Section I
TORSION-AIRE
FRONT WHEEL SUSPENSION

CONTENTS

DATA AND SPECIFICATIONS

MANUAL STEERING

Caster	Camber	Steering Axis Inclination	Toe-In
— ¾° ± ¾°	+ 0° ± ¼° (right) + ¼° ± ¼° (left)	5° to 7° At 0° Camber	⅛″ ± 1/32″ (⅛″ Preferred)

WITH POWER STEERING

Caster	Camber	Steering Axis Inclination	Toe-In
+ ¾° ± ¾°	0° ± ¼° (right) + ¼° ± ¼° (left)	5° to 7° At 0° Camber	⅛″ ± 1/32″ (⅛″ Preferred)

SPECIAL TOOLS

C-3553 . . . . . Remover and Installer—Shock Absorber Lower Bushing
C-3557 . . . . . Installer—Lower Control Arm Bushing
C-3558 . . . . . Remover and Installer—Upper Control Arm Bushing
C-3561 . . . . . Wrench—Ball Joint Assembly to Upper and Lower Control Arm
C-3564 . . . . . Remover—Ball Joint Stud

TIGHTENING SPECIFICATIONS

	Foot-Pounds
Shock Absorber Upper Mounting Nut	25
Shock Absorber Lower Mounting Nut	40
Sway Eliminator Shaft Link Nuts	15
Sway Eliminator Insulator Retainer Nuts	25
Upper and Lower Control Arm Ball Joints	250
Lower Ball Joint Stud Nut	135
Strut to Lower Control Arm Mounting Bolts	65
Lower Control Arm Strut Bushing Nut	35
Shaft to Lower Control Arm Bushing Retaining Nut (Inner)	125
Upper Ball Joint Stud Nut	135
Lower Control Arm Shaft to Crossmember Mounting Nut	200
Upper Control Arm to Support Bracket Mounting Bolt Nuts	55–65
Control Arm Support Bracket to Frame Bolt (½")	70
Steering Knuckle to Brake Support Bolt	55
Steering Knuckle to Steering Knuckle Arm Nut	50

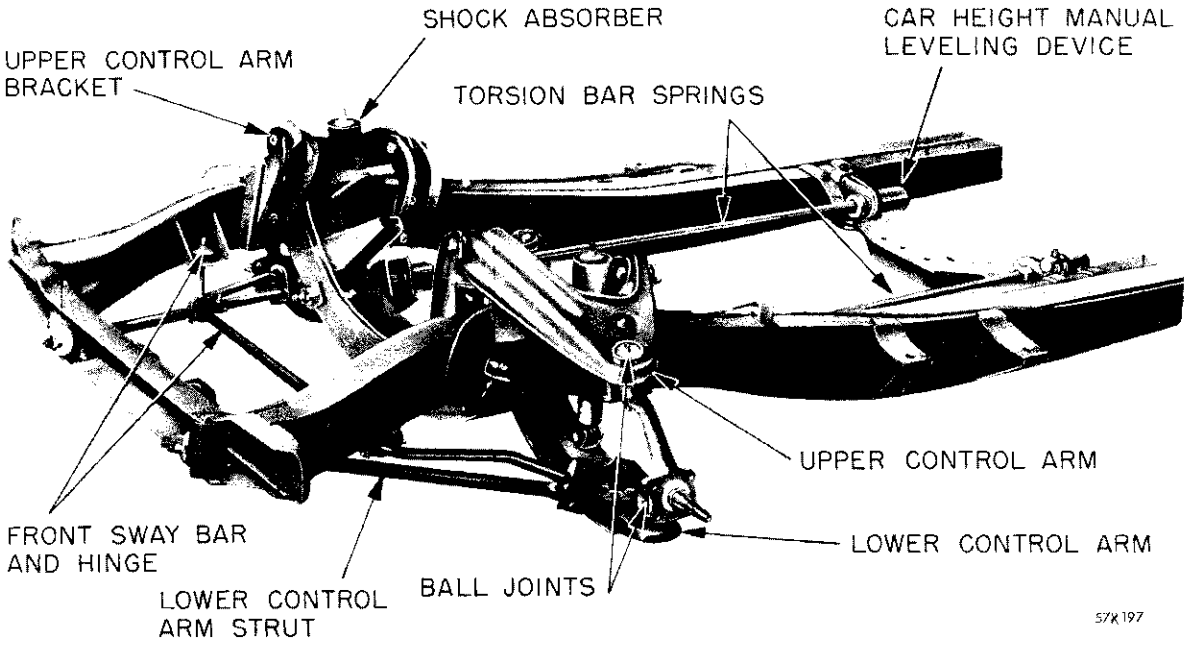

Fig. 1—Frame and Front Suspension

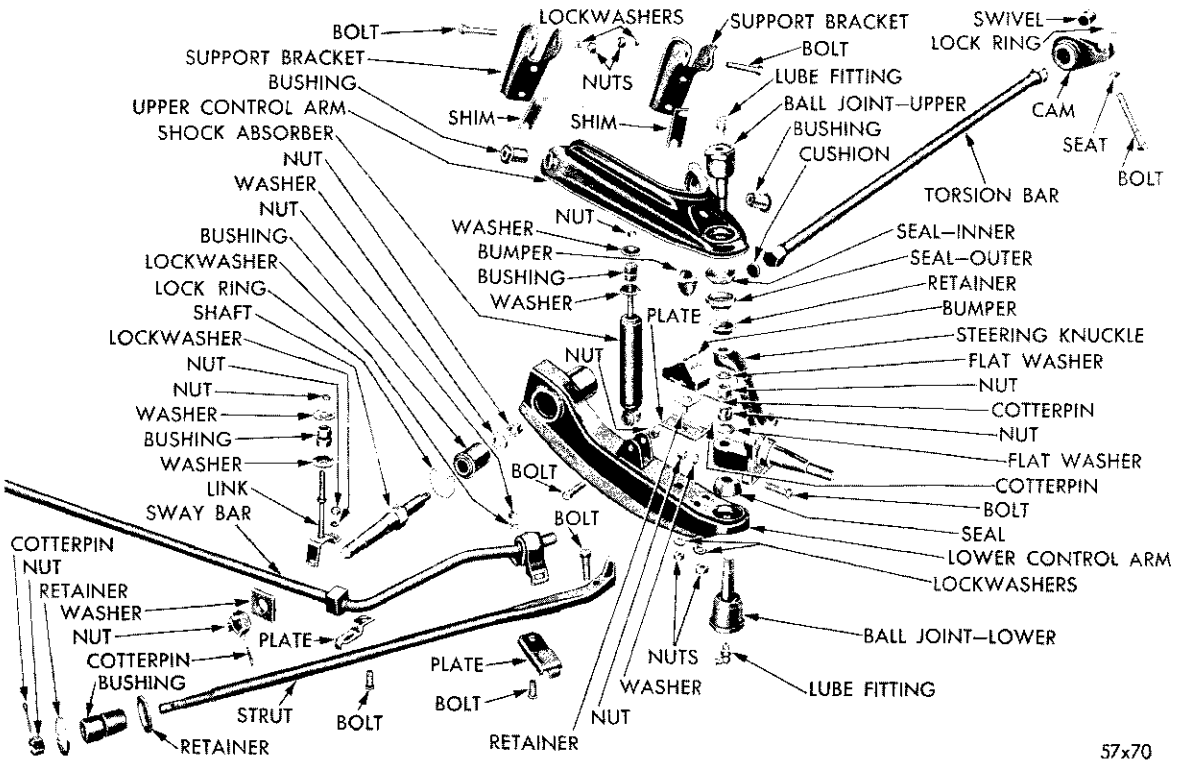

Fig. 2—Front Suspension (Disassembled View)

