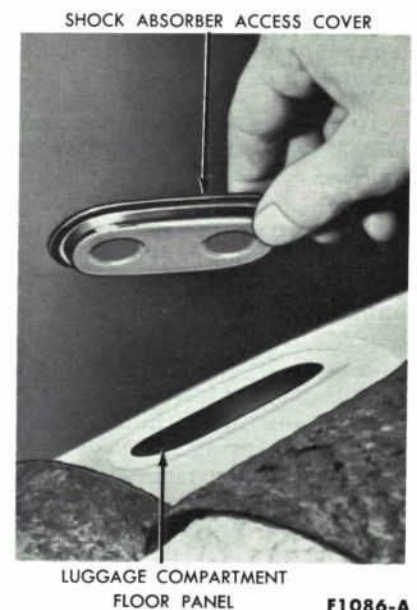


FIG. 106—Rear Shock Absorber Access Cover

2 FAIRLANE REAR SUSPENSION

REAR SPRING REMOVAL

1. Raise the car until the rear wheels clear the floor, place supports beneath the underbody and beneath the axle. Disconnect the lower end of the shock absorber from the spring clip plate, and position out of the way. Disconnect the brake line connector from the axle housing in order to relieve the strain on the brake hose when the axle is lowered.

2. Lower the rear axle slightly to reduce some of the spring load; then remove the spring clip (U-bolt) nuts, the clips, spring clip plate, and lower insulator. Remove the spring front hanger-to-underbody mounting bolts (Fig. 107).

3. Remove the rear shackle nuts and shackle bar, then remove the shackle assembly from the underbody side member and spring rear eye. Remove the spring and front hanger as an assembly. Remove the upper insulator and retainer from the spring.

REAR SPRING INSPECTION AND REPAIR

FRONT HANGER ASSEMBLY

To remove and install the front hanger assembly, proceed as follows:

1. Remove the nut from the spring mounting bolt and tap the bolt out of the bushings and front hanger (Fig. 107). Remove the bolt retainer from the hanger, and withdraw the inboard bushing from the spring front eye through the opening in the hanger. Disengage the spring front eye from the hanger, then remove the outboard bushing from the front eye.

2. Install the outboard bushing in the spring front eye, and position the front eye in the front hanger. Install the inboard bushing through the opening in the

hanger into the spring eye.

3. Install the bolt retainer in the hanger, install the spring mounting bolt, lock washer, and nut. Torque the nut to specifications. Inspect the rear shackle and hanger assembly, bushings, and studs for wear, damaged threads, cracks, or distortion. Check for broken spring leaves. Inspect the anti-squeak insets between the leaves for missing segments. Replace all parts found to be defective. The spring leaves must be dry and free of oil and dirt before new insets can be installed. Inspect the spring clips for worn or damaged threads. Check the spring clip plate and insulator retainers for distortion. If the spring center tie bolt requires replacement, clamp the spring in a vise to keep the spring compressed during bolt removal and installation.

REAR SPRING INSTALLATION

1. Install the outboard shackle bushings in the underbody side member and in the rear eye of the spring (Fig. 107). Insert the lower stud of the rear shackle assembly through the outboard bushing and spring rear eye.

2. Raise the rear end of the spring and the shackle assembly into position, and insert the shackle upper stud through the bushing in the outboard side of the body sidemember. Install the inboard bushings on the shackle studs in the body sidemember, and spring rear eye. Install the shackle bar and retaining nuts. Do not tighten the nuts at this time.

3. Position the spring and front hanger assembly to the underbody sidemember, and install the hanger mounting bolts and lock washers. Start the two upper mounting bolts at the side before starting the two lower mounting bolts from underneath. Do not tighten the bolts at this time.

4. Install the upper insulator

and retainer on the spring (Fig. 107). Lower the axle housing onto the upper insulator and retainer. Install the lower insulator, spring clips, plate, and clip nuts. Do not tighten the spring clip nuts at this time. Torque the rear shackle nuts and the front hanger mounting bolts to specifications. Torque the spring clip nuts evenly to specifications. Raise the axle housing, and connect the brake line connector to the housing. Connect the lower end of the shock absorber to the spring clip plate. Remove the support and lower the car.

