

M 45 4-speed

M 46 4-speed (M 45 + overdrive)

Repairs and Maintenance

Section
4

Group
43

**Manual
Transmissions
M45 / M46**

1979—

VOLVO

Group 43: Manual transmission

M 45 = Standard transmission (introduced on 1979 models)

M 46 = Standard transmission with overdrive unit attached
(M 45 + overdrive).

Repair instructions for Overdrive are available in separate manual.

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Indicates changes in text and/or specification in this manual.

TP 30056/2

4500.04.84

Printed in U.S.A.

Specifications

General

Type	M 45	M 46	Late Models
Gear ratios:			
1st gear	3.71:1	3.71:1	4.03:1
2nd gear	2.16:1	2.16:1	2.16:1
3rd gear	1.37:1	1.37:1	1.37:1
4th gear	1:1	1:1	1:1
4th gear + overdrive	—	0.797:1	0.797:1
Reverse gear	3.68:1	3.68:1	3.68:1

Lubricant

	Metric	US Measurements
Type	Automatic Transmission Fluid Type F or G	
Capacity: M 45	0.75 liter	0.8 US qt.
Capacity: M 46	2.3 liters	2.4 US qts.

Clearances

Clearance between reverse gear and shift fork	0.1–1.0 mm	0.004"—0.04"
Axial clearance:		
Input shaft	0.01–0.20 mm	0.0004–0.008"
Intermediate shaft	0.025–0.10 mm	0.001–0.004"
Main shaft	0.01–0.20 mm	0.0004–0.008"

Aluminum transmission housing:

Pre-tension intermediate shaft to	0.03–0.08 mm	0.012–0.0032"
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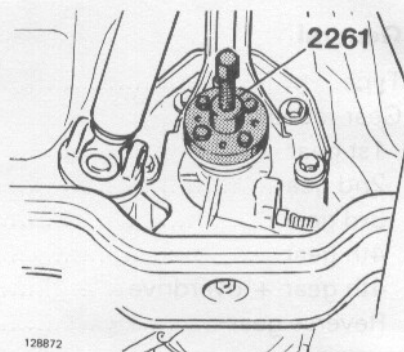
Torques

Bell housing bolts	35–50 Nm	25–35 ft.lbs.
Output shaft flange nut	90–110 Nm	65–80 ft.lbs.
Rear cover (gearshift assembly)	35–50 Nm	25–35 ft.lbs.

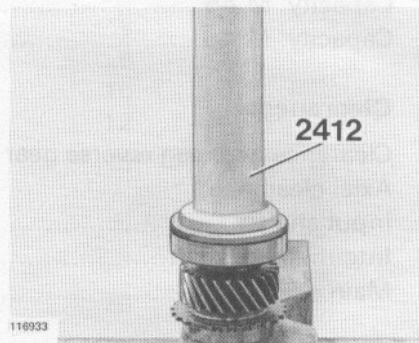
Special tools, transmission M 45 / M 46

To order, put 999 in front of tool number

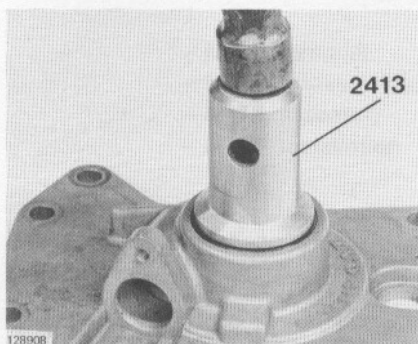
- 1801 Standard handle**
- 2261 Puller**, drive flange
- 2412 Drift**, installing input shaft bearing
- 2413 Drift**, removing / installing rear cover seal
- 2520 Stand**
- 2831 Press tool**, installing main shaft bearing
- 2852 Adapter**, installing gear and synchro ring
- 2853 Adapter**, removing gear and synchro ring
- 2867 Drift**, installing bell housing seal
- 2985 Adapter**, removing main shaft bearing
- 2986 Drift**, installing intermediate shaft bearings
- 5058 Tool**, removing main shaft bearing
- 5064 Drift**, installing rear cover seal
- 5065 Drift**, installing seal on shift selector rail
- 5069 Puller**, removing rear seal
- 5111 Centering drift**, installing clutch
- 5130 Fixture**, attaching transmission to stand 2520
- 5131 Puller**, removing intermediate shaft bearing
- 5147 Tool**, removing main shaft bearing, used with 5058
- 5148 Tool**, removing main shaft bearing on M 46
- 5149 Wrench**, removing / installing flange nut
- 5177 Puller**, intermediate shaft bearing, aluminum housing
- 5180 Drift**, intermediate shaft bearing, aluminum housing
- 5181 Pliers**, removing pin on gearshift lever
- 5972 Fixture**, removing transmission



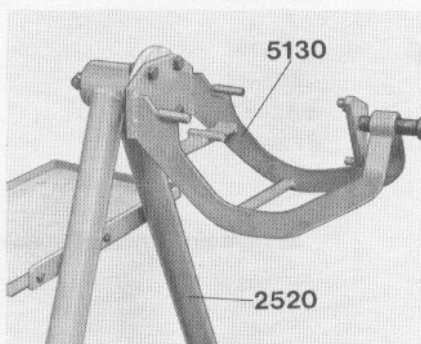
2261 Puller
drive flange



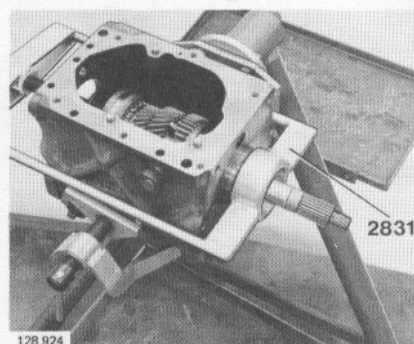
2412 Drift
installing input shaft bearing



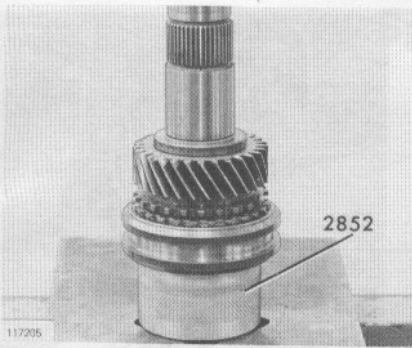
2413 Drift
removing / installing rear cover seal



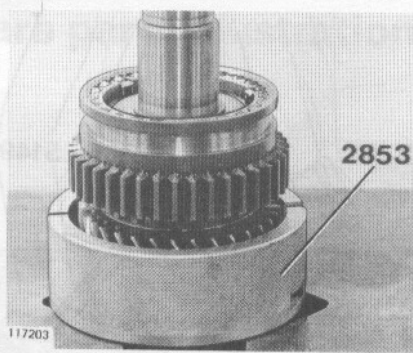
2520 Stand
5130 Fixture
attaching transmission to stand 2520



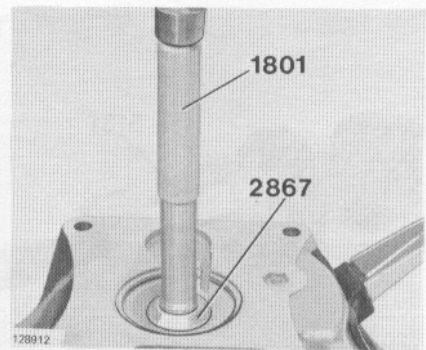
2831 Press tool
installing main shaft bearing



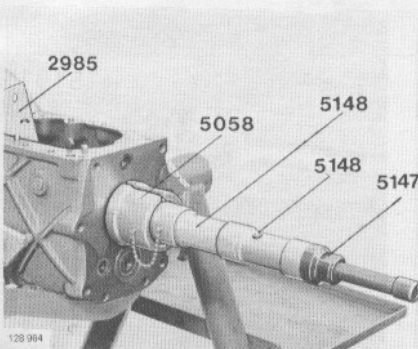
2852 Adapter
installing gear and
synchro ring



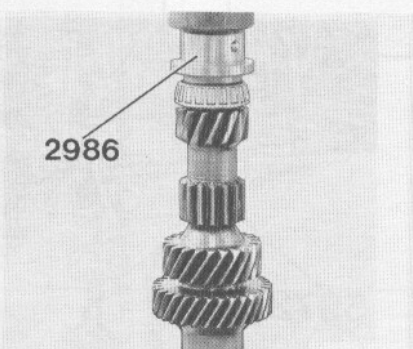
2853 Adapter
removing gear and
synchro ring



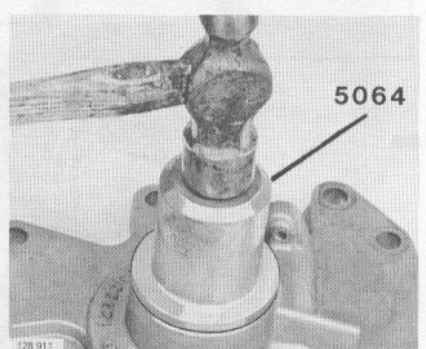
1801 Standard handle
2867 Drift
installing bell housing seal



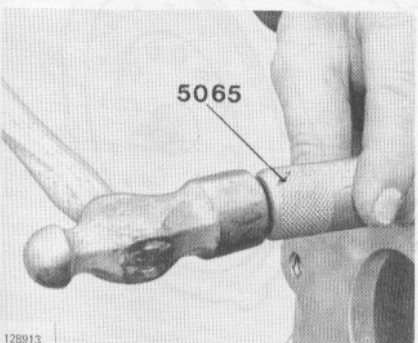
2985 Adapter
removing main shaft
bearing
5058 Tool
removing main shaft
bearing
5147 Tool
removing main shaft
bearing
5148 Tool
removing main shaft
bearing, M 46



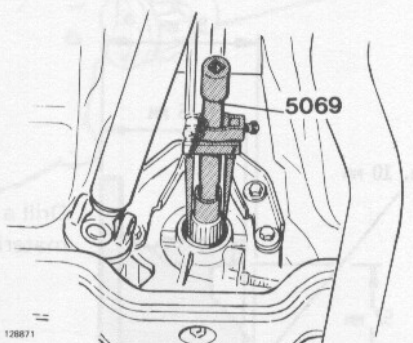
2986 Drift
installing intermediate
shaft bearings



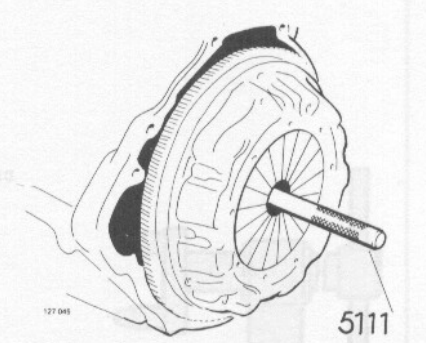
5064 Drift
installing rear cover seal



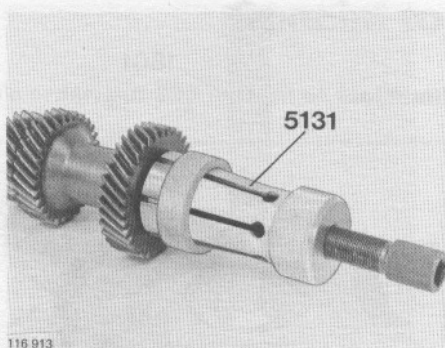
5065 Drift
installing seal on shift
selector rail



5069 Puller
removing rear seal

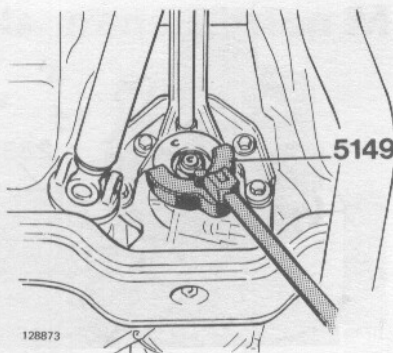


5111 Centering drift
installing clutch



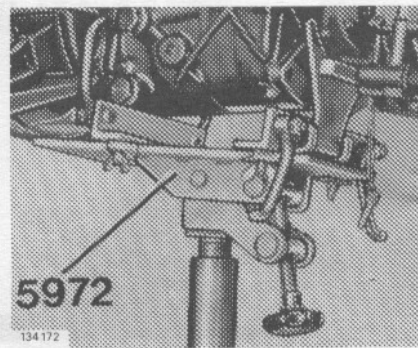
116.913

5131 Puller
removing intermediate
shaft bearing



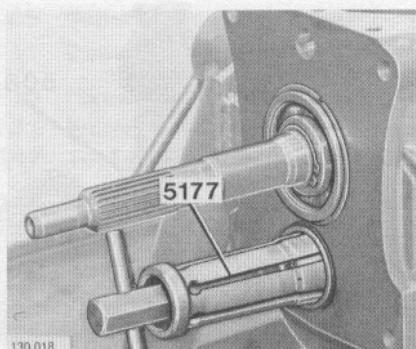
128873

5149 Wrench
removing/installing flange
nut



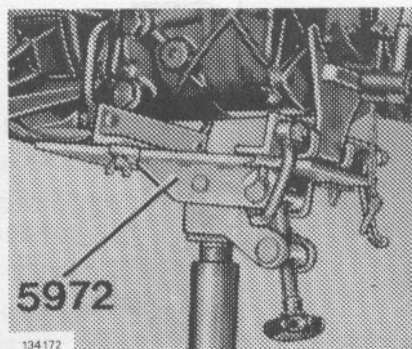
134172

5972 Fixture
removing transmission



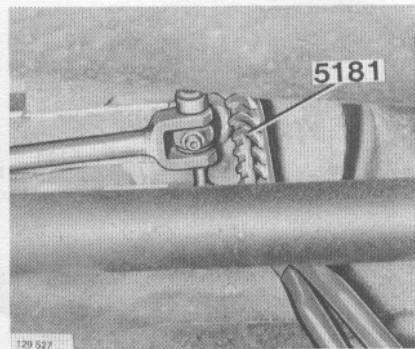
130.018

5177 Puller
intermediate shaft bearing,
aluminum housing



134172

5180 Drift
intermediate shaft bearing,
aluminum housing

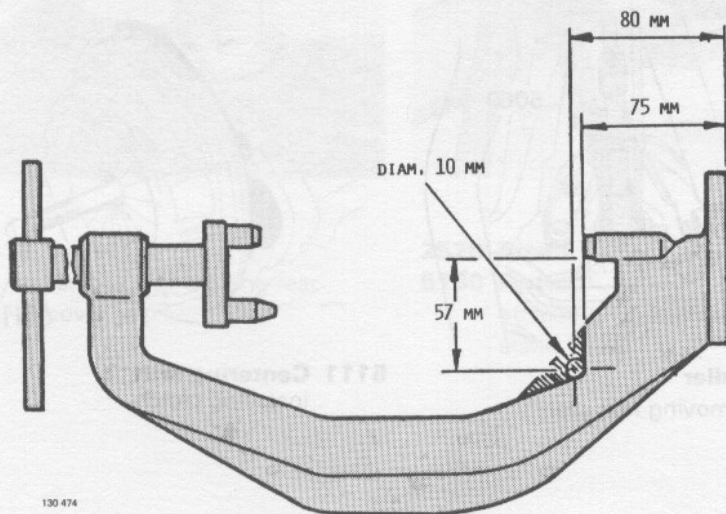


120.527

5181 Pliers
removing pin on gearshift
lever

Modification of fixture 5130

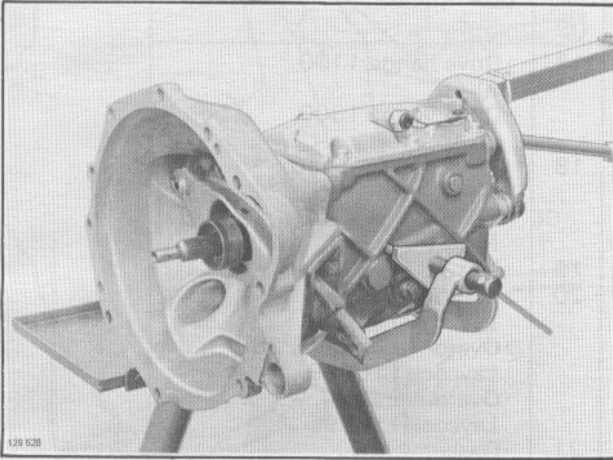
Fixtures delivered prior to introduction of 1979— transmission M 45/M 46 can be modified to fit later model transmissions.



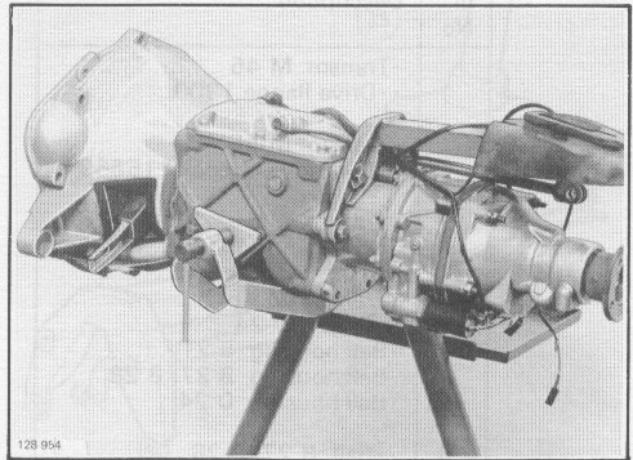
130.474

Drill a hole 10 mm = 3/8". Remove
material stock as shown.