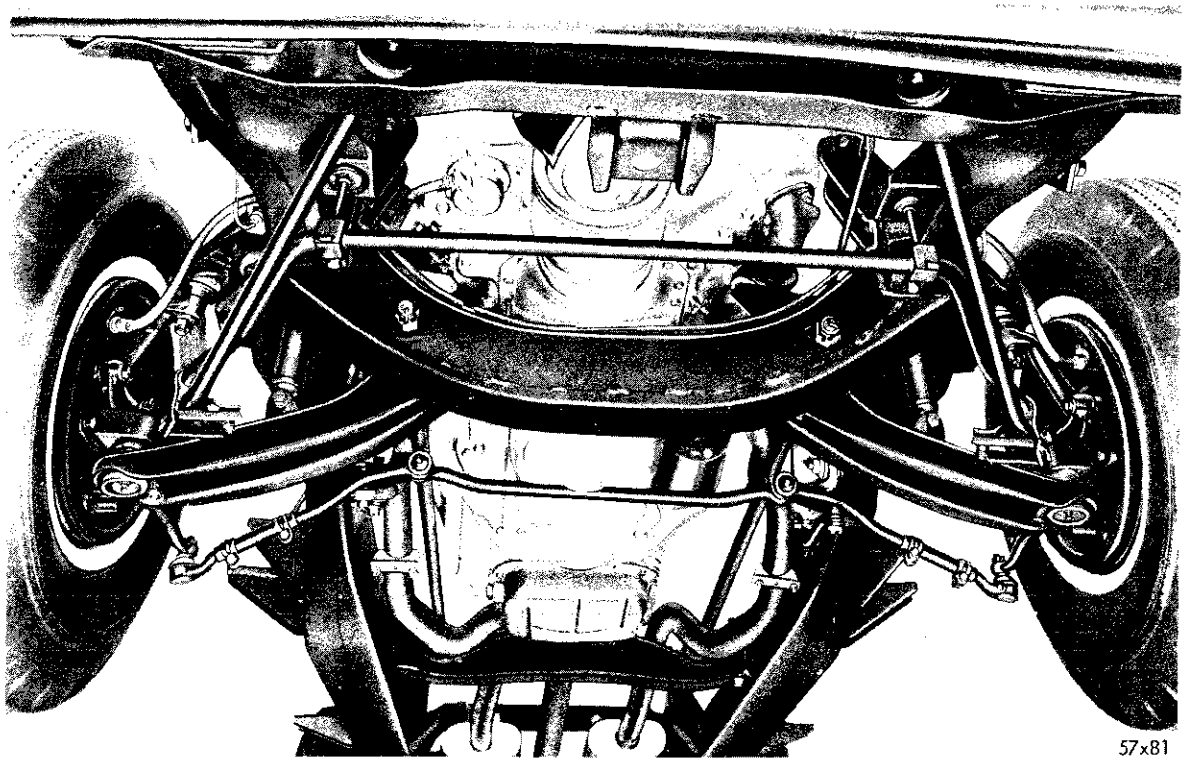

Fig. 3—Lower View Front Suspension Assembly

Section I
TORSION-AIRE
FRONT WHEEL SUSPENSION

The 1957 Chrysler and Imperial Cars are equipped with a completely new rubber mounted ball joint type independent suspension system using torsion bars instead of coil spring. (Figs. 1, 2, and 3). Torsion bars make more efficient use of metal, increases the fatigue life of the metal and permit accurate re-adjustment of car height to compensate for settling of the suspension which might occur after long periods of service. This new suspension gives improved steering and directional stability and with the anti-brake dip principle built into the design, the tendency of the nose of the car to dip when braking is reduced to a minimum. Torsion bar springs also permit relocating of steering linkage and control arm inner pivot points, so that their steering geometrics are more nearly matched resulting in less wheel fight because the vertical movements of the road wheels have little effect on the steering linkage. The new system also offers a number of other advantages in terms of longer part life and ease of servicing.

Lubrication

The number of lubrication points has been reduced to 8 in the new suspension system. The suspension points requiring lubrication are effectively sealed against entry of dust, dirt, water or other contaminants. Rubber bushings should not be oiled or greased. The use of lubricant causes pre-mature failure of bushings.

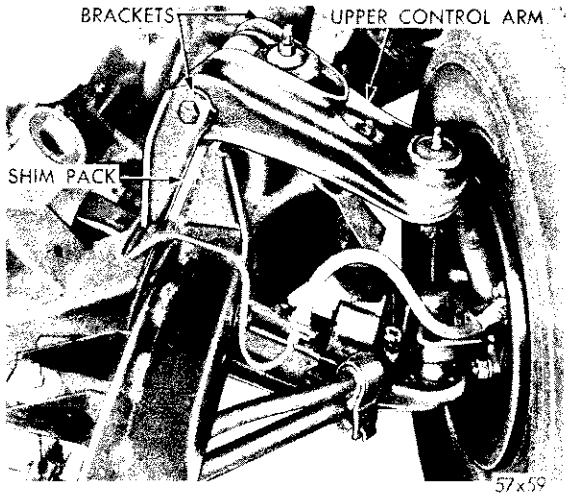

Fig. 4—Upper Control Arm, Shim Pack and Bracket

1. SERVICING THE FRONT SUSPENSION SYSTEM

The upper control arms are mounted on removable brackets which are bolted to the frame sub side-rail. Shim packs are mounted between brackets and frame side-rail to establish caster and camber settings for each front wheel, as shown in Figure 4.

The lower control arms are assembled to pivot shafts and mounted to frame crossmember in replaceable rubber bushings, as shown in Figures 5 and 6. The pivot shafts extend

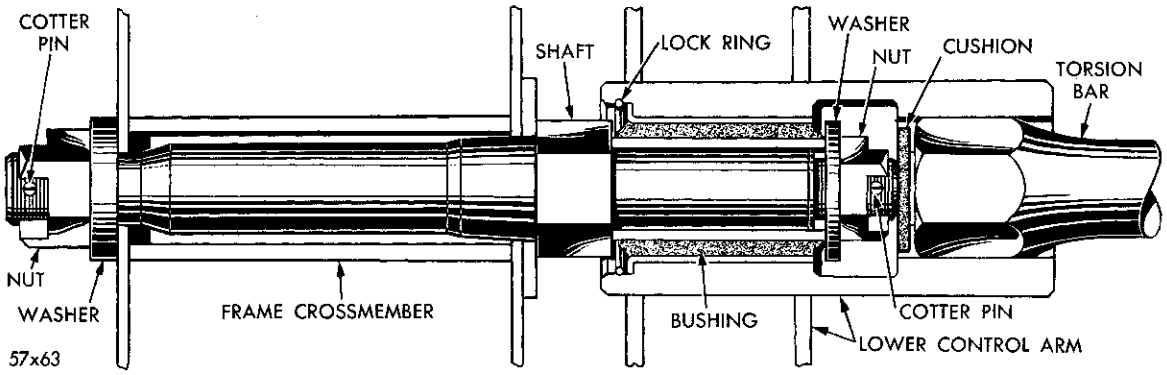

Fig. 5—Lower Control Arm Pivot Shaft and Bushing Assembly

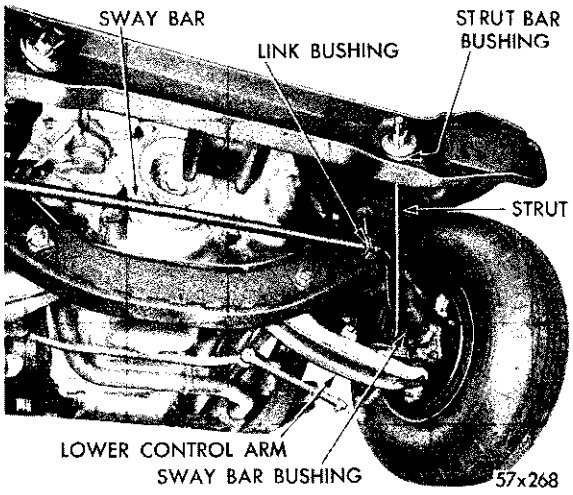

Fig. 6—Lower Control Arm, Strut and Sway Bar Assembly

through the crossmember and from the axis of lower control arms. The steering knuckles are connected, as shown in Figures 7 and 8, to upper and lower arms through ball joints, thus eliminating the king pins. This also eliminates the king pin inclination procedures and the term "Steering Axis Inclination" will be used hereafter.

To prevent the possibility of any fore and aft movement of the lower control arms, a strut is attached from frame crossmember to lower control arm, as shown in Figure 6. The forward end of the struts are mounted in the front crossmember with replaceable rubber bushings, as shown in Figure 9.

