

# Trouble Shooting Hints for Shift Lever Noises

Job No.

26-2

In order to reduce the shift lever noises which may occur on bad and uneven roads proceed and check as follows:

## I. Models 180, 180 a, 180 b, 180 D, 180 Db, 190 D, 190 Db, 219, 220 a, 220 S, and 220 SE

### 1. Relay Shaft

The relay shaft (13) should have no end play in the bearing assembly. Replace the washers (15) by 0.6 mm spring washers, Part No. 121 990 00 48. It is imperative that the lever (14) should be firmly seated in the splines of the relay shaft (13). Loose levers should be electrically welded to the shaft. In order to ensure that the relay shaft has no end play whatsoever in the bearing assembly, the lever (14) and the relay lever (18) should be pressed against the bearing assembly by means of Clamping Device 180 589 05 31. Tighten the clamping screw in the relay lever (18) with the lever in this position. It is not sufficient to compress the levers by hand since this would not produce the required initial tension of the spring washers (Fig. 26-2/1).

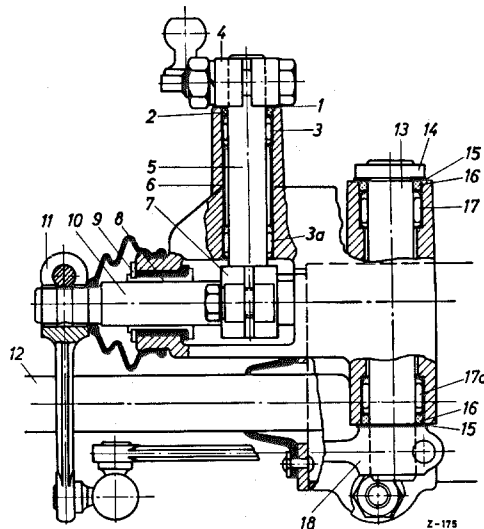


Fig. 26-2/1

- 1 Washer
- 2 Sealing ring
- 3 Outer needle bearing
- 3a Inner needle bearing
- 4 Selector lever
- 5 Selector lever shaft
- 6 Spacer sleeve
- 7 Selector lever on shift tube
- 8 Rubber mounting
- 9 Snap ring
- 10 Shift tube
- 11 Lever on shift tube
- 12 Steering tube
- 13 Relay shaft
- 14 Relay shaft lever
- 15 Washer
- 16 Sealing ring
- 17 Outer needle bearing
- 17a Inner needle bearing
- 18 Relay lever

### 2. Selector Lever and Selector Lever Shaft

Check the end play of the selector lever claw (99) between the shift tube collar and the shift tube (65). The maximum permissible end play is 0.4 mm (see Fig. 26-2/2). When reassembling the unit please remember that a spring washer (1) 12 N 55 a must be installed between the selector lever (4) and the bearing assembly. Before tightening the clamping screw in the selector lever (4) push the lever toward the bearing assembly, so that the selector lever shaft (5) is also installed with a certain amount of initial tension (Fig. 26-2/1).

### 3. Rubber Mounting in Bearing Assembly

The radial play of the shift tube (65) in the rubber mounting (78) of the bearing assembly (77) should not exceed 0.06 mm. Worn rubber mountings should be replaced by 2<sup>nd</sup> version mountings (smaller tolerances). When adjusting the steering wheel shift system make sure that when the 3<sup>rd</sup> or 4<sup>th</sup> gear is engaged, the distance between the shift tube collar and the rubber mounting is approx. 1-1.5 mm (Fig. 26-2/2).

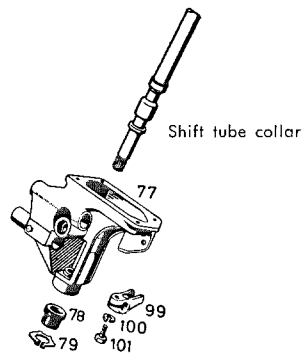


Fig. 26-2/2

- 65 Shift tube
- 77 Bearing assembly
- 78 Rubber mounting
- 79 Snap ring
- 99 Selector lever (on shift tube)
- 100 Lock washer
- 101 Hexagon screw

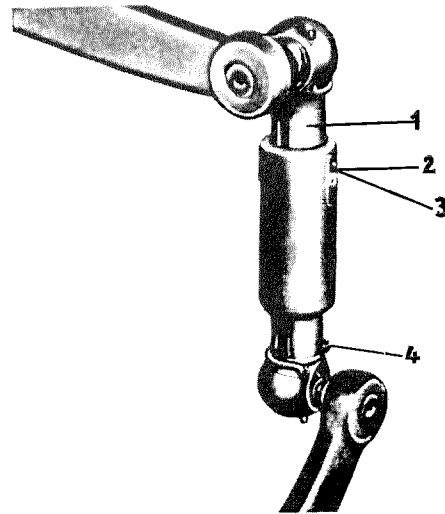


Fig. 26-2/3

- 1 Spring-loaded ball cup connector
- 2 Slot
- 3 Cylindrical pin
- 4 Spring clip

#### 4. Spring-Loaded Ball Cup Connector

In previous models the cylindrical pins (3) of the spring-loaded ball cup connector (1) were insulated by means of Vulkollan bushings. On recent cars these cylindrical pins have been provided with polyamide bushings with a higher wear resistance. These bushings, which should not show any signs of wear, reduce the noise of the pins when they move against the upper and lower ends of the slot. When the gear is engaged the pin should be approximately in the center of the slot (Fig. 26-2/3).