REAR SHOCK ABSORBER REPLACEMENT

REMOVAL

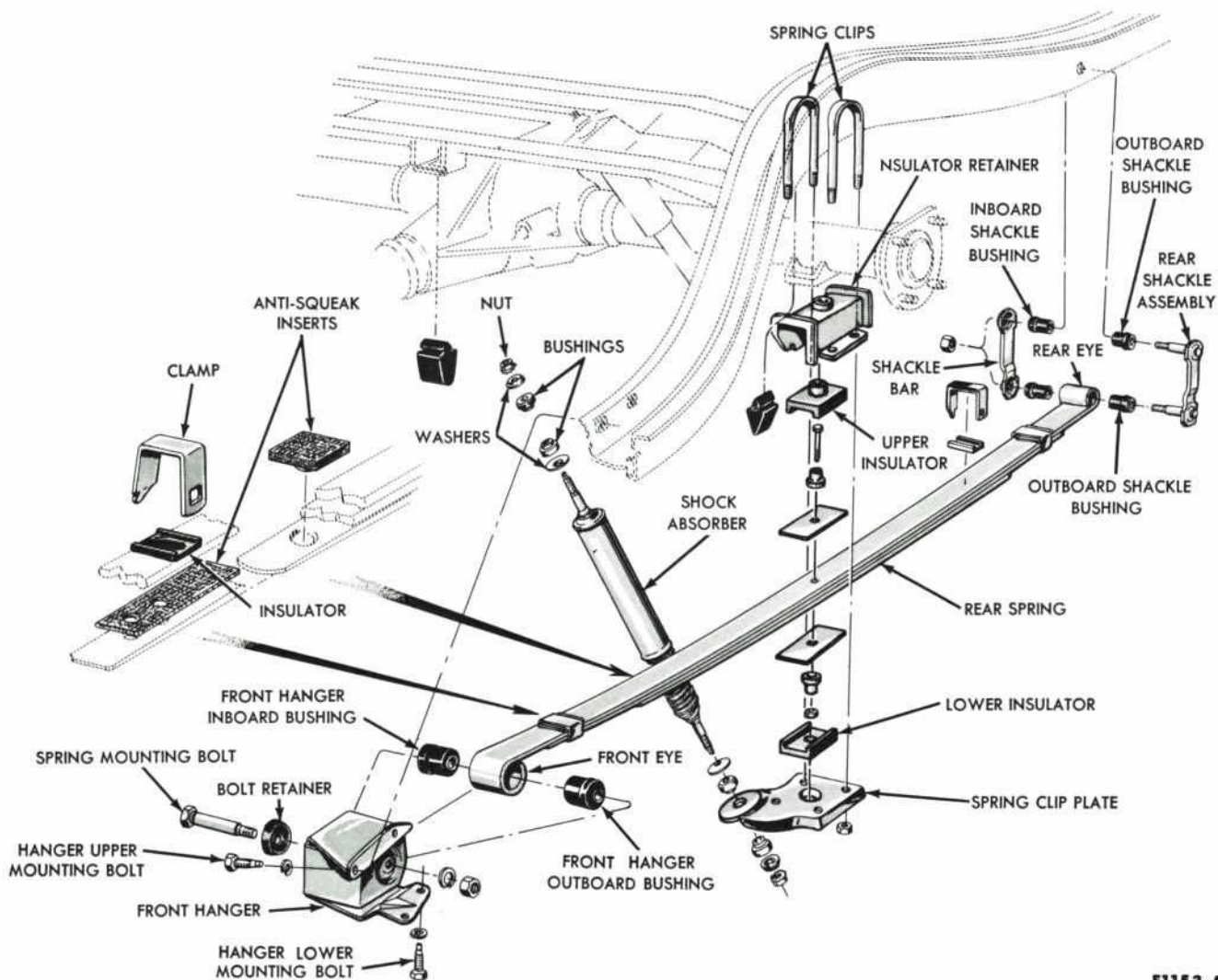
1. Open the luggage compartment door and remove the spare wheel and tire. Remove the shock absorber access cover from the floor pan and remove the nut, outer washer, and rubber bushing that retain the shock absorber to the upper mounting in the floor pan (Fig. 108).

2. Raise the car and remove the retaining nut, outer washer and bushing from the shock absorber at the spring clip plate (Fig. 107). Compress the shock absorber and remove it from the car. If the shock absorber is serviceable and requires new bushings, remove the inner bushings and washers from the shock absorber studs.

INSTALLATION

1. Place the inner washer and bushing on each shock absorber stud. Expand the shock absorber and position it to the spring clip plate and to the mounting in the floor pan. Connect the lower stud to the spring clip plate, and install the bushing, washer, and nut on the stud (Fig. 107).

2. Be sure the spring clip plate is free of burrs. Tighten the nut to specifications. From the lug-



F1153-A

FIG. 107—Rear Spring and Shock Absorber

gage compartment, install the bushing, washer, and retaining nut to the upper mounting stud

(Fig. 108). Torque the nut to specifications.

3. Place the spare wheel and

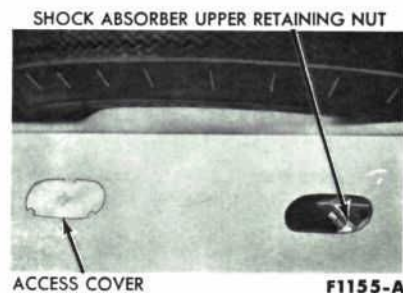
tire in storage position in the luggage compartment and secure in place.

3 GALAXIE REAR SUSPENSION

REAR SPRING FRONT HANGER REPLACEMENT

1. Raise the car on a frame hoist or a jack so that the axle assembly can be lowered. Disconnect the lower end of the rear shock absorber from the spring clip plate. Disconnect the parking brake cable at the equalizer, and disconnect the cable rear retaining clip from the frame cross-member on the side being reworked.

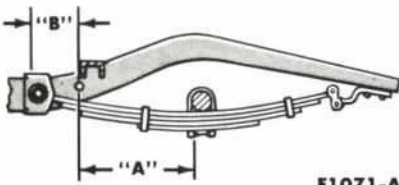
2. Remove the rear spring front hanger stud, and lower the forward end of the spring to allow removal of the hanger bracket. Remove the hanger bracket by cutting the top and bottom flange loose from the center portion with a cutting torch. Bend the center section until free of the frame welds, and then remove. Bend the top and bottom flanges up and down until they break free of the welds.



ACCESS COVER

F1155-A

FIG. 108—Rear Shock Absorber Upper Mounting



F1071-A

FIG. 109—Rear Spring Hanger Alignment Check

3. Burn the old welds off the frame at the lower flange, and grind the weld areas smooth. Cut off approximately 1/8-inch from the edge of the upper flange on the new spring hanger to allow clearance for the original weld on the top of the frame.

4. Elongate the rear spring front hanger bracket center bolt hole in the frame (both sides of the frame channel) with a rotary file to provide clearance for positioning of the new bracket. Locate and tack-weld the new bracket on the frame as follows. Measure the distance "B", Fig. 109, between a locating hole common to both frame side rails and the leading edge of the rear spring front stud. This hole is in the outboard side of the rail to the rear of the rear spring front hanger bracket. Dimension "B" for the new bracket must be within 1/8-inch of the same dimension on the opposite hanger. The bracket must be plumb and in proper position before final welding. Use mild steel rod and arc welding equipment.

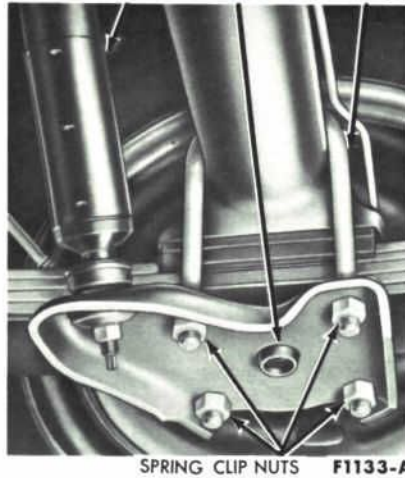
5. Reposition the rear spring in the bracket. Install the rear spring front hanger stud and nut. Torque the nut to specifications. Connect the lower end of the shock absorber. Connect the parking brake cable and lower the car.