The sway bar shaft is insulated and mounted

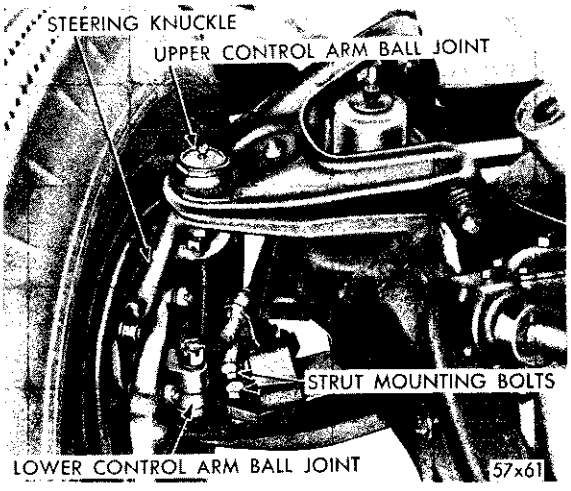

Fig. 7—Steering Knuckle and Ball Joint Assembly

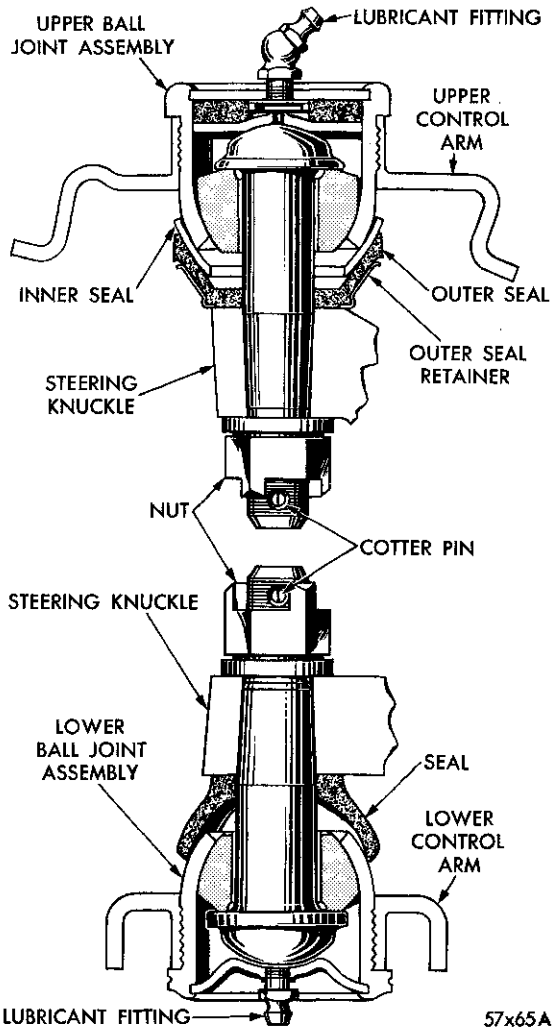

Fig. 8—Upper and Lower Steering Knuckle Ball Joint Assembly

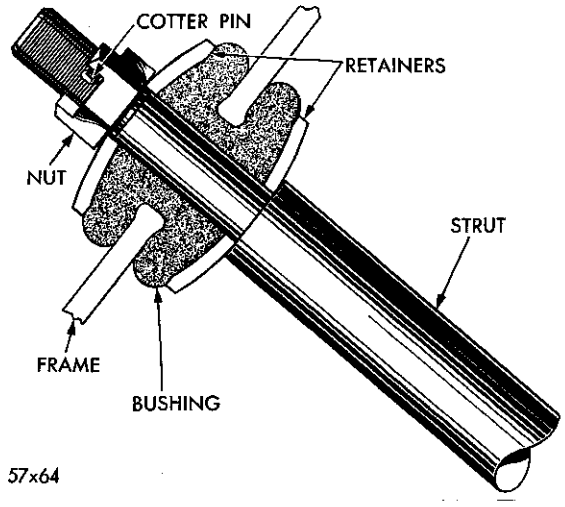

Fig. 9—Front Strut Bar Bushing Assembly

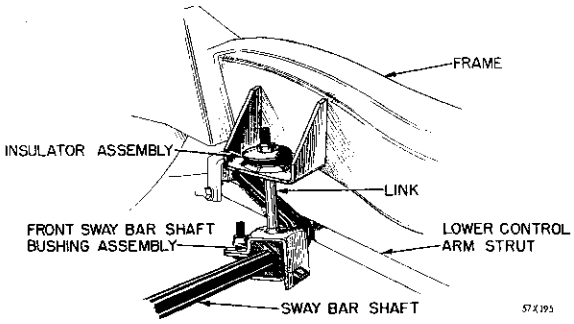

Fig. 10—Front Sway Bar to Frame Attachment

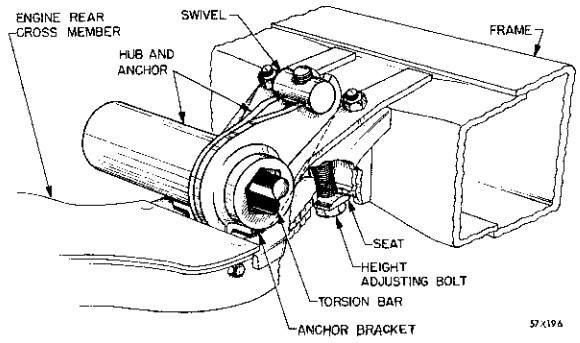

Fig. 11—Torsion Bar Spring Cam and Height Adjustment Bolt Assembly

to frame and the lower control arm. (Figs. 6 and 10.)

The front end of the torsion bars are indexed with lower control arms at frame front crossmember pivot points (Figs. 1 and 2). The rear end of torsion bars are indexed in anchors which are supported by brackets welded to frame side-rails and crossmember, as shown in Figure 11. The torsion bar springs (Fig. 12) are marked (L) and (R) in manufacture and are not interchangeable.

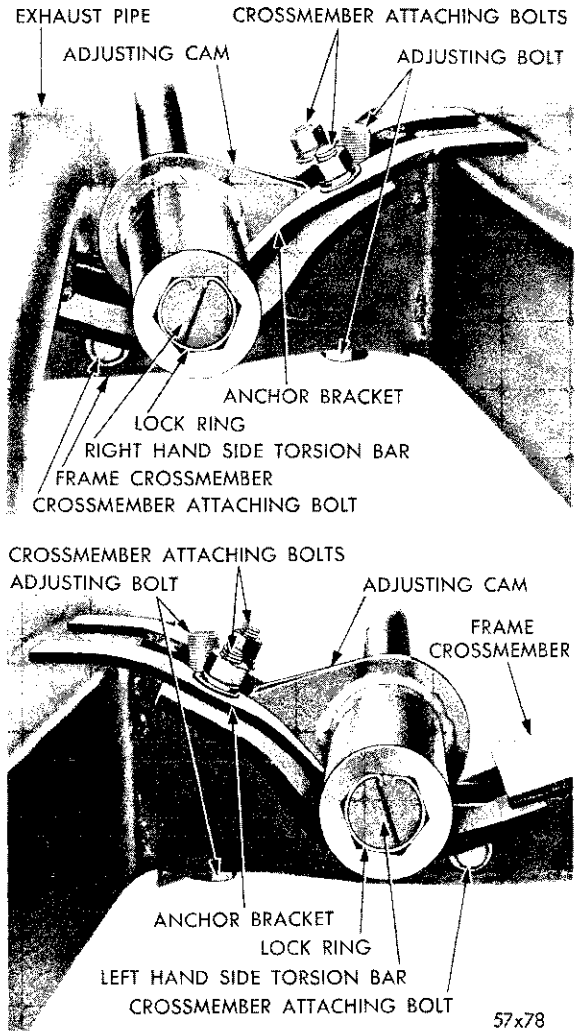

Fig. 12—Torsion Bar Spring (Rear Mounting)

SERVICE PROCEDURES

2. CHECKING FRONT SUSPENSION HEIGHT

Front suspension height should be checked and if necessary, reset whenever service work has been done on the torsion bars. The vehicle should be placed on a level floor with weight of vehicle on the torsion bars. (No passenger load, full gas tank). Using a steel rule, measure from the lowest point of the ball joint to floor, as shown in Figure 13. Again using steel rule, measure from the underside of lower control arm bushing housing, (at center line of lower control arm), as shown in Figure 14. **Under car weight, the bushing housing will always be higher than the ball joint housing.** The difference between these two points should be held to $2\frac{3}{16}$ inches plus or minus $\frac{1}{16}$ inches. Check measurements on the opposite side of car in same manner. After the differential measurements have been established for each side, they should be compared. **The results must be held within $\frac{1}{8}$ inch of each other.**

NOTE: Jounce front of car and allow it to find its free height before checking.

