SUSPENSION

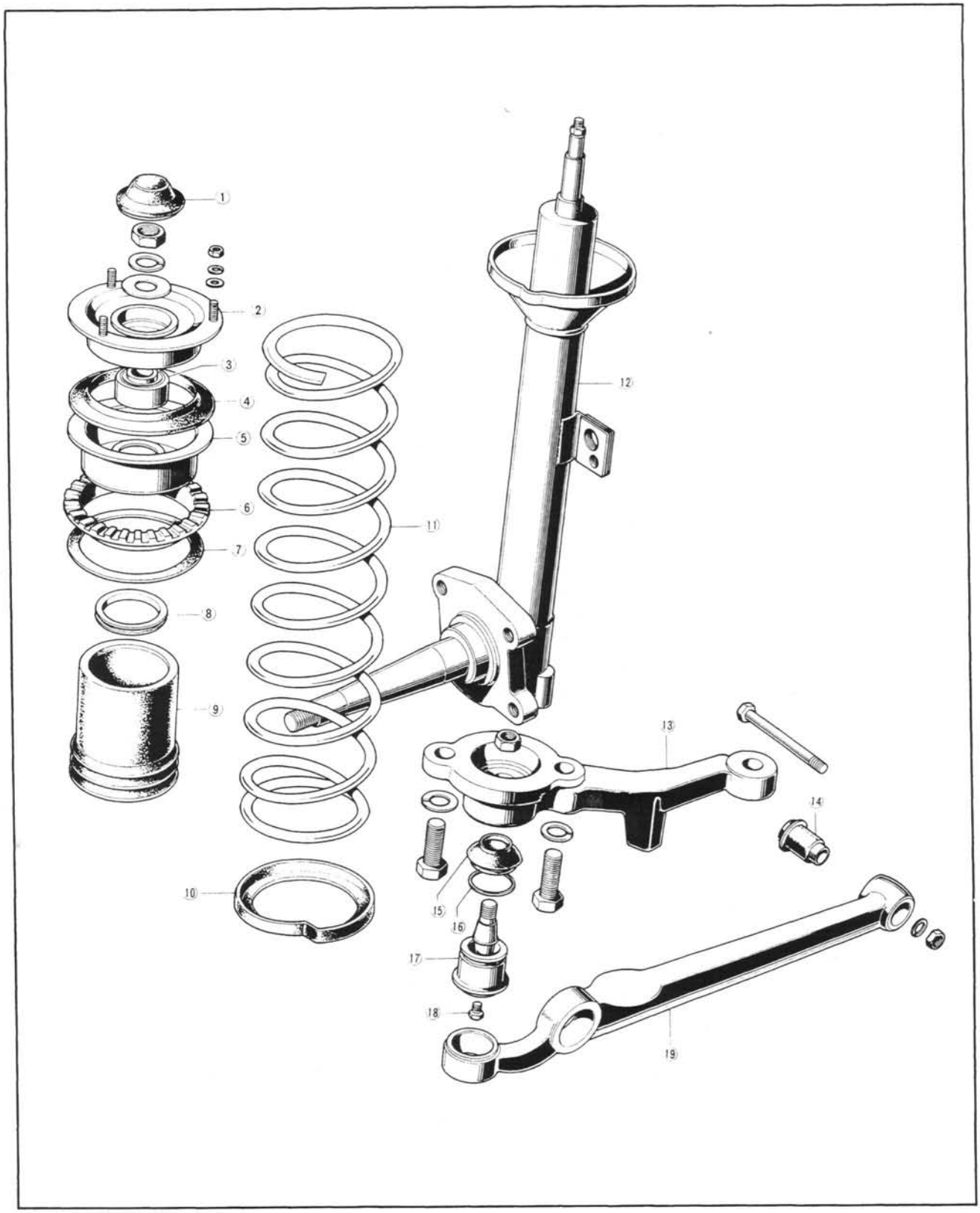

Fig. 13–1 Front suspension

1. Cap
2. Mounting rubber
3. Bearing
4. Seal
5. Spring seat upper
6. Rubber seat upper
7. Adjusting plate
8. Dust seal ring
9. Boot
10. Rubber seat lower
11. Coil spring
12. Front shock absorber assembly
13. Knuckle arm
14. Rubber bush
15. Dust seal
16. Set ring
17. Ball joint
18. Plug
19. Arm