REAR SPRING REPLACEMENT

1. Raise the car until the rear wheels clear the floor, and place supports under the car frame and the rear axle. Disconnect the parking brake cable spring (Fig. 110) from the inner spring clip. Disconnect the lower end of the shock absorber from the spring clip plate.

2. Remove the spring clip nuts, clips, and the spring clip plate. Remove the front hanger stud from the forward end of the spring (Fig. 111). Remove the shackle hanger and spring, and remove the spring from the car.

SHOCK ABSORBER TIE BOLT SPRING CLIP



SPRING CLIP NUTS F1133-A

FIG. 110—Rear Spring and Spring Slips

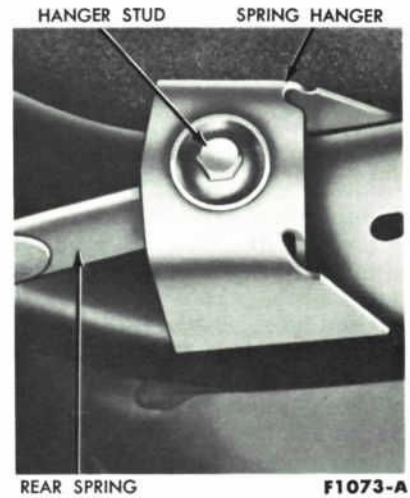
3. Position the new spring under the rear axle. The shorter end of the spring between the center tie bolt and the spring eye should be toward the front of the car. Install the shackle and shackle hanger, leaving the lock nuts finger-tight.

4. Install the front hanger stud in the spring and hanger, and torque the lock nut to specifications. Torque the shackle lock nuts to specifications. Install the spring clips, plate, and clip nuts. Be sure that all parts are properly seated on the spring and rear axle.

5. Torque the clip nuts to specifications. Do not exceed the maximum torque because the rear wheel camber may be affected. Connect the lower end of the shock absorber to the rear spring clip plate. Connect the parking brake cable spring to the inner spring clip.

REAR SPRING INSPECTION AND REPAIR

Inspect the rubber bushings, shackle and studs, and hanger and studs for cracks, distortion, stripped threads, or other visible damage. Check for broken spring leaves. Inspect the anti-squeak inserts between the leaves and replace them if they are worn. The spring leaves must be dry and free of oil and dirt before new inserts are installed. Inspect the spring clips for damaged threads. Check the spring clip plates for cracks or distortion. Replace all parts found to be defective.

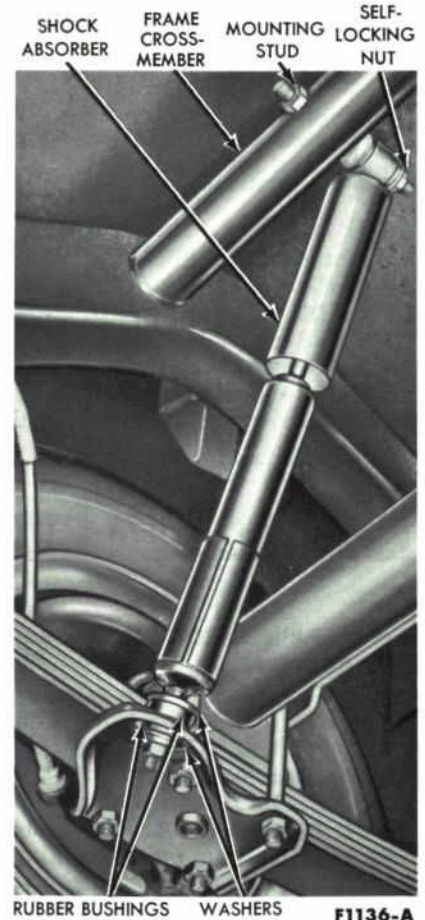


REAR SPRING F1073-A

FIG. 111—Rear Spring Front Hanger

REAR SHOCK ABSORBER REPLACEMENT

1. Remove the nut that retains the shock absorber assembly to the spring clip plate, and remove



RUBBER BUSHINGS WASHERS F1136-A

FIG. 112—Rear Shock Absorber

the lower washer and rubber bushing (Fig. 112). Remove the self-locking nut and washer that retains the upper end of the shock absorber to the mounting stud on the crossmember. Compress the shock absorber to clear the hole in the spring clip plate, and remove the assembly from the mounting stud.

2. If the shock absorber is serv-

iceable, replace the rubber bushings in the eye of the shock absorber. Expell the air by holding the shock absorber in the normal upright position and pulling the shaft out to extend it to its full length. Invert the shock absorber and push the shaft in to compress it to its shortest length.

3. Place the inner washer and the shock absorber on the mount-

ing stud, then install the outer washer and self-locking nut (snug). Extend the shock absorber, and locate the lower stud in the hole in the spring clip plate with washers and new rubber bushings. Install the lower retaining nut and torque to specifications. Torque the self-locking nut on the upper mounting stud to specifications.

4 THUNDERBIRD REAR SUSPENSION

REAR SPRING REMOVAL

1. Raise the car until the rear wheels clear the floor and place supports beneath the underbody and axle. Unhook the coil spring that retains the parking brake cable, and position the cable out of the way. Disconnect the lower end of the shock absorber from the spring clip plate, and position the cable out of the way.

2. Lower the rear axle slightly to reduce some of the spring load; then remove the spring clip (U-bolt) nuts, clips, and spring clip plate (Fig. 113). Remove the lower insulator and retainer.

3. Remove the spring front hanger-to-underbody mounting bolts (Fig. 114). Remove the rear shackle nuts and shackle bar, then remove the shackle assembly from the rear hanger and spring (Fig. 115). Remove the spring and front hanger as an assembly. Remove the upper insulator and retainer from the spring.

