CHASSIS SUSPENSION • • • SECTION 8

CONTENTS

GENERAL INFORMATION

This section covers front suspension, front end alignment, rear suspension and the sway eliminator.

Front suspension includes description and replacement of the parts which attach the steering knuckles to the front crossmember, front coil springs and shock absorbers, in addition to the steering knuckles and the steering arms. Front suspension parts must be in good condition and properly installed before the front end can be successfully aligned. Front end alignment includes preparatory operations and procedures required to check or adjust caster, camber, toe-in, king pin inclination and toe-out on turns. **NOTE: Front end alignment affects steering and tire wear.**

Rear suspension includes rear springs and mountings and rear shock absorbers. Rear spring installation also affects front end alignment and, therefore, must be correct.

The sway eliminator, used to control body and frame sway encountered when rounding curves at high speeds, is also covered in this Section, since limiting sway is important in maintaining front end alignment on curves. Front and rear suspension is shown in Fig. 238.

DESCRIPTION AND CONSTRUCTION

a. FRONT SUSPENSION. The front suspension is an independent parallel arm type provided with a coil spring for support at each wheel. The front wheels are attached to the front brake drums and hubs which are mounted through the steering knuckle, steering knuckle support and upper and lower suspension arms directly to the frame (Fig. 239).

Since each front wheel is mounted independently, road shocks affecting one wheel do not affect the opposite wheel.

Each steering knuckle pivots on a king pin mounted in a forged steering knuckle support. The upper end of this support is attached to the outer end of the upper suspension arm. The lower end of the support is attached to the outer end of the lower suspension arm. Both ends of the support are pivot points.

The inner ends of the forked upper suspension arm are pivot mounted to the front shock absorber support attached to the top of the frame and front crossmember. The inner end of the forked lower suspension arm is pivot mounted on the bottom of the front crossmember.

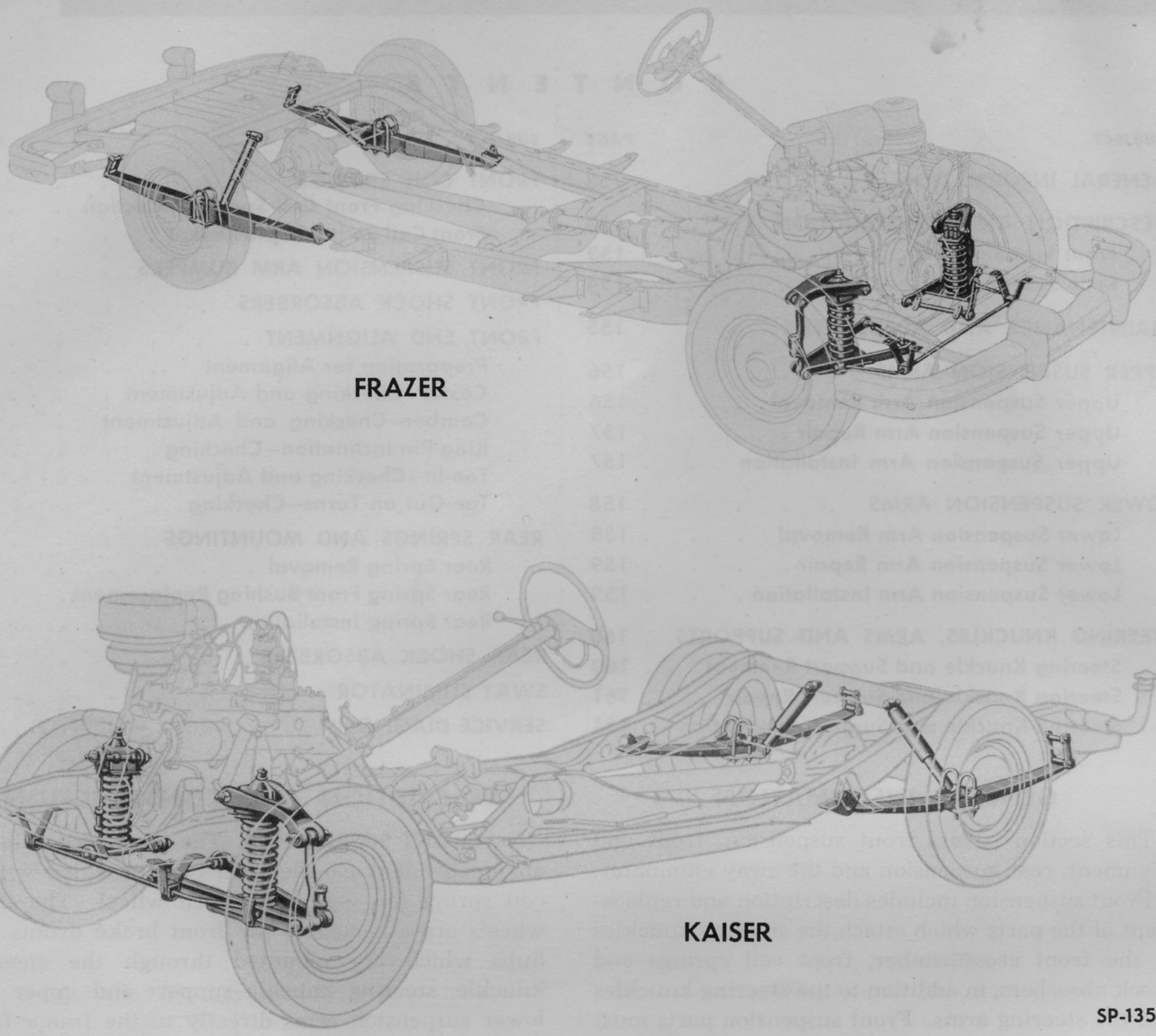


Fig. 238—Front and Rear Suspension

The coil spring is installed with the bottom end supported on the lower spring seat which is a part of the lower suspension arm. The upper end of the coil spring presses against the bottom side of the upper spring seat which is solidly mounted on the frame. With this construction, the weight of the vehicle is supported on the coil spring.

Flexing of the spring at each front wheel is controlled by a double-acting hydraulic "airplane" type shock absorber mounted inside the coil spring. The upper end of the shock absorber is attached to the shock absorber support, mounted on the front frame crossmember, and the lower end is attached to the lower spring seat, a part of the lower suspension arm. In addition, there are two rubber compression bumpers at each front wheel to limit up and down vertical travel of the wheel and act as a cushion if the front suspension bottoms when a severe bump or hole in the road is encountered.

b. REAR SUSPENSION. Two semi-elliptic leaf type rear springs provided with spring covers, hung longitudinally from the frame side rails in rubber bushed mountings, support the rear axle and transmit the drive from the rear wheels to the frame (Fig. 240).

The front of each rear spring is connected directly to a spring hanger which is riveted to the underside

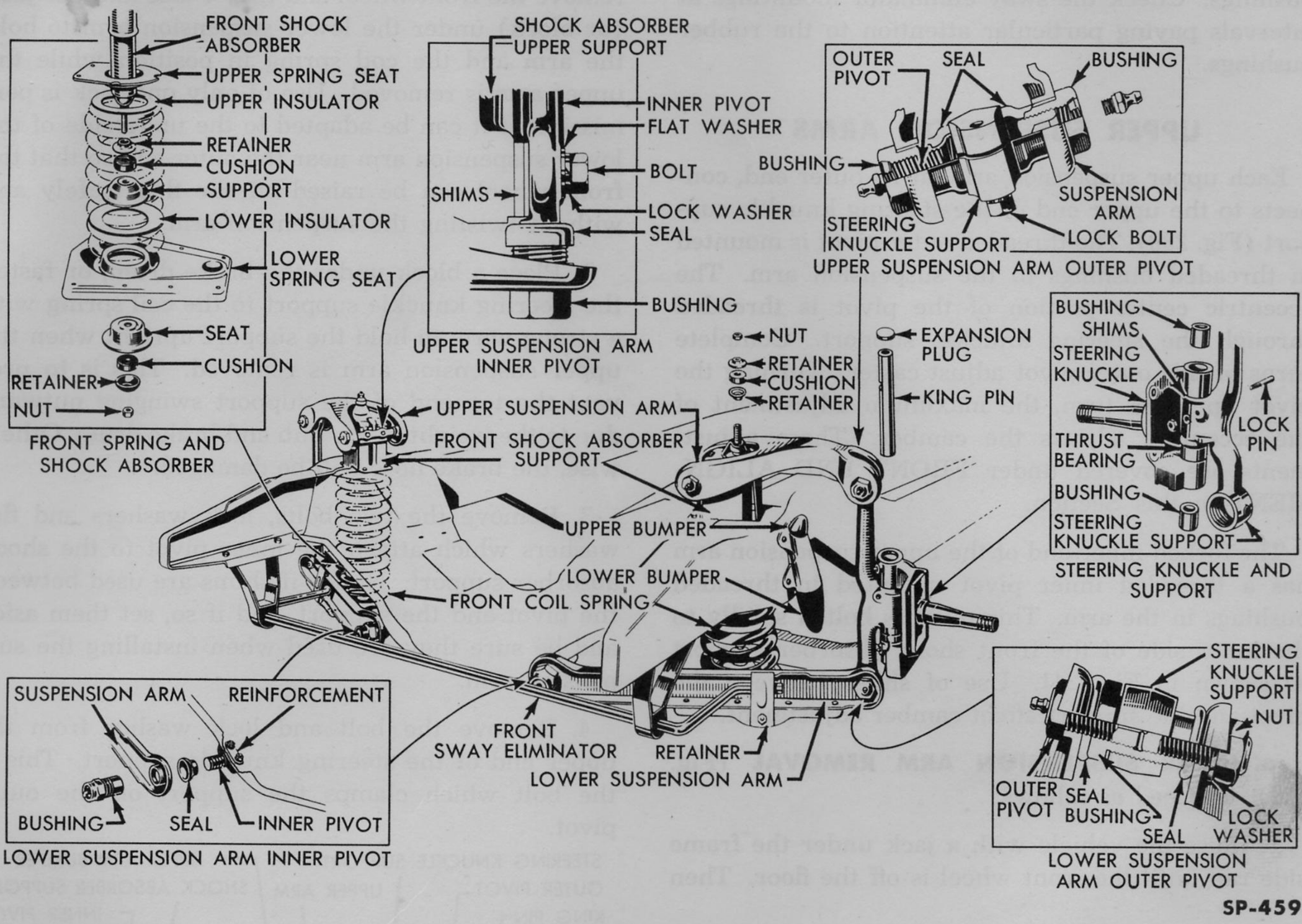


Fig. 239—Front Suspension Installation—Exploded View

of the frame side rail. The rear end of each rear spring is connected to the shackle bracket on the frame by a shackle and link assembly.

Each rear spring is mounted at its center on a spring pad which is welded to the axle housing. Rubber insulation is used between the top leaf of the spring and the spring pad. A spring plate, which has a stud to which the shock absorber attaches, is used on the bottom of the spring, together with a U bolt at each side of the spring, to fasten the spring solidly on the axle housing.

A double-acting hydraulic "airplane" type shock absorber is used at each rear spring and is connected between the spring plate and the number 3 crossmember on Kaiser Models and number 4 crossmember on Frazer Models. This manner of installation (Fig. 238) controls both side sway and vertical movement resulting from flexing of springs.

MAINTENANCE AND ADJUSTMENT

Careful maintenance of front end alignment is the major item of chassis suspension maintenance; adjustments should be made when indicated by tire wear and/or difficult or unsatisfactory steering. The procedure for adjusting front end alignment is given in detail later in this Section.

Lubricate the front and rear suspension parts at regular intervals as described in Section 17 "Lubrication," to assure smooth riding, easy steering and to minimize wear.

Check front and rear shock absorbers periodically for leaks. Also check shock absorber mountings to be sure rubber insulators are in good condition. Likewise, rear spring rubber bushings must be maintained in good condition. Check tightness of rear spring mountings and front suspension pivot

bushings. Check the sway eliminator mountings at intervals paying particular attention to the rubber bushings.

UPPER SUSPENSION ARMS

Each upper suspension arm, at its outer end, connects to the upper end of the steering knuckle support (Fig. 239). The threaded outer pivot is mounted in threaded bushings in the suspension arm. The eccentric center portion of the pivot is threaded through the steering knuckle support. Complete turns of this outer pivot adjust caster. Turning the pivot up to ½ turn, the maximum adjustment of the eccentric, adjusts the camber. These adjustments are covered under FRONT END ALIGNMENT in this Section.

The forked inner end of the upper suspension arm has a threaded inner pivot mounted in threaded bushings in the arm. This pivot is bolted solidly to the inner side of the front shock absorber support as shown in Fig. 241. Use of shims between the pivot and the support affect camber adjustment.

a. UPPER SUSPENSION ARM REMOVAL (Fig. 239). Proceed as follows:

1. Raise the vehicle with a jack under the frame side rail until the front wheel is off the floor. Then remove the front wheel and tire. Place another jack (or block) under the lower suspension arm to hold the arm and the coil spring in position while the upper arm is removed. Use of only one jack is permissible if it can be adapted to the underside of the lower suspension arm near the outer end so that the front wheel can be raised off the floor safely and without twisting the suspension arm.