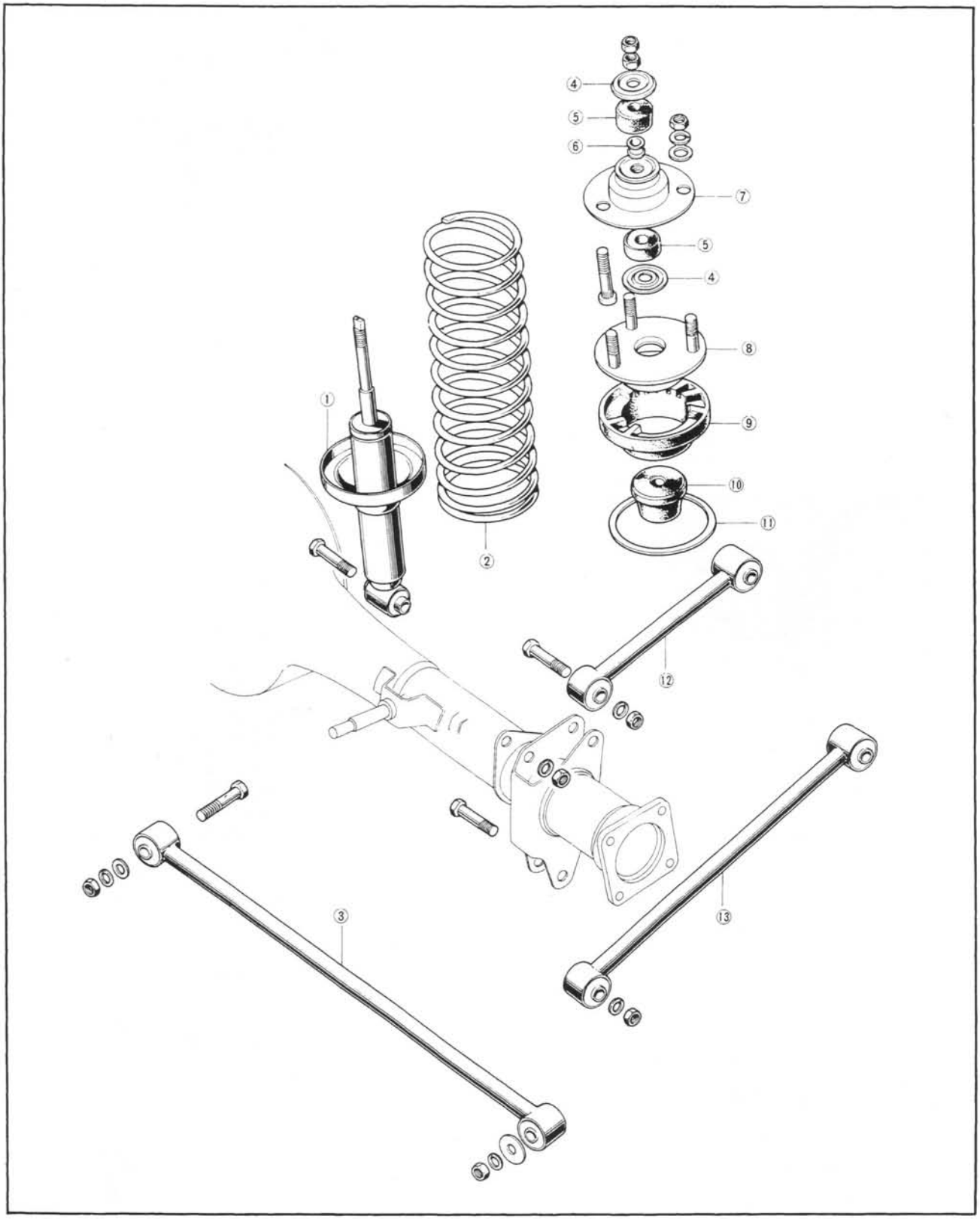

Fig. 13–2 Rear suspension

1. Rear shock absorber assembly
2. Coil spring
3. Lateral rod
4. Retainer
5. Rubber bush
6. Gromet
7. Set plate
8. Spring seat upper
9. Rubber seat
10. Bound stopper
11. Adjusting shim
12. Upper link
13. Lower link

SUSPENSION

The front suspension is of double action shock absorbers integrally made with each steering knuckle, coil springs, suspension arms and stabilizer bar.
This front suspension does not require lubrication, except the lower ball joints which are provided with plugs to attach grease fittings when required.
The toe-in can be adjusted, but the camber, caster and king pin inclination are set during production, and can not be altered.
The rear suspension is of a four-links lateral rod, coil springs and De Carbon type shock absorbers.

13–A. FRONT SHOCK ABSORBER

13–A–1. Removing of Front Shock Absorber

1. Jack up the vehicle until the front wheels are clear of the ground and remove the front wheel.
2. Remove the three nuts attaching the mounting rubber to the front fender apron.

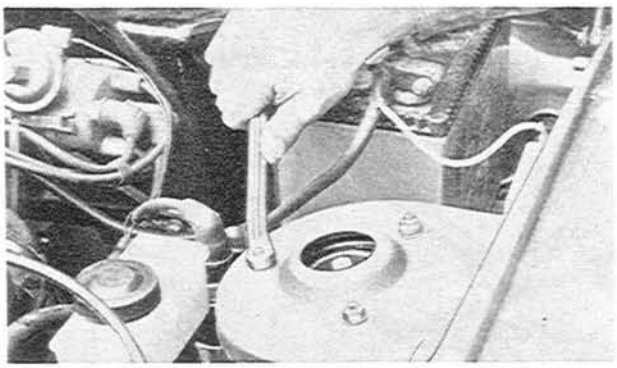

Fig. 13–3 Removing of three nuts

3. Disconnect the brake pipe from the reservoir tube. Plug the end of the brake pipe to prevent leakage of the fluid.
4. Remove the bolts attaching the caliper to the dust cover and remove the caliper.
5. Remove the hub grease cap, split pin, set cover and bearing adjusting nut from the steering knuckle spindle.
6. Remove the wheel hub and brake disk assembly from the steering knuckle spindle.
7. Remove the two bolts attaching the front shock absorber to the steering knuckle arm.

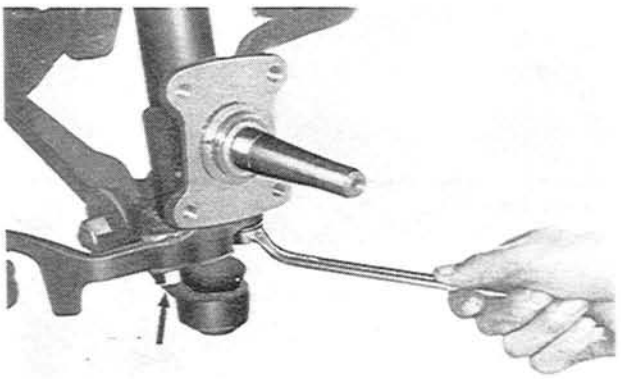

Fig. 13–4 Removing of two bolts

8. Remove the shock absorber.

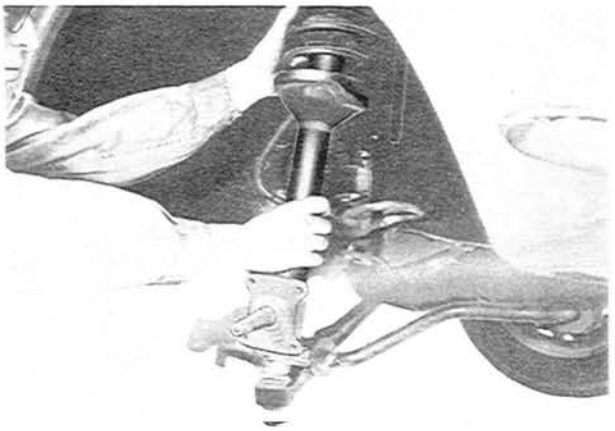

Fig. 13–5 Removing of shock absorber

9. Hold the shock absorber in a vise.
10. Using the **coil spring holder** (49 0223 640A and 49 0223 641), compress the coil spring.
11. Hold the upper end of the piston rod with a spanner and then remove the lock nut.