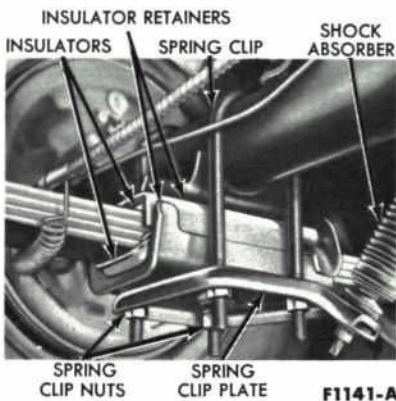


FIG. 113—Rear Spring Center Mounting

REAR SPRING INSPECTION AND REPAIR

FRONT HANGER ASSEMBLY

If the front hanger, bracket, or bushings are to be replaced, proceed as follows:

1. Remove the nut from the spring mounting bolt, and remove the bracket from the bolt and hanger (Fig. 116). Tap the spring mounting bolt out of the bushings and hanger, then separate the hanger from the spring. Remove the bushings.

2. Position the inner bushing and hanger to the spring eye. Position the outer bushing to the spring eye, then insert the spring mounting bolt (Fig. 116). Be sure that the bolt head is fully seated in the hanger (Inset, Fig. 116). Assemble the bracket to the spring mounting bolt and hanger, and install the nut. Torque the nut to specifications.

REAR SHACKLE AND HANGER

Inspect the rear shackle, bushings and studs for cracks, distortion, or other visible damage. If the rear shackle bushings are to be replaced, it will be necessary to remove the rear hanger assembly. Torque the hanger attaching bolts to specifications when re-installed.

SPRING LEAVES AND TIE BOLT

Check for broken spring leaves. Inspect the anti-squeak inserts between the leaves for cracks or



FIG. 114—Rear Spring Front Hanger Installation

missing segments. The spring leaves must be dry and free of oil and dirt before new inserts are installed.

Inspect the spring clips for stripped threads. Check the spring clip plate and insulator retainers for distortion or cracks. If the spring center tie bolt requires replacement, clamp the spring in a vise to keep the spring compressed during bolt removal and installation.

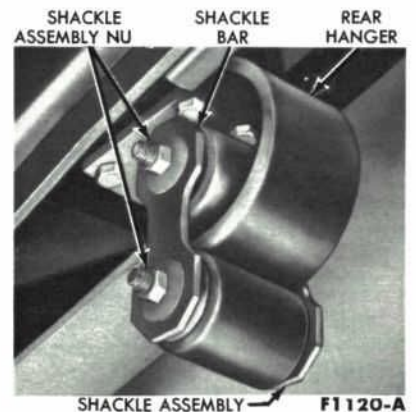


FIG. 115—Rear Spring and Rear Hanger

REAR SPRING INSTALLATION

1. Position the rear eye of the spring to the rear hanger and install the shackle assembly to the spring hanger (Fig. 115). The rear eye is at the long end of the tie bolt. Install the shackle bar and retaining nuts. Do not tighten the nuts at this time.

2. Position the spring and front hanger assembly to the underbody, and install the hanger mounting bolts (Fig. 114). Do not tighten the bolts at this time. Install the upper insulator and retainer on the spring with the retainer flange forward (Fig. 113).

3. Lower the axle housing onto the upper insulator and retainer. Install the lower insulator, insulator retainer (flange to the rear), spring clips (U-bolts), plate, and (U-bolt) clip nuts. Do not tighten the spring clip nuts at this time.

4. Torque the rear shackle nuts and the front hanger mounting bolts to specifications. Torque the spring clip nuts evenly to specifications. **Make sure that the lower insulator retainer contacts the upper retainer.** Raise the axle housing, and connect the brake line connector to the axle housing. Connect the lower end of the shock absorber to the spring clip plate. Connect the coil spring to the parking brake cable.

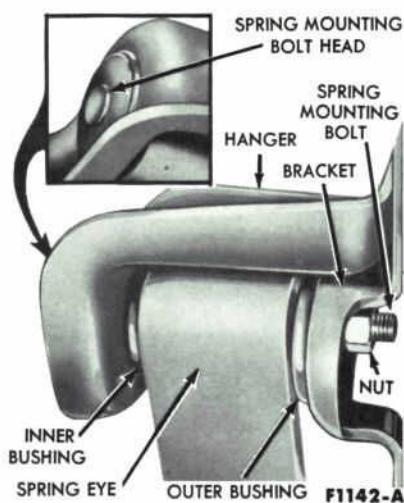


FIG. 116—Rear Spring Front Hanger Assembly

REAR SHOCK ABSORBER REPLACEMENT

REMOVAL

1. Raise the rear end of the car and remove the bolts that secure the shock absorber mounting bracket to the underbody (Fig. 117). Remove the retaining nut, outer washer and bushing from the shock absorber at the spring clip plate. Compress the shock absorber and remove it from the car.

2. Remove the nut, outer washer and bushing that secure the shock absorber to the mounting bracket, and remove the bracket. If the shock absorber is



FIG. 117—Rear Shock Absorber Mounting

serviceable and requires new bushings, remove the inner bushings and washers from the shock absorber studs.

INSTALLATION

1. Place the inner washer and bushing on each shock absorber stud. Connect the upper stud to the mounting bracket, and install the bushing, washer, and nut on the stud. Torque the nut to specifications.

2. Connect the mounting bracket and shock absorber to the underbody (Fig. 117). Torque the bolts to specifications. Connect the lower stud to the spring clip plate, and install the bushing, washer, and nut on the stud. Be sure the spring clip plate is free of burrs. Tighten the nut to specifications.