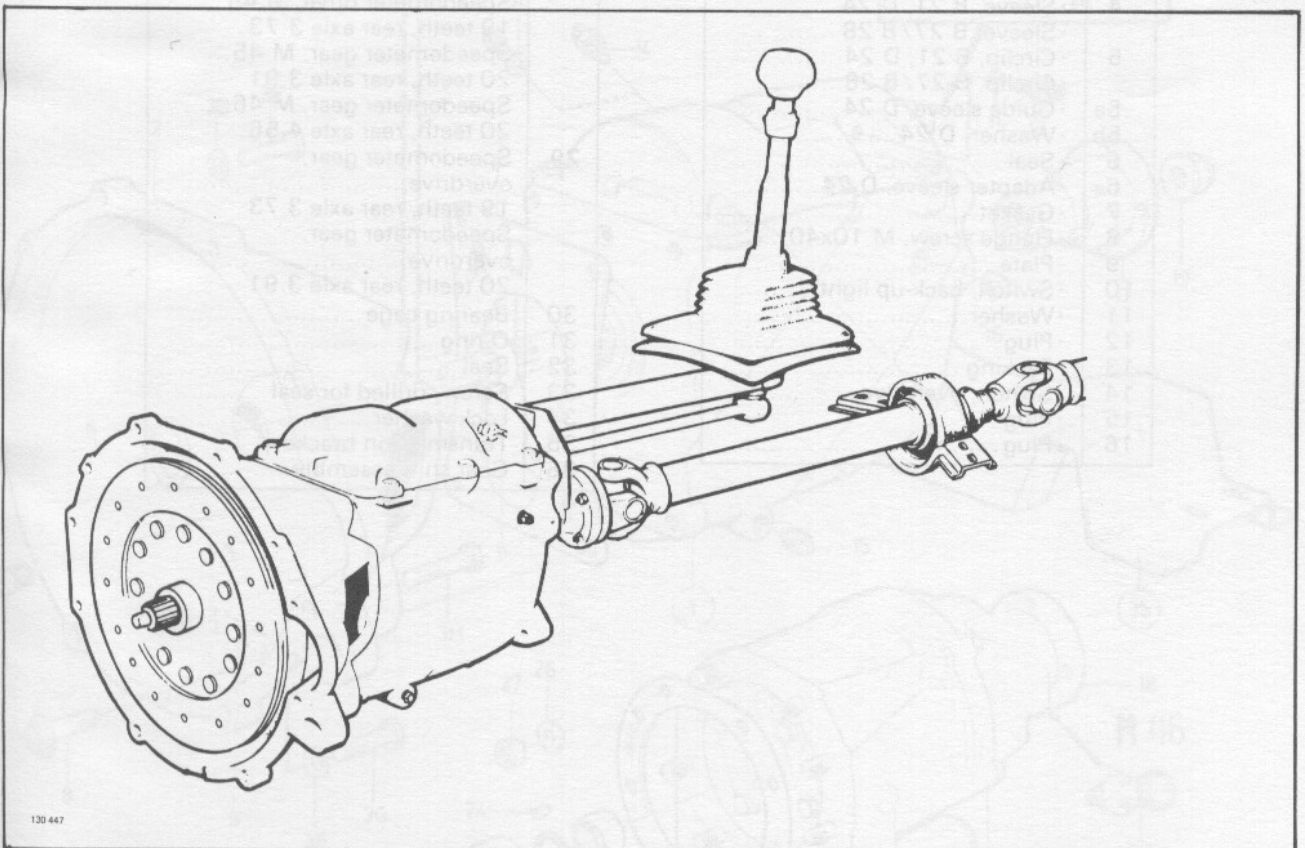
Spare parts illustrations



M 45



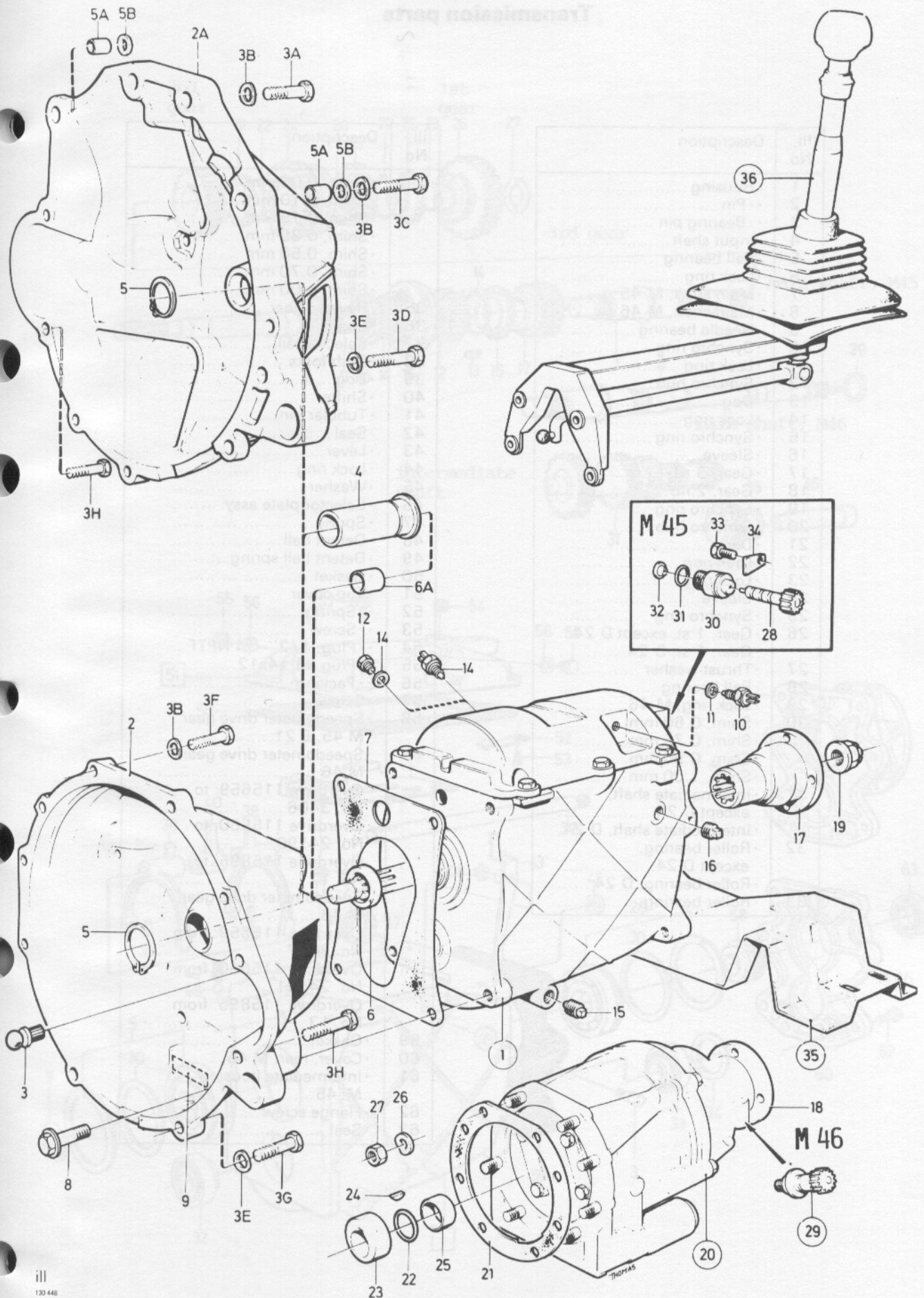
M 46



Transmissions M 45 / M 46

III. No.	Description
	• Transm. M 45
	• Drive flange 1300
	• Transm. M 46
	• Overdrive laycock 115659
	• Transm. M 45
	• Drive flange 1100
	• Transm. M 46
	• Engine D 24
2	• Bell housing, B 21
	• Bell housing, B 27 / B 28
2a	• Bell housing, D 24
3	• Ball, B 27 / B 28
3a	• Screw
3b	• Resilient washer
3c	• Screw M 12x100
	• Screw, M 10x70, D 24
3e	• Resilient washer
3f	• Screw, M 12x40
3g	• Screw, M 10x40
3h	• Screw
4	• Sleeve, B 21, D 24
	• Sleeve, B 27 / B 28
5	• Circlip, B 21, D 24
	• Circlip, B 27 / B 28
5a	• Guide sleeve, D 24
5b	• Washer, D 24
6	• Seal
6a	• Adapter sleeve, D 24
7	• Gasket
8	• Flange screw, M 10x40
9	• Plate
10	• Switch, back-up light
11	• Washer
12	• Plug
13	• Packing
14	• Switch, overdrive
15	• Plug
16	• Plug

III. No.	Description
17	• Drive flange 1100 M 45
	• Drive flange 1300, M 45
18	• Drive flange, 1140 M 46
	• Drive flange 1300 M46
19	• Nut
20	• Overdrive, B 21
	Laycock 115660
	• Overdrive, B 27 / B 28
	Laycock 115659
	• Overdrive, D 24
	Laycock 115895
21	• Gasket
22	• Circlip
23	• Cam, oil pump
24	• Key
25	• Circlip
26	• Spring washer
27	• Nut
28	Speedometer gear, M 45
	18 teeth, rear axle 3.54
	Speedometer drive, M 45
	19 teeth, rear axle 3.73
	Speedometer gear, M 45
	20 teeth, rear axle 3.91
	Speedometer gear, M 46
	20 teeth, rear axle 4.56
29	Speedometer gear, overdrive
	19 teeth, rear axle 3.73
	Speedometer gear, overdrive
	20 teeth, rear axle 3.91
30	Bearing cage
31	O-ring
32	Seal
33	Screw, drilled for seal
34	Lock washer
35	Transmission bracket
36	Gear shift assembly

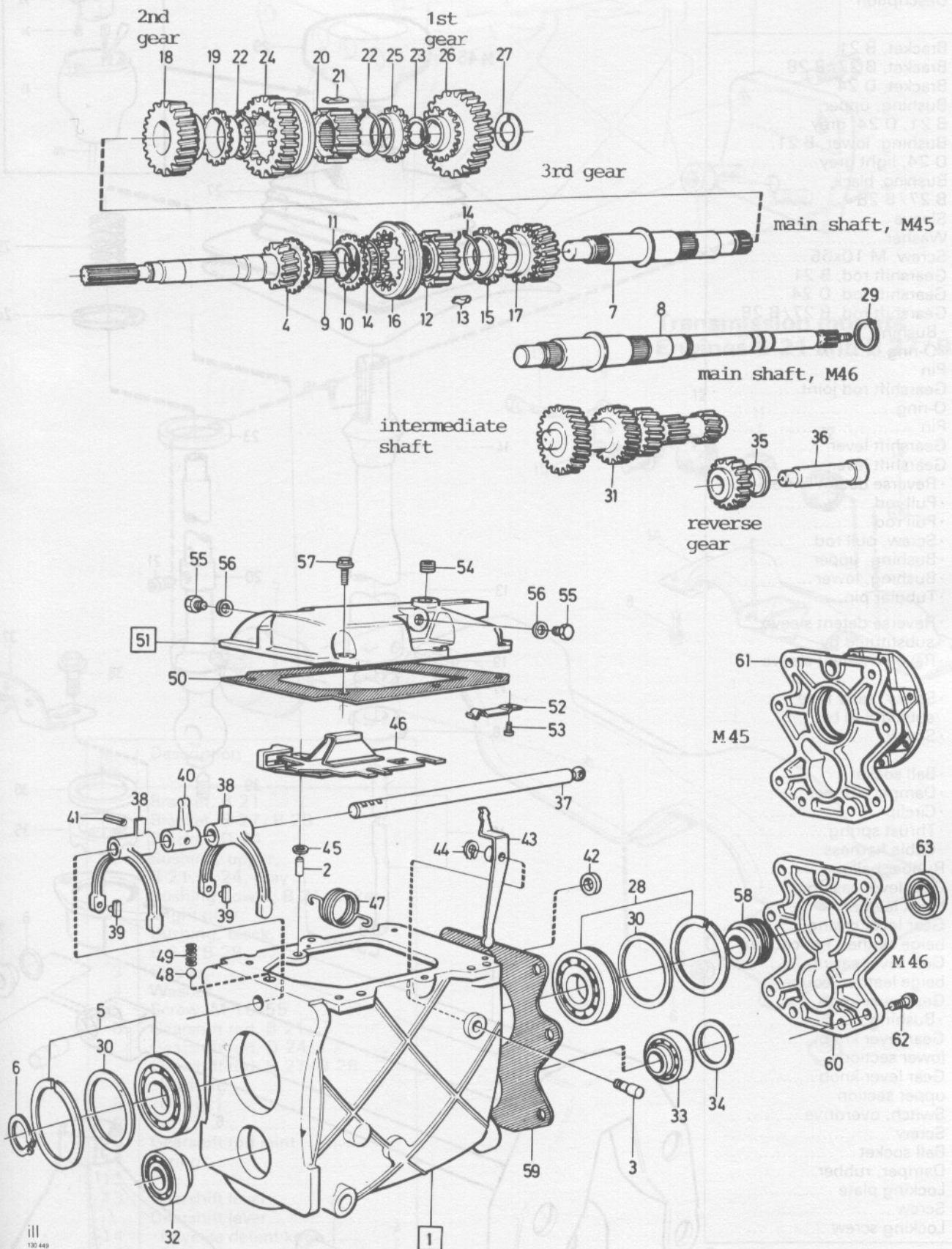


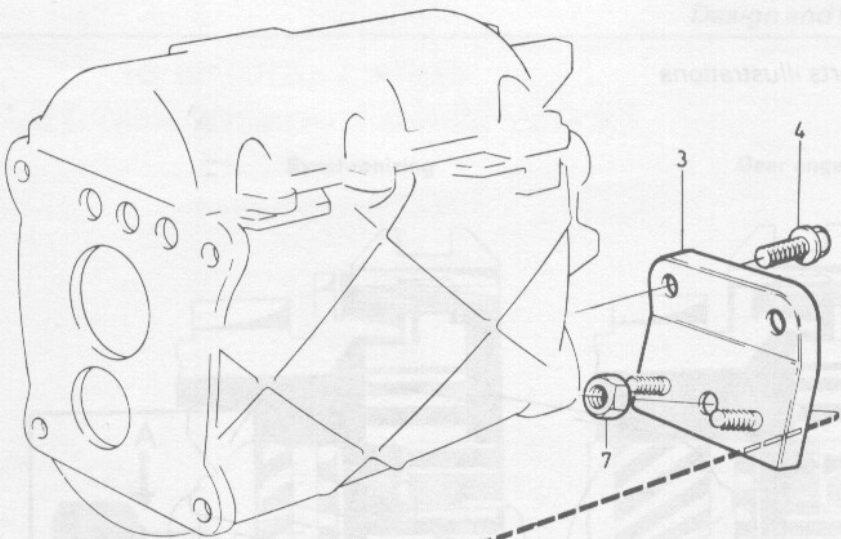
III
130 448

Transmission parts

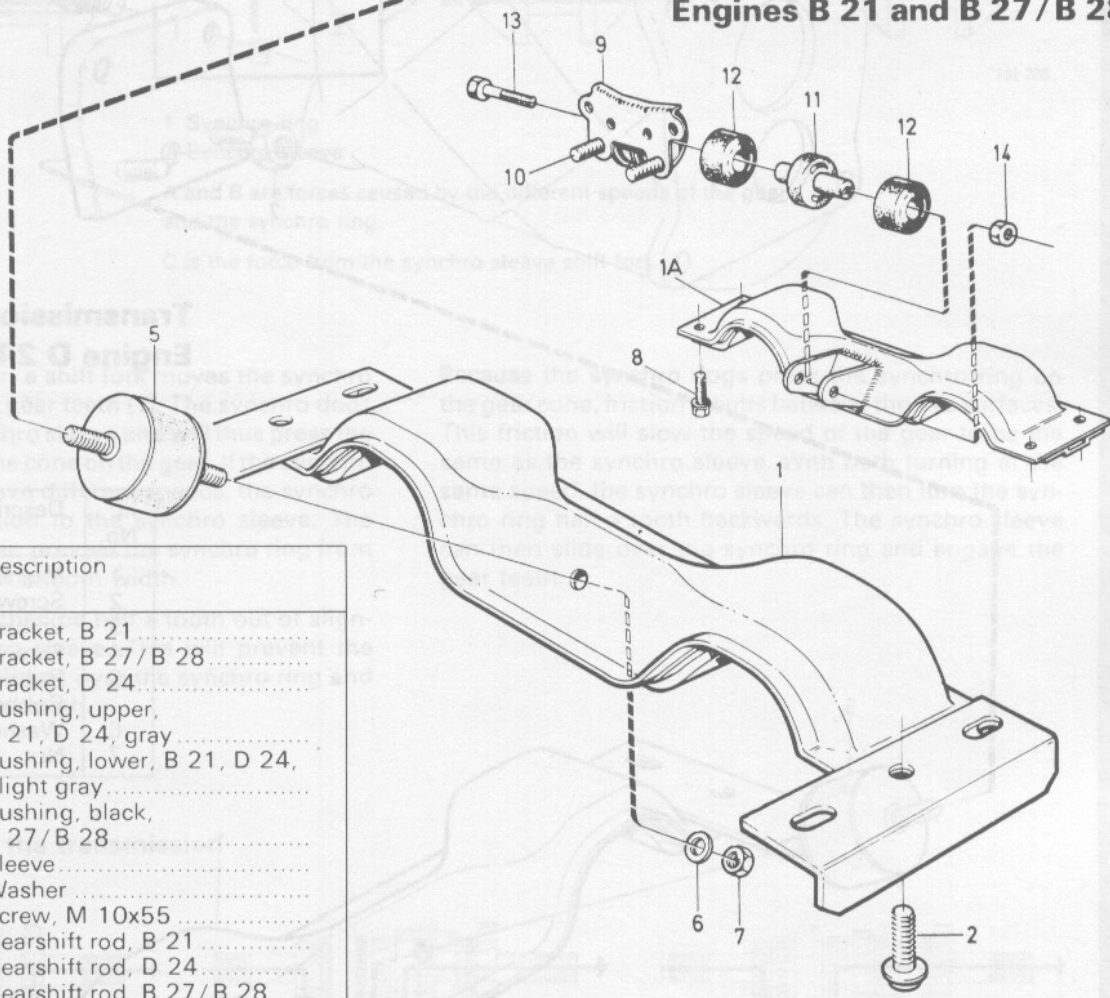
Ill. No.	Description
1	• Housing
2	• Pin
3	• Bearing pin
4	• Input shaft
5	• Ball bearing
6	• Lock ring
7	• Main shaft, M 45
8	• Main shaft, M 46
9	• Needle bearing
10	• Synchro ring
11	• Lock ring
12	• Synchro hub
13	• Dog
14	• Lock ring
15	• Synchro ring
16	• Sleeve
17	• Gear, 3:rd
18	• Gear, 2:nd
19	• Synchro ring
20	• Synchro hub
21	• Dog
22	• Lock ring
23	• Lock ring
24	• Sleeve
25	• Synchro ring
26	• Gear, 1:st, except D 24 ..
	• Gear, 1:st, D 24
27	• Thrust washer
28	• Ball bearing
29	• Lock ring, M 46
30	• Shim, 0.60 mm.....
	• Shim, 0.75 mm.....
	• Shim, 0.90 mm.....
	• Shim, 1.00 mm.....
31	• Intermediate shaft, except D 24.....
	• Intermediate shaft, D 24.
32	• Roller bearing, except D 24.....
	• Roller bearing, D 24
33	• Roller bearing

Ill. No.	Description
34	• Shim, 0.05 mm.....
	• Shim, 0.10 mm.....
	• Shim, 0.15 mm.....
	• Shim, 0.35 mm.....
	• Shim, 0.50 mm.....
	• Shim, 0.70 mm.....
	• Shim, 1.00 mm.....
35	• Reverse gear
36	• Shaft.....
37	• Selector rail.....
38	• Shift forks.....
39	• Dog
40	• Shifter
41	• Tubular pin
42	• Seal
43	• Lever
44	• Lock ring
45	• Washer
46	• Selector plate assy.
47	• Spring
48	• Detent ball
49	• Detent ball spring
50	• Gasket
51	• Top cover
52	• Spring
53	• Screw
54	• Plug, 1/2"—14 NPTF...
55	• Plug, M 14x12.....
56	• Packing
57	• Screw
58	• Speedometer drive gear M 45, B 21
	• Speedometer drive gear, M 46
	Overdrive 115659: to No. 3406
	Overdrive 115660: to No. 24190
	Overdrive 115895: to No. 12
	• Speedometer drive gear, M 46
	Overdrive 115659: from No. 3407
	Overdrive 115660: from No. 24191
	Overdrive 115895: from No. 13
59	• Gasket.....
60	• Cover, rear, M 45
61	• Intermediate housing, M 45.....
62	• Flange screw
63	• Seal