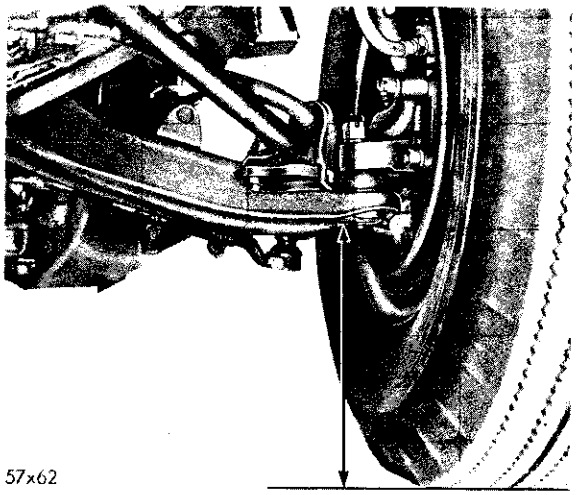

Fig. 13—Measuring Front Spring Height

Make correction by tightening or loosening the adjusting bolt at torsion bar anchor, (Fig. 15) until correct height has been obtained. **When front suspension height has been changed by adjustment, check alignment of front wheels, and aiming of headlight beam. Adjust as necessary.**

3. FRONT WHEEL ALIGNMENT (CASTER AND CAMBER)

Correct front wheel alignment produces easy, positive steering with a minimum of scuffing action between tire and load. Normally, when checking front wheel alignment, car should be empty (all luggage or load should be removed). If a constant load is carried, such as when a car is used by salesman for carrying samples, etc., car should be loaded with its normal amount of weight before checking front wheel alignment.

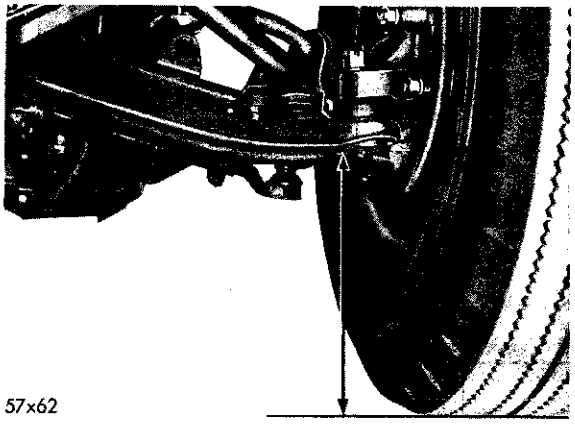

Fig. 14—Measuring Front Spring Height at Control Arm

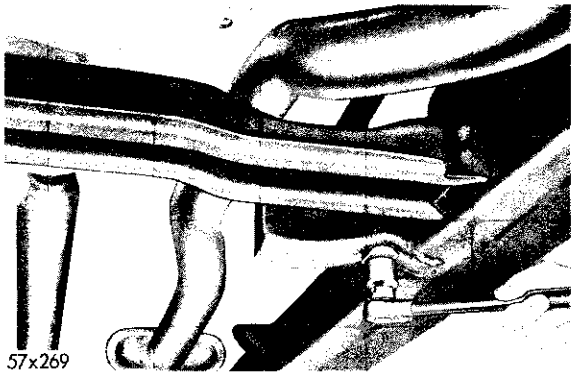

Fig. 15—Adjusting Torsion Bar Cam Bolt

All factors of front wheel alignment are interrelated, but each angle has specific purpose. Four different angles are used in positioning front wheels for proper steering under varying conditions of weight and speed. When making adjustments or installing new suspension parts, the alignment angles in both front wheels should be checked in the following order: Camber, Caster, Steering Axis Inclination and Toe.

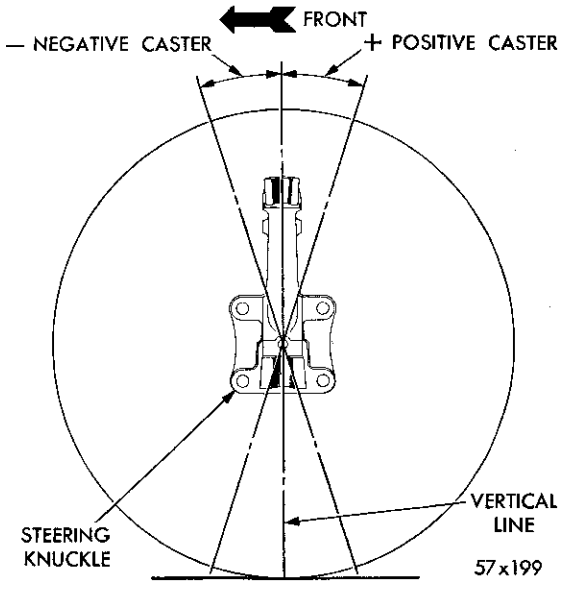

Fig. 16—Caster Angle

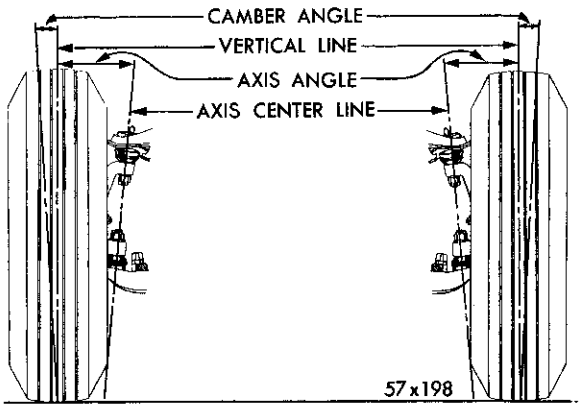

Fig. 17—Camber Angle Axis Inclination

NOTE: Front suspension parts are heat treated, if they are damaged or bent, they should be replaced. Under no circumstances should these parts be heated in order to straighten.

Before checking front wheel alignment, the following inspections should be made to determine the necessity for repair or replacement of parts.

Inflate all tires to recommended pressure. Check adjustment of front wheel bearings. (Refer to "Servicing the Steering Knuckles" Paragraph 8, of this Section.) Check tire wear as outlined in "Wheels and Tires" Section XIII.

Check upper and lower ball joints, tie rod ends and idler arm for excessive looseness. Check for bent frame and rear spring "U" bolts for tightness or shifted axle housing.

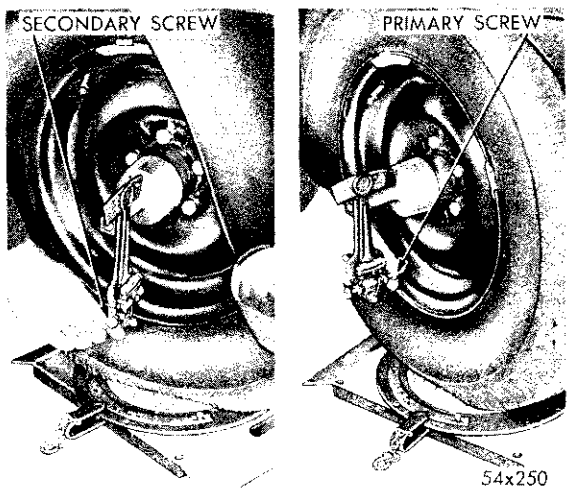

Fig. 18—Checking Caster—Right Wheel

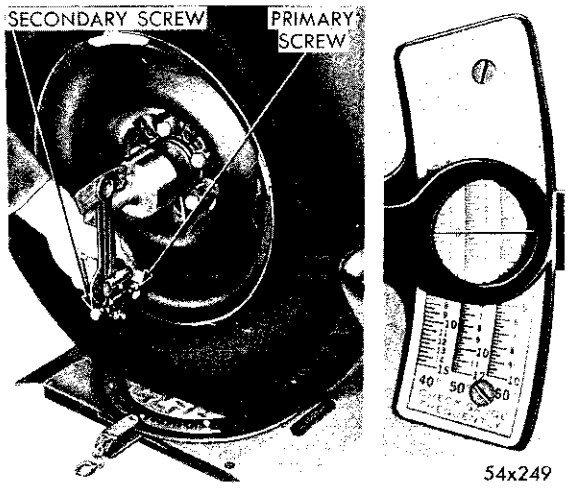

Fig. 19—Checking Camber (Tool C-3409)

Grasp the front and rear bumper at center and jounce car up and down several times. This will place the torsion bar springs and shock absorbers in their "normal" unloaded position. **The car must remain in the "normal unloaded position" while checking camber, caster and steering axis inclination.**

Negative Caster is amount in degrees that the axis of the ball joint leans from vertical toward front of car (Fig. 16).

Positive Caster is the amount of degrees that ball joints lean toward rear of car.