2. Place a block under the brake drum, or fasten the steering knuckle support to the coil spring with a strong wire, to hold the support upright when the upper suspension arm is removed. This is to prevent the top end of the support swinging outward due to the weight of the hub and brake drum. Otherwise, the brake hose will be damaged.

3. Remove the two bolts, lock washers and flat washers which attach the inner pivot to the shock absorber support. Notice if shims are used between the pivot and the support, and if so, set them aside and be sure they are used when installing the suspension arm.

4. Remove the bolt and lock washer from the upper end of the steering knuckle support. This is the bolt which clamps the support on the outer pivot.

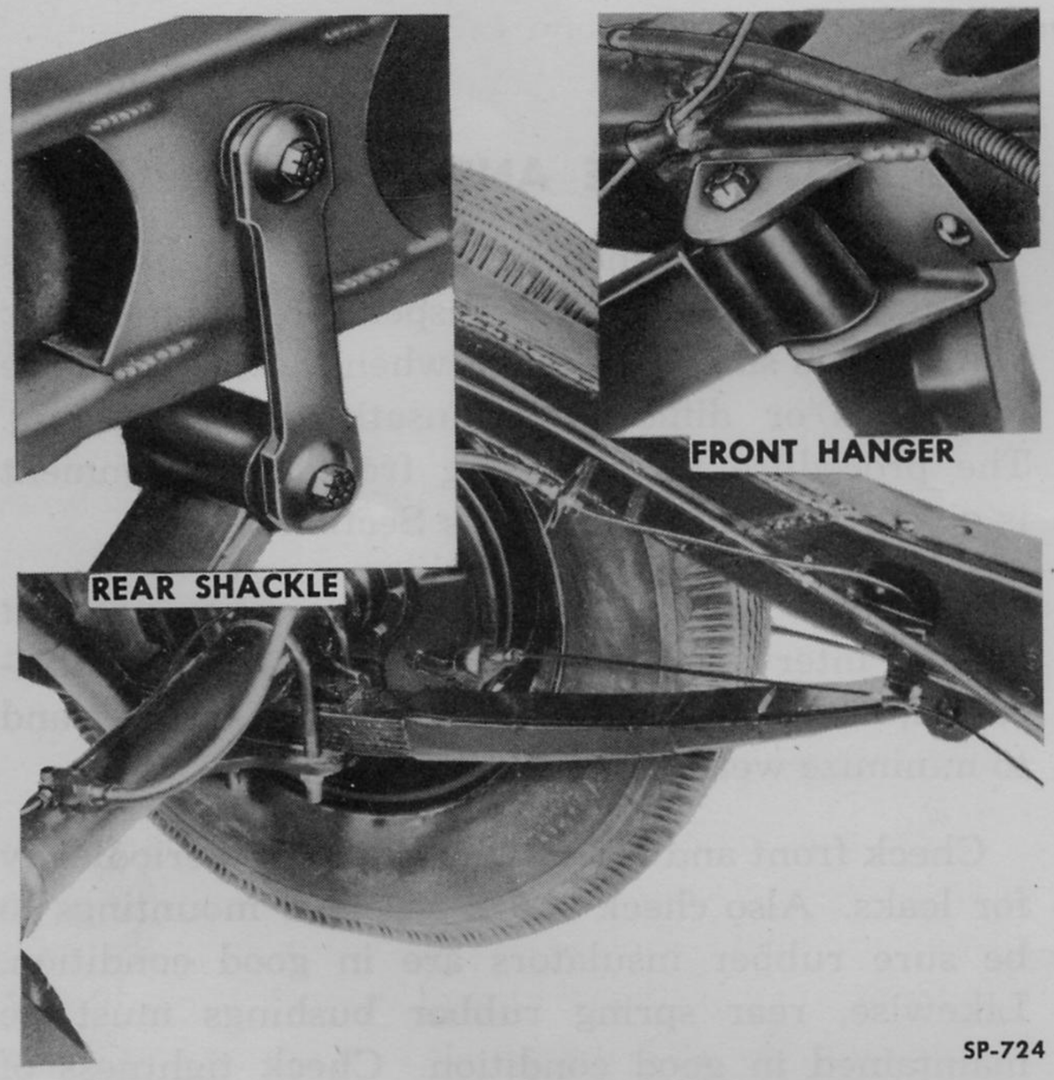


Fig. 240—Rear Spring Mounting—Kaiser

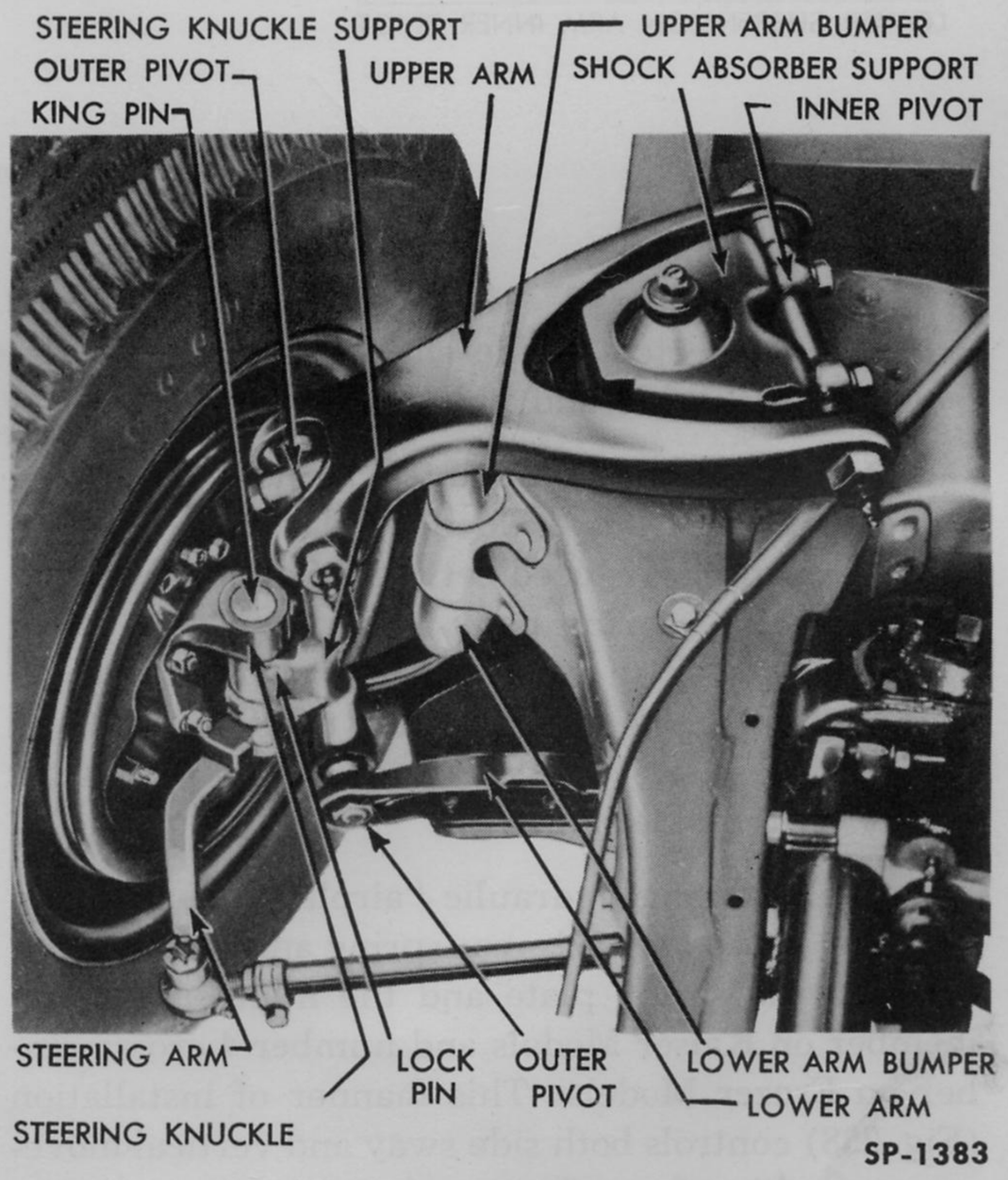


Fig. 241—Left Hand Front Suspension—Rear View—Frazer

5. Remove the two threaded bushings which mount the outer pivot in the outer end of the upper suspension arm.

6. Using Camber Adjusting Wrench KF-25 in the front end of the outer pivot, turn the pivot out of the steering knuckle support and through the hole in the suspension arm to remove the pivot and the two seals. Lift off the upper suspension arm.

b. UPPER SUSPENSION ARM REPAIR. Repair operations consist of replacing inner pivot and bushings. However, before this is done, be sure the suspension arm is not distorted or cracked and that new bushings will fit tight in holes in arm.

Bushings installed in a new arm cut threads in the arm to make a tight fit. New bushings used in an old arm already threaded must also make a tight fit. Discard seals and bushings if worn, replacing with new parts.

1. Turn the two pivot bushings off the end of the inner pivot and out of the suspension arm. Move the seals on the pivot away from the arm to permit moving the pivot endwise enough to clear the arm at one end. When one end is free pull the other end out of the arm.

2. To install the inner pivot, place new rubber seals on the pivot, one on each end with cupped side out. Fit the pivot into the upper suspension arm. Mount the arm in a vise as shown in Fig. 242.

3. Start the threads of the two bushings into the bushing holes in the arm. Use a large wrench and turn the bushings slowly. **NOTE: Do not use cutting lubricant.**

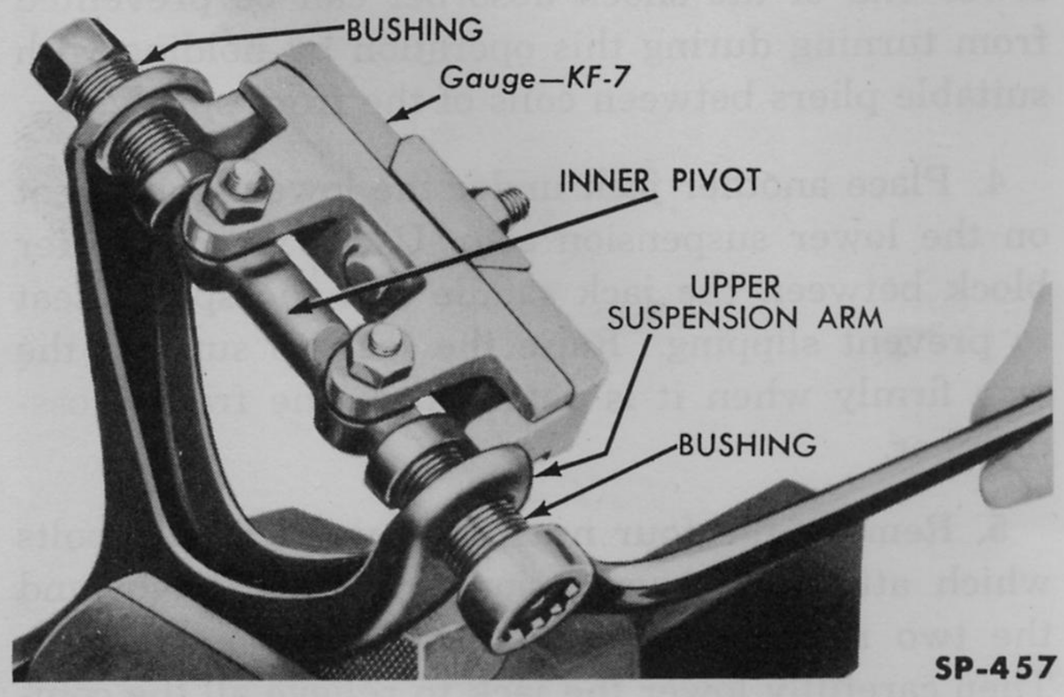


Fig. 242—Installing Upper Suspension Arm Inner Pivot

4. Assemble Upper Suspension Arm Assembly Gauge KF-7 on the pivot as shown in Fig. 242. This gauge is to establish the proper spacing between the sides of the arm. Tighten the wedge plate bolt to expand the jaws of the gauge until they spread the sides of the arm $\frac{1}{16}$ inch from the normal position. This amount of spreading should provide the proper spacing between sides of the suspension arm.

5. Turn both of the bushings into the suspension arm and onto the pivot until the hex portion bottoms against the arm. Remove the gauge (KF-7) from the inner pivot by loosening the wedge plate bolt and removing the two bolts attaching the gauge to the pivot.