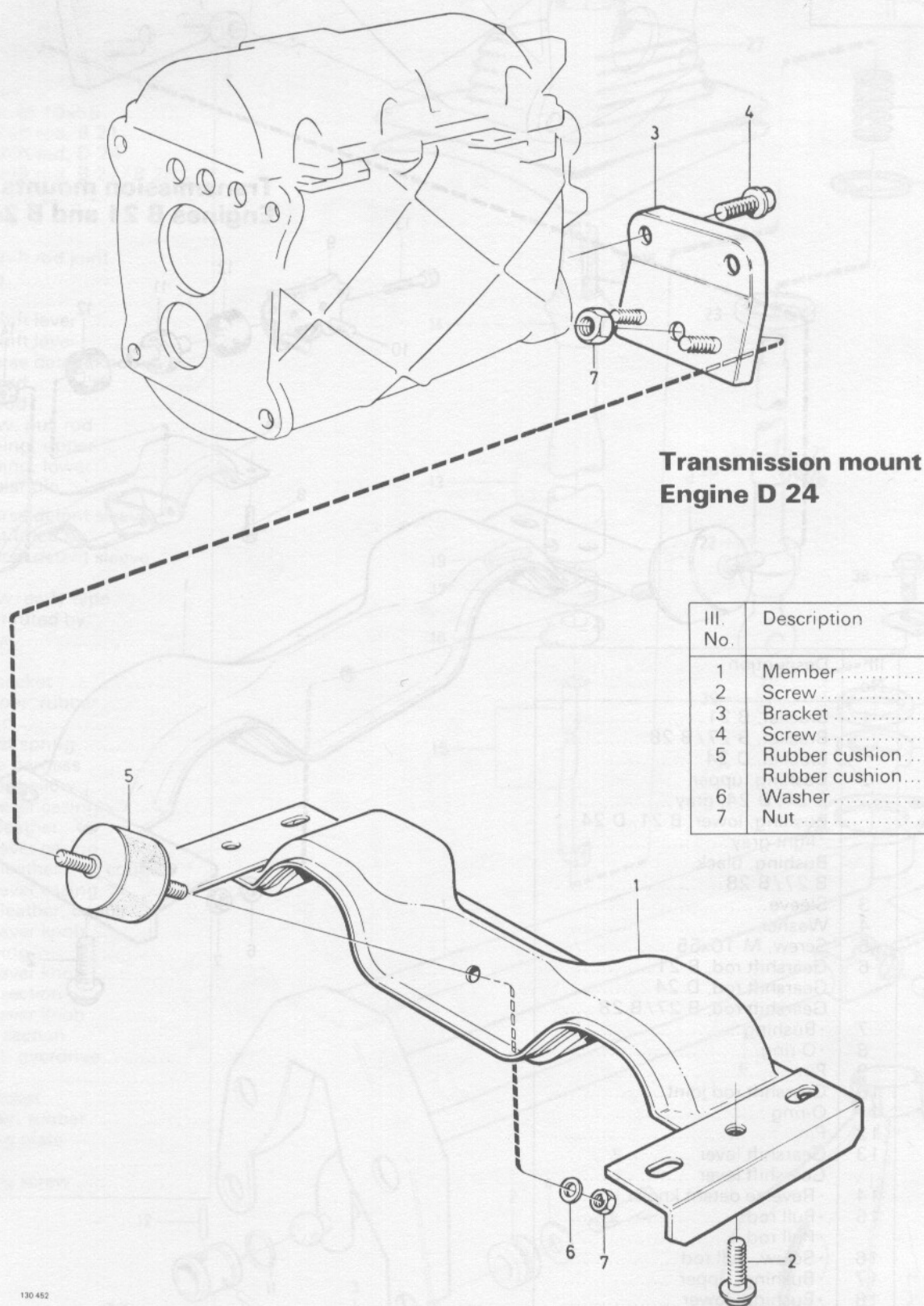


**Transmission mounts
Engines B 21 and B 27/ B 28**



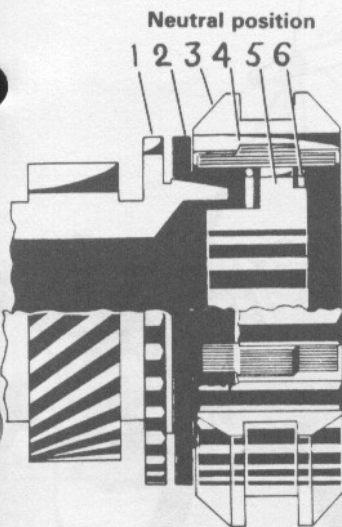
Ill. No.	Description
1	Bracket, B 21
	Bracket, B 27/ B 28
	Bracket, D 24
2	Bushing, upper, B 21, D 24, gray
	Bushing, lower, B 21, D 24, light gray
	Bushing, black, B 27/ B 28
3	Sleeve
4	Washer
5	Screw, M 10x55
6	Gearshift rod, B 21
	Gearshift rod, D 24
	Gearshift rod, B 27/ B 28
7	• Bushing
8	• O-ring
9	Pin
10	Gearshift rod joint
11	O-ring
12	Pin
13	Gearshift lever
	Gearshift lever
14	• Reverse detent knob
15	• Pull rod
	• Pull rod
16	• Screw, pull rod
17	• Bushing, upper
18	• Bushing, lower
19	• Tubular pin

ill
130451

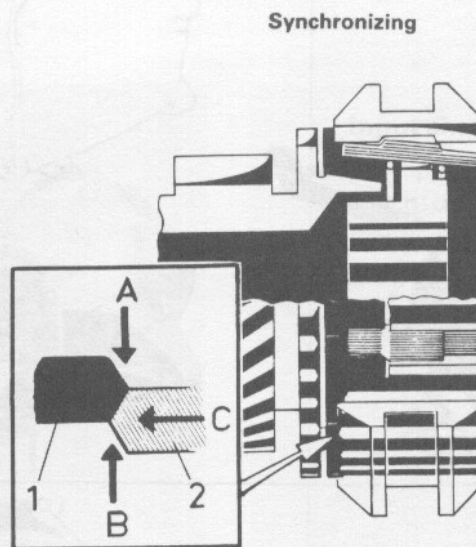


130 452

Synchronization



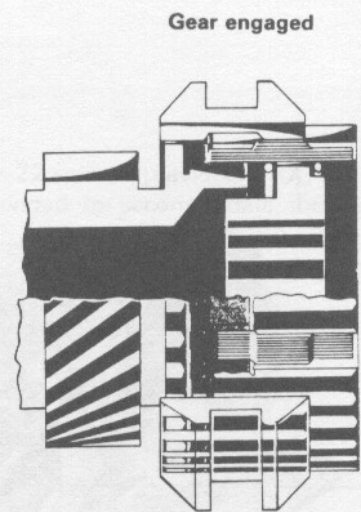
- 1 Gear teeth
- 2 Synchro ring
- 3 Synchro sleeve
- 4 Dogs (in slots)
- 5 Synchro hub
- 6 Spring



- 1 Synchro ring
- 2 Synchro sleeve

A and B are forces caused by the different speeds of the gear and the synchro ring.

C is the force from the synchro sleeve shift fork.



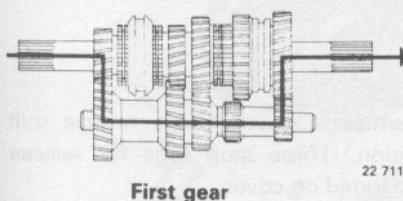
132 286

When engaging a gear, a shift fork moves the synchro sleeve (3) towards the gear teeth (1). The synchro dogs (4) move with the synchro sleeve and will thus press the synchro ring against the cone on the gear. If the synchro sleeve and the gear have different speeds, the synchro ring will turn in relation to the synchro sleeve. The synchro dogs, however, prevent the synchro ring from turning more than half a tooth width.

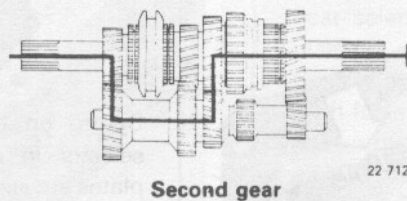
The synchro ring will then be half a tooth out of alignment with the synchro sleeve. This will prevent the synchro sleeve from sliding over the synchro ring and engaging with the gear teeth.

Because the synchro dogs press the synchro ring on the gear cone, friction results between the two surfaces. This friction will slow the speed of the gear to be the same as the synchro sleeve. With both turning at the same speed, the synchro sleeve can then turn the synchro ring half a tooth backwards. The synchro sleeve can then slide over the synchro ring and engage the gear teeth.

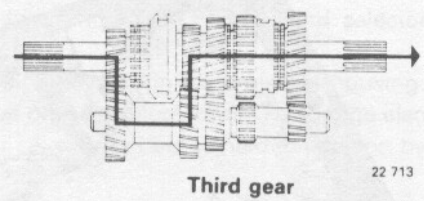
Power flow through the transmission



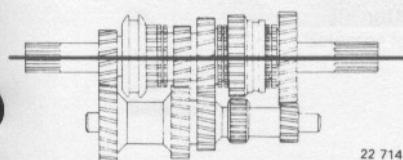
First gear



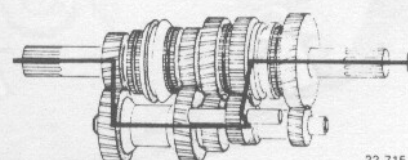
Second gear



Third gear

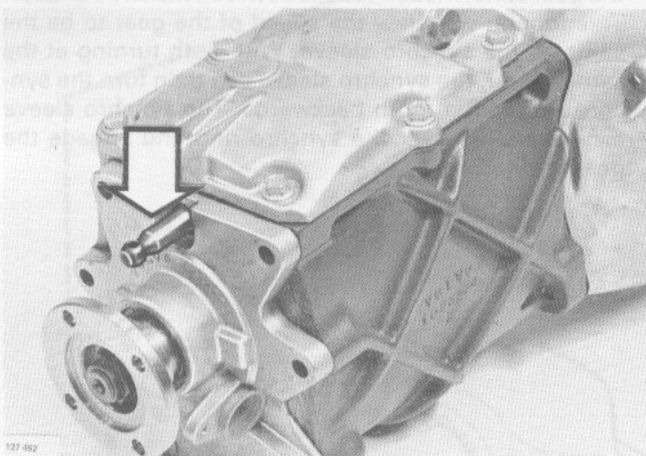
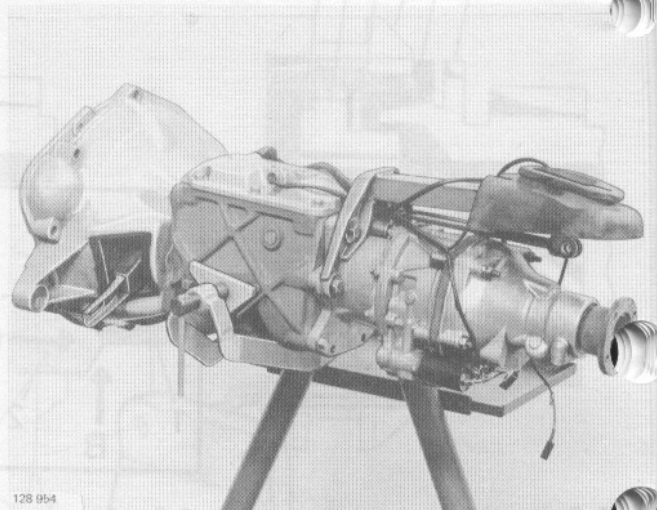
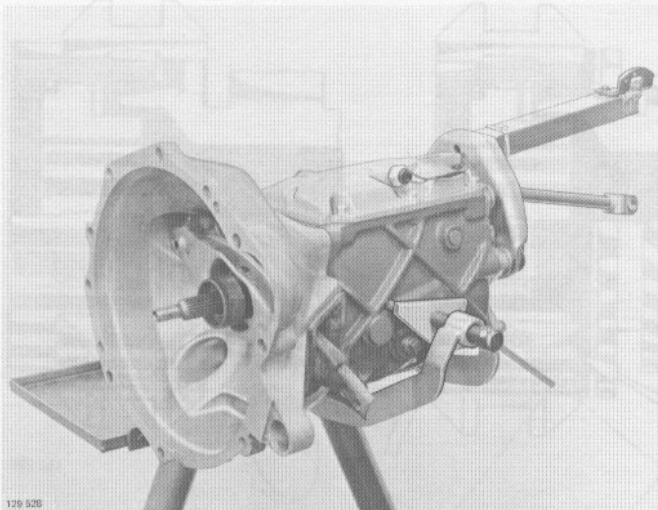


Fourth gear

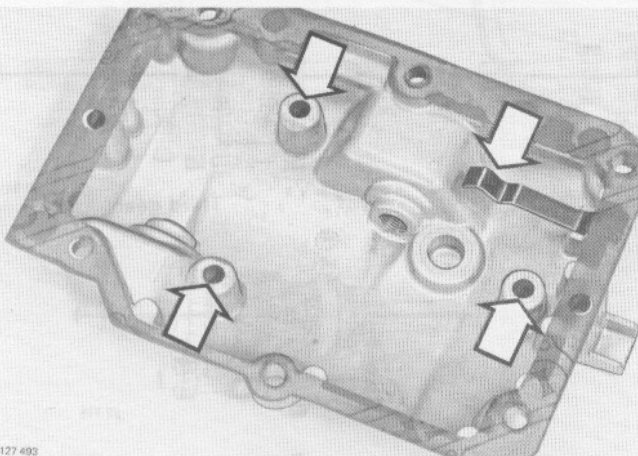


Reverse gear

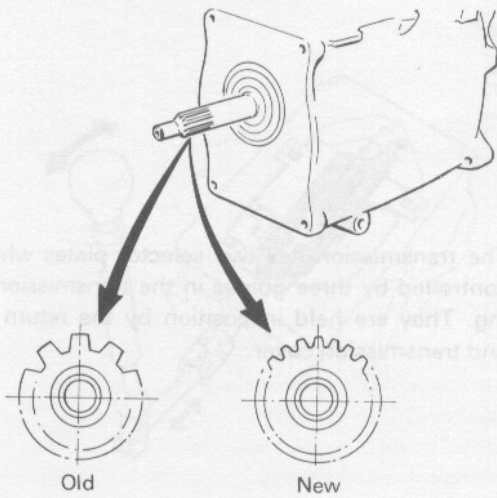
New features of M 45/M 46 transmission 1979—



Transmission housing contains one shift selector rail (previously 3).



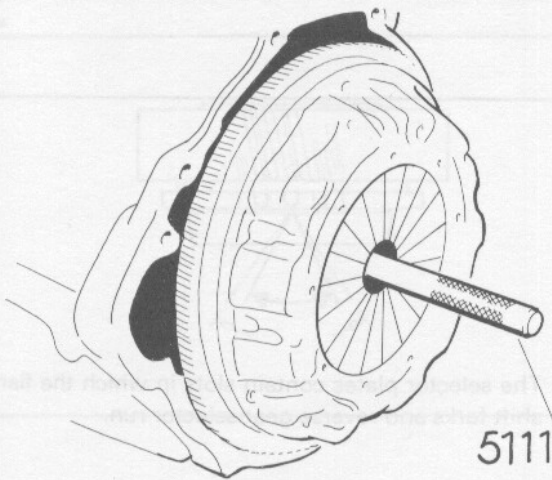
Spring on transmission cover keeps reverse shift selector in position, Three stop lugs for selector plates are also included on cover. Recess for one shift selector rail has been removed, making cover flatter.



127 048

Input shaft

The input shaft has 22 splines (previously 10). Clutch disc is changed to accommodate the new shaft.

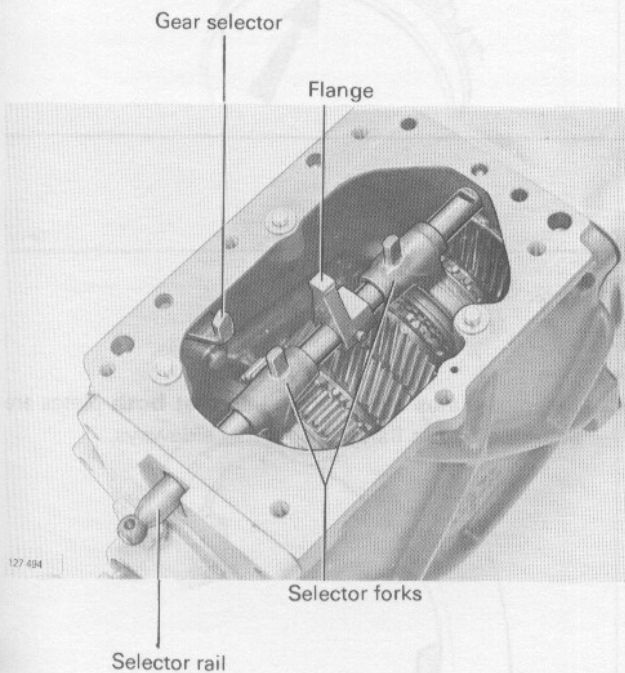


127 045

4-cyl and 6-cyl models with manual transmission

Centering drift for new clutch plate

Centering drift 999 5111 is required for centering the clutch plate on the new M 45/M 46 transmission.

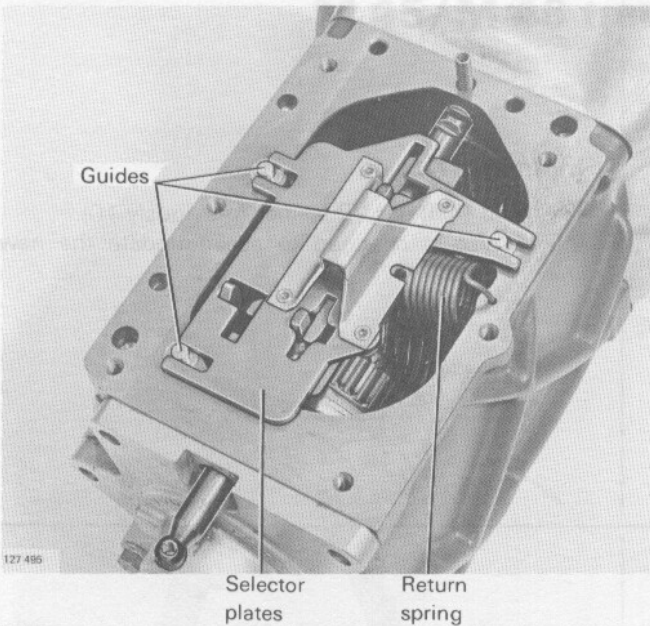


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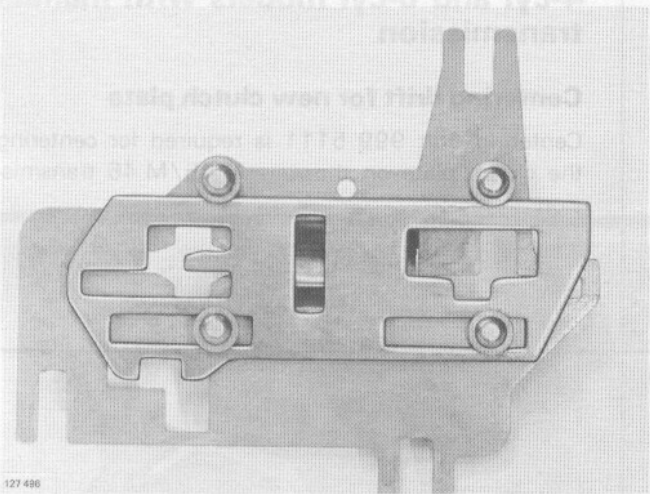
Gear-change controls

The gear-change controls consist of gear selector rail, gear selector, two (shift) forks, flange and selector plates.

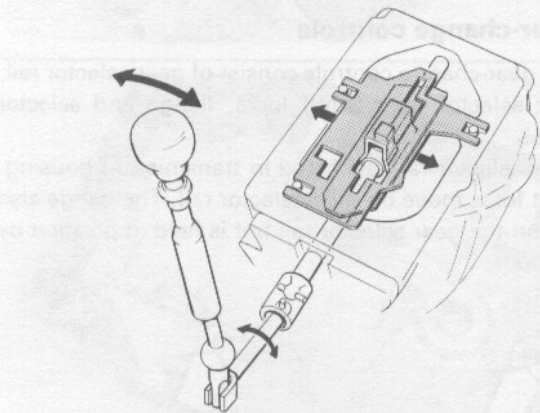
Gear selector rail is located in transmission housing. Shift forks move on gear selector rail. The flange also sits on the gear selector rail but is held in position by a pin.