Camber is amount that front wheels lean outward or inward from the vertical, when viewed from front of car (Fig. 17). With positive cam-

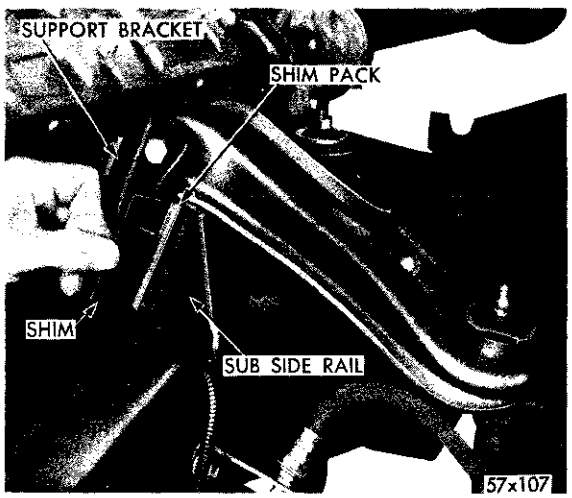

Fig. 20—Removing Shims to Adjust Camber or Caster

ber, wheels are farther apart at top than at bottom. With negative camber, this condition is reversed.

Caster and camber adjustment (Figs. 18 and 19) is accomplished by the use of 1/16 and 1/32 inch shims placed between the upper control arm support brackets and the frame sub siderails. (Refer to Fig. 20). Shim may be changed at either front or rear bracket to change the caster setting or equally at both brackets to change camber.

The removal of shims at the rear bracket or addition of shims to front bracket will decrease positive caster. One shim (1/16 inch) will change caster approximately 3/8°. The addition of shims at both front and rear support brackets will decrease positive camber. One shim (1/16 inch) at each bracket will change camber (approximately) 1/8°. Caster and camber adjustments are made as follows:

Remove load from upper control arms and frame bracket by placing a jack under lower control arm as near to the front wheel as possible. Raise car off floor. Loosen upper control arm support bracket bolts and add or remove shims as required, as shown in Figure 20. Retighten bolts, remove jack and bounce front of vehicle to allow car to assume its normal operating position before checking wheel alignment.

The total thickness of the shim pack at either of the support brackets should **NOT** exceed 5/16 inch.

4. ADJUSTING FRONT WHEEL TOE-IN

Toe-In means that wheels are closer together

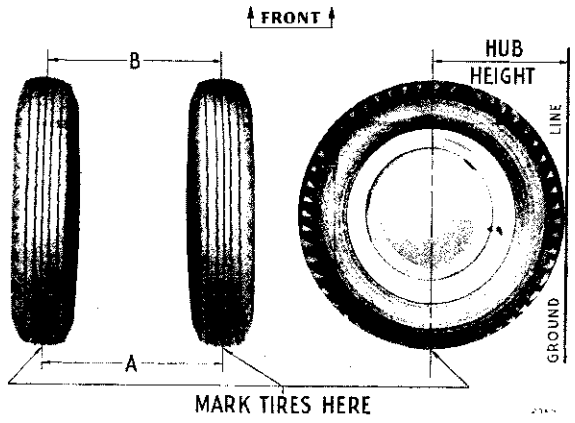

Fig. 21—Front Wheel Toe-in

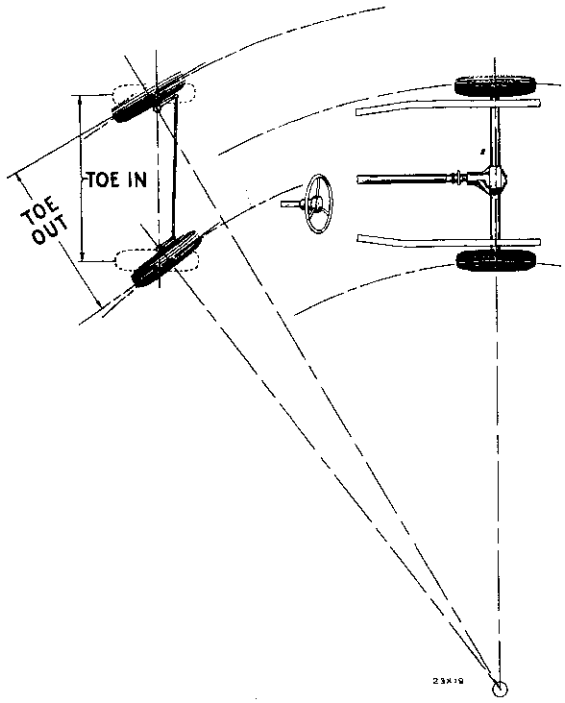

Fig. 22—Steering Geometry on Turns

at front than they are at rear. To measure, spin front wheels and scribe a thin line in center of tread of each tire (Fig. 21). Jounce front end up and down several times and position wheels in straight-ahead position. Gauge and scriber Tool C-695 can be used for scribing tire treads and measuring toe.

Measure distance at hub height between points A and B, Fig. 21. The distance between point B should be 1/8 inch less than distance between point A. To adjust toe, lengthen or short-

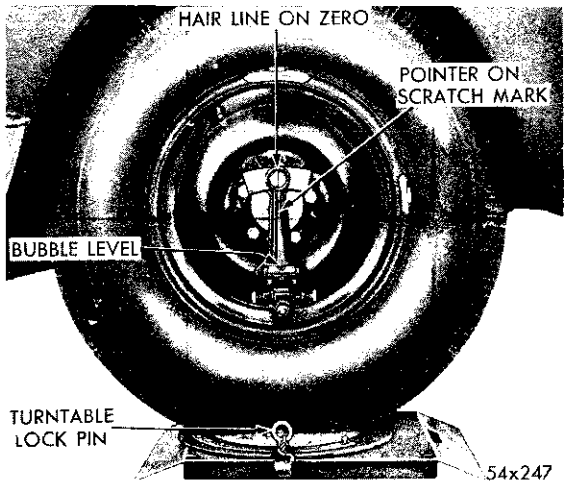

Fig. 23—Gauge C-3409 and Turntable DD 435 on Right Wheel

en the tie rods an equal amount until the wheels toe-in 1/8 inch, plus or minus 1/32 inch (1/8 inch preferred) and recheck measurements at points A and B.

NOTE: The steering wheel hub, steering gear arm, steering tube and steering gear roller shaft are machined with master serrations to place front wheels straight-ahead when steering wheel is in center position. Do not alter these serrations to change position of these parts. Improper position of steering wheel must be corrected by adjusting tie rod lengths.

Toe-out turns.

When car makes a turn, front wheels travel in circles which have a common center (Fig. 22). The arc of circle traveled by the inside front wheel is smaller than arc of circle traveled by outside front wheel. Consequently, when turned to right or left, the wheels will be farther apart at front than at rear. The amount that front wheels toe-out depends upon how far they are turned.

With front wheels on turntables, set right wheel to 20 degrees. The turntable under left wheel should indicate 21½ degrees, plus or minus 1 degree. If reading is not within these limits, the steering knuckle arm or steering gear arm may be bent. Before above check is made, make sure that camber, caster, steering axis inclination and toe-in are within limits.

5. CHECKING STEERING AXIS INCLINATION

Steering axis inclination is amount in degrees that axis of the ball joints lean away from vertical toward center of car (Fig. 16). If camber can be adjusted within the recommended limits, it is unnecessary to check steering axis inclination.

To check axis inclination refer to Figs. 16 and 17 and proceed as follows:

Inflate tires to recommended pressure, place front wheels in straight-ahead position on turntables and set foot brakes. Grasp front bumper at center and move front end of car up and down several times to permit front suspension parts to settle in "normal" unloaded position.

Assemble gauge to right wheel (Fig. 23) and pull out turntable lock pins. Turn front wheels to left until right wheel has turned more than 20 degrees then return to 20 degrees. Adjust secondary screw (Fig. 24). which controls the short pointer until bubble is centered in spirit level. **Do not disturb gauge setting or release brakes.**

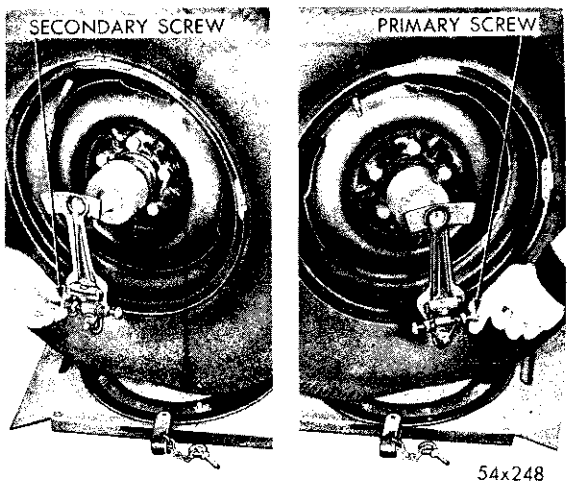

Fig. 24—Checking Steering Axis Inclination (Gauge C-3409)

Turn front wheels to right until right wheel is turned to an angle of more than 20 degrees mark. Allow wheel to back off to exactly 20 degrees. Adjust primary screw (Fig. 24) until bubble centers in spirit level. The reading on 40-degree scale of gauge will be steering axis inclination for right wheel.