6. Check the pivot to be sure it will move freely in the bushings. If correct it will resist slightly any effort to turn the pivot by hand. Do not rotate the pivot as this will change the centered position of the pivot in relation to the suspension arm.

7. Move the two rubber seals on the pivot until each seats against the flange at the bushing hole in the arm. Install the lubrication fitting in the end of each bushing.

c. UPPER SUSPENSION ARM INSTALLATION (Fig. 239). Proceed as follows:

1. Fit the upper suspension arm into place so the outer end, curving downward, straddles the steering knuckle support and the inner end fits against the front shock absorber support. Install the shims, if any were removed, between the inner pivot and the support to make proper camber adjustment possible. Use the same thickness of shims as previously removed. If shims were not used originally do not install any. Usually more shims are required on the left side of the vehicle to compensate for the extra weight of the battery, steering gear, generator, etc. and their effect on camber. Need for use of shims can be positively determined only when adjustment for proper camber is made. Install the two bolts and lock washers to attach the pivot to the side of the shock absorber support. Tighten the bolts to 60–70 foot pounds torque.

2. Fit a rubber seal into place between each side of the steering knuckle support and the side of the suspension arm. Then insert the outer pivot through the front side of the arm and a seal, threading it on through the steering knuckle support, the other seal and the other side of the arm. Use Camber

Adjusting Wrench KF-25 in the end of the pivot to turn it. Parts should be in the relative positions shown in the sectional inset in Fig. 239 with the eccentric portion of the pivot centered in the steering knuckle support.

3. While holding the support and the eccentric portion of the pivot centered between the sides of the upper suspension arm, start the rear bushing into the hole in the arm and onto the end of the pivot. Then start the front bushing into the arm and onto the pivot. Use a large wrench and turn the bushings slowly. **Do not use cutting lubricant.** With both bushings started, turn the rear bushing into the arm until it bottoms against the outside of the arm. Then tighten the front bushings in the same way and install the lubrication fitting in the end of the bushing. Bushings must fit tight in the arm.

4. Install the lock bolt and lock washer on the steering knuckle support to clamp the support on the eccentric portion of the pivot.

5. Remove the block from under the brake drum or remove the wire used to hold the steering knuckle support upright (whichever was used when removing the arm). Install the wheel and tire. Then remove the jack, or jacks if two were used to raise the front end of the vehicle.

6. After the upper suspension arm is installed (Fig. 241 and 243), check and adjust front end alignment to obtain proper caster and camber as described under FRONT END ALIGNMENT.

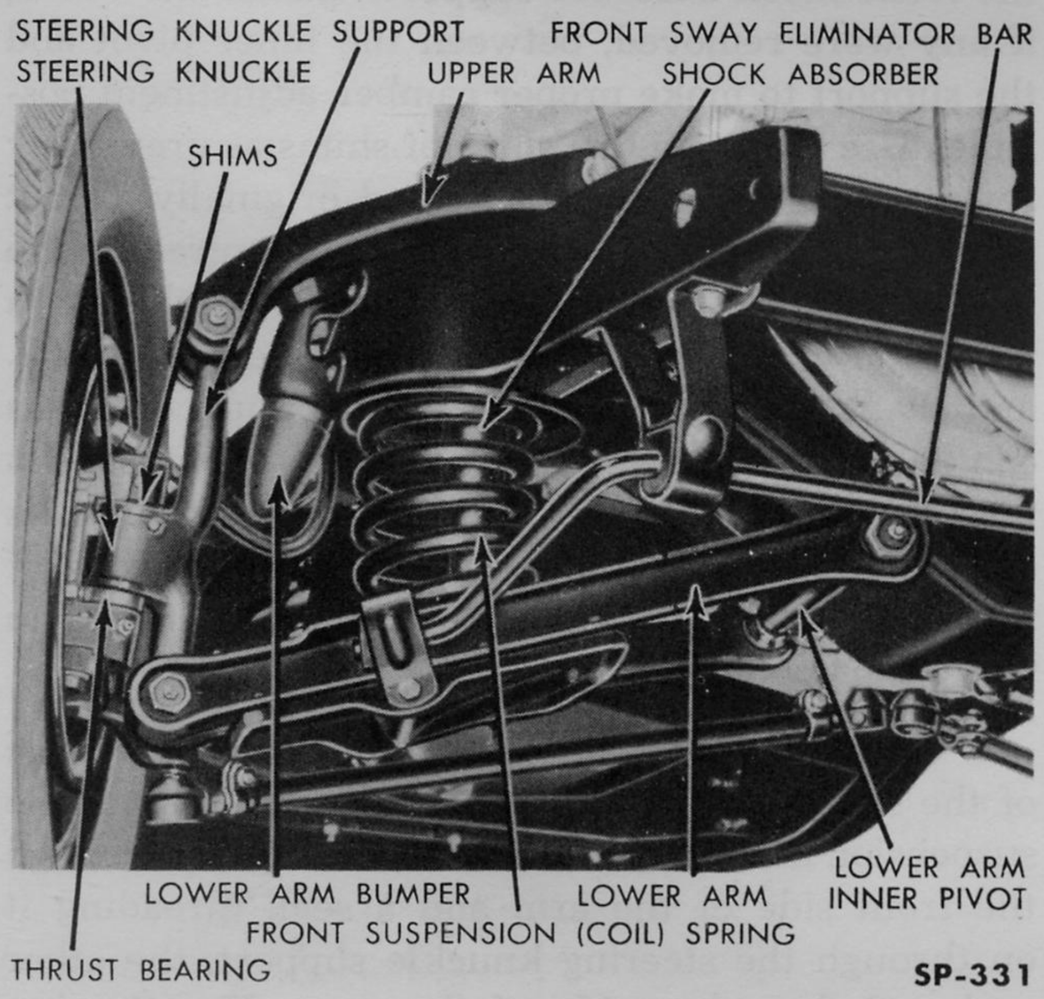


Fig. 243—Right Hand Front Suspension Arm—Front View—Frazer

LOWER SUSPENSION ARMS

Each lower suspension arm at its outer end connects to the lower end of the steering knuckle support (Fig. 239). The outer pivot threads through both sides of the suspension arm and through the bushing installed in the lower end of the steering knuckle support. A lock nut secures the outer pivot in the arm.

The forked inner end of the lower suspension arm has a threaded pivot mounted on threaded bushings in the arm. This pivot is bolted solidly to the underside of the front crossmember. The lower spring seat is integral with the suspension arm, being riveted solidly to the arm. The sway eliminator is connected directly to the lower suspension arm near the outer end.

a. LOWER SUSPENSION ARM REMOVAL (Fig. 239). Proceed as follows:

1. Disconnect the sway eliminator at the lower suspension arm by removing the nut, lock washer, bolt and retainer which attach the cushion and the end of the sway eliminator bar to the suspension arm (Fig. 243).

2. Raise the vehicle with a jack under the frame side rail until the front wheel is off the floor. Remove the front wheel and tire.

3. At the underside of the lower spring seat remove the shock absorber retaining nut, retainer, shock abosrber cushion and cushion seat. The lower end of the shock absorber can be prevented from turning during this operation by holding with suitable pliers between coils of the front spring.

4. Place another jack under the lower spring seat on the lower suspension arm. Use a wood adapter block between the jack saddle and the spring seat to prevent slipping. Raise the jack to support the arm firmly when it is detached at the front crossmember.

5. Remove the four nuts, lock washers and bolts which attach the suspension arm inner pivot and the two reinforcements to the front crossmember. Then carefully lower the jack to relieve all the compression on the front coil spring.

6. When the coil spring is loose, remove the spring, upper and lower spring insulators, shock absorber cushion support, cushion, and cushion retainer. All the parts except the spring and its insulators, which fit between the spring and the spring seats, are assembled on the lower end of the shock absorber. It is not necessary to remove the shock absorber.

7. Remove the lower suspension arm outer pivot nut and lock washer. From the front side of the arm, turn the threaded pivot out of both sides of the arm and out of the bushing in the steering knuckle support. After the pivot is removed the lower suspension arm and the rubber seals are loose and can be removed from the lower end of the steering knuckle support. Do not remove the bushing from the steering knuckle support unless it is worn or loose and needs to be replaced.

b. LOWER SUSPENSION ARM REPAIR. Repair operations consist of replacing the inner pivot and bushings. Before this is done check the suspension arm for cracks or distortion and be sure new bushings fit tight in holes in arm. When bushings are installed in a new arm they cut threads in the arm and fit tight. New bushings used in an old arm already threaded must also fit tight. Discard seals and bushings if worn, replacing with new parts.

1. Turn the two inner pivot bushings off the ends of the inner pivot and out of the suspension arm. Move the seals on the pivot away from the arm to permit moving the pivot endwise enough to clear the arm at one end. Then pull the other end out of the arm.

2. To install the pivot, place new rubber seals on the pivot, one on each end with cupped side out. Fit the pivot into the lower suspension arm and mount the arm in a vise as shown in Fig. 244.

3. Start the threads of the two bushings into the bushing holes in the arm. Use a large wrench and turn the bushings slowly. **Do not use cutting lubricant.**

4. Assemble Lower Control Arm Assembly Gauge KF-9 on the pivot as shown in Fig. 244. Roll the seals out of the way of the gauge prongs. The gauge will establish the proper spacing between the sides of the arm.

5. Turn both of the bushings into the suspension arm and onto the pivot until the hex portion bottoms against the arm. Remove the gauge (KF-9) from the inner pivot and move the two seals on the pivot until each seats over the end of the bushing and against the side of the arm. Do not turn the pivot after removing the gauge or the equalized spacing between the sides of the arm and the bolt holes in the pivot will change causing it to be incorrect. Install the lubrication fitting in the end of each bushing.

c. LOWER SUSPENSION ARM INSTALLATION (Fig. 239). Proceed as follows:

1. Fit the lower suspension arm into place so that the outer end straddles the lower end of the steering knuckle support with the spring seat on the bottom side of the arm. Insert a rubber seal between each end of the bushing (in the steering knuckle support) and the suspension arm.

Thread the outer pivot through the front side of the arm, through the rubber seal and into the bushing in the steering knuckle support. **NOTE: Be sure the support and bushing are centered between the sides of the arm before the pivot is started into the bushing.** Turn the pivot on through the bushing through the other rubber seal and through the rear side of the arm until the hex head bottoms on the arm. See inset, Fig. 239 for relative positions of parts.

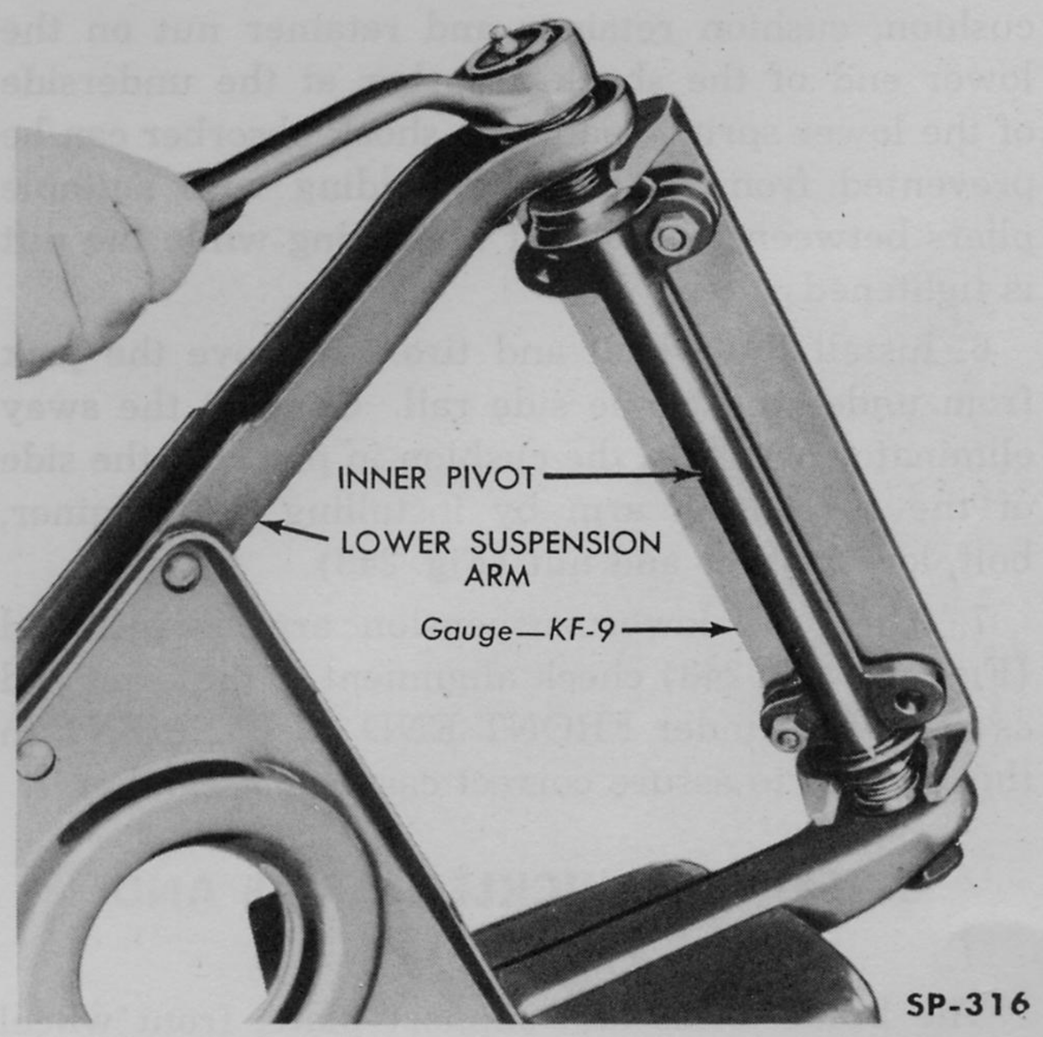


Fig. 244—Installing Lower Suspension Arm Inner Pivot

Install the lock washer and nut on the end of the pivot. When the pivot is installed there should be equal clearance of at least ⅛ of an inch between the arm and bushing at each side of the support. Install the lubrication fitting in the front end of the pivot.