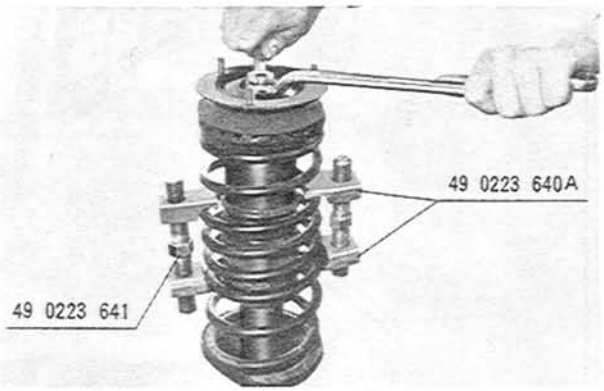

Fig. 13–6 Removing of lock nut

12. Remove the mounting rubber, bearing, rubber seal, spring seat upper, rubber seat upper, adjusting plate, seal ring, dust boot, coil spring and lower seat in that order.

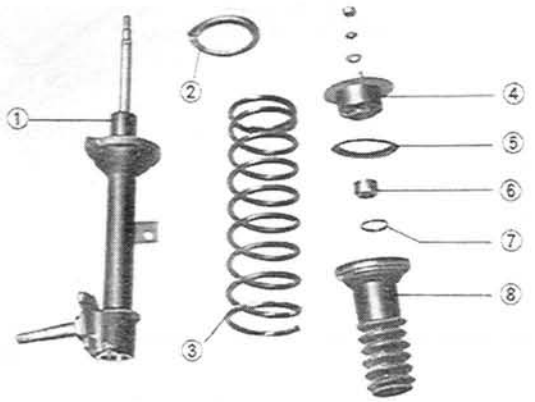

Fig. 13–7 Front shock absorber

1. Shock absorber
2. Rubber seat lower
3. Coil spring
4. Mounting rubber
5. Rubber seal
6. Bearing
7. Dust seal ring
8. Spring seat upper, rubber seat upper, adjusting plate and boot

13–A–2. Disassembling of Front Shock Absorber

1. Using the **cap nut wrench** (49 0259 700), remove the cap nut and seal from the reservoir tube.

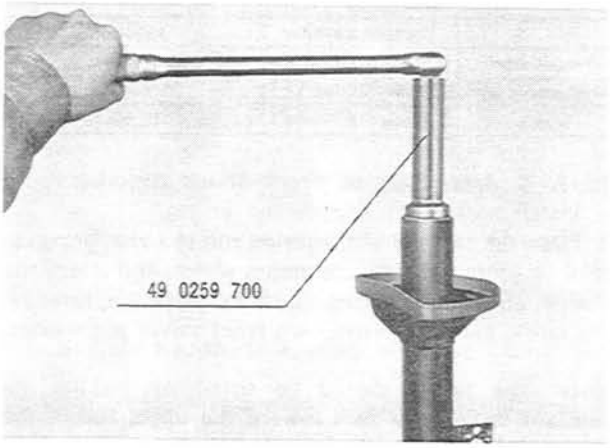

Fig. 13–8 Removing of cap nut

2. Remove the "O" ring installed on the piston rod guide with a suitable tool.

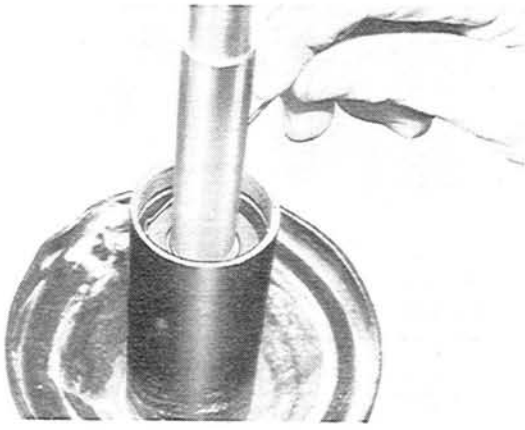

Fig. 13–9 Removing of "O" ring

3. Pull out the piston rod assembly from the pressure tube.
4. Remove the piston rod guide, back up ring, stopper and stopper guide from the piston rod.
5. Hold the upper end of the piston rod in a vise, being careful to protect it with aluminum plates, and remove the piston nut.

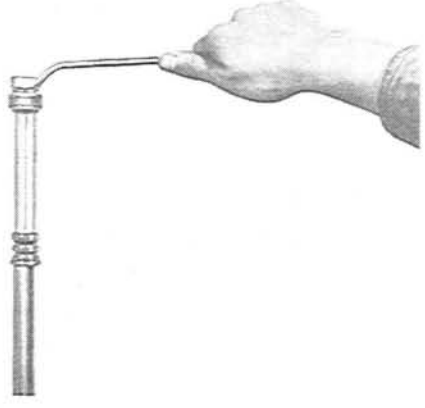

Fig. 13–10 Removing of piston nut

6. Remove the washer, centering valve, relief valves, piston, check valves, check valve springs and the washer from the piston rod in that order.
7. Remove the piston ring from the piston.

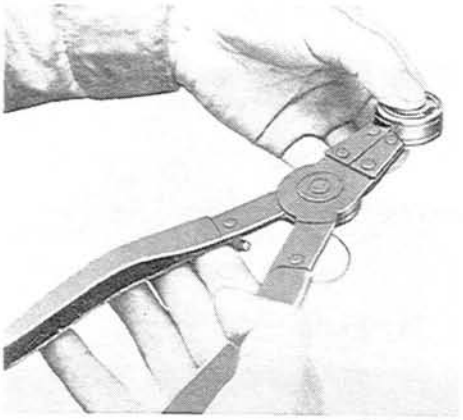

Fig. 13–11 Removing of piston ring

8. Remove the pressure tube from the reservior tube.
9. Remove the base valve assembly from the pressure tube.
10. Remove the bolt and nut of the base valve assembly, and remove the valve seat, relief valves, base valve casing and relief valves.