PART 6

SERVICE SPECIFICATIONS AND SPECIAL TOOLS

STEERING

FALCON

STEERING GEAR AND LINKAGE ADJUSTMENTS

Sector Shaft End Play—Steering Linkage Disconnected	No Perceptible
Worm Bearing Pre-Load (Pull to keep steering wheel moving)	3-6 in-lbs
Total Pre-Load: Mesh Load plus Worm Bearing Pre-Load	8-13 in-lbs
Backlash permissible at 30° on either side of Straight-ahead steering position	No Perceptible

TORQUE LIMITS

Description	Ft-Lbs
Sector Arm and Idler Arm to Cross Link Slotted Nut	25-35
Spindle Connecting Rod and End Assembly to Idler and Sector Arms Slotted Nut	25-35
Spindle Connecting Rod and End Assembly to Spindle Arm Slotted Nut	25-35
Spindle Connecting Rod Clamp to Adjusting Sleeve Lock Nut	10-15
Steering Wheel Nut	25-35

TORQUE LIMITS (Continued)

Description	Ft-Lbs
Idler Arm Mounting Bracket to Underbody Assembly Lock Nut	13-20
Idler Arm Assembly to Idler Arm Mounting Bracket Nut	45-60
Steering Wheel Nut	25-35
Cover Assembly to Steering Gear Housing Assembly Bolt	12-20
Sector Arm to Sector Shaft Assembly Nut	85-110
Steering Gear to Underbody Assemblies Bolt	25-35
Steering Column Bracket to Instrument Panel Nut	9-13

DIMENSIONS

Sector Adjusting Screw Head to End of Sector Shaft Clearance	0.002 in max
Toe-in	¼ - ⅝ inch
Steering Wheel Rotation—Center to Stop	2 ⁵ / ₁₆ turns

FAIRLANE

STEERING GEAR AND LINKAGE CHECKS AND ADJUSTMENTS

Sector Shaft End Play Check (Steering Linkage Disconnected)	No Perceptible
Worm Bearing Preload Check	4-7 in-lbs
Total Preload (Mesh Load plus Worm Bearing Preload)	9-14 in-lbs
Permissible Backlash at 30° on Either Side of Straight-Ahead Steering Wheel Position	No Perceptible Backlash

TORQUE LIMITS

Description	Ft-Lbs
Steering Arm to Idler Arm Rod Nut	60-70
Spindle Connecting Rod to Steering Arm to Idler Arm Rod Nut	35-40
Steering Spindle Connecting Rod to Spindle Arm	35-40

TORQUE LIMITS (Continued)

Description	Ft-Lbs
Steering Spindle Connecting Rod Sleeve Clamp Nut	10-14
Steering Idler Arm Mounting Bracket to Underbody Nut	20-25
Steering Idler Arm Nut to Bracket	60-70
Flexible Joint Flange Connecting Bolt	15-20
Steering Wheel Nut	20-30
Steering Gear Housing—Cover Assembly to Housing Assembly Bolt	12-20
Steering Pitman Arm Nut	110-150
Steering Gear Assembly to Underbody Assembly Bolt	25-35
Steering Column Bracket to Instrument Panel Nut	12-16

POWER STEERING CHECKS AND ADJUSTMENTS

Maximum pull required to Turn Wheel at least One Complete Turn, either Direction (Engine Idling)	4½ pounds
Normal Fluid Pressure Against Either Stop (Engine Idling) 170 Six or 221 V-8	750-900 psi
Control Valve Spool Travel (from center)	Approx. 0.060 inch
Worm Bearing Preload Check	2-4 in-lbs
Total Preload (Mesh Load plus Worm Bearing Preload)	5-9 in-lbs
Power Steering Belt Tension—New —Used	120-150 lbs* 90-120 lbs*

*Using Tool BT-33-73F

TORQUE LIMITS

Description	Ft-Lbs
Power Cylinder to Pitman Arm to Idler Arm Rod	60-70*
Spindle Connecting Rod Adjusting Sleeve Nut	10-14
Spindle Arm Connecting Rod to Spindle Arm Nut	35-40
Hydraulic Control Valve Clamp Nut	15-20
Pressure Hose to Pump	18-25
Pressure Hose to Valve	6-9

TORQUE LIMITS(Continued)

Description	Ft-Lbs
Valve to Cylinder Hoses	14-18
Return Tube to Valve	10-20
Cylinder Mounting Bracket to Frame Nuts	35-43
Hydraulic Cylinder Piston to Bracket Nut	18-24
Hose Insulator Bracket to Underbody Bolt	12-15
Pump Valve Retainer	30-35
Spring Cap to Valve Housing Bolts	4-6½
Pump Attaching Bracket to Engine	¼-20 8-10 ⅜-16 12-15 ⅝-16 23-28
Pitman Arm to Control Valve Stud	50-60
Cylinder to Bracket Lock Nut	3-5

DIMENSIONS

Steering Wheel Rotation—Center to Stop	2½ turns
Sector Adjusting Screw Head to End of Sector Shaft Clearance	0.002 inch max
Carrier to Pump Housing End Clearance	0.0015 inch max

*Used Nut—50-60 ft-lbs

GALAXIE

STEERING GEAR AND LINKAGE CHECKS AND ADJUSTMENTS

Sector Shaft End Play Check (Steering Linkage Disconnected)	No Perceptible End Play
Worm Bearing Preload Check	2-7 in-lbs
Total Preload (Mesh Load plus Worm Bearing Preload)	9-15 in-lbs
Permissible Backlash at 30° on Either Side of Straight-Ahead Steering Wheel Position	No Perceptible Backlash

TORQUE LIMITS

Description	Ft-Lbs
Steering Arm to Idler Arm Rod Nut	50-60
Steering Spindle Connecting Rod to Steering Idler Arm Lock Nut	45-55
Steering Spindle Connecting Rod to Spindle Arm	45-55
Steering Spindle Connecting Rod Sleeve Clamp Nut	11-14

TORQUE LIMITS(Continued)

Description	Ft-Lbs
Steering Idler Arm Mounting Bracket to Frame Nut	25-35
Steering Idler Arm Bushing Nuts	60-70
Flexible Joint Clamp Bolt	15-20
Transmission Gear Shift Tube Bracket to Cap (Gear Shift Tube to Steering Column) Bolt	8-11
Steering Wheel Nut	25-35
Steering Gear Housing—Cover Assembly to Housing Assembly Bolt	12-20
Steering Pitman Arm Nut	110-150
Steering Gear Assembly to Frame Assembly Bolt	28-43
Steering Column Bracket to Instrument Panel Bolt	12-16
Transmission Manual Shift Rod to Tube and Socket Assembly (Fordomatic and Cruise-O-Matic)	8-13