2. Fit the coil spring insulators into the upper and lower spring seats. Install the front coil spring, the flat or finished end into the upper spring seat. Install the cushion retainer, shock absorber cushion and cushion support over the lower end of the shock absorber. See inset, Fig. 239 for relative location of parts.

Move the suspension arm upward into place, fitting the lower end of the shock absorber through the spring seat and the ends of the spring into position in the spring seats.

3. Place a jack, with a suitable wood adapter block on the saddle, under the lower spring seat on the lower suspension arm. Raise the jack to compress the coil spring until the inner pivot seats against the underside of the front crossmember.

4. Use a drift to line up the holes in the inner pivot with corresponding holes in the crossmember and install two reinforcements and four bolts, lock washers and nuts to attach the inner pivot to the crossmember. Remove the jack from under the lower suspension arm.

5. Install the cushion seat, shock absorber cushion, cushion retainer and retainer nut on the lower end of the shock absorber at the underside of the lower spring seat. The shock absorber can be prevented from turning by holding with suitable pliers between the coils of the spring while the nut is tightened.

6. Install the wheel and tire. Remove the jack from under the frame side rail. Connect the sway eliminator bar, with the cushion in place, to the side of the suspension arm by installing the retainer, bolt, lock washer and nut (Fig. 243).

7. After the lower suspension arm is installed (Figs. 241 and 243) check alignment of the front end as described under FRONT END ALIGNMENT in this Section to assure correct caster and camber.

STEERING KNUCKLES, ARMS AND SUPPORTS

The brake shoes and support plate, front wheel and tire, hub and brake drum and the steering arm are all mounted on, or supported by, the steering knuckle. Each steering knuckle, in turn, is mounted on the steering knuckle support (Fig. 241 and 243), connected by the king pin which is held rigidly in the support by a tapered lock pin.

The support is connected to the outer end of the upper and lower suspension arms by pivots. The steering knuckles swivel on the upper and lower ends of the king pin on full-floating bushings. Expansion plugs in the steering knuckle enclose the ends of the king pin and keep out dirt. A shimmed thrust bearing is used between the bottom of the support and the knuckle.

a. STEERING KNUCKLE AND SUPPORT REMOVAL (Fig. 239). The steering knuckle and support can be removed as a unit. If this is desired, the steering knuckle support is disconnected at the upper and lower suspension arm outer pivots. The steering knuckle can also be removed from the vehicle without removing the support. Both conditions are covered in the following procedure.

If the knuckle and support are removed as a unit, that part of the procedure beginning with operation 5, below, will also be applicable to the disassembly of the steering knuckle from the support.

1. Raise the front of the vehicle and remove the front wheel and tire. Adapt a jack to the underside of the lower suspension arm near the outer end, so that the front wheel can be raised off the floor safely and without twisting the suspension arm. Otherwise, use the jack under the frame side rail.

2. Remove the brake drum and hub as described in Section 12, "Wheels and Tires." Then remove the brake shoe mechanism and support plate as a unit by removing the four bolts which mount the support plate to the steering knuckle. It is not necessary to disconnect the brake hose at the support plate as the plate assembly can be moved out of the way and wired or tied to the frame.

3. Disconnect the tie rod end from the steering arm by removing the cotter pin and nut and disconnecting rod stud from arm with a suitable wedge type puller.

4. If the steering knuckle and support are to be removed as a unit, disconnect the support at the outer end of the upper and lower suspension arms by removing the outer pivots. Refer to UPPER SUSPENSION ARM REMOVAL, and to LOWER

SUSPENSION ARM REMOVAL, for detailed information. Remove the knuckle and support when the unit is disconnected.

5. If the steering knuckle is to be removed separately or is to be disassembled from the support, first remove the king pin lock pin. If pin is the original pin, drive it out from the rear side of the support using a suitable punch and hammer. If a replacement pin with a threaded end has been previously installed, the lock washer and nut must be removed before driving the pin out.

6. Remove the expansion plug from the opening in the top of the steering knuckle to expose the top of the king pin. Drill a hole through the plug and pry the plug out with a punch.

7. Use a suitable drift on the top end of the king pin and with a hammer drive the king pin and bottom expansion plug out through the bottom of the steering knuckle.

8. Pull the steering knuckle free from the support at the same time removing the thrust bearing and shims.

9. Remove the bolts which attach the steering arm to the steering knuckle and remove the arm.

b. STEERING KNUCKLE AND SUPPORT REPAIR. Steering knuckles have the bores micro-finished to a mirror finish for use of floating, split-type, steel-backed bushings. This type permits free rotation of the bushings in the knuckle and also around the king pin, resulting in more even distribution of wear. The floating bushings are a free fit and do not require driving, reaming or burnishing.

1. Remove the floating type bushings. Floating type bushings can be pressed out by hand.

2. Inspect the steering knuckle and support. Check the knuckle and support carefully for twisting, bending and distortion as these conditions will affect front end alignment. Replace either or both parts if damaged or if the bores are worn. The bushing in the lower end of the support, into which the pivot heads, must be threaded tight into the support. Threads in the bushing and upper end of the support must not be worn. Check the thrust bearing for wear and roughness and replace as necessary.

3. Install the floating type bushings in the micro-finished steering knuckle by pressing them into place by hand, after wiping the outside of the bushings with lubricant. In the floating bushings the oil groove runs out at one end. Install the bushing with this end toward the steering knuckle support. In this position the closed end of the oil groove in each bushing will be next to the expansion plug in the knuckle.

c. STEERING KNUCKLE AND SUPPORT INSTALLATION (Fig. 239). If the steering knuckle and support were both removed they should be assembled prior to installation on the vehicle. In this case install the outer pivots to connect the steering knuckle support to the outer end of the upper and lower suspension arms. If only the steering knuckle was removed install or assemble the knuckle on the support. The following procedure applies to both these conditions:

1. Put the steering knuckle in place on the support, with the steering arm end at the bottom. Insert the thrust bearing, open side down, between the lower face of the support and the steering knuckle. Fit shims (available in .003, .010 and .030 of an inch thicknesses) between the top face of the support and the steering knuckle as required to provide 0 to 5 pounds pull measured with a spring scale attached at the cotter pin hole at the outer end of the spindle (Fig. 245). **NOTE: The king pin must be installed before making this check.**

Carefully align the bores in the knuckle and the support, also the shims and the bearing; then drive the king pin into place using a suitable soft drift

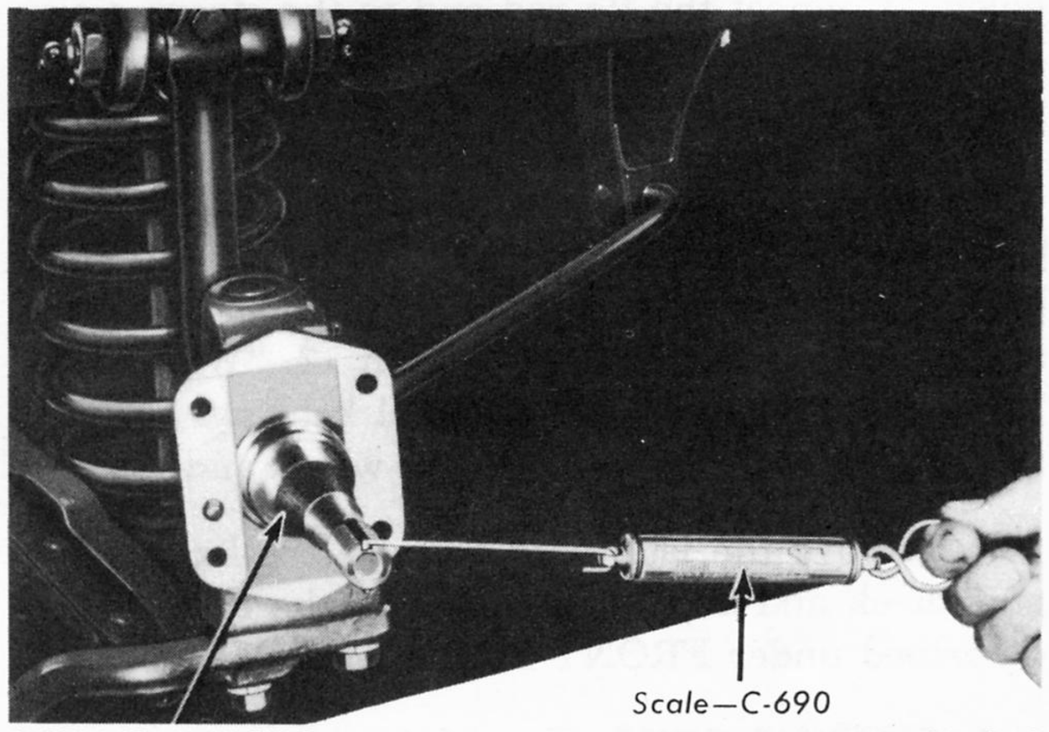


Fig. 245—Checking Pull to Determine Fit of Steering Knuckle

and hammer. The cut-out on the side of the king pin must align with the lock pin hole in the support when the king pin is installed.

2. With the proper fit of the knuckle on the support established and the king pin in place, install the king pin lock pin from the front side of the support, using a threaded service replacement pin. Drive the pin in solidly and install the lock washer and nut on the threaded end of the pin to hold it solidly in the support.

3. Install an expansion plug in the steering knuckle at the top end of the king pin and another plug at the bottom of the king pin. Expand the plugs to fit tightly in the knuckle by using a rounded end drift against the center of the plug and striking the drift with a hammer. Stake around the top and bottom of the knuckle at four places to prevent plugs from loosening. Install lubrication fittings in the steering knuckle.

4. At this point the assembling of the steering knuckle onto the support is complete. If the two were removed as a unit they must now be installed on the vehicle. Fit the knuckle and support assembly into place at the outer ends of the upper and lower suspenison arms and install the outer pivots to connect the support to the arms. For detailed information refer to UPPER SUSPENSION ARM INSTALLATION, operations 2, 3 and 4 and LOWER SUSPENSION ARM INSTALLATION, operation 1.

5. Install the steering arm on the bottom of the steering knuckle. For additional information relative to steering arms, refer to STEERING ARMS below. Connect the tie rod end to the steering arm by fitting the stud through the arm and installing the nut and cotter pin.

6. Install the brake shoe mechanism and support plate assembly on the steering knuckle, with four bolts, lock washers and nuts. Then, install the hub and drum as described in Section 12, "Wheels and Tires," making certain the wheel bearings are correctly adjusted. Install the front wheel and tire.

7. Remove the jack used to raise the front wheel and check and adjust alignment of the front end as described under FRONT END ALIGNMENT.

d. STEERING ARMS (Fig. 241). Always use right and left hand arms of the same type in pairs. Attaching bolts must be the correct size for the arms being installed. Inspect arms carefully after removal for bending or twisting and replace when necessary as either of these conditions will affect front end alignment and steering. When installing the steering arm on the steering knuckle tighten the attaching bolts to 35 – 40 foot pounds torque. **NOTE: It is very important that the top of the arm fits properly in the broached groove in the knuckle when tightening the bolts.**

FRONT COIL SPRINGS

An important difference, as far as replacement of front coil springs is concerned, is the variation in the load rate of the springs. The load rate of the two front springs used on a vehicle must be matched to provide a level front end. This does not mean the two springs must have identical load characteristics but, rather, that the left spring must be somewhat stiffer or stronger than the right spring to compensate for the extra weight of the battery, generator, steering gear and starting motor on the left side of the vehicle. Springs of the same part number differ in load rate between permissible limits. Due to this variation, it is possible by selection to match springs for use in a vehicle. Service replacement springs are marked on an end coil with paint; those with a load rate above the median specified rate are marked with red, those below the median rate are marked with white. When using red and white marked springs together, install the spring with the red marking on the left side of the vehicle and the white marked spring on the right. Two red or two white marked springs may be used together provided their load rates differ sufficiently to have the front end level within limits when the springs are installed. Also, the upper spring seat is designed to permit use of a spacer between the top end of the spring and the upper seat to provide a means of leveling a slight tilt in the front end without replacing a spring.