13–A–3. Checking of Front Shock Absorber

1. To test the shock absorber, hold the shock absorber in an upright position and work the piston rod up and down in its full length of travel, four or five times. If a strong resistance is felt due to hydraulic pressure, the shock absorber is functioning properly. If no resistance is felt or there is a sudden free movement in travel, the shock absorber should be repaired.
If excessive amount of fluid is evident on the exterior of the shock absorber, the shock absorber should be repaired.
2. Check the coil spring for signs of fatigue, cracks or any damage.
3. Check the mounting rubber for weakness at the rubber cushion, roughness or damage at the bearing, and damage of the bolts.
4. Check the reservior tube for fluid leak or deformation and check the steering knuckle for crack.
5. Check the piston rod for wear. The piston rod

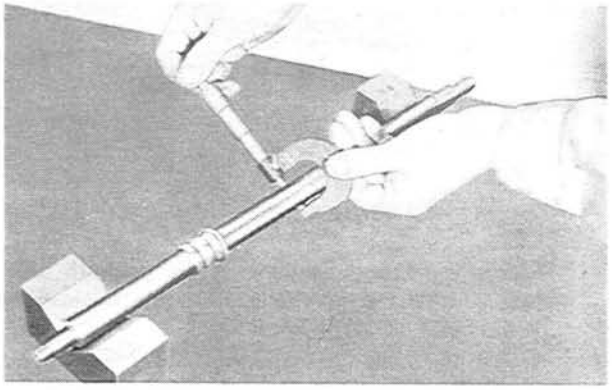

Fig. 13–12 Checking of piston rod diameter

diameter should be **more than 19.94 mm (0.785 in).** The standard diameter is 20.0 mm (0.788 in).
6. Check the run-out of the piston rod by supporting both ends of the piston rod on V blocks and applying a dial indicator. The permissible run-out is **under 0.1 mm (0.004 in).**

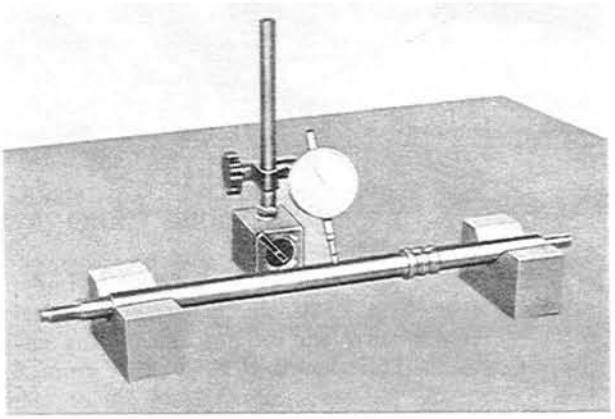

Fig. 13–13 Checking of run-out

7. Check the contact surface of the piston with the check valve and the relief valve for wear or damage. If excessive wear or damages are found, replace with a new one.
8. Check the piston ring for wear or damage.
9. Check the relief valve and the check valve for wear, damages and flatness.

	Thickness x number	Flatness
Relief valve	0.20 mm (0.008 in) x 5	Less than 0.02 mm (0.0008 in)
Centering valve	0.10 mm (0.004 in) x 1	
Check valve	0.25 mm (0.010 in) x 1	Less than 0.02 mm (0.0008 in)

10. Check the check valve spring for signs of fatigue or damages.
11. Check the run-out of the pressure tube.
The permissible run-out is **under 0.2 mm (0.008 in).**

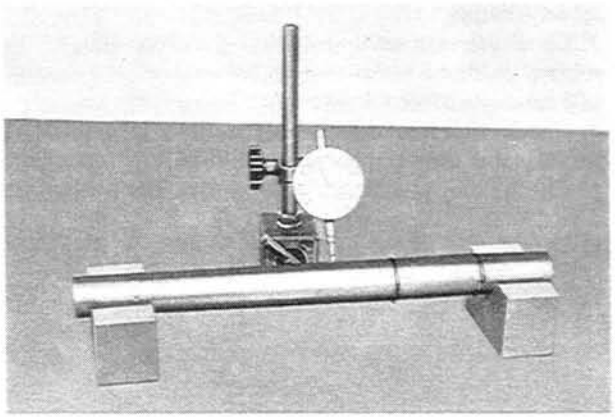

Fig. 13–14 Checking of run-out

12. Check the inner diameter of the pressure tube.
The inner diameter of the tube should be **less than 30.07 mm (1.184 in).**
13. Check the cap nut and seal for damaged threads, and check the lip of the oil seal for wear or damages. If necessary, replace with a new one.
14. Check the rod guide for wear or damage.
15. Check the base valve casing, tension valve compression valve and washer for wear or damages.

	Thickness x number	Flatness
Tension valve	0.10 mm (0.004 in) x 4	
Compression valve	0.20 mm (0.008 in) x 5	
Washer	0.50 mm (0.020 in) x 1	Less than 0.02 mm (0.0008 in)

13–A–4. Assembling of Front Shock Absorber

1. Install the piston ring to the piston.
2. Place the top end of the piston rod in a vise, being careful to protect it with aluminum plates, and install the washer, check valve spring, check valve, piston, three relief valves, centering valve, two relief valves and washer.

Note: The piston should be fitted by making the constant orifice side face toward the upper end of the piston rod.

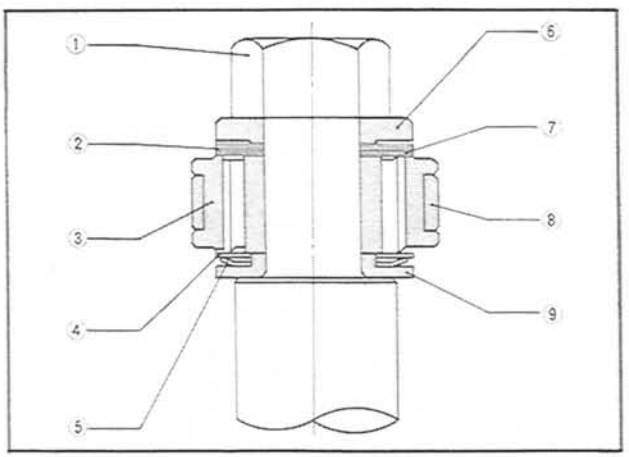

Fig. 13–15 Piston assembly

1. Nut
2. Relief valve
3. Piston
4. Check valve
5. Check valve spring
6. Washer
7. Centering valve
8. Piston ring
9. Washer

3. Tighten the piston nut to **1.5 m-kg (10.0 ft-lb),** ensuring that the check valve and check valve spring are properly positione.