To check angle of left front wheel, place gauge on left wheel, turn front wheels to right and repeat procedure outlined above.

NOTE: If the steering axis inclination does not conform with limits listed in Specifications, check for bent frame, steering knuckle or control arms or damaged ball joints.

6. SERVICING THE SWAY BAR (FIGS. 6 and 10)

a. Removal

The front sway bar is attached to frame and strut bars through insulated rubber mounting brackets. To remove the sway bar proceed as follows:

Remove two sway bar link retaining nuts and concave washers. Remove two sway bar cushion retaining nuts, lockwashers and bolts, (one on each strut). Slide sway bar out through con-

trol arm struts and away from vehicle. **The sway bar cushions are not serviced separately. If replacement is necessary, install new sway bar assembly.**

Remove lower concave washers. Remove sway bar link insulating bushings from frame bracket by forcing out of position. If bushings are worn or deteriorated, install new ones as required.

b. Installation

Dip new sway bar link bushing in water, install in opening in frame bracket, using a twisting motion. When installed properly, the groove in bushing will index with opening in frame bracket.

Thread sway bar into position over top of lower control arm struts. Engage sway bar cushion housings with struts and install lockplates. Insert bolts, lockwashers and nuts. Tighten to 25 foot-pounds torque. Install washers over ends of links (concave side up), then slide links up through bushings. Install washers (concave side down), over ends of links and down on bushings. Install nuts and tighten to 15 foot-pounds torque.

7. SERVICING THE LOWER CONTROL ARM STRUT (FIGS. 6 and 9)

a. Removal

Remove the nuts, lockwashers, and bolts that attach the sway bar bushing housing to struts. Disconnect sway bar from struts. Remove the strut to lower control arm mounting bolts and nuts. Remove the cotterpin, nut and bushing retainer from forward end of strut at front crossmember. Slide strut and inner bushing retainer from bushing in frame, as shown in Figure 9. Using a knife, cut bushing out front of frame.

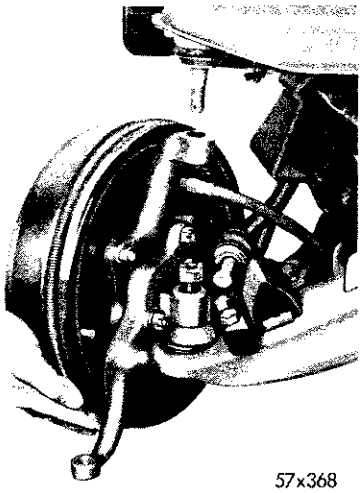

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Fig. 25—Removing or Installing Steering Knuckle

b. Installation

Dip new bushing in water and with tapered portion toward rear of vehicle, install in opening in frame using a twisting motion until groove in bushing indexes properly with frame. With cupped side out, slide washer over threaded end of strut. Push strut through bushing in frame (Fig. 9). Slide outer washer over end of strut (cupped side in). Install nut. Tighten nut sufficiently to install strut to lower control arm mounting bolts. Install bolts, lockwashers and nuts, and tighten to 65 foot-pounds torque. Tighten strut nut to 30 foot-pounds torque and install cotter pin. Check caster and camber.

8. SERVICING THE STEERING KNUCKLES (FIG. 25)

a. Removal

Remove wheel, tire and drum. Cover brakes with clean cloth to protect lining from becoming covered with grease. Remove the cotterpins, nuts and lockwashers attaching the steering arm and brake dust shield to steering knuckle. Remove steering arm, and brake assembly from steering knuckle but leaving the brake hose attached. Do not allow assembly to hang by the brake hose. Remove ball joint studs from steering knuckles as described in "Servicing the Upper and Lower Ball Joints," Paragraph 9, using Tool C-3564. Lift steering knuckle out and away from vehicle.

b. Installation

To install steering knuckle, refer to Fig. 25, and slide upper and lower ball joint studs into steering knuckle and install lockwashers and nuts. Tighten the ball joint stud nut to 135 foot-pounds torque. Install cotterpins.

Slide brake assembly over knuckle and into position. Install lockwashers and nuts on upper rear and lower front bolts. Install upper front and lower rear bolts through dust shield and steering knuckle, then slide steering arm over

bolts. Install lockwashers and nuts. Tighten nuts evenly to 55 foot-pounds torque. Install cotterpins. Remove covering from brake shoes, replace wheel, tire and drum assembly. Adjust front wheel bearings as per "Front Wheel Bearing End Play Adjustment", Paragraph 16. Refer to "Front Wheel Alignment (Caster and Camber)", Paragraph 3.

9. SERVICING THE BALL JOINTS—(UPPER AND LOWER) (FIGS. 26 and 27)

a. Removal of Upper Ball Joint

CAUTION

Upper and lower ball joints are not interchangeable. The upper ball joint is a preloaded joint and should not be used in the lower control arm.

Remove wheel and tire assembly. With support under the lower control arm, remove upper and lower ball joint stud nuts. Install Tool C-3564 (Fig. 26). Apply load to studs and rap knuckles at ball joint boss sharply with a hammer to loosen stud. **To avoid damaging stud do not attempt to hammer stud out of knuckle.**

Remove tool, and disengage ball joint from knuckle. Remove ball joint dust cover and grease seal. Remove lubrication fitting from top of ball joint, using Tool C-356, as shown in Figure 27, unscrew ball joint from upper control arm.

b. Installation of Upper Ball Joint

NOTE: When installing new ball joint, it is very important that the ball joint threads engage those of the control arm squarely.

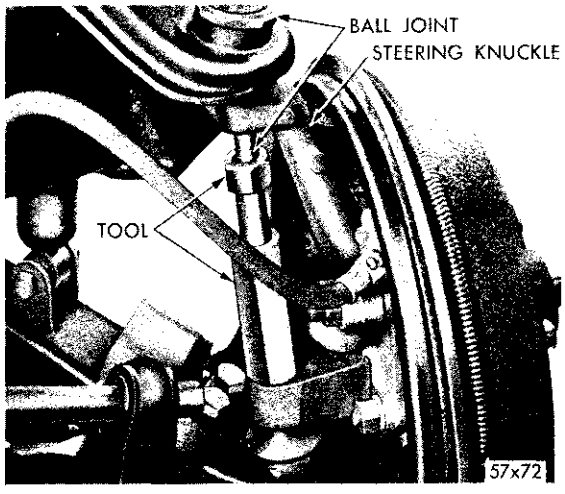

Fig. 26—Removing Upper Ball Joint—(Removal Tool C-3564)

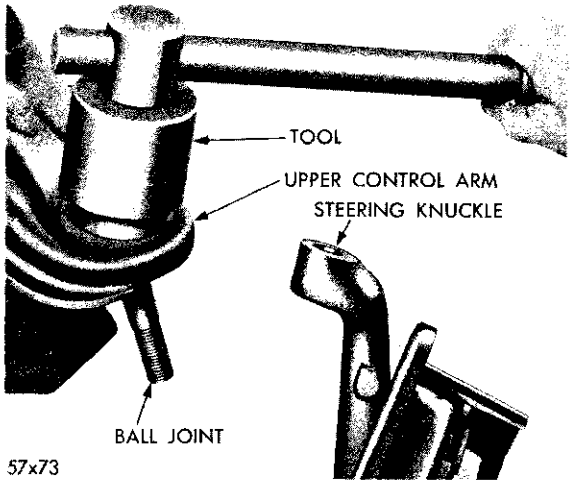

Fig. 27—Removing or Installing Upper Control Arm Ball Joints

With the lubrication fitting removed, screw ball joint into control arm as far as possible by hand. Using Tool C-3461, tighten until ball joint housing is seated on control arm. Tighten to a minimum of 250 foot-pounds torque. Slide seal and dust cover up into position, over stud and position stud in steering knuckle. Install washer and nut. Tighten 135 foot-pounds torque. Install cotter pin and lubrication fitting. Lubricate ball joint with a good grade of chassis lubricant.

c. Removal of Lower Ball Joint

Raise wheel off floor supporting weight under

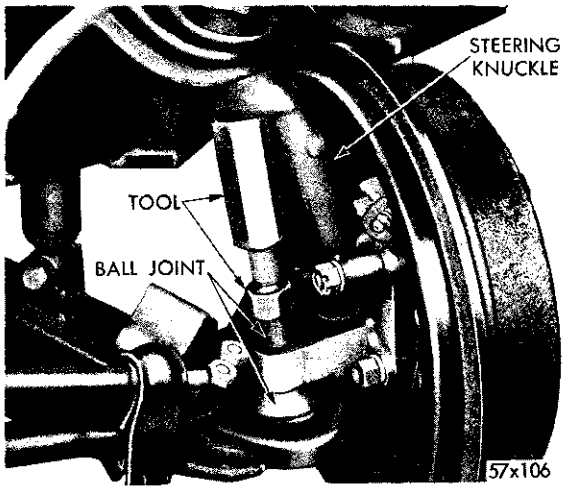

Fig. 28—Removing Lower Ball Joint

the lower control arm, allowing enough clearance to remove lower ball joint, and remove wheel and tire assembly. Remove upper and lower ball joint stud nuts, install Tool C-3564 (Fig. 28) as described in "Upper Ball Joint Removal" Paragraph 9 procedure. Rap knuckle at stud boss sharply with a hammer to loosen stud. **To avoid damaging stud do not attempt to hammer stud out of knuckle.** Remove grease fitting using Tool C-3561, screw out ball joint.