The standard front coil springs on the 1951 Kaiser and Frazer models are identified by white paint on the two center coils of the Kaiser springs and green paint on the two center coils of the Frazer springs. Special heavy duty springs are sometimes used on vehicles consistently subject to use on extremely rough roads or to overloading. General use of such springs is not recommended. The heavy duty springs are identified by various colors of paint on a

center coil to indicate their application as provided in the Parts Lists. When these springs are used they must be used in pairs and heavy duty front shock absorbers must also be used. In addition, to maintain proper balance, heavy duty type rear springs and rear shock absorbers should be installed.

a. CHECKING FRONT COIL SPRING DEFLECTION. To determine if front springs are properly matched, spring deflection should be checked. Before checking be sure the front suspension is thoroughly lubricated as described in Section 17, "Lubrication."

Bounce the front end of the vehicle up and down several times to be sure the suspension operates freely and does not bind. Measure at each lower suspension arm from the top of the arm near the outer end, upward to the top face of the frame side rail. Be careful to measure between identical points on both sides of the vehicle to obtain comparable dimensions. The two measurements must be the same within 3/8 of an inch.

A difference greater than this indicates uneven spring deflection probably caused by improperly matched springs. Replacement or switching of front springs, or use of the spring spacer is required to correct the condition.

b. FRONT COIL SPRING REPLACEMENT. Front coil springs can be removed by following the procedure for the lower suspension arm removal, since the front spring is removed as a part of that procedure. Refer to LOWER SUSPENSION ARM REMOVAL for detail information.

After the spring is removed the upper spring seat, used only on Frazer models, can be replaced. Remove the two nuts, lock washers and bolts which attach the seat to the underside of the front crossmember and remove the seat. When installing the seat, be sure the flange around the center hole faces downward. On Kaiser models the upper spring seat is an integral part of the front crossmember.

Front coil spring installation, like removal, can be accomplished by following the applicable part of the procedure for installation of the lower suspension arm, since the spring is installed as part of that procedure. Refer to LOWER SUSPENSION ARM INSTALLATION for detailed information. Be sure to select a spring that has the proper load rate so that the front end will be level when the spring is deflected after installation.

FRONT SUSPENSION ARM BUMPERS

Two rubber bumpers at each side of the vehicle are provided to limit the vertical, or up and down, movement of the front wheels (Fig. 243). The upper rubber bumper is pressed into the top of a bracket riveted to the outside of the frame side rail. The lower bumper is screwed into the bracket. The bumpers are important because they cushion shock if the suspension arms bottom when the front wheels strike a severe hole or bump in the road.

The lower rubber bumper can be replaced by screwing the stud, which is molded into the bumper, out of the bracket. Install the new bumper by tightening the bumper stud into the bracket. If the clinch nut inside the bracket has loosened, remove it and in its place use a tapping plate. When the tapping plate is required a special spacer is installed between the bracket and the bumper.

FRONT SHOCK ABSORBERS

The two double-acting hydraulic "airplane" type shock absorbers are mounted inside the front coil springs. The upper end of each extends upward through the upper spring seat, with a stud in the top of the shock absorber fitted through a hole in the front shock absorber support. The support is riveted onto the top face of the frame side rail. The stud with suitable cushions, retainers and a self-locking nut, attaches the upper end of the shock absorber to the support. A similar stud in the lower end of the shock absorber, together with cushions, retainers, a support, a seat, and a self-locking nut, attaches the lower end to the lower spring seat (see inset, Fig. 239). Heavy duty shock absorbers should be installed when using heavy duty front coil springs.

a. MAINTENANCE. The shock absorbers are not adjustable and do not require the addition of fluid. If a leak should occur the shock absorber assembly must be replaced. The mounting cushions should also be replaced whenever inspection indicates the mountings are loose due to deterioration of the rubber.

b. FRONT SHOCK ABSORBER REMOVAL. (Fig. 239.) Front shock absorbers, although mounted inside the front coil springs, can be removed and installed without removing the springs. The procedure is as follows:

1. Raise the front end of the vehicle with a jack under either the frame side rail or the center of the front crossmember to relieve tension of the front coil spring.

2. Remove the nut, retainer, cushion, and cushion seat from the lower end of the shock absorber at the underside of the lower spring seat. Prevent turning of the lower end of the shock absorber during this operation by holding with suitable pliers between the coils of the front spring.

3. Compress the shock absorber until the stud in the lower end clears the spring seat and the shock absorber lower support. Remove the support which sets on top of the spring seat by pulling it out between coils of the spring. This will permit withdrawal of the shock absorber through the opening in the lower spring seat when the retaining nut is removed from the top end.

4. Remove the nut, retainers and cushions from the stud at the top end of the shock absorber. Insert a screwdriver in the slot in the top of the stud to prevent the shock absorber turning while removing the nut. Make sure the shock absorber does not drop to the floor through the opening in the lower spring seat. Withdraw the shock absorber through the opening in the lower spring seat.

c. FRONT SHOCK ABSORBER INSTALLATION (Fig. 239). Proceed as follows:

1. Install the retainer and a rubber cushion on the stud at the top end of the shock absorber. Fit the shock absorber through the opening in the lower spring seat and into place inside the front coil spring, the stud with the screwdriver slot at the top end inserted through the hole in the front shock absorber support.

2. Install the lower retainer, a rubber cushion, the upper retainer and the self-locking nut, tightening the nut to attach the top end of the shock absorber solidly to the support.

3. Fit the retainer and a rubber cushion onto the stud at the lower end of the shock absorber.

4. Compress the shock absorber until the stud at the lower end is raised high enough to permit sliding the shock absorber lower support between the coils of the spring and onto the top of the lower spring seat. Relative position of the support is shown in inset in Fig. 239.

5. Release the shock absorber so the lower stud fits down through the hole in the support. Install the cushion seat, rubber cushion, retainer and self-locking nut on the lower stud from the underside of the lower spring seat. Tighten the nut to attach the lower end of the shock absorber solidly to the lower spring seat.

FRONT END ALIGNMENT

Front end alignment is the adjustment of the related factors of caster, camber, king pin inclination, toe-in, and toe-out on turns to provide proper steering and to assure long life from tires by preventing improper wear. If the front end is not correctly aligned, hard steering, vehicle wander, front wheel shimmy and abnormal tire wear can be expected.

The checking and adjusting of front end alignment requires the use of special equipment. Any reputable front end equipment, either portable or stationary, may be used. Equipment other than that illustrated and explained in this manual should be used according to instructions furnished by the equipment manufacturer.

Alignment specifications given herein apply to an unloaded vehicle, one in which the weight on the wheels is normal curb weight. After adjustment, the alignment will vary depending on loading and operating conditions but will be within limits for satisfactory performance, provided adjustment was within specified limits.

a. PREPARATION FOR ALIGNMENT. Checking and adjusting front end alignment will not correct steering difficulties or unusual tire wear if other conditions or parts of the vehicle are at fault. Therefore, it is necessary to check and adjust, or otherwise correct, each of the following items before making front end alignment adjustments. When considering these items preparatory to checking front end alignment, driving habits of the operator of the vehicle should not be overlooked as a possible source of unusual tire wear.

1. Check and correctly inflate all tires. Refer to Section 12, "Wheels and Tires."

2. Check frame alignment as described in Section 13, "Frame." Straighten the frame if required.

3. Check the tires for wear and rotate as necessary to have tires of the same diameter (equal wear) on the front wheels.

4. Statically and dynamically balance the front wheels and tires and, if possible, the hubs. Refer to Section 12, "Wheels and Tires," for additional information.

5. Check wheel bearing adjustment and readjust as necessary in accordance with instructions in Section 12, "Wheels and Tires."

6. Check front wheel run-out at rim and tire. Run-out should not exceed ⅛ of an inch. If the run-out is excessive, check for improper mounting and correct as necessary. Mark the point of any run-out with chalk so the point can be properly located when affixing the alignment checking gauge.

7. Check steering gear mounting and linkage for looseness or binding. Refer to Section 10, "Steering," for additional information.

8. Check steering gear worm bearing and roller shaft adjustments in accordance with instructions in Section 10, "Steering."

9. Check front spring deflection as described under CHECKING FRONT COIL SPRING DEFLECTION above. Also check for sagging of the rear springs. Make necessary corrections.

10. Inspect all front suspension parts for looseness, excessive wear, binding and distortion or other damage. Particular attention should be given to the suspension arm pivots and the steering knuckle king pin and bushings. Adjust or replace parts as required.

11. After the vehicle has been checked and conditioned as itemized above, locate a perfectly level floor area and set up the required special equipment. Then proceed as described in the following paragraphs.

c. CASTER—CHECKING AND ADJUSTMENT. Caster is the backward or forward tilt of the king pin from a true vertical. If caster is "positive" the top of the king pin tilts to the rear, if "negative" the top of king pin tilts forward. Limited adjustment of caster is possible by turning the threaded outer pivot in the upper suspension arm through the steering knuckle support. This moves the upper end of the support forward or rearward, tilting the support and the king pin.

1. Move the vehicle into position on the level floor area and adjust the front wheels to the straight-ahead position on Front Wheel Turntables

Universal camber and caster gauge—DD-428

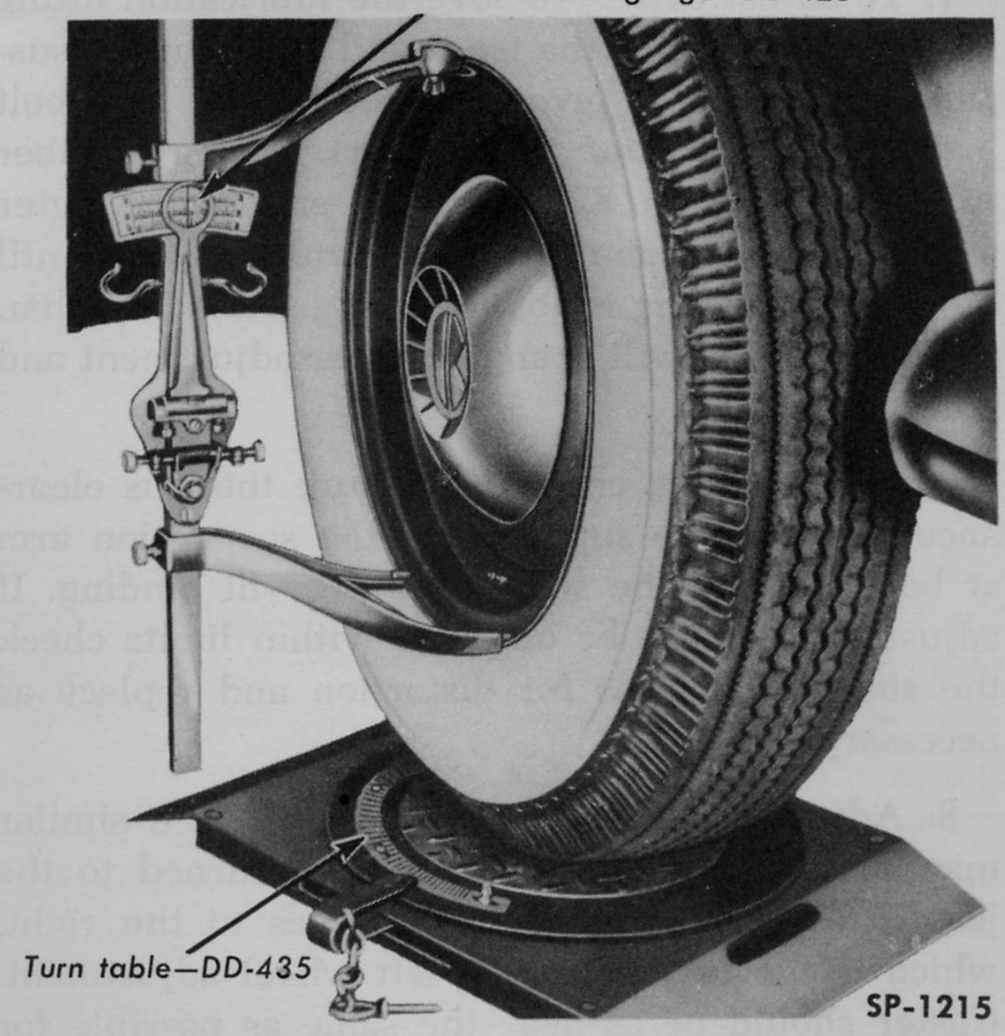


Fig. 246—Checking Front End Caster

DD-435. Wheel turntables **must** be perfectly level and locked; wheels should be centered on them.