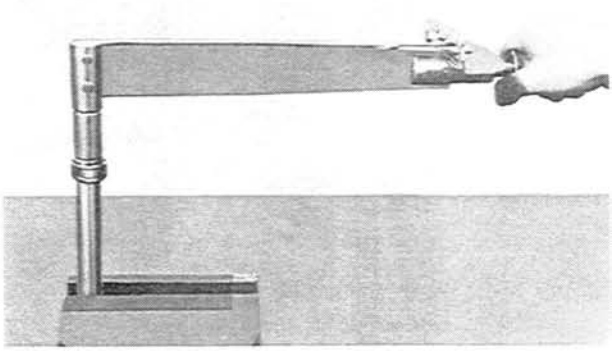

Fig. 13–16 Tightening of piston nut

4. Punch two positions of the threads between the piston nut and the piston rod with a punch to prevent loosening of the piston nut as shown in Fig. 13–17.

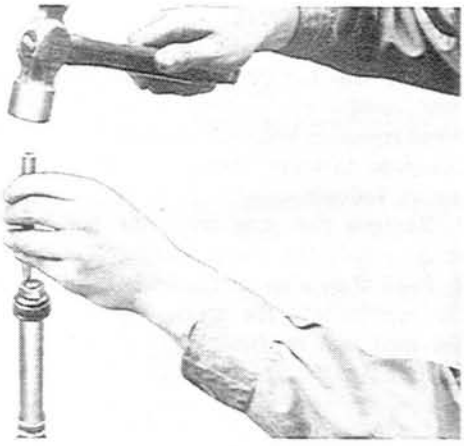

Fig. 13–17 Applying of punch

5. Fit the four tension valves onto the bolt and install it into the base valve casing.
6. Fit the five compression valves, washer and nut to the base valve casing and tighten the nut to **0.15 m-kg (1.0 ft-lb)**.

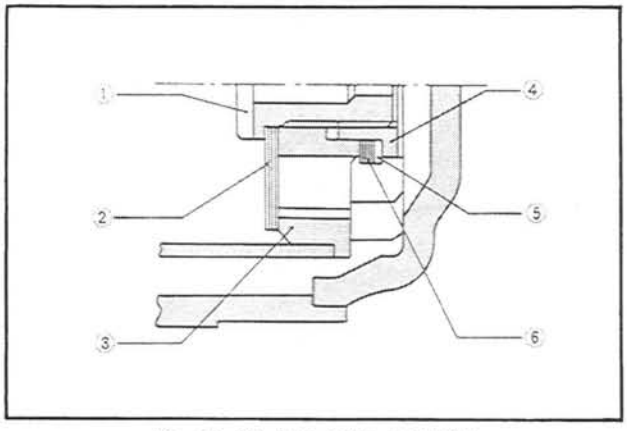

Fig. 13–18 Base valve assembly

1. Bolt
2. Relief valve
3. Base valve casing
4. Nut
5. Valve seat
6. Relief valve

7. After tightening the nut, punch the center of the bolt with a punch.
8. Install the stopper guide, stopper, back up ring and the piston rod guide into the pressure tube.
9. Install the two oil stop rings onto the bottom side of the pressure tube, as shown in Fig. 13–19.
10. Insert the piston rod assembly into the pressure tube from the bottom side and install the base valve assembly into the bottom of the pressure tube.

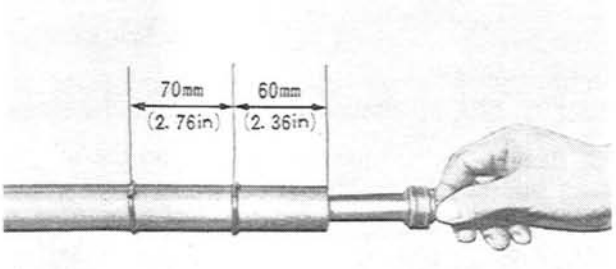

Fig. 13–19 Installing of oil stop rings

11. Insert the pressure tube assembly into the reservior tube.
12. Fill the reservior tube with shock absorber fluid. The capacity of fluid should be exactly **245 cc (0.52 U.S. pint, 0.43 Imp. pint)**.

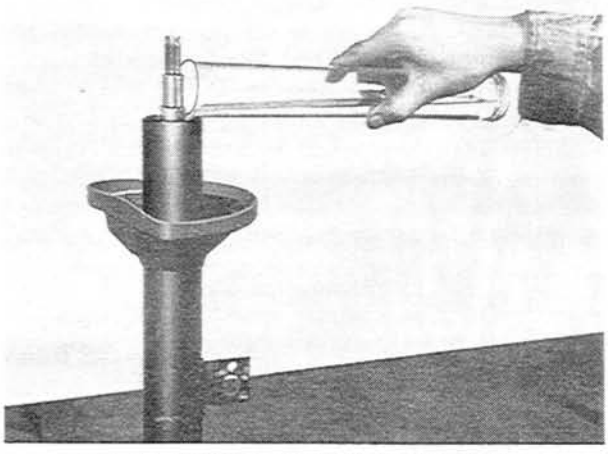

Fig. 13–20 Filling of shock absorber fluid

13. Apply grease to the lip of the oil seal. Install the "O" ring and insert the cap nut slowly onto the piston rod.
14. Tighten the cap nut temporarily, ensuring that the piston rod is extended to its maximum length, with the **hook wrench** (49 0259 702).

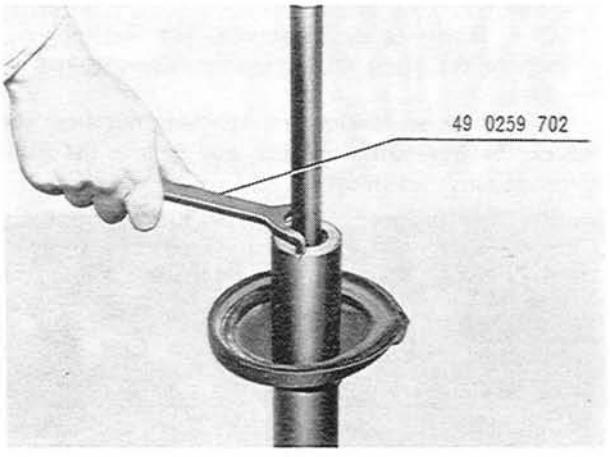

Fig. 13–21 Tightening of cap nut

Tighten the cap nut to a torque of **5.5 m-kg (40 ft-**

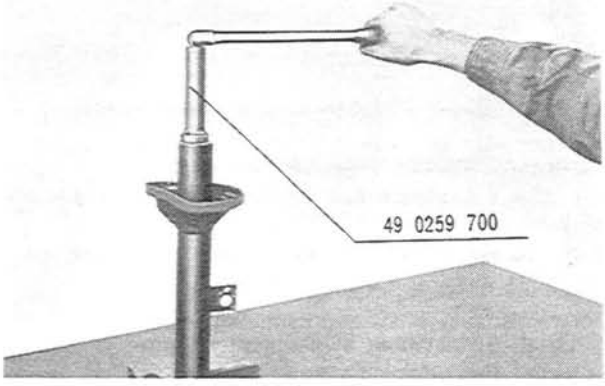

Fig. 13–22 Tighting of cap nut

lb), with the **cap nut wrench** (49 0259 700), after the piston is lowered.