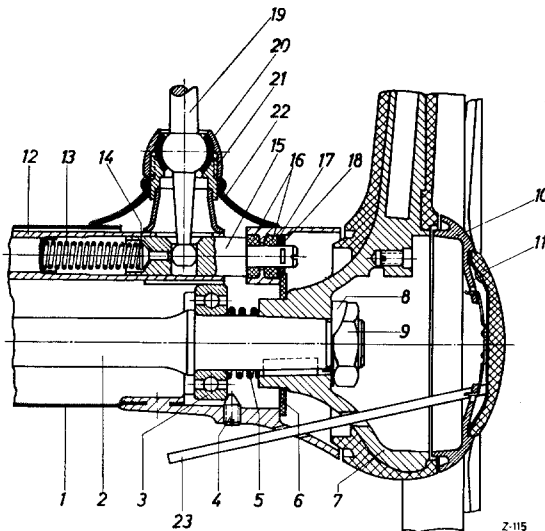


Fig. 26-2/4

- 1 Steering column jacket
- 2 Steering tube
- 3 Annular grooved bearing
- 4 Grub screw
- 5 Pressure spring for steering tube
- 6 Rubber washer
- 7 Steering wheel
- 8 Locking plate
- 9 Hexagon nut
- 10 Horn ring
- 11 Trademark plate
- 12 Shift tube
- 13 Pressure spring for shift tube
- 14 Spring seat pin
- 15 Guide pin
- 16 Rubber ring
- 17 Shim
- 18 Snap ring
- 19 Shift lever
- 20 Rubber cushion
- 21 Cover cap
- 22 Rubber cuff
- 23 Welding rod (3 mm thick)  
to press off the trademark plate

#### 5. Shift Tube and Shift Lever

The rubber rings (16) on the guide pin (15) should always be in good condition, so that the shift tube (12) and the guide pin cannot touch the steering column jacket. The radial play between guide pin and shift tube should not exceed 0.06–0.07 mm (Fig. 26-2/4).

Check the position of the shift lever. In neutral position the upward deviation of the lever from the horizontal should be approx. 80 mm. When engaging the individual gears the shift tube should not touch the recess in the steering column jacket (Fig. 26-2/5).

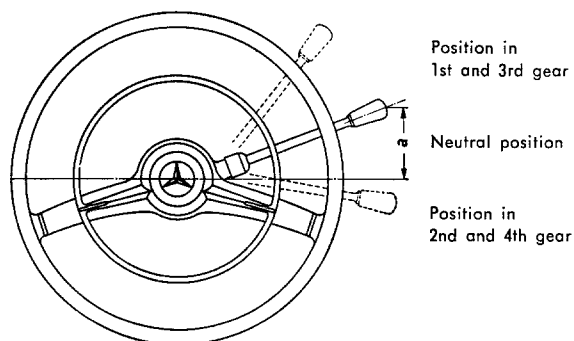


Fig. 26-2/5

$a = 80 \text{ mm}$

## 6. Rubber Cuff

The rubber cuff must be flexible and must slide easily on the steering column jacket. Cuffs which have come into contact with grease tend to stick to the steering column jacket and should therefore be replaced. The collar of the rubber cuff (see arrow in Fig. 26-2/6) should not be too thick, so that it cannot exert any pressure on the shift lever. The flexibility of the rubber cuff can be increased by reducing the thickness of the collar.

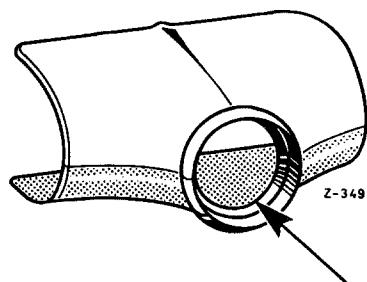


Fig. 26-2/6

## 7. Engine Mountings

On Models 190 and 190 SL harder rear engine rubber mountings can be installed in order to reduce the rattle in the shift lever.