POWER STEERING CHECKS AND ADJUSTMENTS

Pump Belt Tension—New Used	120-150 lbs* 90-120 lbs*
Maximum Pull required to Turn Wheel at Least One Complete Turn, Either Direction (Engine Idling)	12 lbs
Worm Bearing Preload Check	3-5.5 in-lbs
Worm and Ball Nut Mesh Adjustment	8-13 in-lbs
Normal Fluid Pressure Against Either Stop (Engine Idling)	(223 and 292) 750-900 psi (352 and 390) 950-1100 psi
Carrier to Pump Housing End Clearance	0.0015 in max
Control Valve Spool Travel (from Center)	Approx. 0.060 in

*Using Tool BT-33-73F

TORQUE LIMITS

Engine	Part Name	Ft-Lbs
All	Pitman Arm to Sector Shaft Nut	110-150
	Pitman Arm to Idler Arm Rod Nut	50-60
	Power Cylinder to Steering Arm to Idler Arm Rod Lock Nut	60-70*
	Spindle Arm Connecting Rod to Control Rod Nut	45-55
	Spindle Arm Connecting Rod to Spindle Arm Nut	45-55
	Spindle Connecting Rod Adjusting Sleeve Nut	11-14†
Mileage Maker Six	Pump Reservoir to Fender Apron Nut	11-14
	Drive Pulley and Crankshaft Pulley to Crankshaft Bolt	45-55
	Drive Pulley to Crankshaft Pulley Bolt	20-25
	Pump Adjusting Bracket to Generator Support Pivot Bolt	20-25
292 V-8	Reservoir Adaptor Nut	30-35
	Pump Support Through Water Pump Housing to Engine Bolt	8-11
All	Hydraulic Control Valve Clamp Nut	15-20
	Idler Arm Mounting Bracket to Frame Nuts	25-35
	Idler Arm Bushing Nuts	60-70
	Hydraulic Cylinder Piston to Bracket Nut	18-24
	Hose Insulator Bracket to Frame Bolt	12-15

TORQUE LIMITS(Continued)

Engine	Part Name	Ft-Lbs
All	Pump Valve Retainer	30-35
	Pump to Adjusting Bracket	20-25
	Spring Cap to Valve Housing Bolts	4-6½
	Pump Pulley Retaining Bolt	20-25
292 V-8	Pump Support to Exhaust Manifold Bolt	20-25
	Pump Support to Water Pump Bolt	70-80
	Pump Adjusting Bracket to Pump Support Manifold Nut	30-35
	Pump Adjusting Bracket to Pump Support Bolt	20-25
	Pump Adjusting Bracket to Pump Support (Pivot Bolt) Nut	20-25
	Drive Pulley and Crankshaft Pulley to Crankshaft Bolt	45-55
	Drive Pulley to Crankshaft Pulley Bolt	20-25
352 and 390 V-8	Drive Pulley and Crankshaft Pulley to Crankshaft Bolt (2 Sheaves)	55-65
	Drive Pulley to Crankshaft Pulley Bolt (1 Sheave)	20-25
	Pump Adjusting Bracket to Water Pump Housing Bolt	20-25
	Pump Adjusting Bracket to Water Pump Housing Pivot Bolt	20-25
	Reservoir Adaptor Nut	30-35

*Used Nut, 50-60 ft-lbs

†Used Nut, 7-10 ft-lbs

POWER STEERING CAPACITY

Mileage Maker Six	1¾ pints
V-8 Engines	2¼ pints

DIMENSIONS

Control Valve Spool to Housing (Wear Limit)	0.0002-0.0009 in
Sector Adjusting Screw Head to End of Sector Shaft Clearance	0.002 in max
Steering Column Tube to Steering Wheel Clearance	0.0625 in max
Carrier to Pump Housing End	0.0015 in max
Toe-in	⅛-¼ -inch
Steering Wheel Rotation—Center to Stop	2¼ turns

THUNDERBIRD

ADJUSTMENTS AND TOLERANCES

Piston Rack to Sector Shaft Backlash	0.004 in
Worm Bearing Preload	2-4 in-lbs
Mesh Load	6 in-lbs*
Steering Effort (Spring Scale—Engine Idling)	5-6 lbs
Permissible variation between Right and Left Turn Effort	3 in-lbs
Pump Belt Tension—New Used	120-150 lbs† 90-120 lbs
Fluid Pressure	950-1100 psi

*Steering Gear Drained

†Using Tool No. BT-33-73F

TORQUE LIMITS

Description	Ft-Lbs
Sector Shaft (Pitman) Arm Nut	110-150
Steering Arm to Idler Arm Rod Stud Nuts	40-55
Spindle Connecting Rod End Stud Nuts	40-55
Connecting Rod Sleeve Clamp Bolts	16-27
Idler Arm Bracket to Underbody Bolts	20-25
Idler Arm and Bushing to Bracket Nut	60-80
Steering Gear to Underbody Bolts	35-50
Sector Shaft Cover Bolts	23-27
Steering Wheel Nut	20-30
Pump Drive Pulley to Crankshaft Pulley Bolts	20-25
Pump Bracket to Water Pump Housing Bolt	20-25

TORQUE LIMITS (Continued)

Description	Ft-Lbs
Pump Bracket Pivot Bolt	20-25
Pump Housing Bolts	20-25
Steering Column Opening Cover Plate Screw	9-12
Track to Pedal Support Bolts (Moveable Column)	19-23
Pivot Bracket Clamp Bolts	19-23
Pivot Bracket Stud Nuts	9-12
Pawl Pivot Nut	19-23
Lock Plate Eccentric Bolt (Nut)	19-23
Lock Plate Bolt	11-14
Stop Bracket Nut	9-12
Detent Spring Bolt	5-7
Shift Lever to Shaft Connecting Rod Ball Stud Nut	9-12
Friction Adjustment Bolt (Nuts)	9-12

DIMENSIONS

Backlash at 30° on Either Side of Straight-Ahead Steering Position	None
Moveable Column Lock Plate to Lock Pin Clearance	0.0312 in max
Carrier to Pump Housing End Clearance	0.0015 in max
Pump Sleeve Bearing to Seal Clearance	0.095-0.015 in
Sector Shaft Adjusting Screw End Play	0.002 in max
Sector Shaft Centering	3.5 turns from stop to stop
Toe-in	1/16-3/16 inch