Note: The cap nut is tightened in this condition to raise the air pressure remaining within the reservoir tube.

13–A–5. Installing of Front Shock Absorber

Install the front shock absorber in the reverse order of removing, noting the following points.

1. Adjust the vehicle height by using the proper combination of the coil spring and adjusting plate.

The coil springs are available in three sizes according to the strength of the springs.

Coil spring identification	
Mark	Load required to reduce coil spring length from 352 mm (13.86 in) to 194 mm (7.64 in)
1 dot	281 ~ 289 kg (619 ~ 637 lb)
2 dots	289 ~ 296 kg (637 ~ 653 lb)
3 dots	296 ~ 304 kg (653 ~ 670 lb)

If possible, use springs with the same identification mark on both sides.

2. When installing, use vegetable grease for the interior of the rubber bushes.

13–B. SUSPENSION ARM ASSEMBLY

13–B–1. Removing of Suspension Arm Assembly

1. Remove the front shock absorber, referring to Par. 13–A–1.
2. Remove the suspension arm attaching nut from the rod on the front cross member, and remove the front suspension arm assembly.

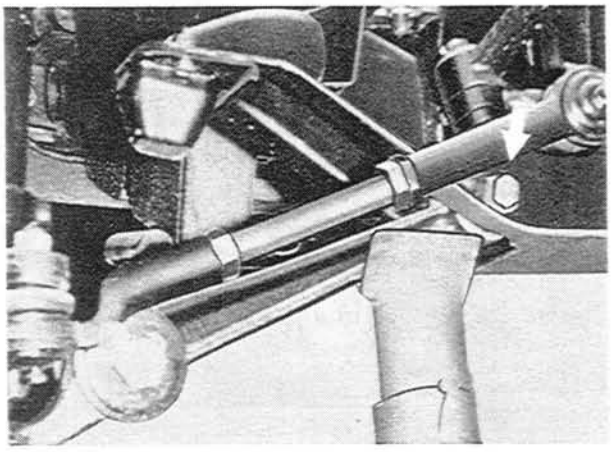

Fig. 13–23 Removing of suspension arm

13–B–2. Checking of Suspension Arm

1. Check the lower arm and knuckle arm for any crack or damage.
2. Check the rubber bushes for weakness, wear or damage. If necessary, replace with new ones.

13–B–3. Installing of Suspension Arm

Install the suspension arm, referring to Par. 13–B–1 and 13–A–1.

13–C. BALL JOINT

The ball joints for the suspension arm are made **maintenance free for 48,000 km (30,000 miles)** and therefore, require no greasing during this period.

When greaseing becomes necessary, supply **Molybdenum Disulfide Lithium Grease** to the ball joints, proceeding as follows:

1. Remove the plug from the ball joint and temporarily install the grease nipple.
2. Feed **Molybdenum Disulfide Lithium Grease** through the nipple until the grease begins to flow freely from the dust seal or the dust seal begins to ballon.
3. Remove the grease nipple and reinstall the plug.

Note: Never use multipurpose grease or chassis grease. If improper grease is used, this will deteriorate the durability of the mechanism.

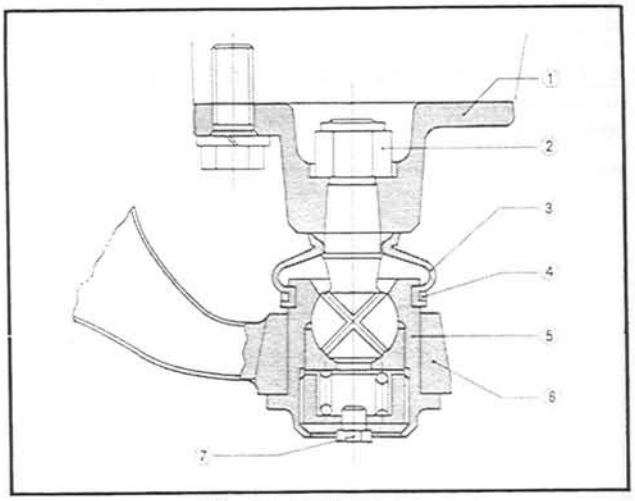

Fig. 13–24 Ball joint

1. Knuckle arm
2. Nut
3. Dust seal
4. Set ring
5. Ball joint assembly
6. Arm
7. Plug

13–C–1. Checking of Ball Joint

1. Check the dust seal for wear, flaw or any damage. If the dust seal is defective, this will allow entry of water and dirt, resulting in ball joint wear.
2. Check the revolving torque of the ball stud. To check, hook the spring scale in the hole of the knuckle arm for connecting the tie rod and pull the spring scale until the ball stud starts to turn. The reading of the spring scale should be **6 to 11 kg (13.2 to 22.3 lb).** If it is less than 6 kg (13.2 lb), replace the ball joint in its assembled form.

13–C–2. Replacing of Ball Joint

If it becomes necessary to replace the ball joint, proceed as follows:

1. Remove the suspension arm assembly as described in Par. 13–B–1.
2. Remove the ball joint nut and remove the ball joint and suspension arm from the knuckle arm.
3. Remove the set ring and the dust boot from the ball joint.
4. Using the **ball joint remover and installer** (49 0259 860), press the ball joint out of the suspension arm.

Note: Before pressing out the ball joint, clean the ball joint and suspension arm so as not to damage the mounting bore of the suspension arm.