NOTE: When installing new ball joint, it is very important that the ball joint threads engage those of the control arm squarely.

d. Installation of Lower Ball Joint

To reinstall, screw ball joint into control arm as far as possible by hand. Using Tool C-3561, tighten until ball joint housing is seated on control arm. Tighten to minimum of 250 foot-pounds torque. Slide seal and dust cover down into position, over stud then position stud in steering knuckle. Install washer and nut. Tighten 135 foot-pounds torque. Install cotterpin; lubrication fitting and lubricate ball joint, using a good grade of chassis lubricant and reinstall wheel and tire assembly.

10. SERVICING THE TORSION BARS

The torsion bars are not interchangeable, side for side. The left hand bar cannot be used on the right side and vice versa. The bars will be marked left or right by (L) or (R) stamped on the end of the rod, as shown in Figure 12. The bars should always be installed with letters toward the rear of car.

a. Removal of Torsion Bar, Cam Swivel and Bolt

To replace torsion bar cam, refer to Fig. 2 and proceed as follows: Raise vehicle off floor by jacking under frame crossmember. Release load from torsion bar by unscrewing the cam adjusting bolt partly out of swivel.

CAUTION

To prevent swivel from falling into frame bracket, do not loosen the swivel bolt all the way out until torsion bar is removed.

Remove the lock ring from rear of anchor (Fig. 12). Slide torsion bar rearward enough to disengage forward end of bar from lower control arm, then forward to disengage torsion bar from cam. Remove bar, bolt, swivel and cam from frame bracket anchor.

b. Installation

With car raised off the floor, assemble cam, swivel, bolt-seat (oval side up) and bolt in frame anchor bracket. Check for torsion bar cushion in lower control arm housing, with cam bolt barely entered in cam swivel. Slide torsion bar into rear cam. Rotate cam and torsion bar assembly until cam is positioned as close as possible to floor pan. Engage front of torsion bar in lower control arm shaft assembly as far as bar will go.

CAUTION

Unless anchor blade is in the position just described when installing torsion bar, it will be impossible to adjust front suspension to the proper suspension height.

Center and install lock ring in rear of cam housing. Pressure may have to be applied to torsion bar to enable lock ring to be installed in housing. After installation of lock ring, tighten cam bolt until approximately 1 inch of threads are showing above the anchor bolt swivel.

NOTE: This is an approximate setting and is to be used merely as a starting point when adjusting suspension height. This setting is also necessary to place load on the torsion bar spring before lowering vehicle to the floor.

Check and adjust suspension height. Refer to "Checking Front Suspension Height", Paragraph 2.

CAUTION

Caster and camber and front suspension height should always be checked whenever the torsion bars are replaced.

Refer to "Checking Front Spring Height", Paragraph 2 of this section.

11. SERVICING THE UPPER CONTROL ARM

a. Removal (FIG. 2)

Place a jack under lower control arm and raise front wheel off floor. Remove wheel and tire assembly. Remove cotter pin, nut, and washer from upper ball joint stud. Install tool and load studs. Using a hammer, remove ball joint stud from steering knuckle by striking the ball joint boss on knuckle sharply. Do not hammer on threaded section of stud.

Remove upper control arm front and rear pivot bolt. Remove control arm from support mountings. Do not remove brackets from frame.

b. Installation

Position upper control arm in support mounting bracket and install front and rear mounting bolts, washers, and nuts. With control arm in normal position tighten nuts to 65 foot-pounds torque. Place upper ball joint stud in steering knuckle and install washer and nut. Tighten nut to 135 foot-pounds torque and secure with cotterpin.

12. UPPER CONTROL ARM BUSHING—REPLACEMENT

Remove upper control arm. Refer to "Upper Control Arm—Removal", operations 1 through 7.

Remove bushings by either pressing them out with Tool C-3558 (Fig. 29) or using a hammer and suitable drift.

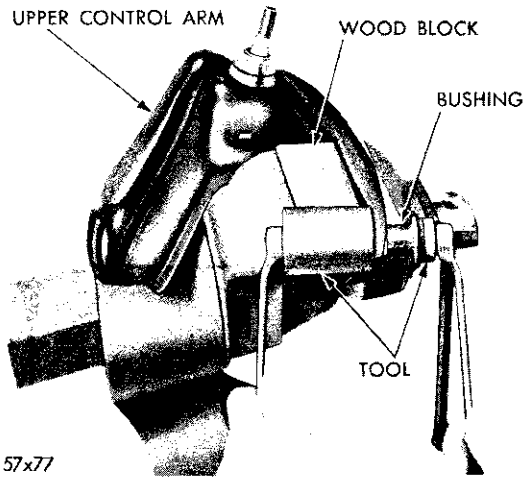

Fig. 29—Removing Upper Control Arm Bushing

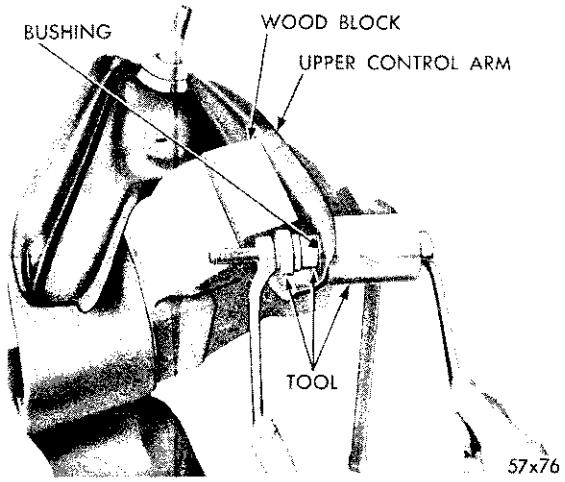

Fig. 30—Installing Upper Control Arm Bushing

NOTE: Make definitely sure control arm is properly supported when removing bushings. If hammer and drift are used, extreme care must be exercised to avoid damaging bushing surface in the control arm.

When installing new bushings, always make sure control arm is supported squarely at the point bushing is being pressed in. Position flange end of new bushing in Tool C-3558 (Fig. 30), and support control arm squarely. Using an arbor press, install bushings (flange out) into control arm until the flanged portion of bushings seat on arm.

Install upper control arm. Refer to "Control Arm—Installation", operations 1 through 3.

13. LOWER CONTROL ARM

a. Removal

Raise car by placing jack under frame cross-member. Remove wheel and tire assembly. Remove torsion bar spring from lower control arm to be removed. Refer to "Servicing Torsion Bar —Removal", Paragraph 10. Remove shock absorber lower eye attachment nut and bolt from mounting bracket. Push lower portion of shock absorber up into frame opening. Remove the two strut to lower control arm mounting bolts and nuts. Remove cotter pin, nut, and washer from lower ball joint stud. Remove lower ball joint stud from knuckle (Refer to Paragraph 9 (a). Remove cotter pin, nut and washer from lower control arm shaft assembly. With washer

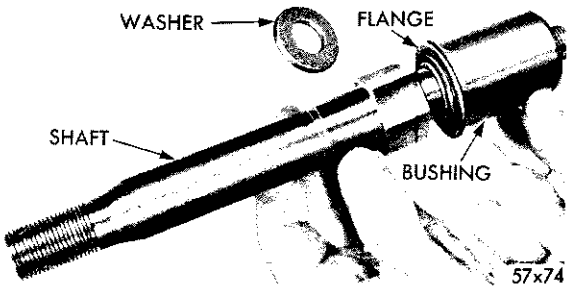

Fig. 31—Removing or Installing Lower Control Arm Pivot Shaft Bushing

removed, reinstall nut (to protect threads) until it is flush with end of shaft. The lower control arm shaft is a tapered fit in front crossmember. Use a hammer and brass drift for loosening, then remove nut from shaft. Slide lower control arm and shaft assembly from rear of crossmember.