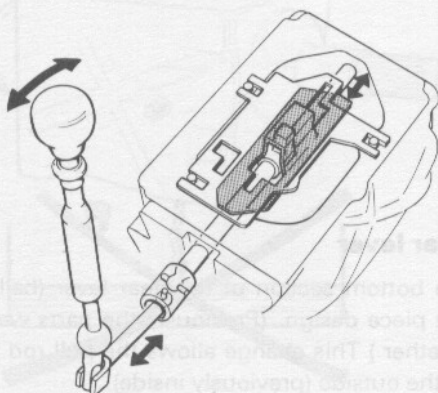
The transmission has two selector plates which are controlled by three guides in the transmission housing. They are held in position by the return spring and transmission cover.



The selector plates contain slots in which the flange, shift forks and reverse gear selector run.



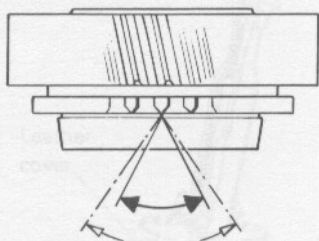
Selector plates are designed so that **both** plates are actuated by the flange and move sideways.



127 498

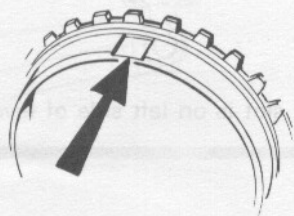
When the gear lever is moved forward or rearward the flange actuates only the **lower** (small) plate which moves rearward and forward.

Gear-changing movement is transmitted (as described above) to the shift fork or gear selector (reverse) which engage the desired gear.



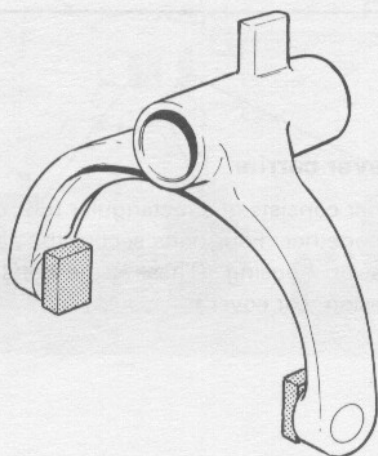
Synchronizing parts

Sharp points are machined into the teeth on third and fourth gears.



127 499

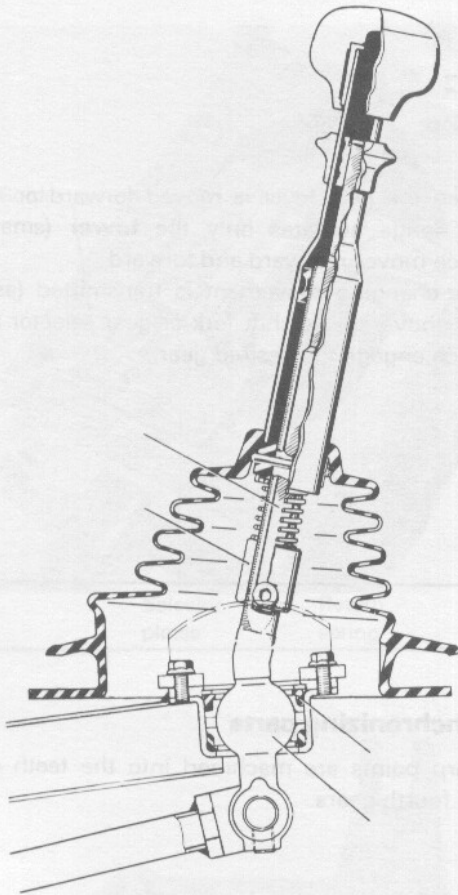
The recesses in the synchronizing rings are narrow to facilitate changing gears.



127 500

Shift forks

The shift forks are made of steel and have loose brass lugs.



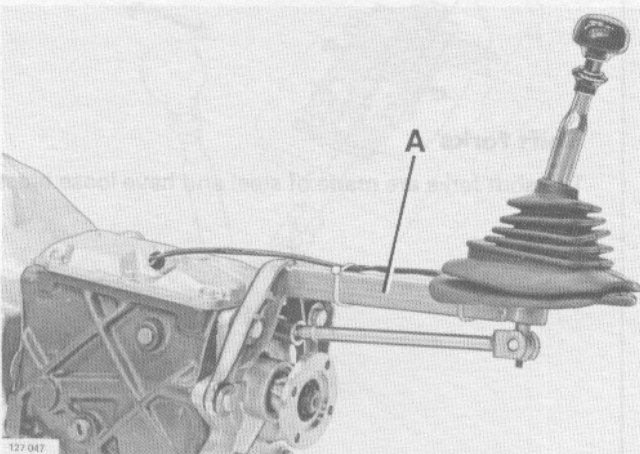
Gear lever

The bottom section of the gear lever (ball end) is a one piece design. (Previously the parts were welded together.) This change allows the pull rod to operate on the outside (previously inside).

- longer interlock sleeve prevents jamming
- wider diameter ball
- ball locating spring is replaced by two rubber dampers.

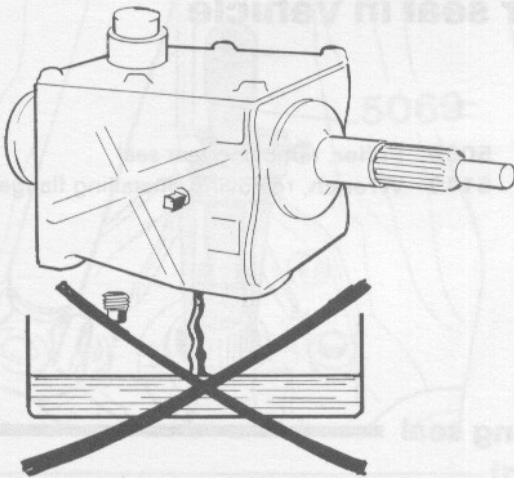


- Reverse slot is on left side of lever instead of the rear.



Gear lever carrier

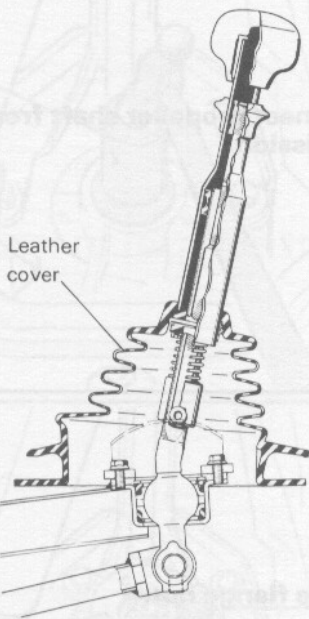
The carrier consists of a rectangular tube and bracket welded together. Four bolts secure the carrier to the transmission housing. (These same bolts secure the transmission rear cover.)



127 049

Oil change

Another interesting new feature is the exclusion of oil change every 30,000 mi. The oil is changed only in connection with the warranty service. The oil level is subsequently checked at the ordinary servicing.

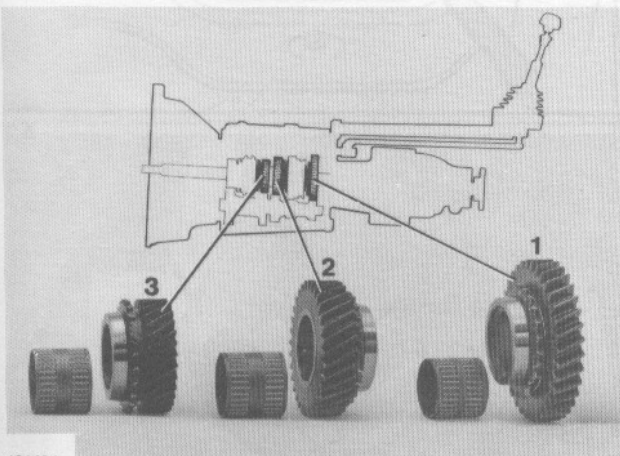


127 503

6-cyl gas models

Gear lever cover

New gear lever cover in black leather on all 6-cylinder models with manual transmission.



131434

Manual transmission.

Manual transmissions have been equipped with needle bearings for first, second and third gear. This does not affect the repair methods for manual transmission.

M 45: replacing rear seal in vehicle

Special tools:

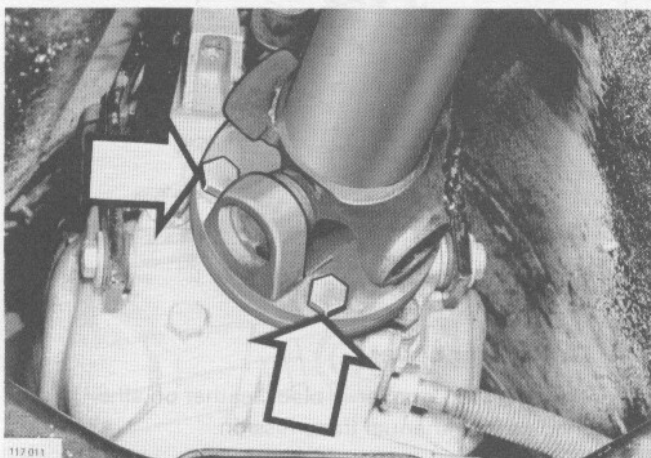
2261 Puller, drive flange

5064 Drift, installing rear cover seal

5069 Puller, removing rear seal

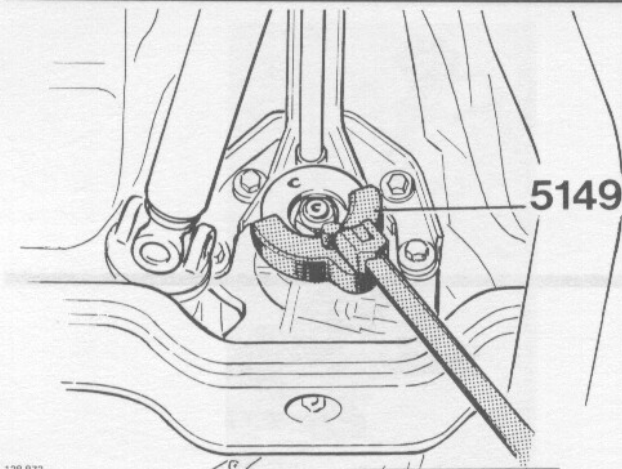
5149 Wrench, removing/installing flange nut

Removing seal



A1

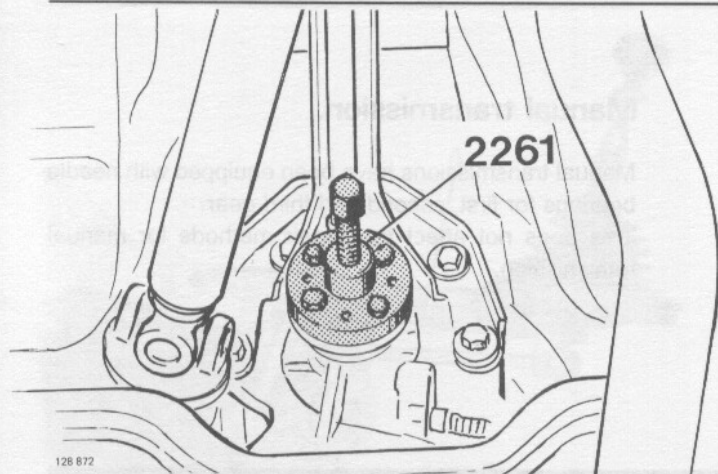
Disconnect propeller shaft from transmission.



A2

Remove flange nut.

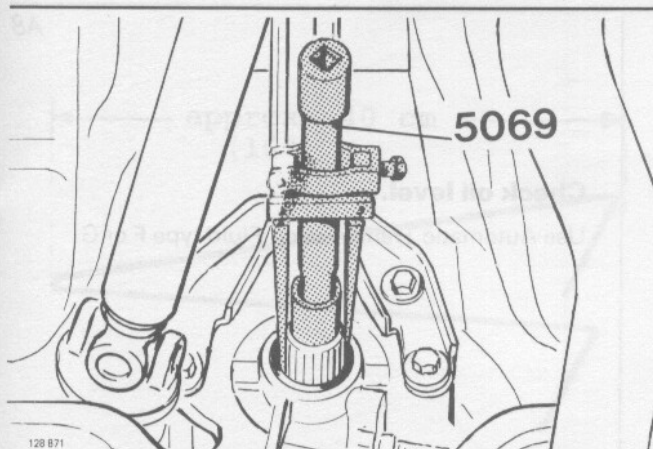
Use wrench **5149** and socket **27 mm = 1-1/16"**.



A3

Remove flange.

Use puller **2261**.

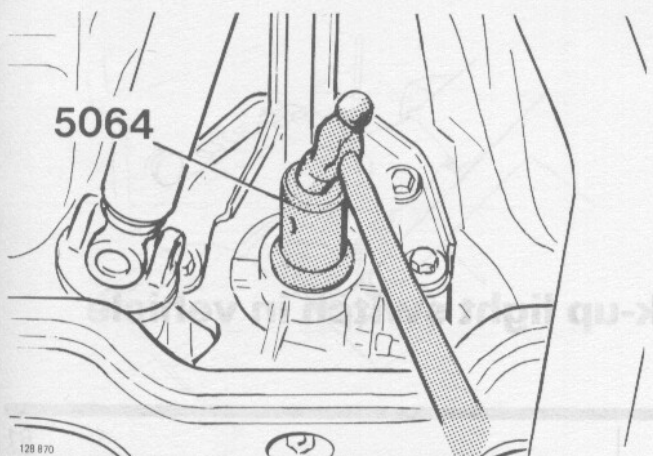


A4

Remove seal.

Use puller **5069**.

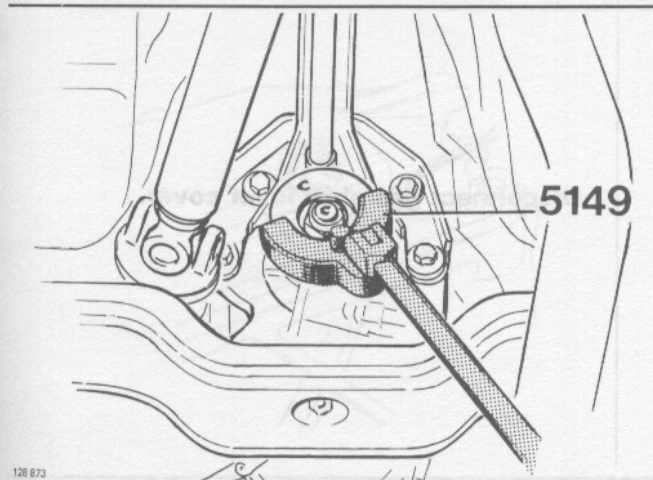
Installing seal



A5

Install new seal.

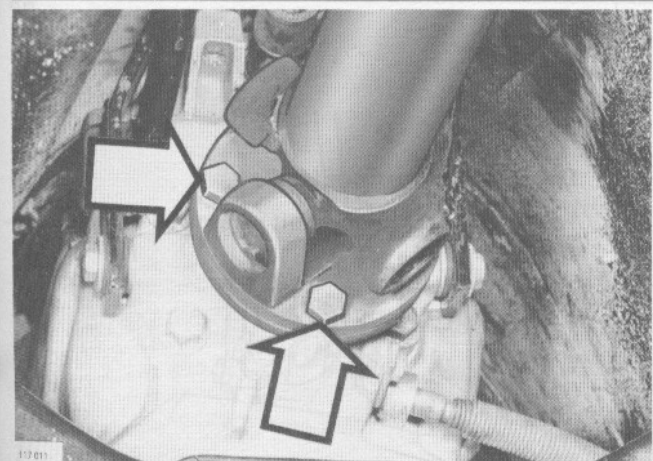
Use drift **5064**.



A6

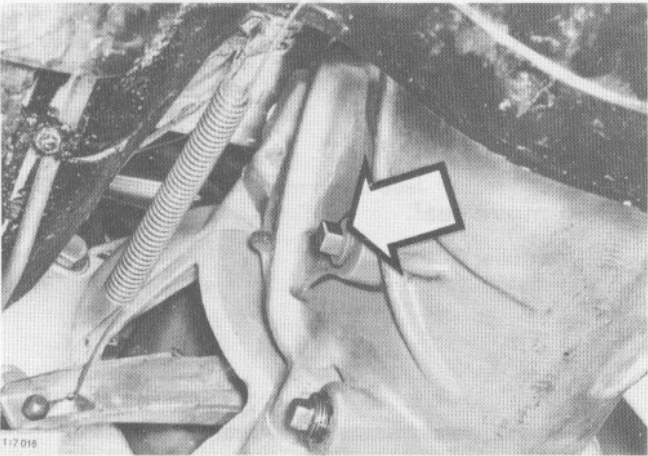
Install flange.

Use wrench **5149** and socket **27 mm = 1-1/16"**.
Torque to **90-110 Nm = 65-80 ft.lbs.**



A7

Attach propeller shaft to flange.

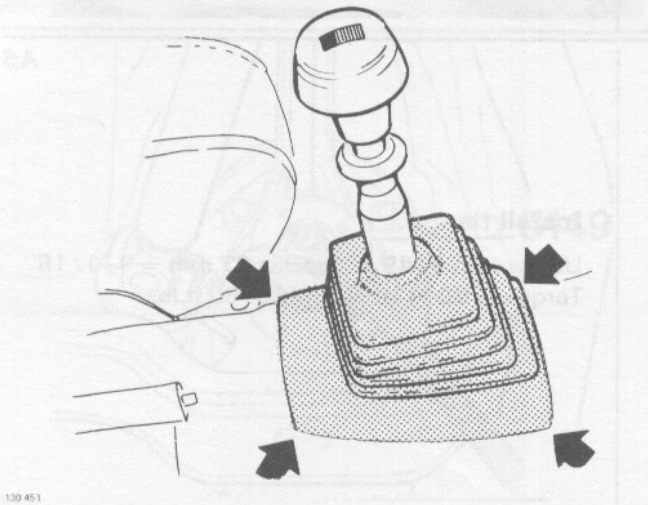


A8

Check oil level.

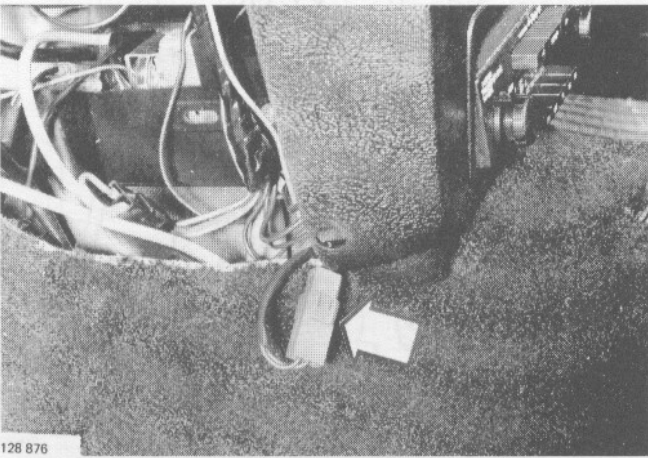
Use Automatic Transmission Fluid type F or G.

M 45/M 46: replacing back-up light switch in vehicle



B1

Disconnect gearshift lever cover.

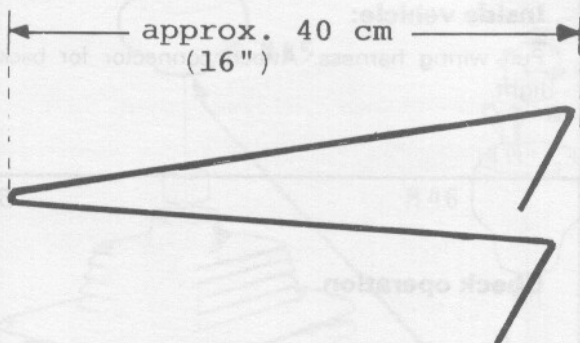


B2

Disconnect connector.