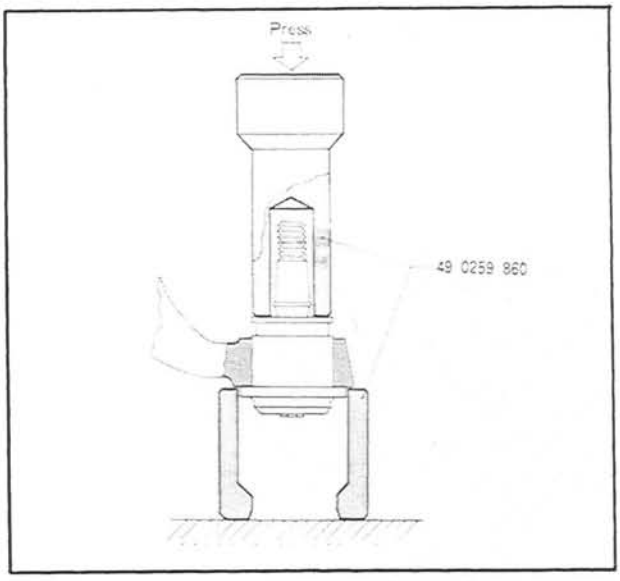

Fig. 13–25 Removing of ball joint

5. Clean the mounting bore of the suspension arm and apply kerosene.
6. Press fit the ball joint to the suspension arm with the **ball joint remover and installer** (49 0259 860).

Note: If the pressure necessary to press in the ball joint is less than 1,500 kg (3,300 lb), the suspension arm should be replaced.

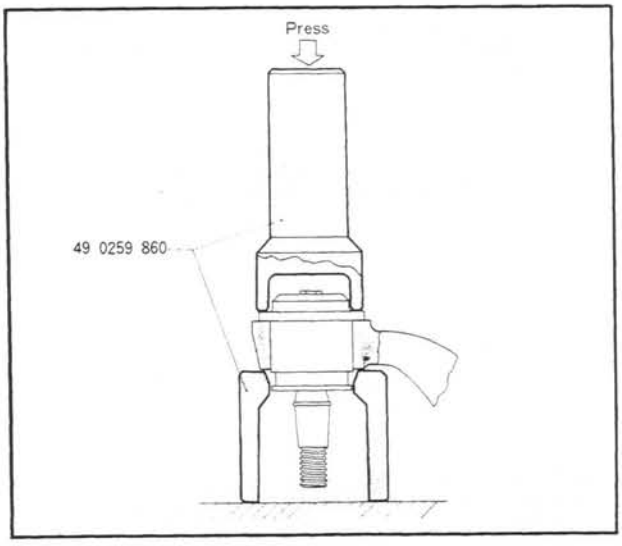

Fig. 13–26 Installing of ball joint

7. Install the ball joint and suspension arm to the knuckle arm and tighten the nut to **6.5 m-kg (50 ft-lb).**

13–D. REAR SUSPENSION

13–D–1. Removing of Rear Shock Absorber

1. Remove the nuts attaching the upper end of the shock absorber from the luggage compartment.
2. Remove the nut from the lower end of the shock absorber.
3. Place the jack under the rear axle housing and raise the vehicle.
Then, place a stand under the frame side rail.
4. Gradually lower the jack under the rear axle housing and remove the rear shock absorber.

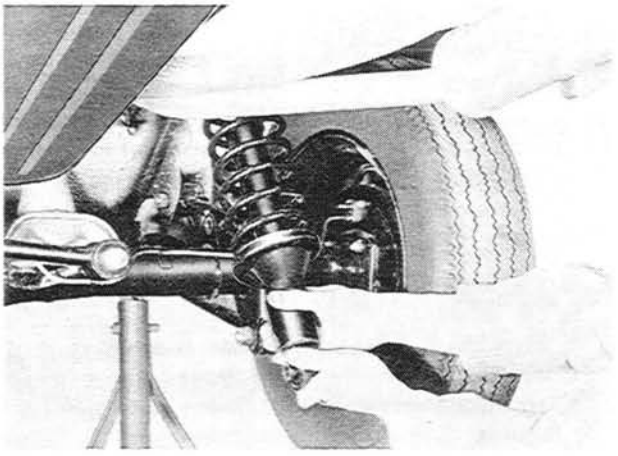

Fig. 13–27 Removing of rear shock absorber

13–D–2. Disassembling of Rear Shock Absorber

1. Apply the identification mark on the rear shock absorber before it is disassembled.
2. Hold the shock absorber in a vise.
3. Using the **coil spring holder** (49 0223 640A and 49 0223 641), compress the coil spring.
4. Remove the lock nuts.

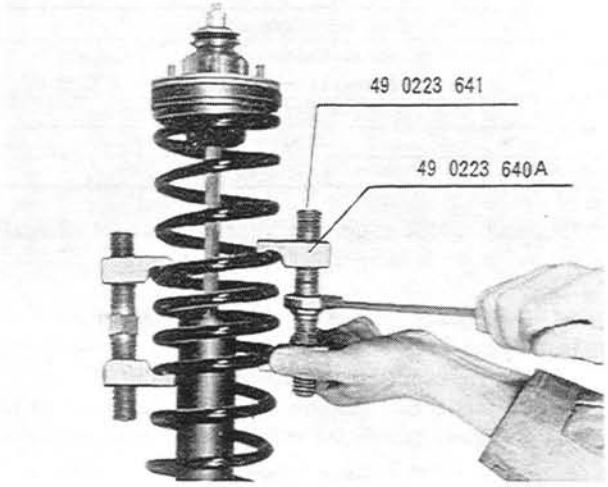

Fig. 13–28 Compressing of coil spring

13–D–3. Checking of Rear Shock Absorber

1. If excessive amount of oil is evident on the exterior of the shock absorber, the shock absorber should be replaced with a new one.

Note: The rear shock absorber should not be disassembled as it contains a high compression gas.
If it is found to be defective, replace it as an assembly.

2. Check the coil spring for signs of fatigue, cracks or any damage.

3. Check the rubber seat, rubber bush for weakness at the rubber cushion.
4. Check the set plate, spring seat for crack, wear and damage. If necessary, replace with a new one.