2. Assemble Universal Camber and Caster Gauge DD-428 on the left front wheel, as shown in Fig. 246, with the quadrant at a right angle to the wheel and with the gauge supported on the edge of the wheel rim. The hairline should be aligned on "zero" with the indicator aligned with the scratch line.

3. Pull the lock pin from both Turntables and turn the front wheels to the right 20 degrees as registered by the indicator on the Turntable under the left wheel.

4. Turn the secondary screw until the level bubble indicates level (is centered between marks).

5. Turn the front wheels to the left 20 degrees as registered by the indicator on the Turntable. This will move the bubble from level position.

6. Turn the primary screw which moves the hairline and the bubble until the bubble levels. The reading under the hairline on the **40 degree scale** on the quadrant is the amount of caster. If the reading is on the side of the scale from "zero" toward the wheel, caster is "positive"—reading from "zero" away from the "wheel is "negative" caster. **Desired reading is "zero" with plus or minus 1 degree permissible.**

7. To adjust caster, remove the lubrication fitting from the bushing at the front end of the upper suspension arm outer pivot and loosen the lock bolt in the upper end of the support. Using Camber Adjusting Wrench KF-25 in the end of the outer pivot, turn pivot one complete turn at a time until the desired reading is obtained (Fig. 247). Less than a complete turn will change camber adjustment and is to be avoided.

After adjusting, check to be sure there is clearance between the support and the suspension arm at both sides of the support to prevent binding. If adjustment cannot be obtained within limits check the suspension arms for distortion and replace as necessary.

8. Adjust caster at the right wheel in a similar manner except the wheels are first turned to the left 20 degrees and then 20 degrees to the right, which is the reverse of the left wheel adjustment. Caster should be as near the same as possible for both wheels.

c. CAMBER—CHECKING AND ADJUSTMENT. Camber is the inward or outward tilt of the wheel at the top when compared to a true vertical. If the camber is "positive" the wheel tilts outward at the top, if "negative" the top of the wheel tilts inward. Camber is adjusted by turning the threaded outer pivot in the upper suspension arm not over ½ turn (the maximum adjustment of the eccentric portion of the pivot). The eccentric portion of the pivot turning in the steering knuckle support moves the upper end of the support in or out, at the same time tilting the top of the wheel in or out.

1. With the vehicle still in position on Front Wheel Turntables DD-435 on the level floor, turn the wheels to the straight ahead position and install turntable lock pins. With the Universal Camber and Caster Gauge DD-428 still mounted on the right wheel as it was for checking caster (Fig. 248), adjust the secondary screw until the indicator aligns with the scratch mark.

2. Turn the primary screw, which moves the hairline and the bubble, until the bubble levels (is centered between marks). The reading under the hairline on the **60 degree scale** on the quadrant is the amount of camber. If the reading is on the side of the scale from "zero" toward the wheel the camber is "positive"—reading from "zero" away from the wheel is "negative" camber. **The desired reading**

Universal camber and caster gauge—DD-428 **SP-333**

Fig. 247—Adjusting Caster or Camber at Upper Suspension Arm Outer Pivot

Universal camber and caster gauge—DD-428

Turn table—DD-435 **SP-1216**

Fig. 248—Checking Front Wheel Camber

is ½ degree "positive" camber. A "zero to ¾ degree positive camber reading is permissible.

3. To adjust camber use the Camber Adjusting Wrench KF-25 in the front end of the outer pivot in the upper suspension arm (same as for caster adjustment) and turn the pivot until desired camber reading is obtained (Fig. 247).

NOTE: The maximum adjustment provided by the eccentric on the pivot can be obtained by ½ turn of the pivot, or less, depending on the original position of the eccentric in the support.

4. If proper adjustment cannot be obtained by turning the pivot, shims for use between the upper suspension arm inner pivot and the shock absorber support can be installed, or removed, as required. Loosen the two bolts which fasten the pivot to the support, removing shims to increase positive camber and installing shims to decrease positive camber. In cases of negative camber where the eccentric has been turned to obtain maximum adjustment and there are no shims to be removed to obtain additional adjustment, a bent steering knuckle support is indicated and it should be replaced.

5. Adjust camber at the left front wheel in a similar manner. If necessary, readjust camber at the right wheel to obtain the same adjustment at both wheels.

6. After adjustment is completed at each wheel, tighten the lock bolt to clamp the upper end of the steering knuckle support on the eccentric portion of the pivot. Install the lubrication fitting in the end of the front bushing.

d. KING PIN INCLINATION — CHECKING. King pin inclination is the amount in degrees that the top of the king pin is tilted inward toward the center of the vehicle from a true vertical. This inclination imparts to the front wheels a tendency to return to the straight-ahead position after they have been turned and causes the wheels to resist turning enough to afford good directional stability.

Camber and king pin inclination are closely related; camber adjustment will change king pin inclination but within permissible limits. If camber is within specified limits and king pin inclination is not, the steering knuckle spindle, or possibly the knuckle support, has been bent and should be replaced. Check king pin inclination as follows:

1. Carefully center the front wheels of the vehicle on Front Wheel Turntables DD-435 located on the level floor. With the Turntables locked, turn the wheels to the straight-ahead position. Lock the front wheel brakes so the wheels cannot roll.

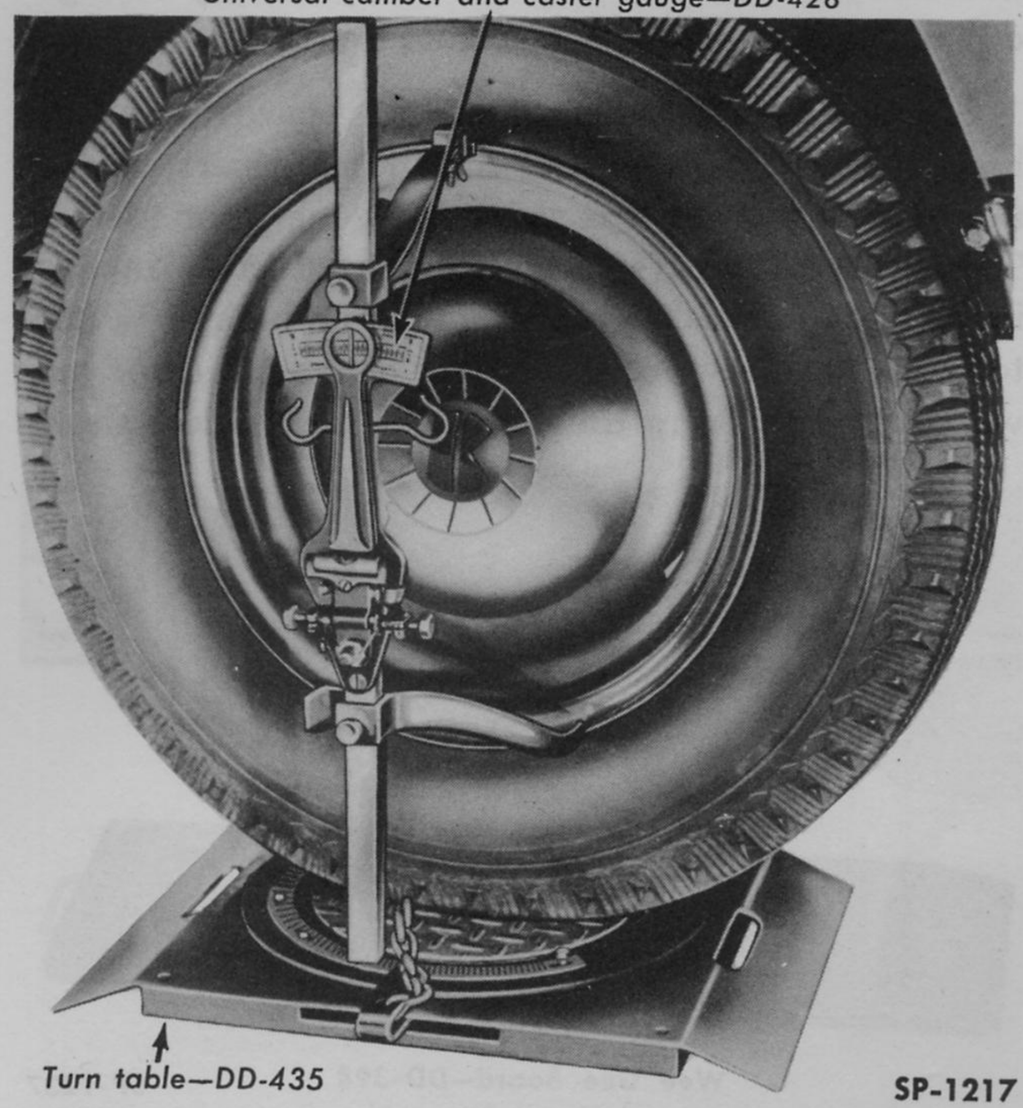
2. Assemble Universal Camber and Caster Gauge DD-428 on the left front wheel, as shown in Fig. 249, with the quadrant parallel to the wheel and the gauge supported on the edge of the wheel rim. The gauge must be mounted on the wheel so that the level bubble indicates level (centers between marks) with the hairline on "zero" and the indicator aligned on the scratch line.

3. Pull the lock pin from both Turntables and turn the wheels to the **right** until the **left** wheel has turned 20 degrees as registered by the indicator on the turntable.

4. Turn the secondary screw until the level bubble indicates level (is centered between marks). This changes the position of the indicator but not the hairline.

5. Turn the wheels to the **left** until the **left** wheel has turned 20 degrees from straight-ahead, as registered by the indicator on the Turntable.

Universal camber and caster gauge—DD-428



Turn table—DD-435

SP-1217

Fig. 249—Checking King Pin Inclination

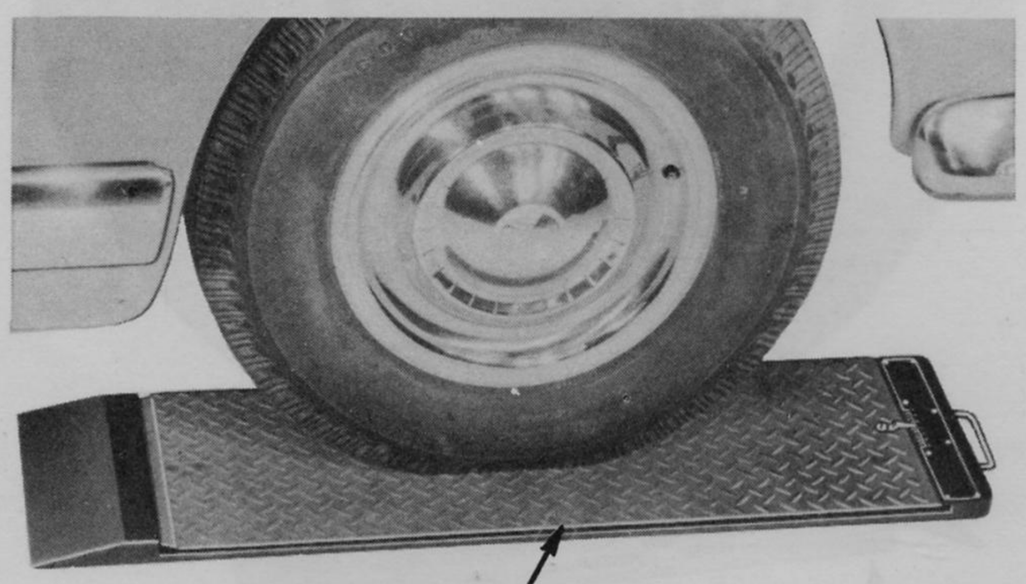
6. Turn the primary screw which moves the hairline and the bubble on the **40 degree scale** on the quadrant is the amount of king pin inclination. **The desired reading is 5 degrees, with 4¾ to 5½ degrees permissible.**

7. Check the king pin inclination at the right front wheel in the same manner, turning the **right** wheel 20 degrees to the **left,** and then 20 degrees to the **right.** If the king pin inclination at either wheel is not within limits, check the camber. If camber is correct the steering knuckle or the steering knuckle support is bent and must be replaced.

e. TOE-IN—CHECKING AND ADJUSTMENT (Fig. 250). Toe-in is the difference in distance between the extreme front and rear of front tires at spindle height. If the rear of the tires is farther apart than the front, the wheels toe-in—if the front of the tires is farther apart than the rear, the wheels toe-out. In order to prevent steering wander, it is better to have a slight toe-in rather than toe-out. Check and adjust as follows:

1. With Toe-In Checking Wee Gee Board DD-398 placed on a perfectly level floor area pull the vehicle slowly forward with one front wheel rolling lengthwise over the Checking Board. The front wheels should be in the straight-ahead position. It is not necessary to have the wheel run perfectly straight down the board to get accurate readings.