To gain access, remove left side panel of center console.

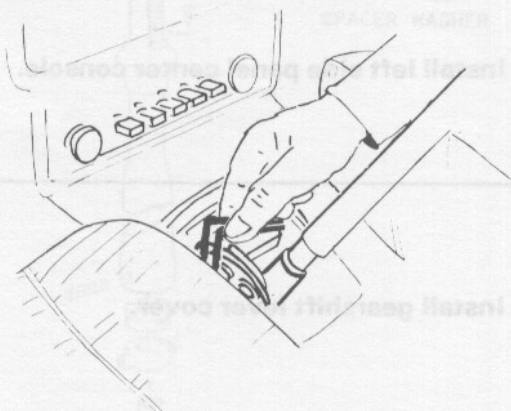
B3



Bend a steel wire to shape as shown.

(early)

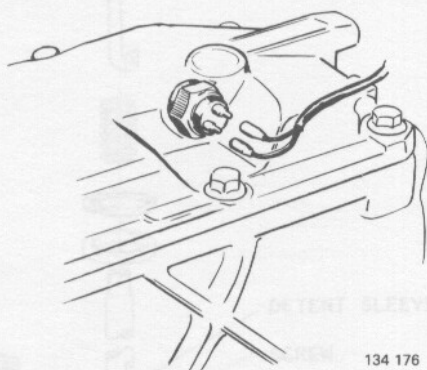
B4



Position steel wire.

Insert the bent steel wire between floor insulation and transmission tunnel on right side.

B5



Gain access to back-up light switch.

Raise vehicle on hoist.

(early).

B6

Replace back-up light switch.

(as applicable)

Use wrench 22 mm = 7/8" to replace back-up light switch.

B7

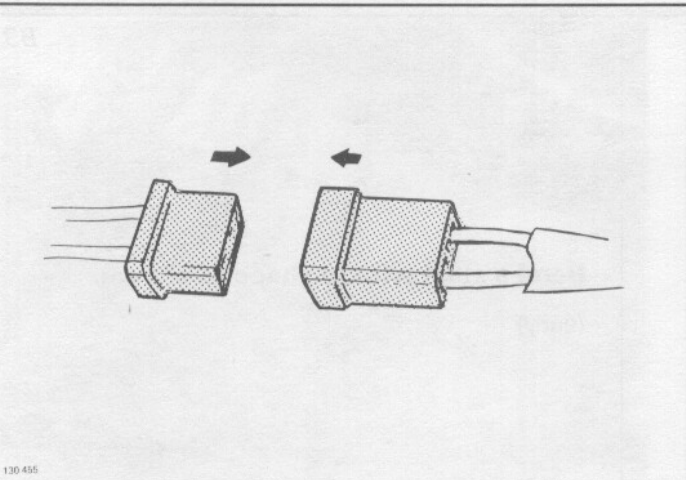
Re-clamp wire to gearshift carrier rod.

B8

Place harness on steel wire as shown.

B9

Install cross member bolts. Lower vehicle.



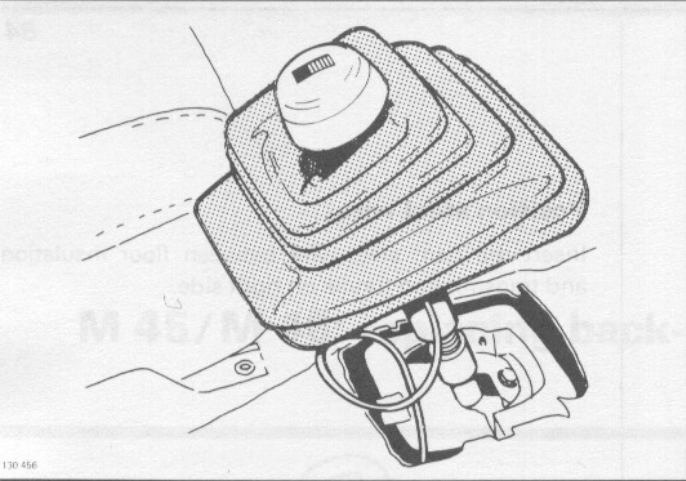
B10

Inside vehicle:

Pull wiring harness. Attach connector for back-up light.

B11

Check operation.



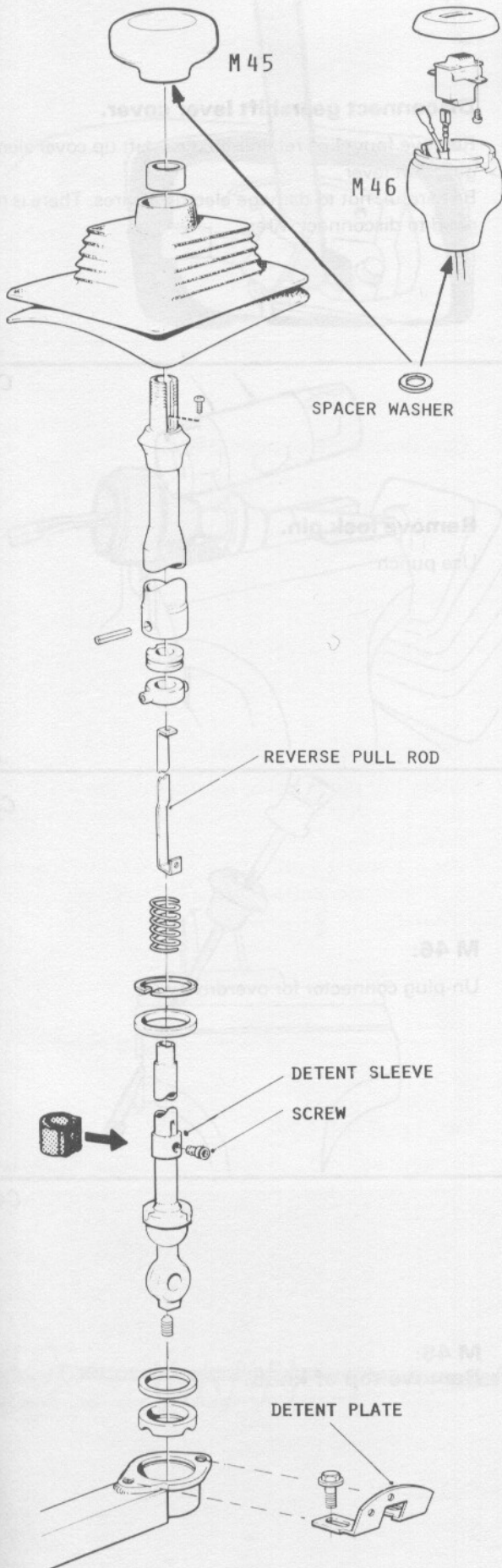
B12

Install left side panel center console.

B13

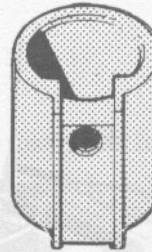
Install gearshift lever cover.

M 45/M 46: repairs to gearshift lever in vehicle



These repairs refer particularly to replacing reverse detent sleeve and/or reverse pull rod.

From mid-79 there is a new type reverse detent sleeve on the gearshift lever. It has a guide which prevents it from rotating on the gearshift lever and exerting forces on the reverse pull rod. It also has a slot which guides reverse pull rod, preventing it from rubbing the detent plate.



1232687 - 2

new

130 467

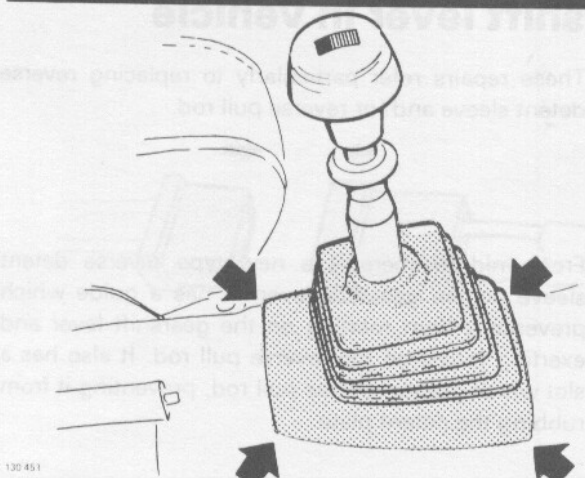
In case the reverse pull rod breaks, the old type reverse detent sleeve should also be replaced. It is 2 mm = 0.08" longer than the old one. Therefore, the gearshift lever knob should be raised accordingly to permit free travel of the reverse detent sleeve.

This is done by installing a 2 mm = 0.08" thick spacer washer with diameter 13 mm = approx. 1/2" inside the gearshift lever knob.

The retaining screw for the reverse detent sleeve should also be replaced. The new type screw is case hardened.

After modification, check gearshift operation.

130 473



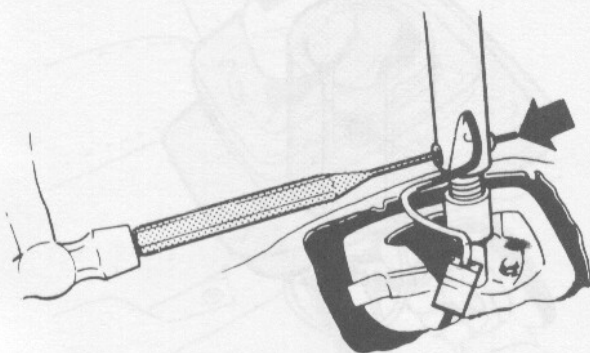
130 451

C1

Disconnect gearshift lever cover.

Remove four clips retaining cover. Lift up cover along gearshift lever.

Be careful, not to damage electrical wires. There is no need to disconnect wires.

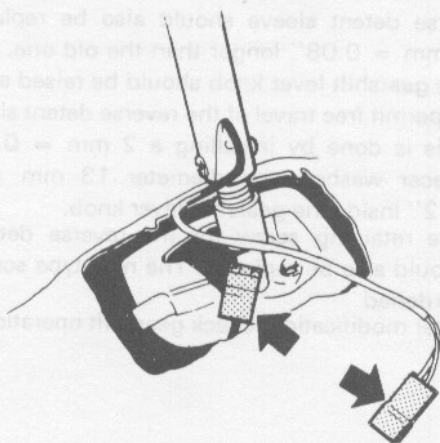


130 458

C2

Remove lock pin.

Use punch.

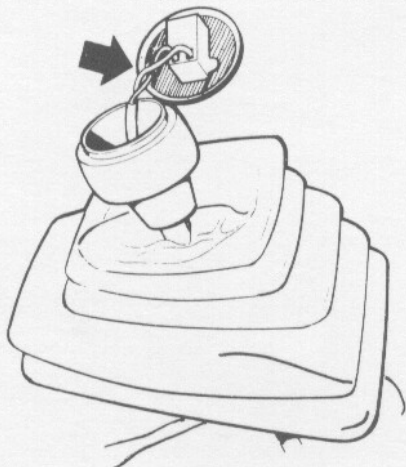


130 459

C3

M 46:

Un-plug connector for overdrive wire.

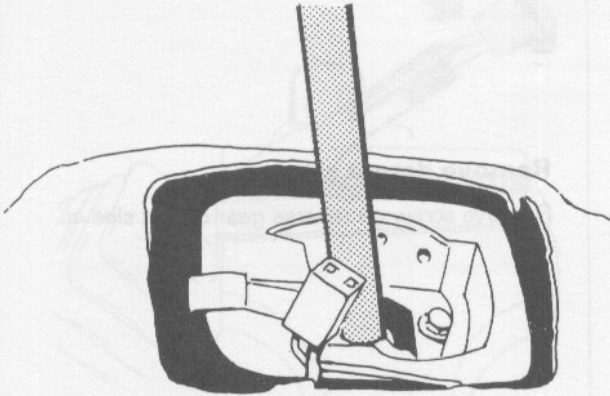


130 460

C4

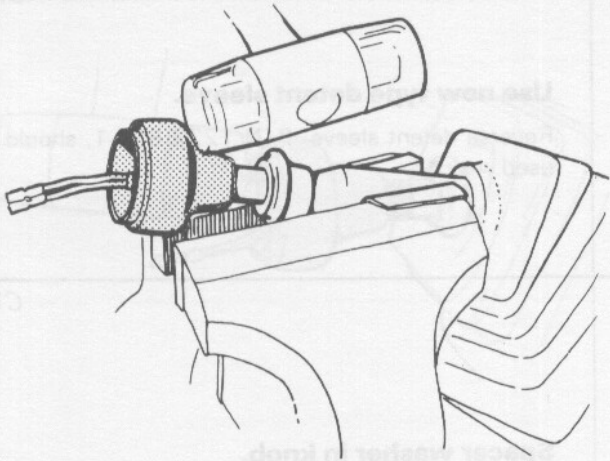
M 46: Remove top of knob.

C5



Lift up gearshift lever.

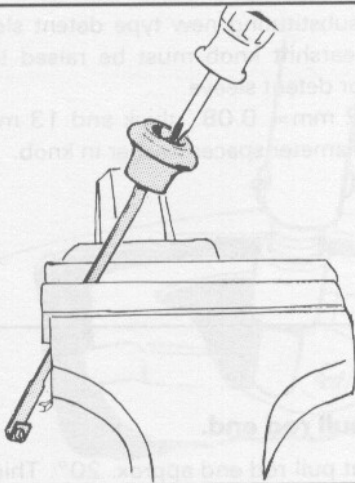
C6



Remove gearshift lever knob.

Position gearshift lever in a vise with soft jaws. Use plastic mallet to carefully knock off knob.

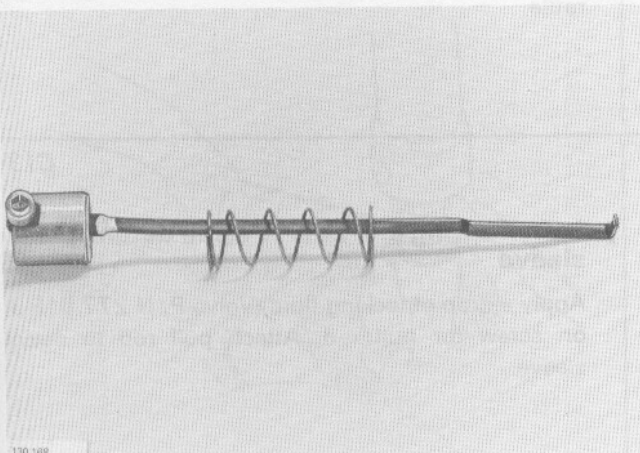
C7



Remove detent knob.

Remove screw. Lift off detent knob.

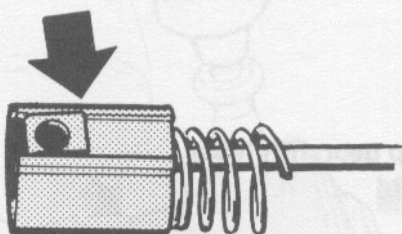
C8



Remove pull rod.

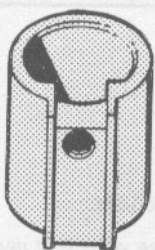
Remove pull rod, spring and detent sleeve assembly.

C9

**Remove detent sleeve.**

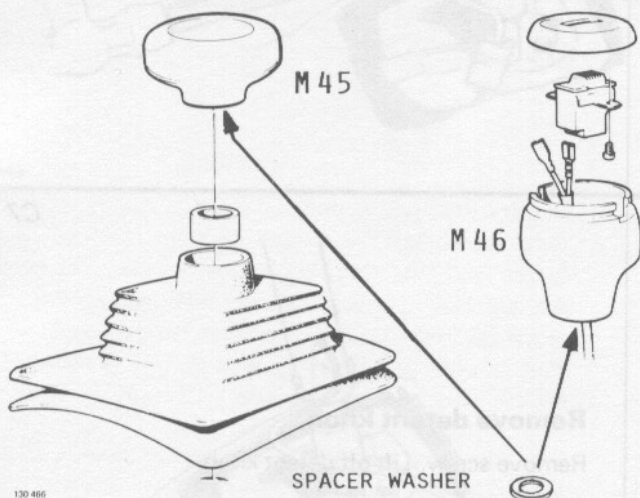
Remove screw on reverse gear detent sleeve.

C10

**Use new type detent sleeve.**

Reverse detent sleeve, P/N 1232 687-1, should be used.

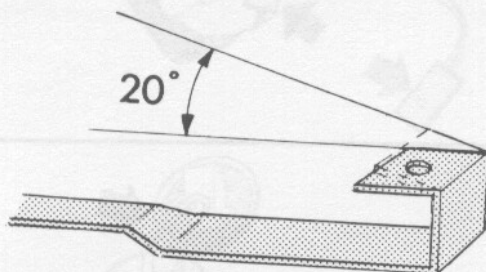
C11

**Spacer washer in knob.**

When substituting new type detent sleeve for older type, gearshift knob must be raised to permit free travel for detent sleeve.

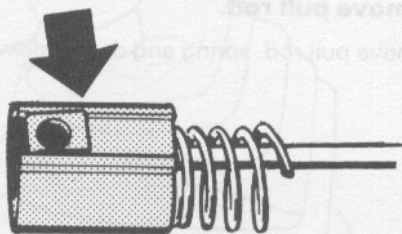
Install 2 mm = 0.08" thick and 13 mm = approx. 1/2" diameter spacer washer in knob.

C12

**Bend pull rod end.**

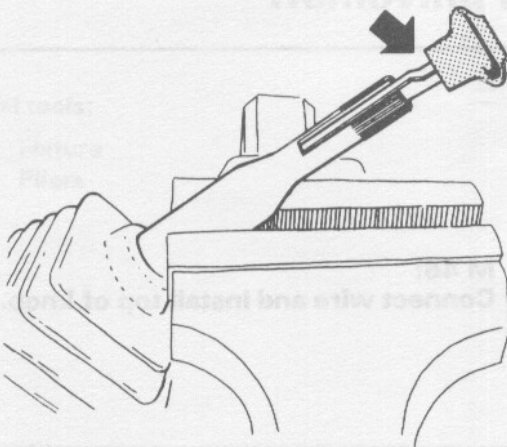
Bend out pull rod end approx. 20°. This will prevent rattle.

C13

**Install spring and new reverse detent sleeve**

Apply a drop of locking fluid (Volvo P/N 277 916-3) on screw for pull rod. Attach pull rod to detent sleeve.

C14

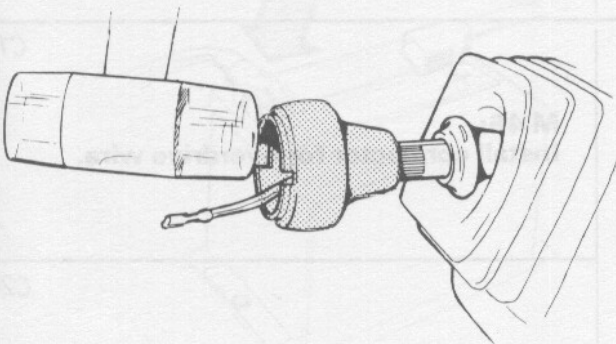


130 468

Install detent knob.

Grease new pull rod. Use screw to install detent knob on new pull rod. Install detent knob and pull rod assembly on gearshift lever.