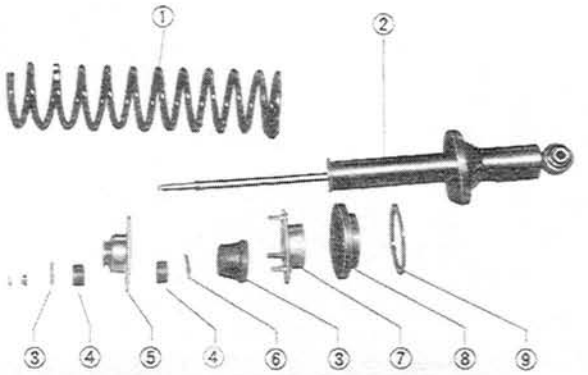

Fig. 13–29 Rear shock absorber assembly

1. Coil spring
2. Rear shock absorber
3. Retainer
4. Rubber bush
5. Set plate
6. Rubber stopper
7. Spring seat upper
8. Rubber seat
9. Adjusting shim

13–D–4. Assembling of Rear Shock Absorber

Assemble the rear shock absorber in the reverse order of disassembling, noting the following point.
1. Adjust the vehicle height by using the proper combination of the coil spring and adjusting plate.
The coil springs are available in three sizes according to the strength of the springs.

Coil spring identification	
Mark	Load required to reduce coil spring length from 371 mm (14.61 in) to 247 mm (9.72 in)
1 dot	263.4 ~ 271 kg (581 ~ 597 lb)
2 dots	271 ~ 279 kg (597 ~ 561 lb)
3 dots	279 ~ 286.6 kg (615 ~ 632 lb)

If possible, use springs with the same identification mark on both sides.

13–D–5. Installing of Rear Shock Absorber

Install the rear shock absorber in the reverse order of removing, noting the following points.
1. The rear shock absorber should be installed by making the protector face toward the front of the vehicle.

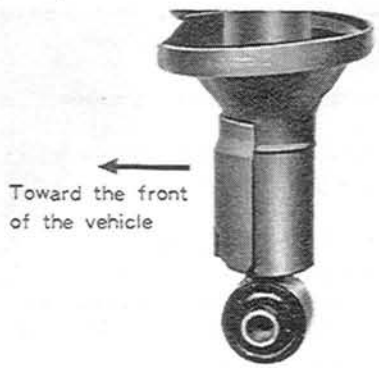

Fig. 13–30 Lower of rear shock absorber

2. Tighten the rear shock absorber attaching nut and bolt to a torque **11 m-kg (80 ft-lb).**

13–E. FOUR LINKS

13–E–1. Removing of Upper and Lower Link

1. Remove the lower link attaching bolts and nuts and remove the lower link.
2. Remove the upper link attaching bolt and nuts and remove the upper link.

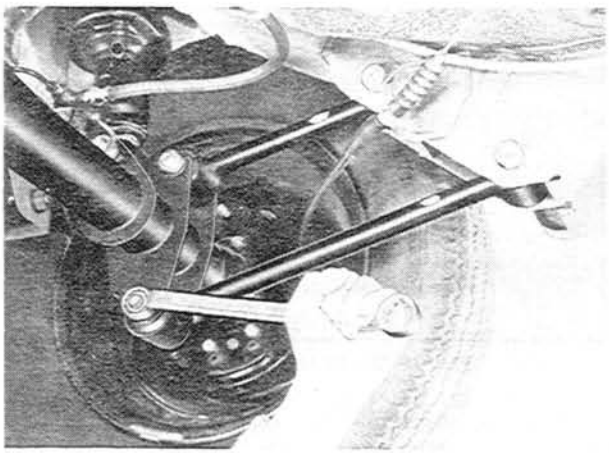

Fig. 13–31 Four links

13–E–2. Checking of Upper and Lower Links

1. Check the links for crack or damage.
2. Check the rubber bushes for weakness.

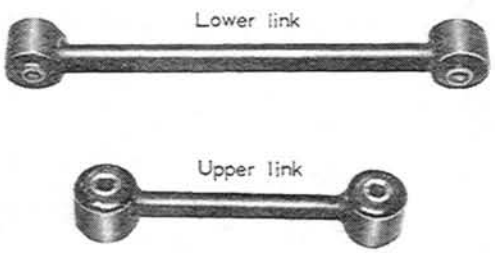

Fig. 13–32 Upper and lower links

13–E–3. Installing of Upper and Lower Link

Install the upper and lower link in the reverse order of removing, noting the following points.
1. When installing the upper and lower link on body

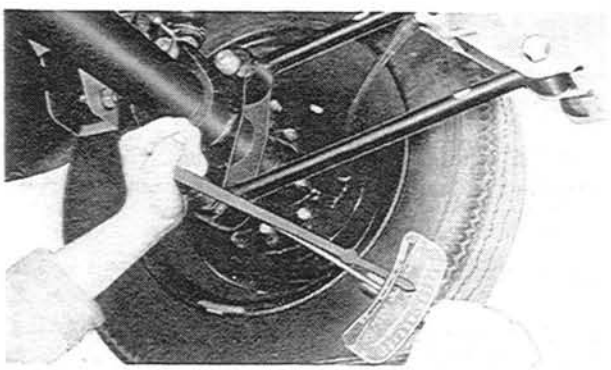

Fig. 13–33 Tightening of links

and rear axle housing the **white mark** should be placed at the front of the vehicle.
2. When installing the upper and lower links, the torque should be **11 m-kg (80 ft-lb)** in unloaded condition. If they are tightened in rebounding condition, the height of the vehicle will get higher or durability of the rubber bushes will deteriorate.

13–F. LATERAL ROD

13–F–1. Removing of Lateral Rod

1. Remove the lateral rod attaching nuts to the rear axle housing.
2. Remove the lateral rod attaching nut and bolt to the body and remove the lateral rod.

13–F–2. Checking of Lateral Rod

Referring to Par. 13–E–2, check the lateral rod.

13–F–3. Installing of Lateral Rod

Install the lateral rod in the reverse order of removing, noting the following point.
1. When installing the lateral rod, the torque should be **11 m-kg (80 ft-lb)** in unloaded condition.
If they are tightened in rebounding condition, the height of the vehicle will get higher or durability of the rubber bushes will deteriorate.

SPECIAL TOOLS

49 0223 640A	Coil spring holder
49 0223 641	Screw (For coil spring holder)
49 0259 700	Cap nut wrench
49 0259 702	Hook wrench
49 0259 860	Ball joint remover and installer