2. Observe the indicator on the board as the vehicle is pulled forward. If the indicator arrow does not move to either side there is no toe-in or toe-out. **Toe-in of ⅛ inch (scale is graduated in ¼ inches) is the desired condition but 1/16 of an inch to ⅛ inch toe-in is permissible.** Movement of the indicator outward or away from the center of the vehicle shows toe-in—indicator movement inward toward the center of the vehicle shows toe-out.



Wee Gee Board—DD-398 SP-1237

Fig. 250—Checking Toe-In

3. Check the opposite front wheel in the same manner. If readings for the two front wheels differ, a variation in the caster or camber of the wheels is indicated and should be corrected before the toe-in is adjusted.

4. To adjust toe-in, shorten or lengthen the steering tie rods. Loosen the two clamps on the tie rod tube and turn the rod tube to adjust the rod length as required. Rod ends have right and left hand threads, so that turning the tube shortens or lengthens the rod assembly. Tighten the clamps to lock the adjustment. Check to be sure there is no binding at the rod ends caused by cocking of the ball seat in relation to the stud. **IMPORTANT NOTE: The two tie rods must be adjusted to the same length.**

5. After adjustment the toe-in should be rechecked to be sure it is correct.

f. TOE-OUT ON TURNS—CHECKING. When making a turn the front wheels must actually toe-out so each wheel can be at a right angle to the radius on which it is turning. The inside wheel must turn at a greater angle than the outside wheel. This condition of toe-out on turns is obtained automatically by the angle or amount that the steering arms are positioned inward at the tie rod end. This characteristic is designed into the arms and is not adjustable. However, the arms may be bent, due to damage, changing the toe-out on turns in which case the arm should be replaced or straightened. Both arms must be exactly alike—be sure when replacing an arm to install one which matches the opposite arm. Check for toe-out on turns as follows:

1. Carefully center the front wheels of the vehicle on Front Wheel Turntables DD-435 on the level floor. With the Turntables locked, turn the wheels to the straight-ahead position.

2. Pull the lock pin from both Turntables and turn the front wheels to the **left** 20 degrees as registered by the indicator on the Turntable under the **left** wheel. The Turntable under the **right** wheel should register 17½ degrees by the indicator.

3. Reverse the procedure by turning the front wheels to the **right** 20 degrees as registered by the indicator on the Turntable under the **right** wheel. The Turntable under the **left** wheel should then register 17½ degrees by the indicator.

4. If the correct readings are not obtained, the indication is that one or both of the steering arms is bent and must be replaced.

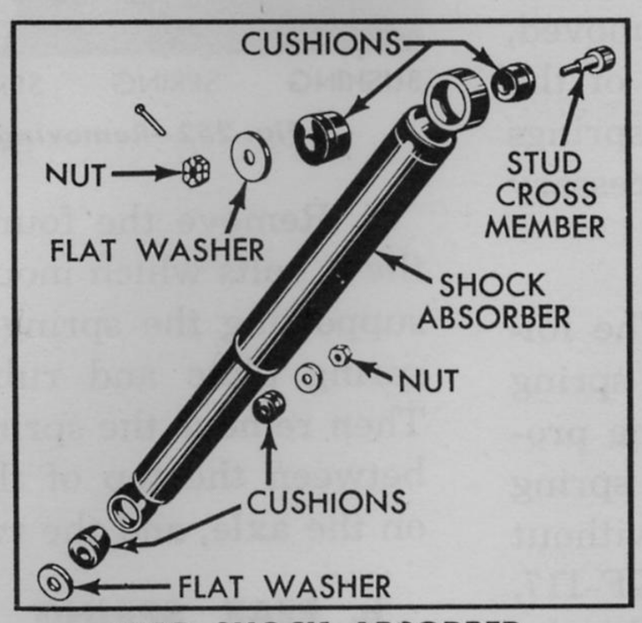
REAR SPRINGS AND MOUNTINGS

Rear springs in all models are semi-elliptic leaf-type, hung longitudinally from the frame side rails in rubber bushed mountings, with the rear axle attached to the springs with U bolts and a spring plate (Fig. 240 and 251). The lower end of the rear shock absorbers connects to the spring plates.

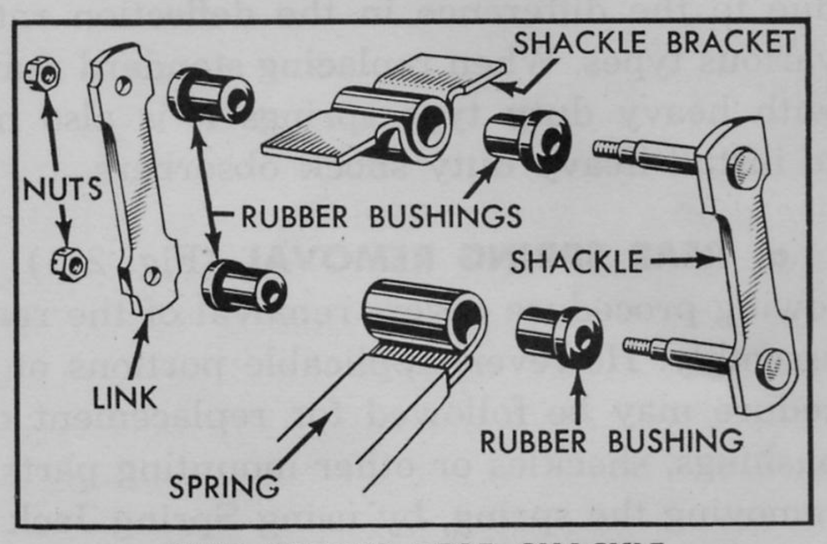
The front of each rear spring is connected to the spring hanger which is riveted to the frame. A special bushing, with rubber bonded between an internal metal tube and a tubular meter outer retainer, is pressed into the front eye of the spring. A bolt clamps the inner metal part of the bushing between the sides of the spring hanger, and the outer metal sleeve pressed into the spring eye does not move, all movement being absorbed in the rubber (Fig. 251).

The rear of each rear spring on Frazer models is connected to the shackle bracket on the frame by a shackle and link assembly. The rear of each rear spring on Kaiser models is also connected by a shackle and link assembly but through a bushing in the frame side rail. Disassembly and assembly procedures, however, are the same. Two rubber bushings are used in the shackle and in the spring eye in both Kaiser and Frazer models.

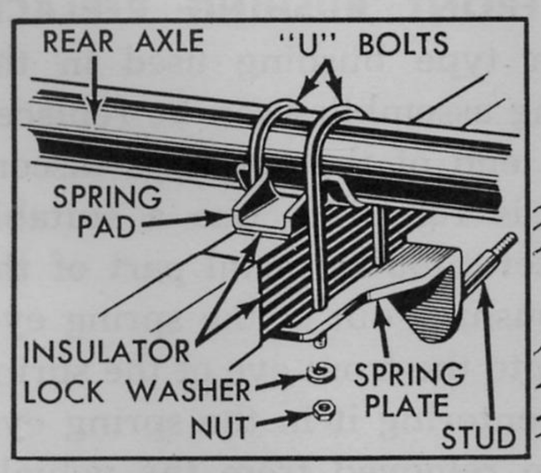
Two types of rubber bushings have been used, one with a flat end on the shoulder and the latest with a spherical end. Each type bushing has a



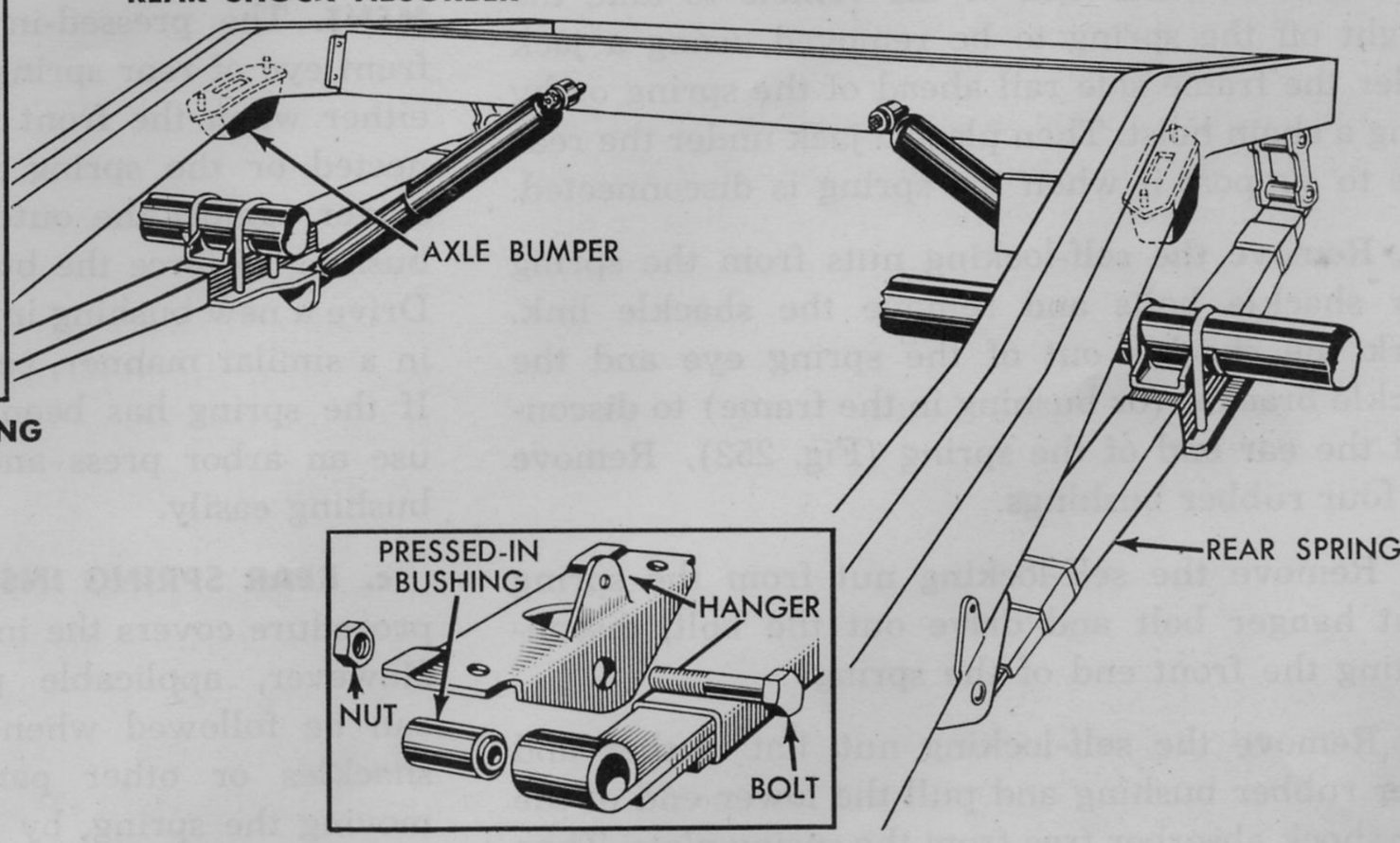
REAR SHOCK ABSORBER



REAR SPRING REAR SHACKLE



REAR SPRING CENTER MOUNTING



REAR SPRING FRONT HANGER

SP-1367

Fig. 251—Rear Spring and Shock Absorber Installation—Exploded View

shackle and link for use with that bushing only. Bushings, shackles and links are interchangeable in sets. Nuts are tightened on the shackle bolts to compress and lock the bushings so that there is no metal to metal contact, all movement being absorbed in the rubber bushings.

Kaiser models use two types of covered rear springs. The standard six leaf spring is used on all models except the utility model, on which seven leaf springs are used. The six leaf spring is identified with brown paint and the seven leaf spring with yellow paint on the spring leaves.

Frazer models use both covered and uncovered rear springs. Standard springs are identified by orange paint or no paint. Heavy duty springs are marked with yellow paint and utility model springs are marked with blue paint.

It is of extreme importance, when replacing rear springs, that the new spring match the one removed, due to the difference in the deflection rate of the various types. When replacing standard rear springs with heavy duty type springs it is also necessary to install heavy duty shock obsorbers.

a. REAR SPRING REMOVAL (Fig. 251). The following procedure covers removal of the rear spring assembly. However, applicable portions of the procedure may be followed for replacement of spring bushings, shackles or other mounting parts without removing the spring, by using Spring Jack KF-117.

1. Raise the rear end of the vehicle to take the weight off the spring to be removed, using a jack under the frame side rail ahead of the spring or by using a chain hoist. Then place a jack under the rear axle to support it when the spring is disconnected.