SUSPENSION

FALCON

FRONT SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Lower Arm Ball Joint Assembly to Spindle Slotted Nut	35-65
Upper Arm Ball Joint Assembly to Spindle Slotted Nut	35-65
Bumper Assembly—Suspension Compression to Body Bracket Stud Nut	12-17
Arm and Inner Shaft Assembly—Upper Suspension to Body Bolt	65-90

FRONT SUSPENSION TORQUE LIMITS (Continued)

Description	Ft-Lbs
Lower Arm Assembly to Underbody Lock Nut	60-75
Lower Arm Strut to Underbody Lock Nut	40-55
Shock Absorber Assembly to Spring Seat Bolt	12-17
Shock Absorber to Upper Mounting Bracket Stud Nut	15-25
Brake Assembly to Front Spindle Lock Nut	25-35

FRONT SUSPENSION TORQUE LIMITS (Continued)

Description	Ft-Lbs
Front Stabilizer to Lower Arm Stud Nut	12-17
Front Strut to Lower Arm Bolt	40-55
Shock Absorber Upper Bracket to Body Nut	8-13
Front Stabilizer to Body Lock Nut	11-16
Upper Arm Shaft to Upper Arm Bolt	40-55
Shaft—Upper Arm Spring Seat to Upper Arm Lock Nut	13-18
Lower Arm Ball Joint Preload	20-30*
Wheel Nut	55-85
Adjustment—Wheel End Play	0.001-0.010 inch

*Inch-Pounds

REAR SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Spring Assembly to Rear Spring Front Hanger Lock Nut	30-40
Spring Shackle Bars to Body Lock Nut	13-20
Spring Shackle Bar to Rear Spring Assembly Lock Nut	13-20
Spring Assembly to Rear Axle "U" Bolt Lock Nut	13-20
Universal Joint Flange—Axle End to Bearing Assembly Nut	9-10
Rear Shock Absorber to Upper Mounting Bracket Stud Nut	15-25
Rear Shock Absorber to Spring Clip	15-25
Hanger Bracket to Underbody Nut	20-27

REAR SEMI-ELLIPTIC LEAF SPRINGS

Body Style	No. of Leaves	Capacity at Normal Loaded Height (Pounds)	Deflection Rate (Pounds per Inch)	Length (Inches)	Width (Inches)
Sedan	5	620-650	75-85	50.0	2.0
Station Wagon	5	860-900	112-122	50.0	2.0

FRONT COIL SPRINGS

Body Style	Design Load (pounds)	Deflection Rate (pounds per inch)	Free Height (Inches)
Sedan	1210 ± 20	170 ± 7	16.48
Station Wagon	1140 ± 20	170 ± 7	16.03

DIMENSION

Distance from Back Face of Strut Rear Insulator Washer to Center of the Strut-to-Lower Arm Front Retaining Bolt 17 $\frac{1}{8}$ inches

FAIRLANE

FRONT SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Front Shock Absorber to Upper Arm	30-40
Lower Arm Bracket to Underbody	36-46
Lower Arm Strut to Strut Bracket	60-75
Lower Arm Strut Bracket to Underbody	36-46
Strut to Lower Arm	70-90
Shock Absorber Upper Bracket to Body	36-46
Stabilizer Bracket to Underbody	10-15
Lower Arm Ball Joint Assembly to Spindle Nut	60-80
Ball Joint to Upper Arm Nuts	20-35
Bumper and Bracket Assembly Retaining Nuts	10-15
Lower Arm to Underbody Pivot Bolt Nut	50-65
Upper Arm Ball Joint Assembly to Spindle Nut	60-80
Upper Arm Inner Shaft Retaining Bolts	115-135
Shock Absorber to Upper Mounting Bracket	20-35
Stabilizer Bar to Lower Arm	10-15
Stabilizer to Body Lock Stud	10-15
Spindle to Brake Carrier Plate	25-35

REAR SUSPENSION TORQUE LIMITS

Spring to Front Hanger Stud Nut	55-65
Front Hanger to Frame Bolts	55-65
Shock Absorber Upper Stud to Crossmember	15-22
Shock Absorber to Rear Spring Clip Plate Nut	15-22
Spring Clip (U-Bolt)	30-45
Spring Shackle Bar to Underbody to Rear Hanger Nut	15-22
Spring Shackle to Rear Spring Nut	15-22

Coil Springs

170 Cyl.	Standard Transmission Load		Automatic Load	
	Rate	Rate	Rate	Rate
Fairlane	1635 ± 25	190 ± 8	1685 ± 25	190 ± 8
Fairlane 500	1635 ± 25	190 ± 8	1685 ± 25	190 ± 8

221 V-8
Fairlane & 500 . . . 1735 ± 25 200 ± 9 1785 ± 25 210 ± 9

Rear Springs	Capacity at Normal Load	Deflection Rate
	732-768	80-90

GALAXIE

FRONT SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Connecting Rod Sleeve Clamp Nut	11-14
Lower Arm Ball Joint Assembly to Spindle Nut	70-90
Upper Arm Ball Joint Assembly to Spindle Nut	60-80
Ball Joint Assembly to Upper Arm Nuts	28-35
Ball Joint Assembly to Lower Arm Nuts	28-35
Upper Arm Inner Shaft to Frame Bracket Nuts	65-85
Upper Arm Bumper Assembly Nut	15-22
Bumper Assembly to Lower Arm Nut	15-22
Lower Arm Front Bushing Bolt	40-60
Lower Arm Rear Bushing Bolt	35-46
Shock Absorber Stud Nut	15-25
Spindle to Brake Backing Plate—Upper Bolt	80-100 ¹
Spindle to Brake Backing Plate—Lower Bolt	25-35
Stabilizer Bar to Lower Arm	10-15
Stabilizer Brackets to Frame	20-35
Front Shock Absorber Pin & Bushing Assembly to Lower Arm Nut	12-20
Bushing—Upper Arm to Upper Arm Inner Shaft	160-190