C15

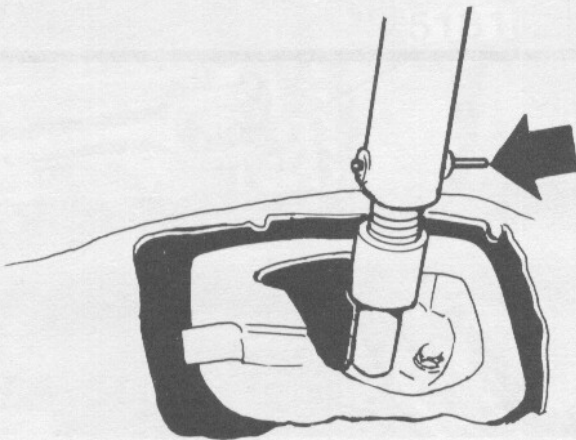


130 469

Install gearshift lever knob.

Position gearshift lever in vise with soft jaws. Use plastic mallet to carefully knock knob into position.

C16

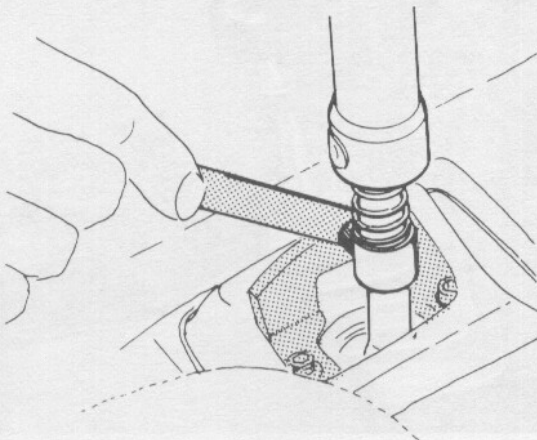


130 470

Assemble gearshift lever.

Install upper part of gearshift lever on lower part in vehicle.
Install lock pin.

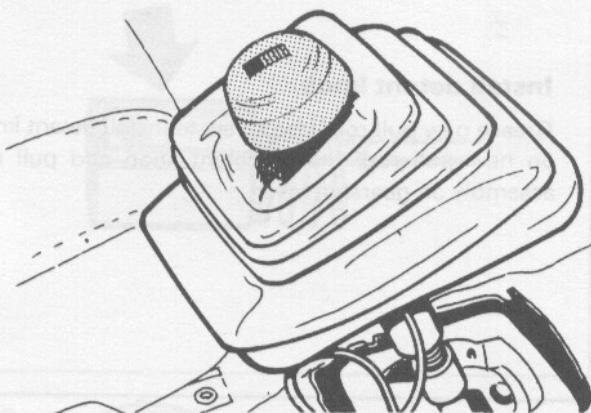
C17



130 471

Check reverse detent for correct operation.

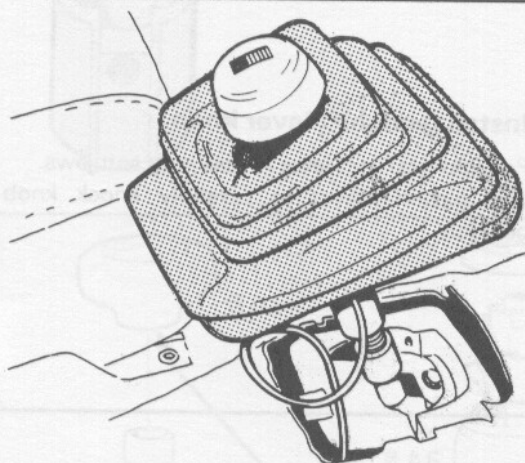
Engage first gear. Distance between detent plate and detent screw should be 0.5–1.5 mm = 0.02–0.06". Adjust by moving detent plate. Also engage second gear and recheck distance.



130 472

C18

M 46:
Connect wire and install top of knob.



130 458

C19

M 46:
Install connector for overdrive wire.

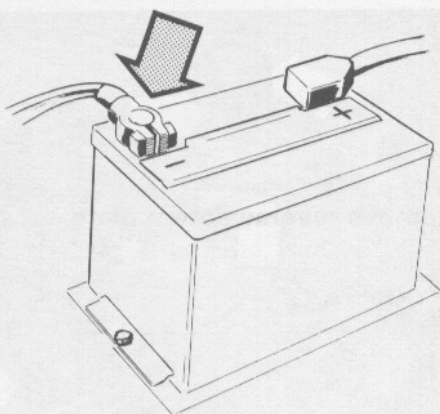
C20

Install gearshift lever cover.

Removing transmission M 45

Special tools:

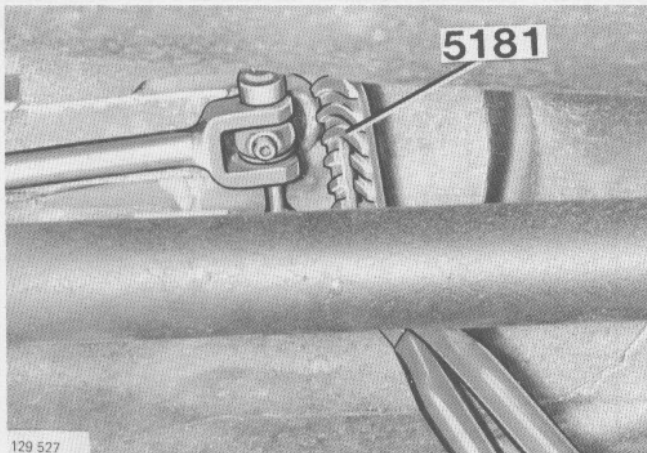
- 5151 Fixture
5181 Pliers



130015

D1

Disconnect battery ground cable.



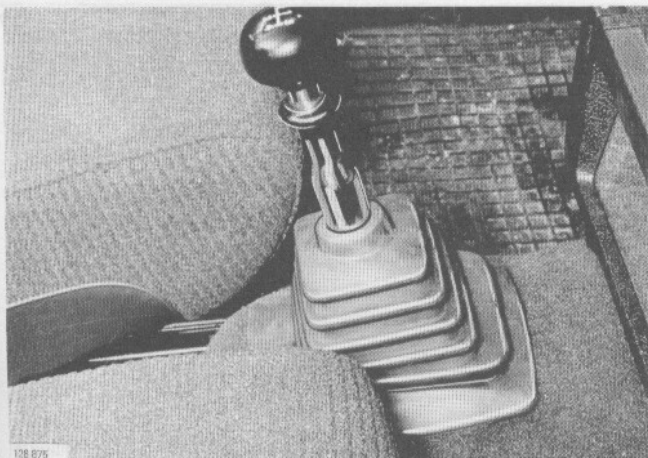
129 527

From under vehicle:

D2

Disconnect gearshift lever from gearshift rod.

Remove lock bolt. Use pliers **5181** to remove pivot pin.

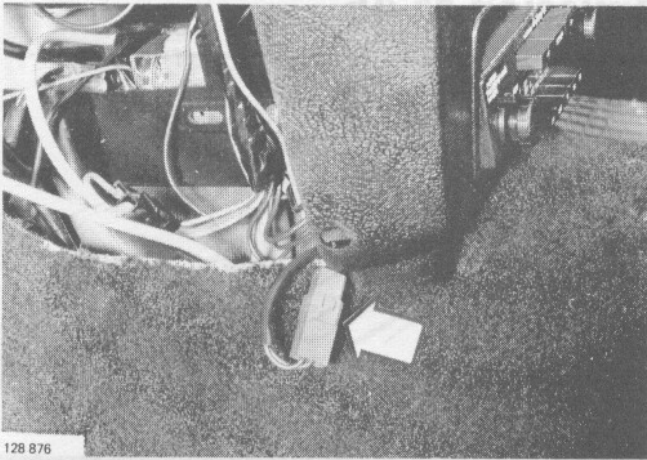


128 675

Inside vehicle:

D3

Disconnect gearshift lever cover from floor.

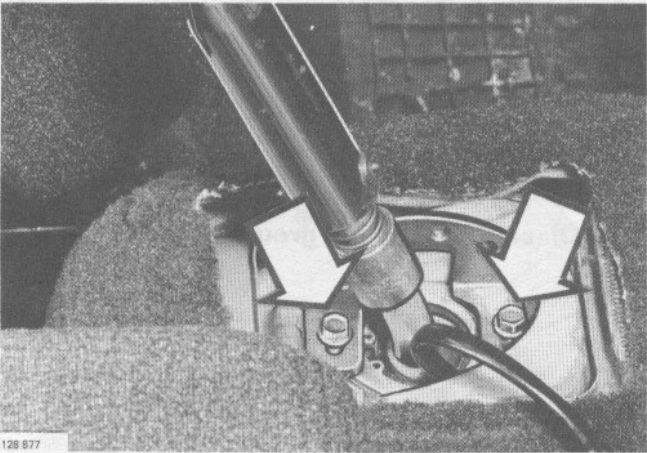


128 876

D4

Inside vehicle:

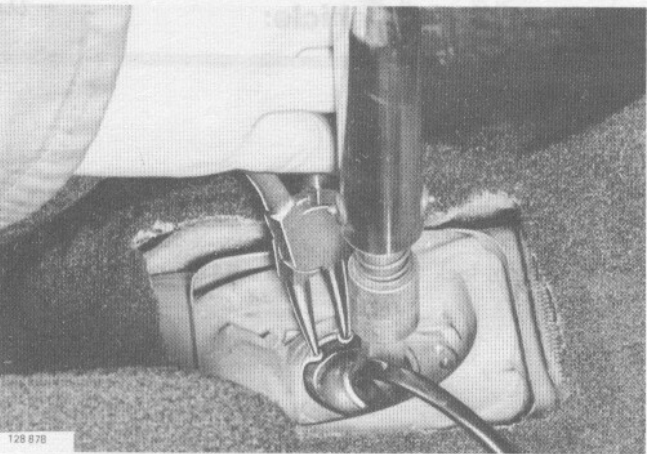
- Remove left side panel of center console.
- Disconnect connector for back-up light.



128 877

D5

Remove reverse detent plate.

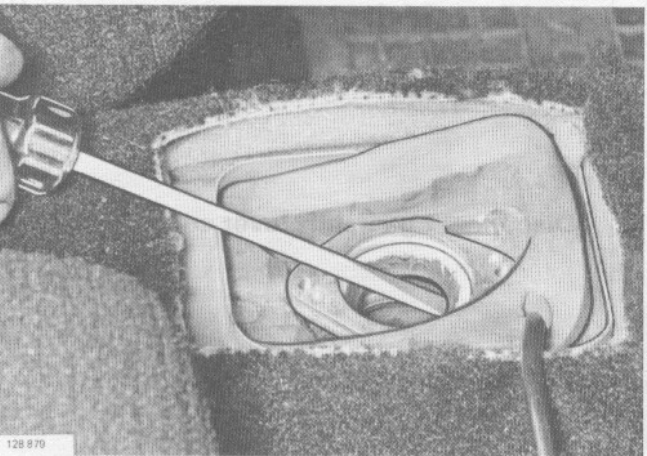


128 878

D6

Remove gearshift lever.

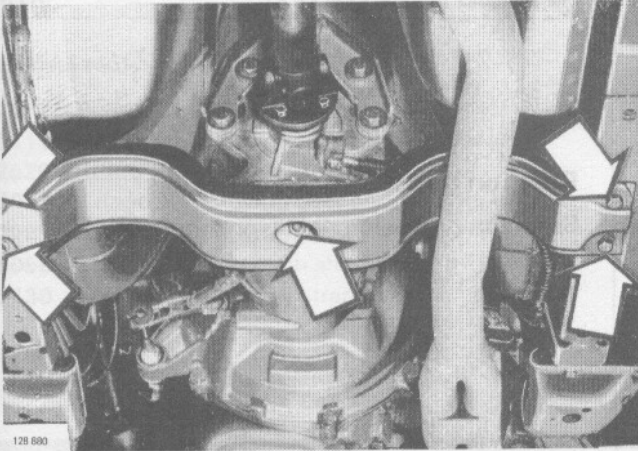
Remove lock ring to remove gearshift lever.



128 879

D7

Remove plastic bushing and rubber ring.


From under vehicle:

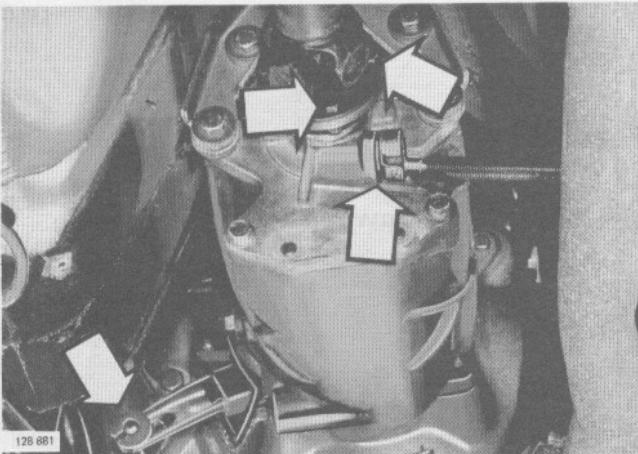
D8

Unhook clutch fork return spring.

D9

Remove cross-member assembly

Cross-member including rubber cushion and bracket.



D10

Disconnect:

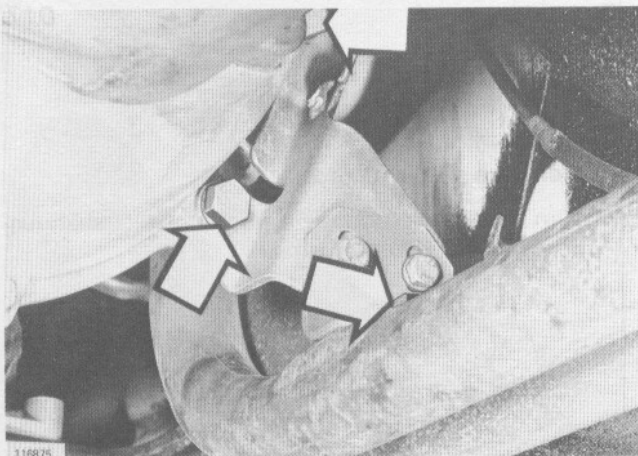
- Speedometer cable from drive gear.
- Propeller shaft from drive flange.
- Clutch cable from fork and bell housing.

D11

Remove front exhaust pipe attachment.

Remove bolts at bell housing.
Remove nut at exhaust pipes.

D12

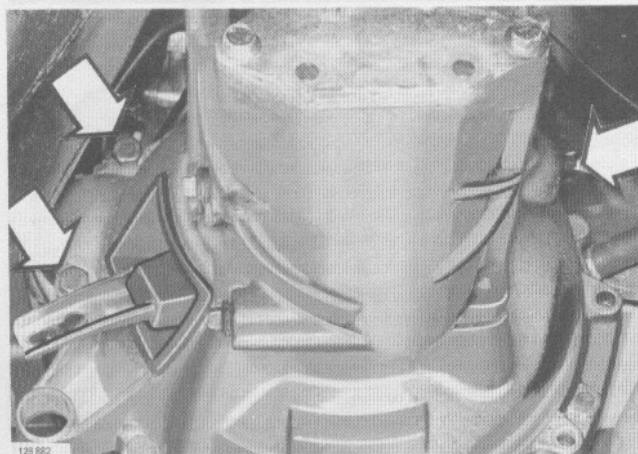
Unhook rubber supports for front muffler.


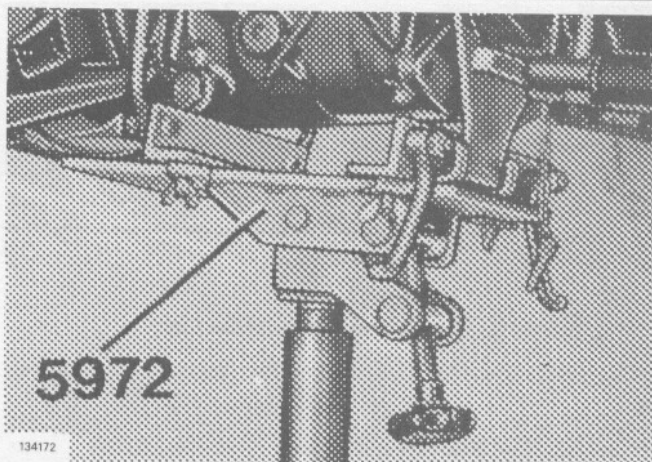
D13

Begin separating bell housing from engine.

Remove all bolts except two at bottom.

D14

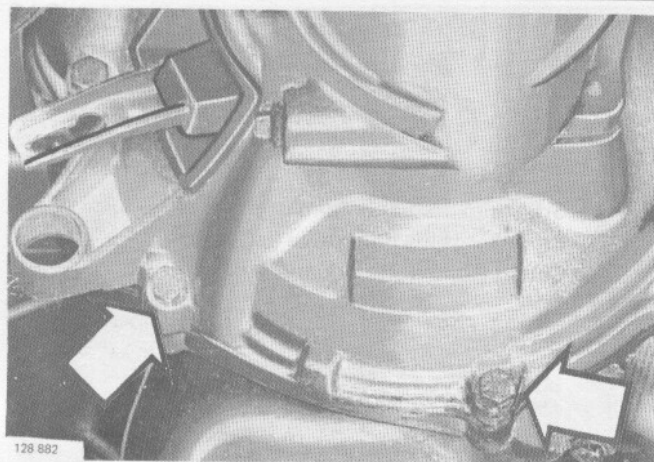
Pull out starter motor until free from bell housing.




D15

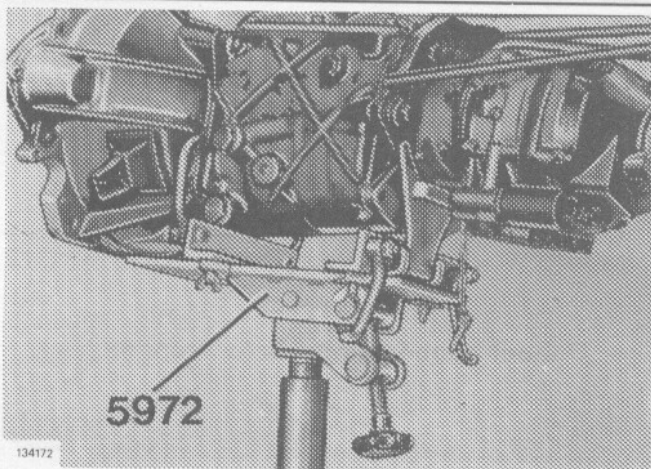
Position transmission fixture.

Secure transmission rigidly on fixture.



D16

Remove two lower bolts at bell housing.



D17

Remove transmission.

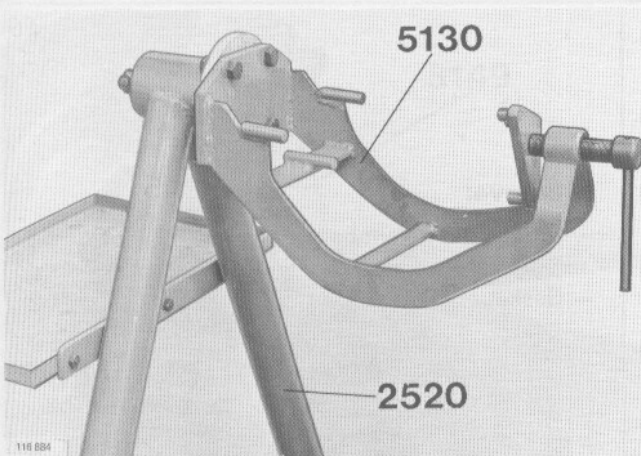
Turn transmission to free it from propeller shaft tunnel while pulling towards rear.