2. Remove the self-locking nuts from the spring rear shackle bolts and remove the shackle link. Work the shackle out of the spring eye and the shackle bracket (or bushing in the frame) to disconnect the ear end of the spring (Fig. 252). Remove the four rubber bushings.

3. Remove the self-locking nut from the spring front hanger bolt and drive out the bolt, disconnecting the front end of the spring.

4. Remove the self-locking nut, flat washer and outer rubber bushing and pull the lower end of the rear shock absorber free from the spring plate. Then remove the inner rubber bushing and flat washer from the mounting stud.

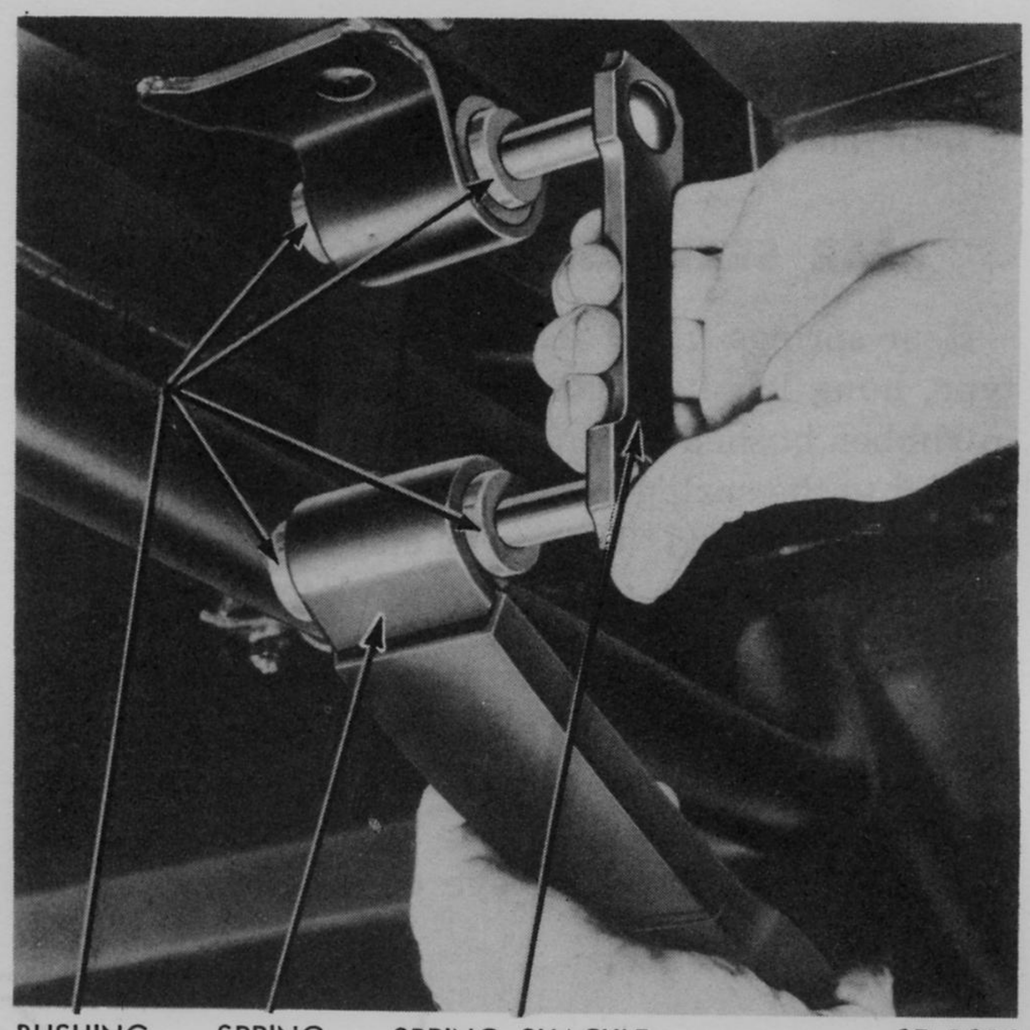


Fig. 252—Removing Rear Spring Shackle—Frazer

5. Remove the four nuts and lock washers from the U bolts which mount the spring to the rear axle, supporting the spring until the nuts, lock washers, spring plate and rubber insulators are removed. Then remove the spring, the upper insulator located between the top of the spring and the spring pad on the axle, and the two U bolts.

b. REAR SPRING FRONT BUSHING REPLACEMENT. The pressed-in type bushing used in the front eye of rear spring assemblies can be replaced either when the front end of the spring is disconnected or the spring is removed. Use a suitable driver against the outer tubular metal part of the bushing to force the bushing out of the spring eye. Drive a new bushing into the front eye of the spring in a similar manner, centering it in the spring eye. If the spring has been removed from the vehicle, use an arbor press and the driver to replace the bushing easily.

c. REAR SPRING INSTALLATION (Fig. 251). This procedure covers the installation of the rear spring. However, applicable portions of the procedure can be followed when installing spring bushings, shackles or other parts without completely removing the spring, by using Spring Jack KF-117.

1. Fit the rear spring into position under the spring pad on the rear axle, inserting the rubber

insulator between the pad and the top of the spring. Put the two U bolts in place, one on each side of the spring and install the lower insulator and the spring plate on the underside of the spring. Install the four lock washers and nuts on the U bolts. Be sure that the spring center bolt fits into the hole in the center of the spring plate, as required to center the mounting.

2. Align the front eye in the front hanger and install the hanger bolt through the outside of the hanger, through the bushing in the spring eye and through the inner side of the hanger. Install the self-locking nut on the hanger bolt.

3. Assemble the rubber bushings in the rear shackle bracket (or bushing in the frame) and the rear eye of the spring, after dipping them in a soap and water solution to prevent binding. Raise the axle and spring with the jack until the rear eye is in position to install the shackle. Install the shackle from the outside of the spring, one bolt through the spring eye and the other through the bracket or bushing in the frame. Install the shackle link on the inner end of the bolts. Install the two self-locking nuts.

4. Fit a flat washer, the inner rubber cushion and the lower end of the rear shock absorber onto the stud on the spring plate. Install the outer rubber cushion and flat washer on the stud. Install the self-locking nut to clamp the parts on the stud.

5. Tighten the spring U bolt nuts to 45–55 foot pounds torque. Tighten the rear shackle nuts to 25–30 foot pounds torque, noting that the link should bottom against the bolt shoulder in order to properly compress the rubber bushings. With the pressed-in type bushing used in the front eye of the spring, tighten the hanger bolt nut to 25–30 foot pounds torque. Remove the jack from under the rear axle and the jack or hoist supporting the rear end of the vehicle.

REAR SHOCK ABSORBERS

Two double-acting hydraulic "airplane" type shock absorbers are used at the rear axle, each unit connected between a rear spring plate and a frame crossmember, number 3 crossmember on Kaiser models and number 4 crossmember on Frazer models (Fig. 251). The shock absorbers control both side sway and vertical movement resulting from flexing of the rear springs. The upper and lower ends of each shock absorber fit over the studs on the crossmember and spring plate respectively, with rubber cushions, flat washers and self-locking nuts used to insulate the mounting and hold the shock absorber securely.

a. MAINTENANCE. The shock absorbers are not adjustable and do not require the addition of fluid. If a leak should occur, the shock absorber assembly should be replaced. Mounting cushions should be replaced any time an inspection indicates the mountings are loose because of rubber deterioration.

b. REAR SHOCK ABSORBER REPLACEMENT (Fig. 251). Remove the self-locking nut, flat washer and rubber cushion at both the top and the lower ends of the shock absorber. Pull the shock absorber off the mounting studs. Remove the cushion and flat washer which is still on each of the mounting studs. To install the shock absorber fit the flat washer and inner rubber cushion on each mounting stud and place the shock absorber in position. The stud in the crossmember fits through the hole in the larger diameter end of the shock absorber. The stud in the spring plate fits through the hole in the lower end of the shock absorber. Put an additional rubber cushion and flat washer on each stud. Then install the self-locking nut on each stud, tightening enough to compress the rubber cushions and hold the shock absorber securely on the mounting studs.

SWAY ELIMINATOR

Sway eliminators are used on all vehicles with independent front suspension to offset body and frame sway which would otherwise occur when rounding curves at high speeds. All Kaiser and Frazer models are equipped with a sway eliminator at the front end of the vehicle (Fig. 253).

a. SWAY ELIMINATOR REMOVAL. Remove the nut, lock washer, bolt and retainer which attach

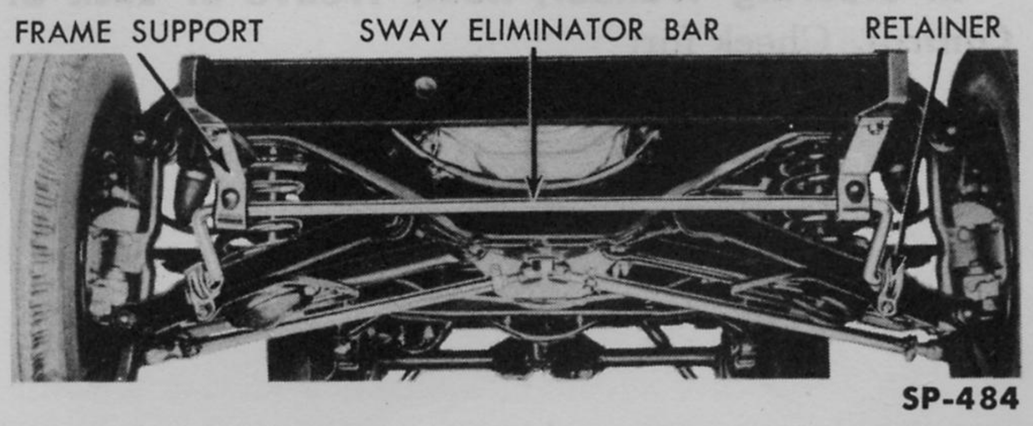


Fig. 253—Front Sway Eliminator Installed—Frazer

the rubber cushion at each end of the sway eliminator bar to the front side of the lower suspension arm. Then remove the two nuts, lock washers and bolts which attach the frame supports to the underside of the front end of each frame side rail. Remove the sway eliminator as an assembly, including the frame supports and the bar end cushions. Replace components of the assembly as required.

b. SWAY ELIMINATOR INSTALLATION. To install the sway eliminator assembly, fit it in place and install the frame support to frame side rail bolts, lock washers and nuts to attach the assembly to each frame side rail. With the rubber cushion in place at each end of the sway eliminator bar, install the retainer, bolt, lock washer and nut to attach each end of the bar to the lower suspension arm.

SERVICE DIAGNOSIS

a. GENERAL. Whenever front end alignment is believed in need of adjustment, checking of tire wear and the way the vehicle steers will usually provide the information to correctly diagnose improper front end alignment. However, other possible causes of the symptoms which indicate improper front end alignment are listed in Section 10, "Steering," and should be considered at the same time. Positive determination of improper front end alignment is assured only by checking with suitable gauges or aligning equipment.

b. IMPROPER FRONT END ALIGNMENT. The following symptoms may be caused by misalignment or other related front or rear suspension conditions as listed. Refer to Section 10, "Steering," for other possible causes.

1. Hard Steering. Check for:

(a) Incorrect caster.

(b) Front suspension arm or steering knuckle bent or twisted.

2. Steering Wander, Road Weave or Lack of Control. Check for:

(a) Incorrect or unequal caster or camber, or toe-out with loose steering linkage.

(b) Front suspension arm or steering knuckle bent or twisted.

(c) Sway eliminator defective.

(d) Sagging front or rear springs.

(e) Worn steering knuckle bushings.

3. Road Shock or Steering Kick-Back to Steering Wheel. Check for:

(a) Steering knuckle bent.

(b) Steering knuckle bushings worn.

4. Vehicle Pulls to One Side. Check for:

(a) Incorrect or uneven caster or camber.

(b) Toe-in at one front wheel, toe-out at the other.

(c) Suspension arm bent or twisted.

(d) Sagging or broken front or rear spring.

(e) Rear wheels not aligned with front wheels.

5. Front Wheel Shimmy or Tramp. Check for:

(a) Incorrect toe-in, caster or camber.

(b) Weak or sagging front springs.

(c) Shock absorbers not functioning.

6. Poor Control on Turns. Check for:

(a) Defective sway eliminator.

(b) Bent steering arm.

(c) Shock absorbers not functioning.

(d) Weak front spring.

c. UNEVEN TIRE WEAR. Uneven tire wear is an indication of improper front end alignment but may also be caused by other factors such as mechanical looseness or driving habits. Refer to Section 12, "Wheels and Tires," for detailed information on various types of tire wear and their probable causes. Information in Section 12 explains the types of tire wear which are usually caused by improper camber or toe-in. Other alignment factors, except improper toe-out on turns, do not affect tire wear to any great extent.