ADJUSTMENT

Front Wheel End Play	0.001-0.010 inch
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REAR SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Rear Spring Front Hanger Stud Nut	30-45
Bumper Assembly Retaining Stud Nut	15-22
Rear Shock Absorber Upper Stud Nut	40-50
Rear Shock Absorber to Rear Spring Clip Plate Nut	15-25
Spring Shackle to Spring and Frame Nuts	15-22
Spring U-Bolt Nut	30-45

REAR SEMI-ELLIPTIC LEAF SPRINGS

Model Application	Capacity at Normal Loaded Height (Pounds)	Deflection Rate (Pounds Per Inch)
2-Door Sedan	905-945	108-122
4-Door Sedan and Convertible	935-975	104-118
Car—Heavy Duty	995-1035	133-147
Station Wagon—Standard	1155-1195	133-147
Station Wagon—Heavy Duty	1280-1320	160-176

THUNDERBIRD

FRONT SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Lower Arm Ball Joint Assembly to Spindle Nut	60-80
Upper Arm Ball Joint Assembly to Spindle Nut	60-80
Upper Arm Shaft to Bushing	15-25
Stabilizer to Lower Arm Nuts	10-15
Shock Absorber to Spring Seat	15-25

ADJUSTMENT

Front Wheel End Play	0.001-0.007 inch
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FRONT COIL SPRINGS

Free Height—Purple Marking	15½ inches
Yellow Marking	15¾ inches

REAR SUSPENSION TORQUE LIMITS

Description	Ft-Lbs
Rear Shock Absorber Stud Nut (Upper or Lower)	15-25
Rear Spring Front and Rear Shackle Nuts	15-22
Rear Spring Shackle Bar to Underbody Nut	15-22
Rear Spring Front Shackle Bracket Retaining Bolts	30-45
Rear Spring Shackle to Rear Spring Nut	15-22
Rear Spring U-Bolt Nut	30-45*

*10 pounds less torque for a used nut.

REAR SEMI-ELLIPTIC LEAF SPRING

Body Style	Number of Leaves	Capacity at Normal Load Height	Spring Length at Normal Load
Hardtop	4	880-920 pounds	60 inches
Convertible	4	980-1020 pounds	60 inches

SPECIAL TOOLS

FALCON

Steering Wheel Puller	3600-AA
Steering Wheel Pull Scale	3600-E
Sector Shaft Arm Puller	3590-FC
Impact Hammer	T50T-100-A
Puller Attachment	T58L-101-A
Sector Shaft Bushings Remover and Replacer	T60K-3576-A

Sector Shaft Bushing and Worm Gear Bearing Cup Replacer	T58L-3548-A
Puller	OTC-462
Spindle Ball Joint Press Adapter Screw	T60K-3006-A
Spindle Ball Joint Assembly Remover Press	T57P-3006-A
Front Coil Spring Assembly Remover and Replacer	T60K-5310-A

FAIRLANE

Steering Wheel Puller	3600-AA
Sector Shaft Arm Puller	3590-FC
Impact Hammer	T50T-100-A
Puller Attachment	T58L-101-A
Sector Shaft Bushing and Worm Gear Bearing Cup Replacer	T58L-3548-A
Steering Gear Housing Bearing and Oil Seal Remover	T58L-3576-A

Ball Stud Remover	3290-B
Spindle Ball Joint Press Adapter Screw	T62F-3006-A
Spindle Ball Joint Assembly Remover Press	T57P-3006-A
Front Coil Spring Assembly Remover and Replacer	T62F-5310-A
Idler Arm Bushing Remover and Replacer	T61P-3355-A
Sector Shaft Bearing Remover	T62F-3576-A

GALAXIE

Steering Wheel Puller	3600-AA
Sector Shaft Arm Puller	3590-FC
Impact Hammer	T50T-100-A
Puller Attachment	T58L-101-A
Steering Gear Housing Bearing and Oil Seal Remover	T58L-3576-A
Sector Shaft Bushing and Worm Gear Bearing Replacer	T58L-3548-A
Rod End Puller	3290-B
Idler Arm Bushing Remover and Replacer	T61P-3355-A
Handle Adapter	T53L-200-A
Power Steering Pump Rotor Shaft Oil Seal Replacer Adapter	T53P-33623-A

Spindle Ball Joint Assembly Remover Press	T57P-3006-A
Torque Wrench Adapter	T58P-3047-A
Upper Arm Shaft Locating Gauge	T58P-3044-A
Lower Arm Bushing Remover	T54P-3044-A13
Spindle Rod End Puller	CJ 89-1
Shock Absorber Bushing Assembly Remover	T57P-18201-A
Shock Absorber Bushing Assembly Remover	T57P-18201-A5
Shock Absorber Bushing Assembly Replacer	T57P-18201-A1
Shock Absorber Bushing Assembly Replacer	T57P-18201-A4

THUNDERBIRD

Sector Shaft Arm Puller	3590-FC
Handle Adapter	T53L-200-A
Power Steering Pump Rotor Shaft Oil Seal Replacer Adapter	T53P-33623-A
Torsion Bar Sleeve Seal Puller Attachment	T58-101-A
Sector Shaft Bushing and Worm Gear Bearing Cup Replacer	T58L-3548-A
Sector Shaft Bushing and Seal Remover and Replacer	T61B-3576-A
Pinion Bearing Cup Replacer (inner and outer)	T53T-4616-B
Sector Shaft Upper (Bushing Replacer Adapter)	T61B-33815-A

Valve Spool Lock Nut Wrench	T61B-3553-A
Valve Spool Adjustment Wrench	T61B-3553-B
Puller	OTC-462
Idler Arm Bushing Remover and Replacer	T61P-3355-A
Steering Wheel Puller	3600-N
Spindle Ball Joint Assembly Remover Press	T57P-3006-A
Spindle Rod End Puller	CJ 89-1
Front Coil Spring Assembly Remover and Replacer	T61B-5310-A

WHEELS AND TIRES

	Car	Falcon Station Wagon	Ranchero	Fairlane	Car	Galaxie Station Wagon	Thunderbird
Inflation Pressure							
Front	24	24	24	24	24	24	24
Rear	24	26	30	24	24	28	24
Number of Wheel Retaining Bolts		4		5		5	5
Wheel Nut Torque		55-85		85-95		85-95	75-85



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