Disassembling transmission M 45

Special tools:

- 2261 Puller**, drive flange
- 2413 Drift**, removing/installing rear cover seal
- 2520 Stand**
- 2853 Adapter**, removing gear and synchro ring
- 2985 Adapter**, removing main shaft bearing
- 5058 Tool**, removing main shaft bearing
- 5130 Fixture**, attaching transmission to stand

- 5131 Puller**, removing intermediate shaft bearing
- 5147 Tool**, removing main shaft bearing, used with 5085
- 5149 Wrench**, removing/installing flange nut
- 5177 Puller**, intermediate shaft bearing



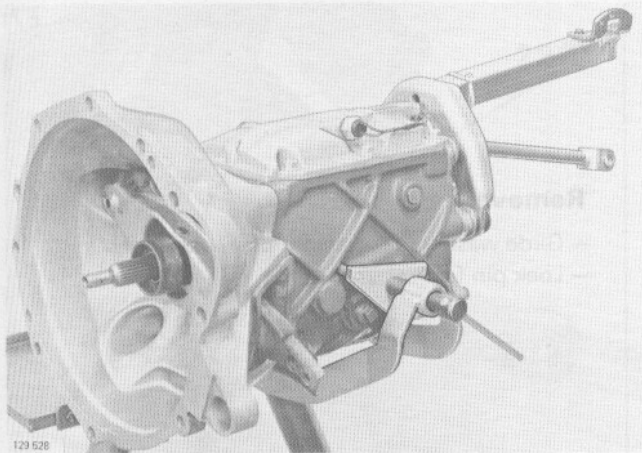
E1

Attach fixture 5130.

Use four bolts to attach to stand **2520**.

NOTE:

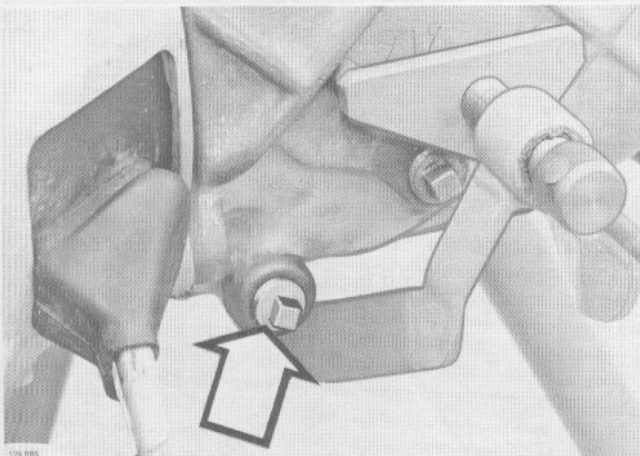
Modified type fixture 5130 must be used. See "Modification of fixture 5130" at end of Special Tool section.



E2

Install transmission fixture.

Ensure all mating surfaces align when tightening holding bolt.

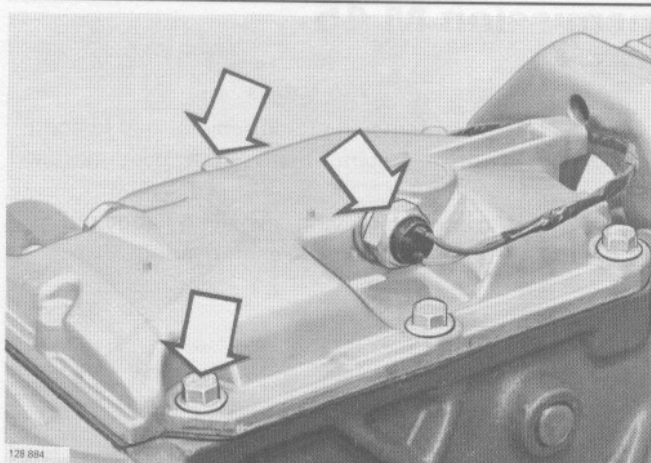


E3

Remove sound deadening material from gearshift carrier.

E4

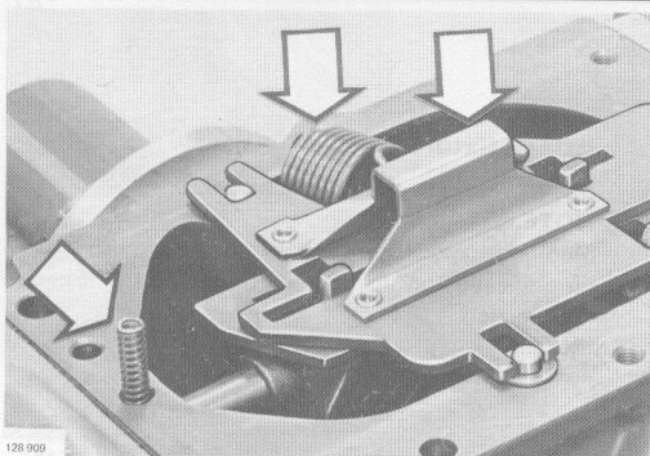
Remove drain plug and drain oil.



E5

Remove:

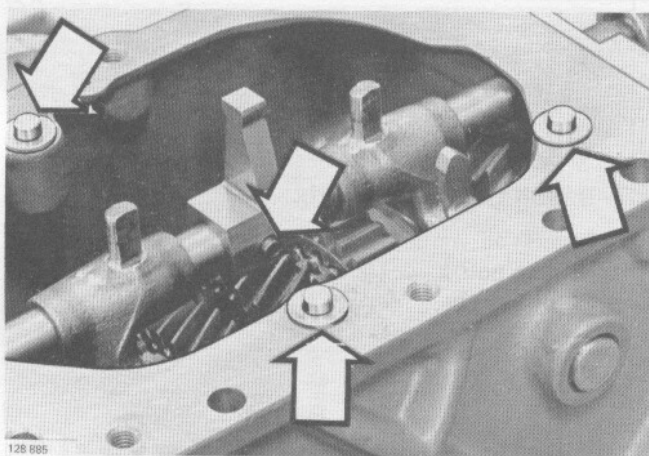
- Back-up light switch.
- Transmission top cover.



E6

Remove:

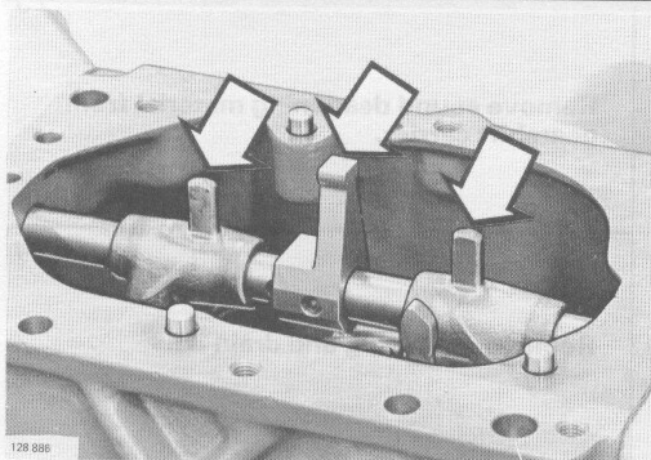
- Spring and detent ball.
- Selector plate assembly and return spring.
- Gasket.



E7

Remove:

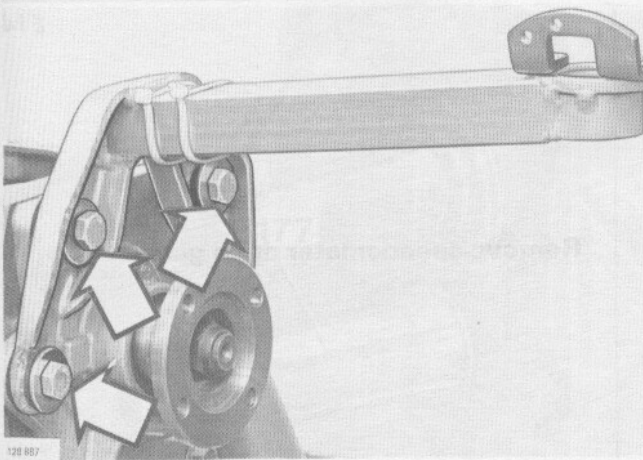
- Glide washers for selector plate assembly.
- Lock pin for shifter.



E8

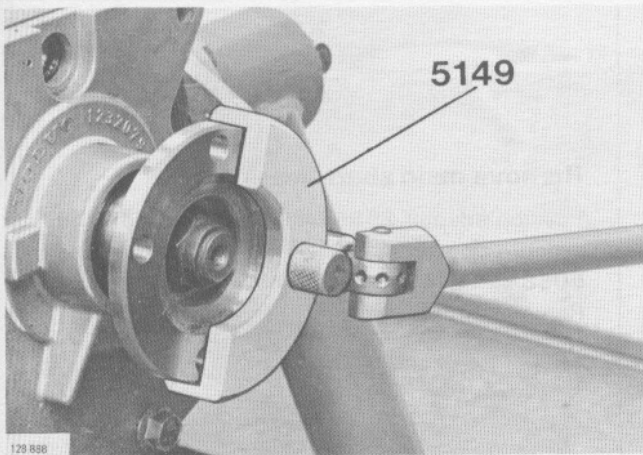
Remove:

- Selector rail.
- Shifter and shift forks.



E9

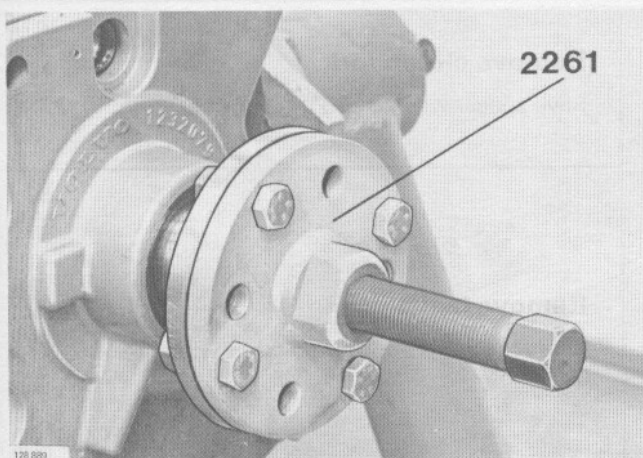
Remove gearshift carrier assembly.



E10

Remove drive flange nut.

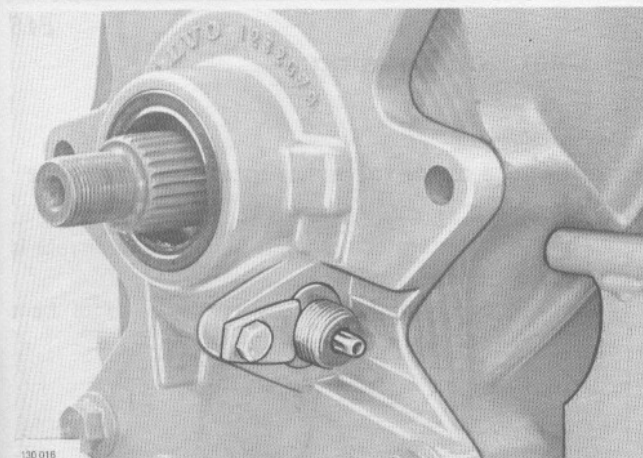
Socket **27 mm** = 1-1/16". Use wrench **5149** to hold.



E11

Pull off drive flange.

Puller **2261**.



E12

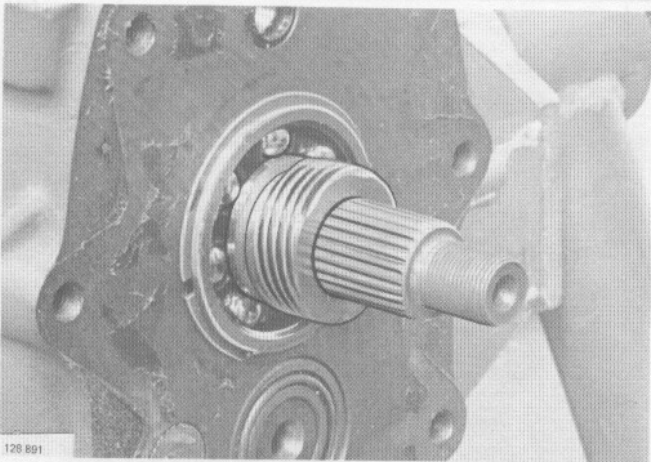
Remove speedometer driven gear.

Remove bolt and retainer to pull out gear.

E13

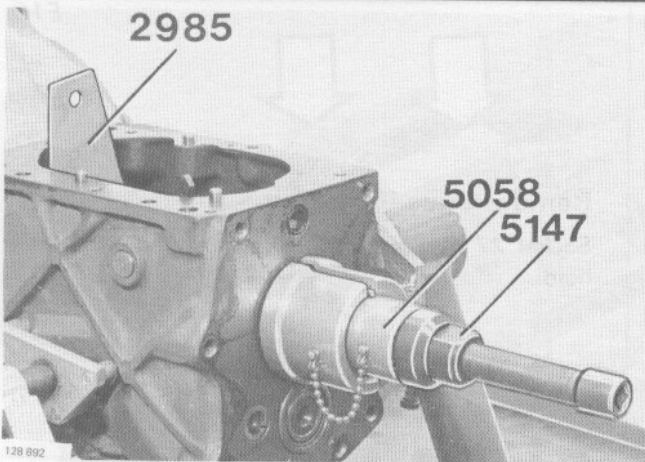
Remove rear cover.

Remove gasket and shims.



E14

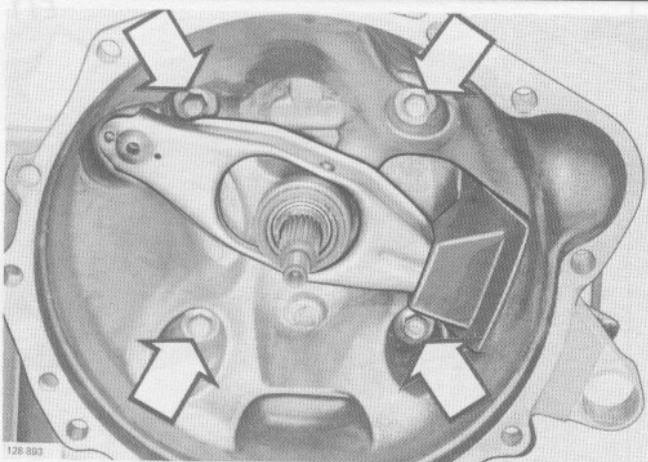
Remove speedometer drive gear.



E15

Remove main shaft bearing.

Position adapter **2985** between input shaft and front synchro ring. Remove bearing spacer ring. Use tools **5058** and **5147** to pull off bearing. Remove thrust washer.



E16

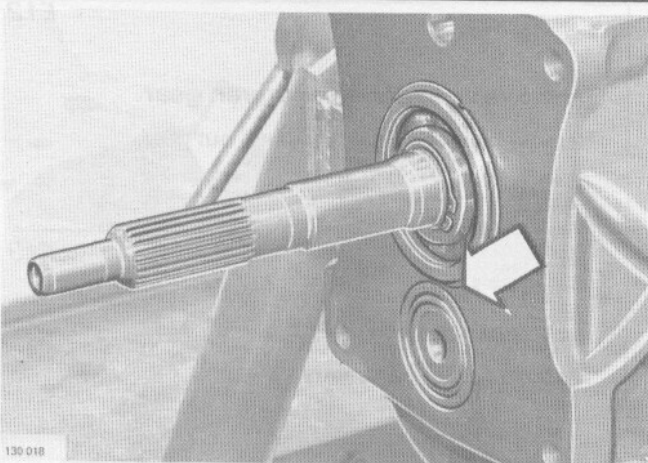
Remove clutch fork.

Save spacer washer and throw-out bearing.

E17

Remove bell housing.

Remove gasket and shims. Inhex wrench 8 mm.



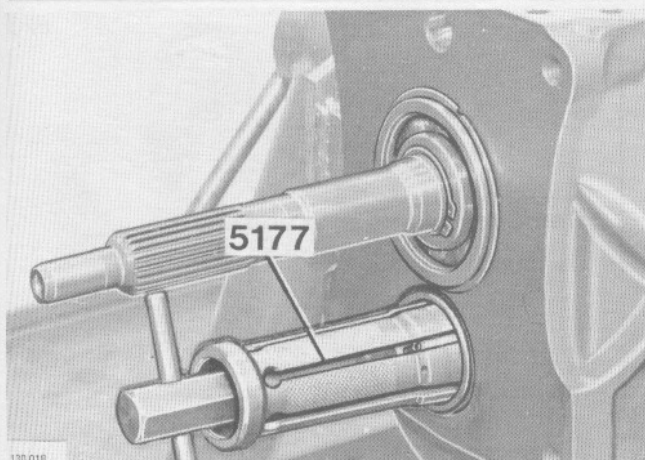
E18

Cast iron housing:

Remove outer races for intermediate shaft bearings.

First knock intermediate shaft back until rear race is free.

Then knock intermediate shaft forward until front outer race can be removed.



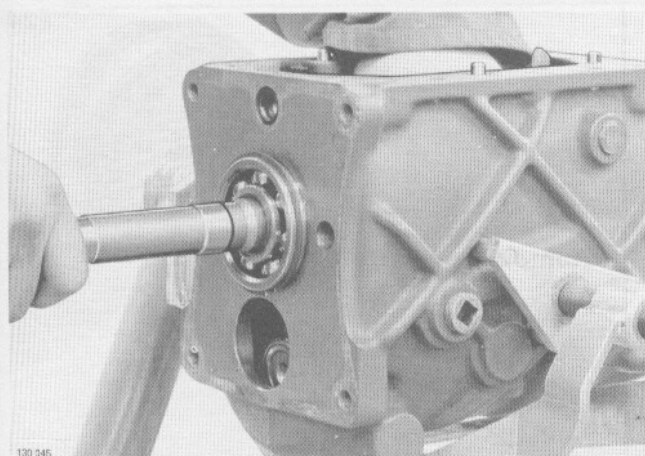
130 016

E18

Aluminum housing:

Remove outer races for intermediate shaft bearings

Carefully knock intermediate shaft until puller **5177** can grip races.



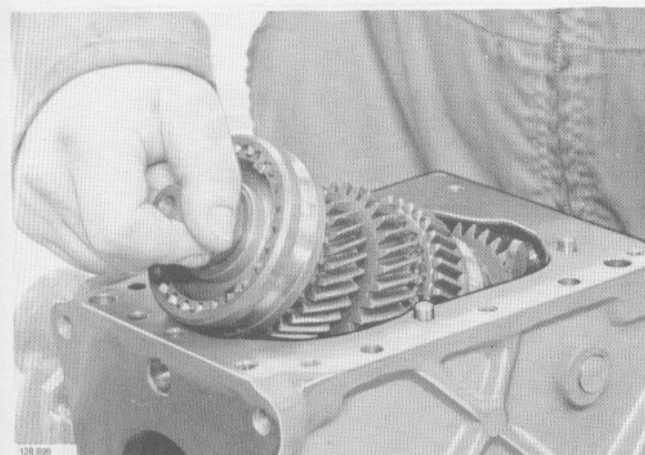
130 045

E19

Pull out input shaft.