Harder rubber mountings:

rear left: Part No. 121 223 00 12

rear right: Part No. 121 223 01 12

In order to limit the sprung movement of the engine on Models 219 and 220 a stop piece Part No. 105 242 00 26 should be installed (Fig. 26-2/7). The stop piece should be screwed into the recess in the lower part of the engine mounting together with one or several shims Part No. 105 242 00 66 in such a way that **with the engine installed** there is a distance " $a$ " = 1-2 mm. This distance is necessary in order to prevent an increase in the noise transmitted to the interior of the car. If the rubber mounting should settle down after a certain mileage the prescribed distance " $a$ " = 1-2 mm can be obtained by removing shims.

Make sure that the thin rubber coating on the rubber mounting above the stop piece is not removed since otherwise the exposed movable metal part of the rubber mounting will knock against the stop piece when the engine mounting is depressed and will produce a knocking noise.

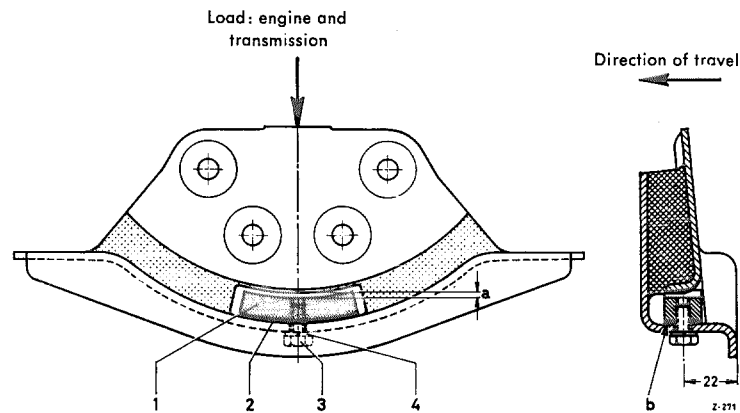


Fig. 26-2/7

However, the rubber coating should be removed at the point where the stop piece is attached (Fig. 26-2/7).

## 8. Shift Rod and Shift Lever

In order to reduce shift noises recent practice is to install ball cup connectors with Vulkollan insert Part No. 000 991 04 22 on the selector and shift rods and Vulkollan bushings Part No. 000 992 00 10 in the selector and shift levers in the transmission case cover. These parts can also be installed subsequently.

### Subsequent Installation:

1. Remove the transmission and mark the position of the shift and selector levers on the shifting shaft and on the selector finger. After loosening the clamping screws, remove the two levers.
2. Remove the shift and selector rods from their levers.
3. Drill the brass elements out of the rubber bushings on the levers and press out the rubber bushings.
4. Press the Vulkollan bushings into the levers.

5. Attach the selector and shift levers to the shifting shaft and the selector finger, paying attention to the marks made during removal.
6. Measure the length of the shift rod and the selector rod and unscrew the ball cup connectors on the two rods.
7. Install ball cup connectors with Vulkollan inserts on the shift rod and the selector rod and lock by means of the lock nuts.

**Note:** Both the shift and the selector rod must be adjusted to their appropriate length.

8. Attach the shift and selector rods to the shift and selector levers.

9. Install the transmission. The ball cup connectors with Vulkollan inserts on the shift and selector rods are no longer secured against slipping out by spring clips on the levers at the bearing assembly. When reassembling the levers make sure that the ball studs of the levers form an angle of

approx. 90° with the shift and selector rods on the bearing assembly. If necessary, bend the shift and selector rods slightly.

**Note:** Be careful when bending the rods and make sure that they do not foul the transmission tunnel or each other.

## II. Model 190 SL

### Shift Tube with Rubber Bushing

In order to reduce shift noises and to avoid vibrations of the shift lever recent cars have been provided with rubber-insulated shift tubes Part No. 121 260 08 82 (1<sup>st</sup> version) and Part No. 121 260 11 82 (2<sup>nd</sup> version). This rubber-insulated shift tube can also be installed subsequently.

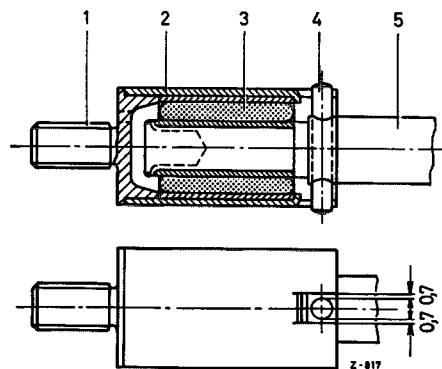


Fig. 26-2/8

1<sup>st</sup> version

- 1 Splines
- 2 Sleeve
- 3 Rubber bushing
- 4 Notched pin
- 5 Shift tube

Subsequent installation:

1. Remove the old shift tube (see Job No. 26-6).
2. Flare the transmission tunnel in such a way that the sleeve (2) of the shift tube cannot touch the tunnel.
3. Install the rubber-insulated shift tube (see Job No. 26-6).

**Note:** On the 1<sup>st</sup> version of the shift tube the notched pin (4) must be positioned in the center of the sleeve recess (2) (Fig. 26-2/8).