CAUTION

Do not lose torsion bar spring cushion (small disc located in end of shaft assembly).

b. Installation

Position shaft and lower arm assembly in crossmember in normal position; and install washer and nut. Tighten 175 to 200 foot-pounds torque and secure with cotter pin. Position lower ball joint stud in steering knuckle and install washer and nut. Tighten nut 135 foot-pounds torque and secure with cotter pin. Place shock absorber in position in lower mounting bracket and install bolt and nut. Tighten to 40 foot-pounds torque. Install wheel and tire assembly. **Do not lower front of vehicle at this time.** Install torsion bar spring. Refer to "Servicing Torsion Bar Installation", Paragraph 10.

14. LOWER CONTROL ARM PIVOT SHAFT BUSHING—REPLACEMENT (FIGS. 31 and 32)

Remove lower control arm assembly. Refer to "Lower Control Arm—Removal", Paragraph 13. Remove torsion bar spring cushion (small disc) from end of shaft assembly.

a. Disassembly

Remove lock ring from end of bushing housing. Support lower control arm assembly in an arbor press; and using a brass drift, press shaft and bushing assembly from control arm. Remove cotter pin, nut, and washer; and slide bushing assembly from shaft.

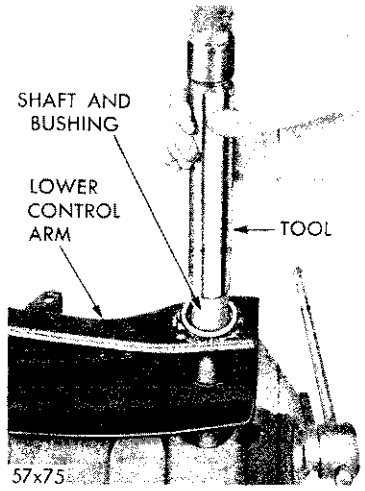

Fig. 32—Installing Lower Control Arm Pivot Bushing

b. Assembly

Position new bushing (flanged end of bushing first) on shaft and install washer and nut. Tighten nut 100 to 150 foot-pounds torque and install cotter pin.

With lower control arm supported, install shaft and bushing assembly by using Tool C-3557 and pressing bushing into the lower control arm until flanged portion of bushing is seated all the way into control arm. Install lock ring making sure it is seated properly in the ring groove. Install torsion bar spring cushion in control arm. Install lower control arm. Refer to "Lower Control Arm—Installation", Paragraph 13.

15. UPPER CONTROL ARM SUPPORT MOUNTING BRACKETS

The upper control arm support mounting brackets are bolted to the frame side-rails and should not be removed unless they have been damaged due to accident, etc. When removing the mounting brackets, extreme care should be taken so not to lose the alignment shim pack located between the bracket and frame side-rail. In event a shim pack is lost, a selection of shims $\frac{5}{16}$ inch thick **may be used as a starting point** when reassembling.

16. FRONT WHEEL BEARING END PLAY ADJUSTMENT

A new front wheel bearing adjusting nut and lock is used on the 1957 cars to provide greater

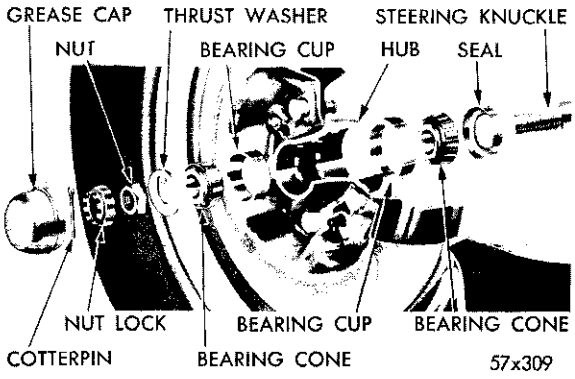

Fig. 33—Front Wheel Bearing Adjustment

front wheel bearing adjustment accuracy. (Fig. 33).

To adjust the front wheel bearings, proceed as follows: Remove any burrs or nicks on the spindle thread to insure accurate torque readings. Tighten the wheel bearing adjusting nut with an inch-pound torque wrench to 90 inch-pounds torque while rotating the wheel.

Selectively position the nut lock over the adjusting nut so that the spindle cotter pin hole is in line with one set of slots in nut lock. Without removing the nut lock, back off the nut until the next set of slots in nut lock is lined up with spindle cotter pin hole. Insert and bend the cotter pin to secure the nut lock.

NOTE: This procedure should result in from .000 inch (no pre-load) to .003 inch bearing free play measured axially.

SERVICE DIAGNOSIS

17. FRONT END NOISY—POSSIBLE CAUSES AND CORRECTIONS

Lack of lubrication in ball joints or tie rod ends.

Worn upper or lower control arm pivot bushings (rubber) or loose mounting brackets—Tighten brackets or replace bushings.

Loose or worn strut mounting bushings (rubber)—Tighten mounting nut to proper torque or replace bushing.

Worn ball joints or tie rod ends—Replace as necessary.

Front shock absorber noisy—Tighten mounting nuts or replace bushing or shock absorber as required.

Sway eliminator noisy—Check attaching bolts for tightness and rubber bushings for wear. If rubber bushings are worn, replace sway eliminator assembly.

Worn or loose front wheel bearings—Adjust or replace as required.

18. BODY HAS TENDENCY TO PITCH AND ROLL

Low or uneven tire pressures—Inflate tires to proper pressure.

Shock absorber inoperative—Replace as required.

Loose sway eliminator—Tighten mounting bolts to proper torque.

Improper front suspension height—Adjust torsion bar springs as required.

19. TIRE WEAR

The same items which caused excessive tire wear in the previous suspension will also apply to the 1957 series suspension.

20. STEERING

The following is a list of steering problems which may be checked after it has definitely been established that difficulty is caused by the front suspension system.

21. WHEEL BOUNCE

Unequal tire pressure—Inflate tires to recommended pressure.

Unbalanced wheels tires or brake drums—A wheel and tire assembly that is out of static balance can cause an up and down action which will affect steering ability and control.

Damaged or in some instances, repaired tires.

Inoperative shock absorber—Replace shock absorber.

22. HARD STEERING

Lack of lubrication in ball joints or tie rod ends.

Low or uneven tire pressure—inflate to proper pressure.

Improper caster—Check and adjust front end alignment.

Upper or lower control arms bent or twisted —Replace as required.

Frame bent—Straighten frame and check alignment.

Bent steering knuckle—Replace as required.

23. EXCESSIVE PLAY OR LOOSENESS IN STEERING SYSTEM

Loose stabilizer—Tighten bolts to proper torque.

Worn or loose front wheel bearings—Replace or adjust as required.

Worn ball joints—Replace as required.

Worn upper or lower control arm bushings—Replace as required.

Worn tie rod ends—Replace as required.

24. FRONT WHEEL SHIMMY

Uneven tire pressure—Inflate to proper pressure.

Worn or loose front wheel bearings—Replace or adjust as required.

Inoperative shock absorber—Replace as required.

Worn ball joints or tie rod ends—Replace as required.

Worn upper or lower control arm bushings—Replace as required.

Loose or worn strut mounting bushings—Tighten to proper torque or replace bushings.

Incorrect front end alignment—Check and adjust front end alignment.

Loose or bent steering knuckle—Tighten or replace.

Wheels and tires out of balance—Balance wheels and tires.

Excessive wheel and tire runout—Correct as necessary.

25. CAR PULLS TO ONE SIDE

Low or uneven tire pressure inflate to proper pressure.

Rear wheels are not tracking with front wheels—Check alignment to determine cause and correct as necessary.

Brake dragging—Adjust brakes.

Inoperative shock absorber—Replace as required.

Incorrect front wheel alignment—Check caster, camber, and toe-in and adjust as required.

Bent upper or lower control arm—Replace as required.

Section II

REAR AXLE

CONTENTS

DATA AND SPECIFICATIONS

Rear Axle	C-75	C-76	IM-1-2-4
Type	Semi-Floating	Semi-Floating	Semi-Floating
Gear Type	Hypoid	Hypoid	Hypoid
Ring Gear Diameter	8.75″	8.75″	8.75″
Pinion Bearing	2	2	2
Type	Tapered Roller	Tapered Roller	Tapered Roller
Adjustment	Shim Pack	Shim Pack	Shim Pack
Differential Bearings	2	2	2
Type	Tapered Roller	Tapered Roller	Tapered Roller
Adjustment	Threaded Adjuster	Threaded Adjuster	Threaded Adjuster