E20

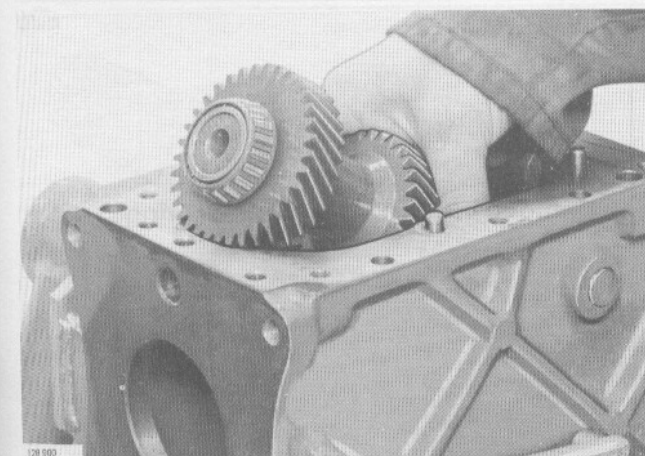
Remove 4th gear synchro ring



128 899

E21

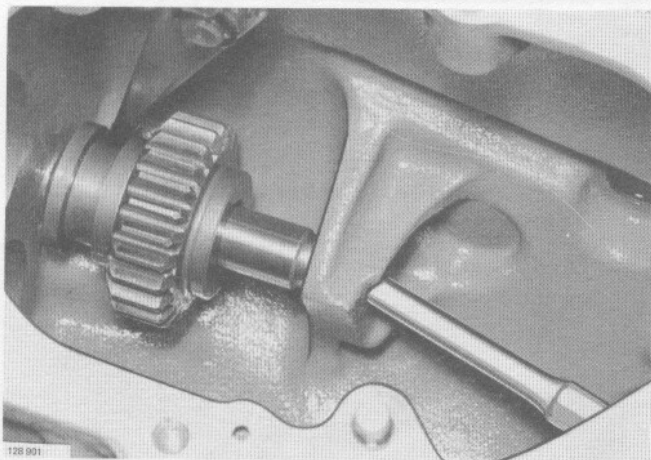
Lift out main shaft.



128 090

E22

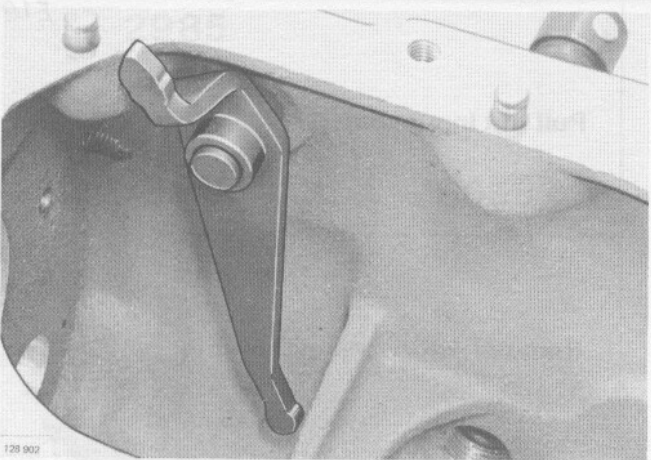
Lift out intermediate shaft.



E23

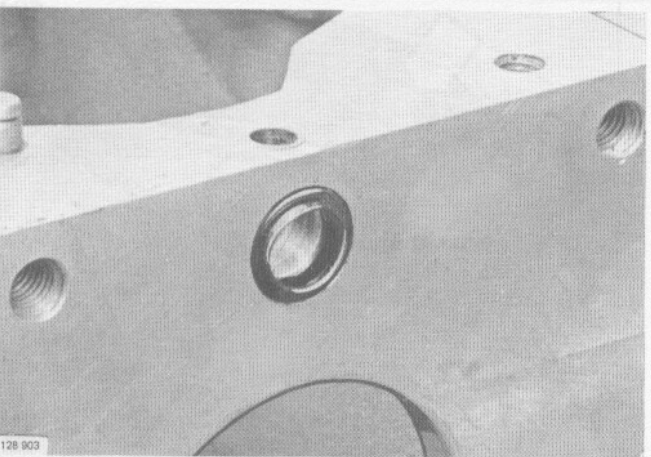
Remove reverse gear and shaft.

Use punch to knock shaft back.



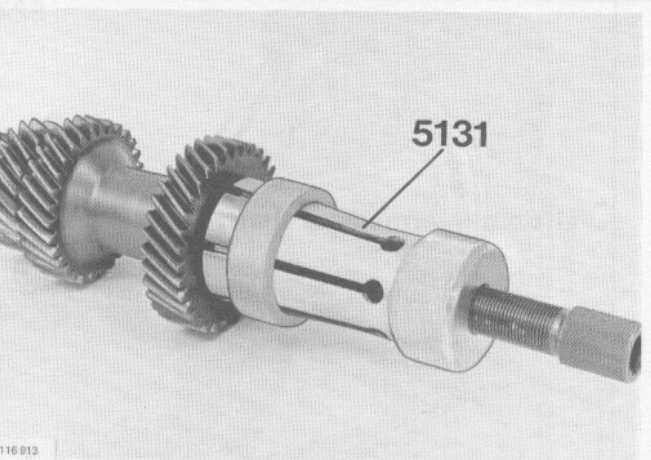
E24

Remove reverse gear shift fork.



E25

Remove seal for selector rail.

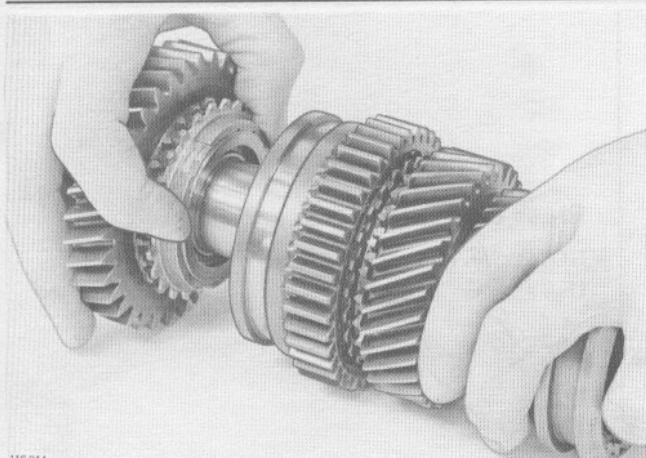


E26

Remove intermediate shaft bearings.

Use puller **5131**.

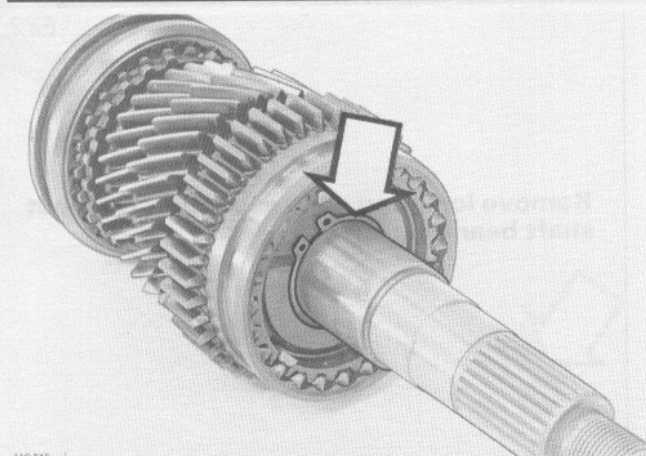
E27



116 914

Remove 1st gear and synchro ring from main shaft.

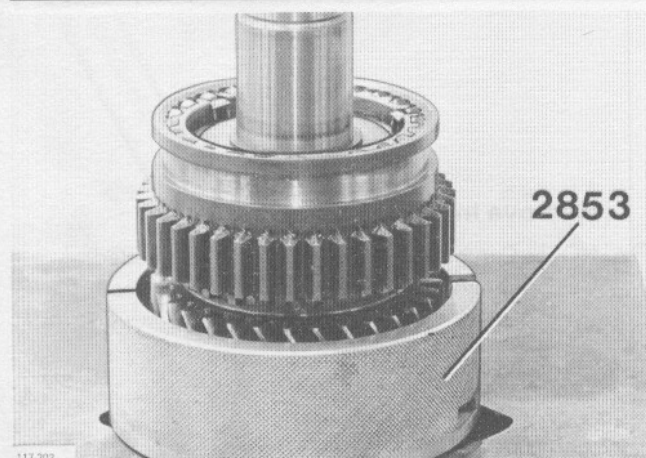
E28



116 915

Remove lock ring for 1-2 synchro hub.

E29

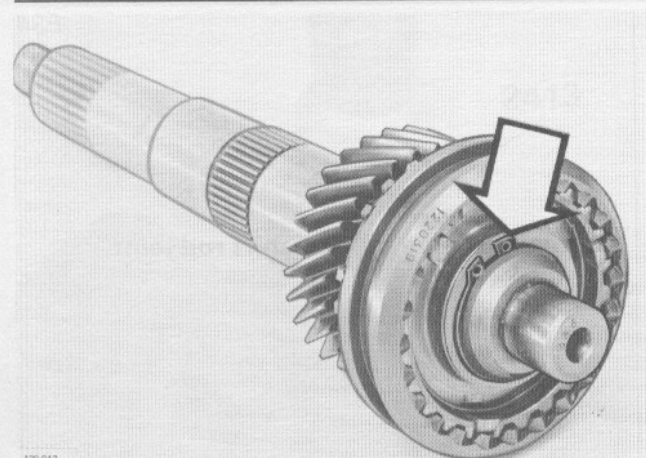


117 203

Press off synchro hub and gear.

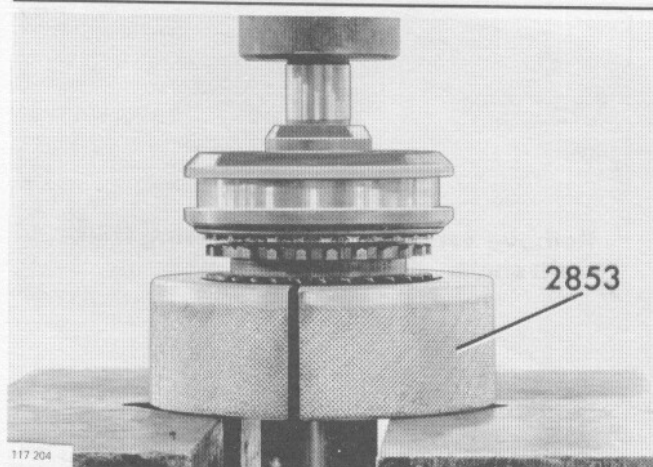
NOTE: Can be tight so a press may be needed.
Use adapter **2853**.

E30



126 017

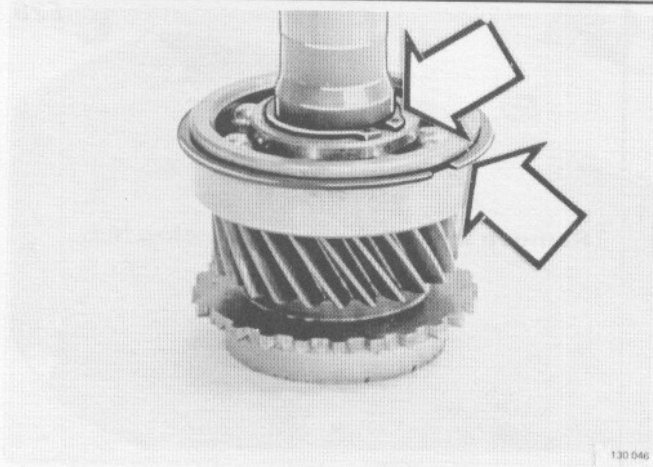
Remove lock ring for 3-4 synchro hub.



E31

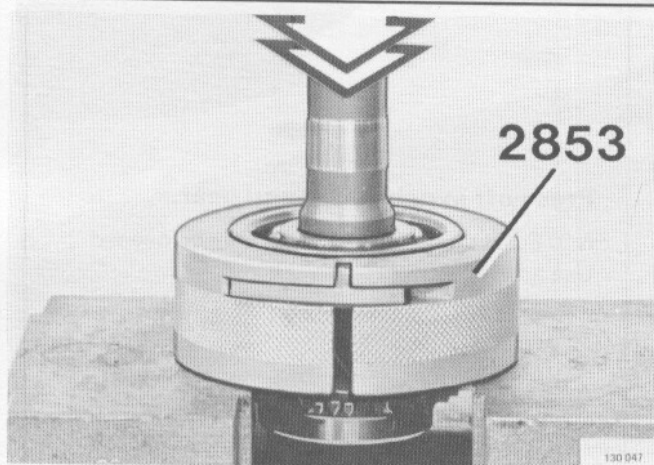
Press off synchro hub and gear.

NOTE: Can be tight so a press may be needed.
Use adapter **2853**.



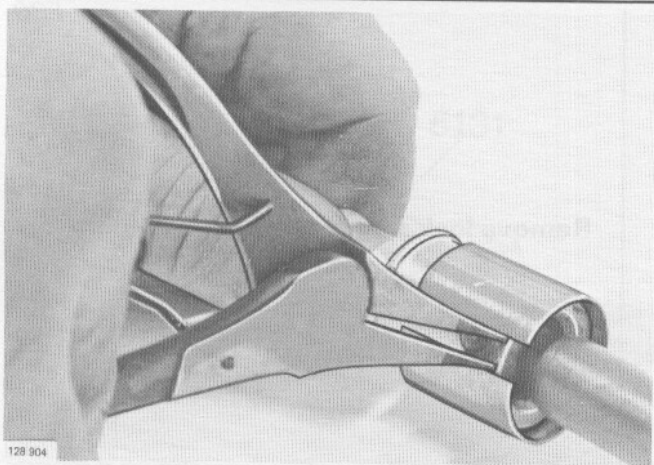
E32

Remove lock ring and spacer ring for input shaft bearing.



Remove input shaft bearing.

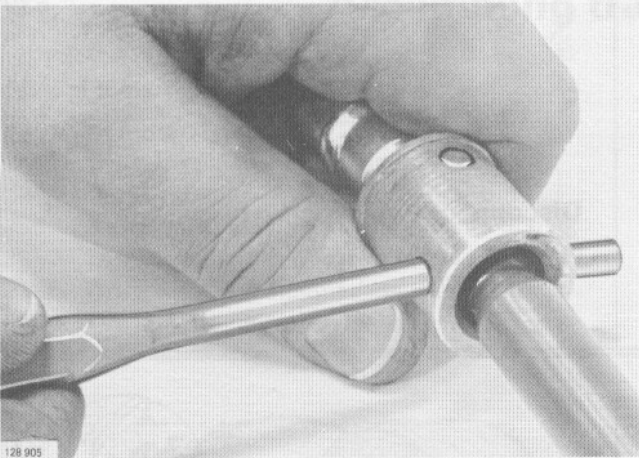
NOTE: Can be tight so a press may be needed.
Use adapter **2853**, small hole UP under bearing.



E34

Remove sleeve on gearshift rod joint.

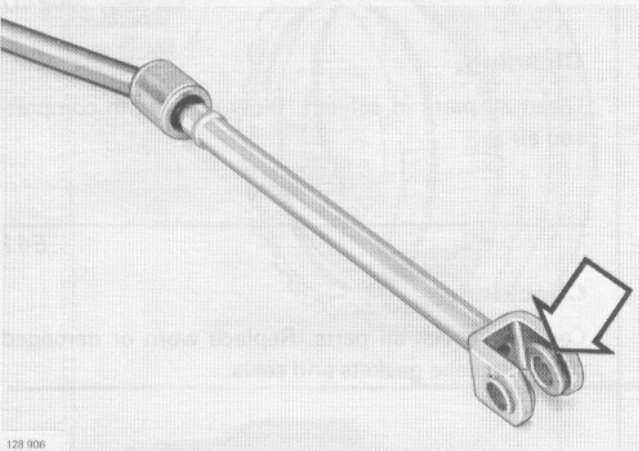
E35



Disassemble gear selector rail and gearshift rod.

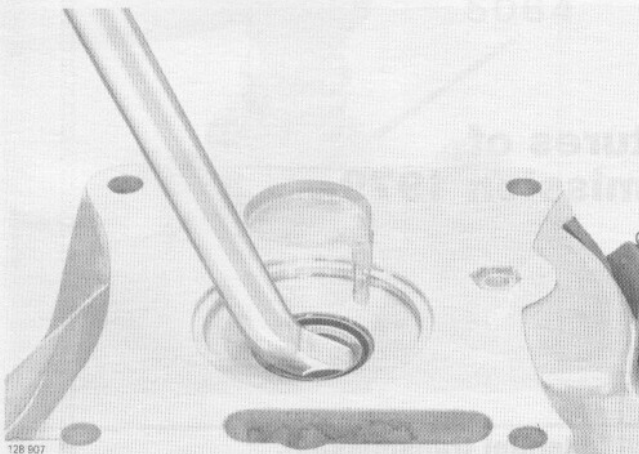
Use a 5 mm punch to push out front pin.

E36



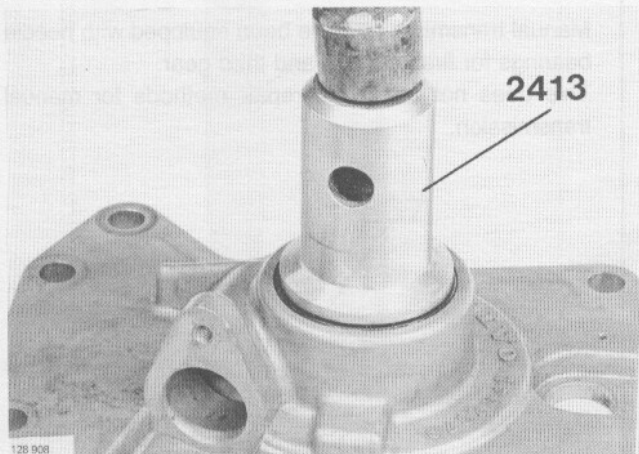
Remove gearshift rod bushings.

E37



Remove bell housing seal.

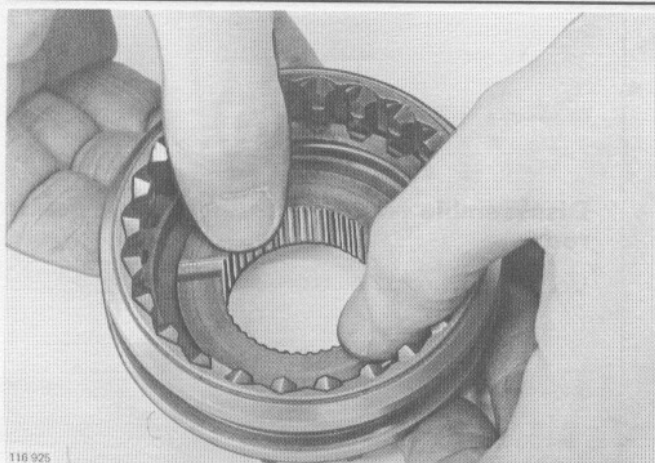
E38



Remove rear cover seal.

Use drift **2413** to knock out seal.

E39



Disconnect two synchro hubs.

Push hubs out of sleeves.

E40

Cleaning.

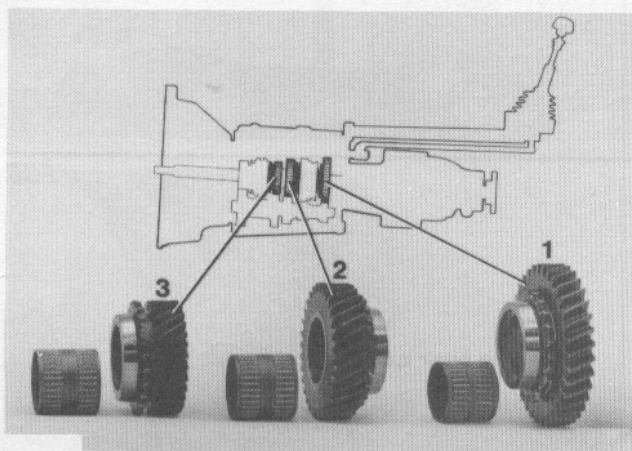
Clean all parts in solvent. Blow clean with compressed air.

E41

Checking.

Carefully check all parts. Replace worn or damaged parts. Replace gaskets and seals.

New features of M 45/M 46 transmission 1979—



Manual transmission.

Manual transmissions have been equipped with needle bearings for first, second and third gear.

This does not affect the repair methods for manual transmission.