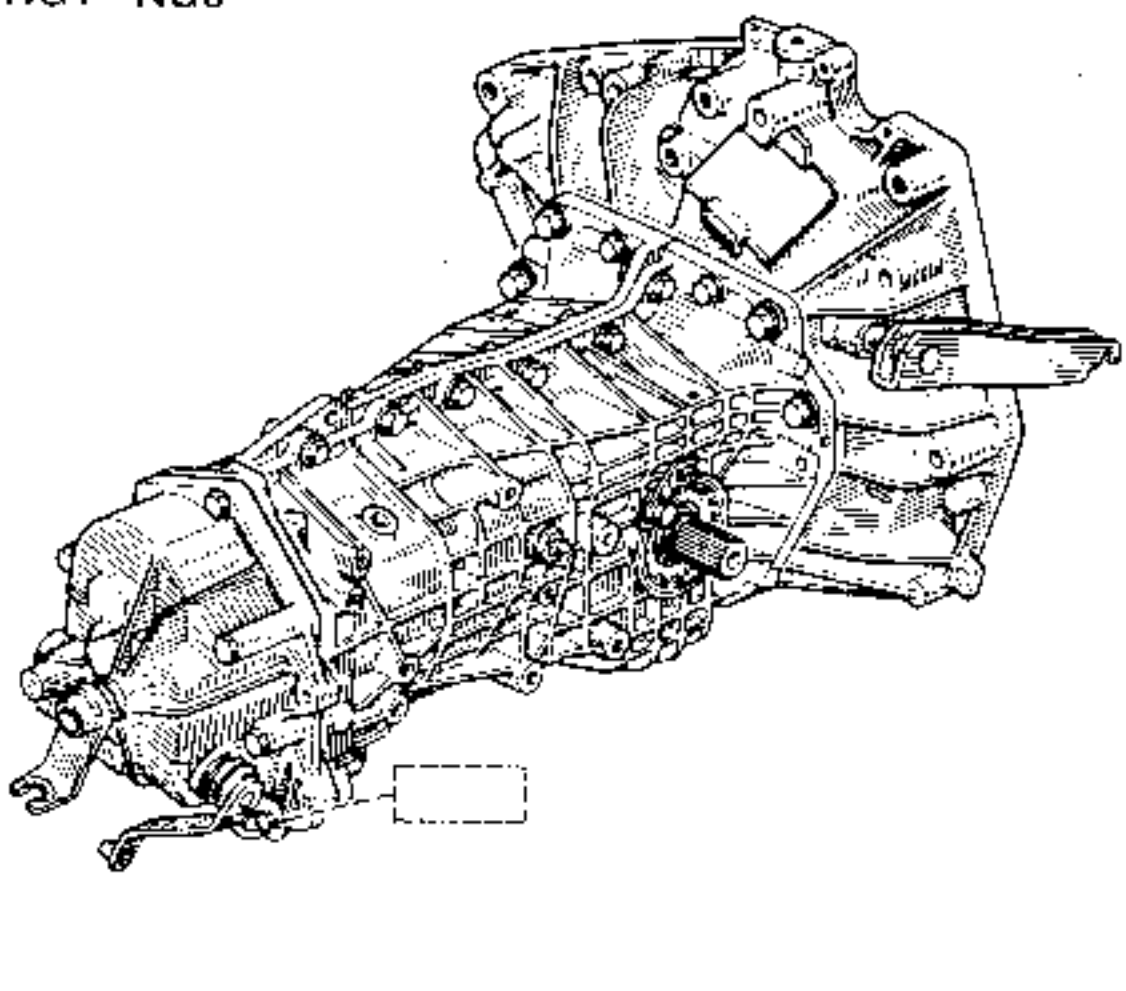
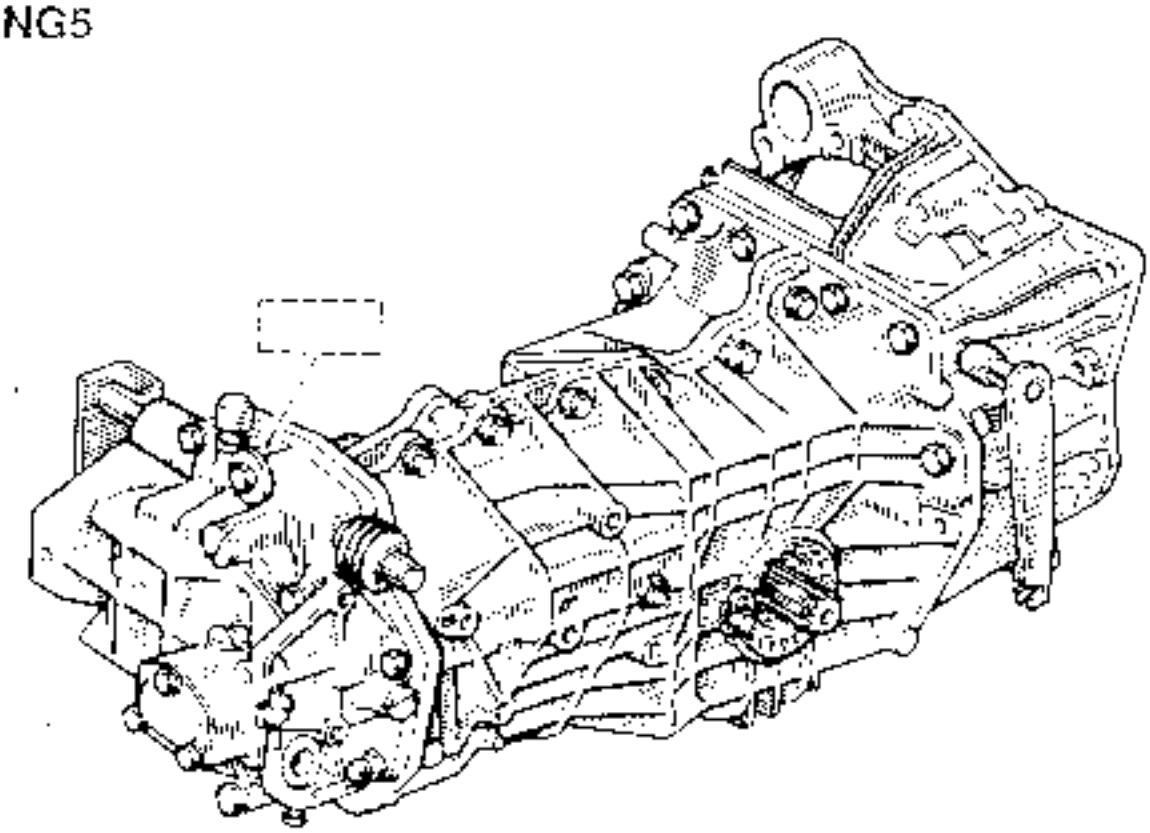
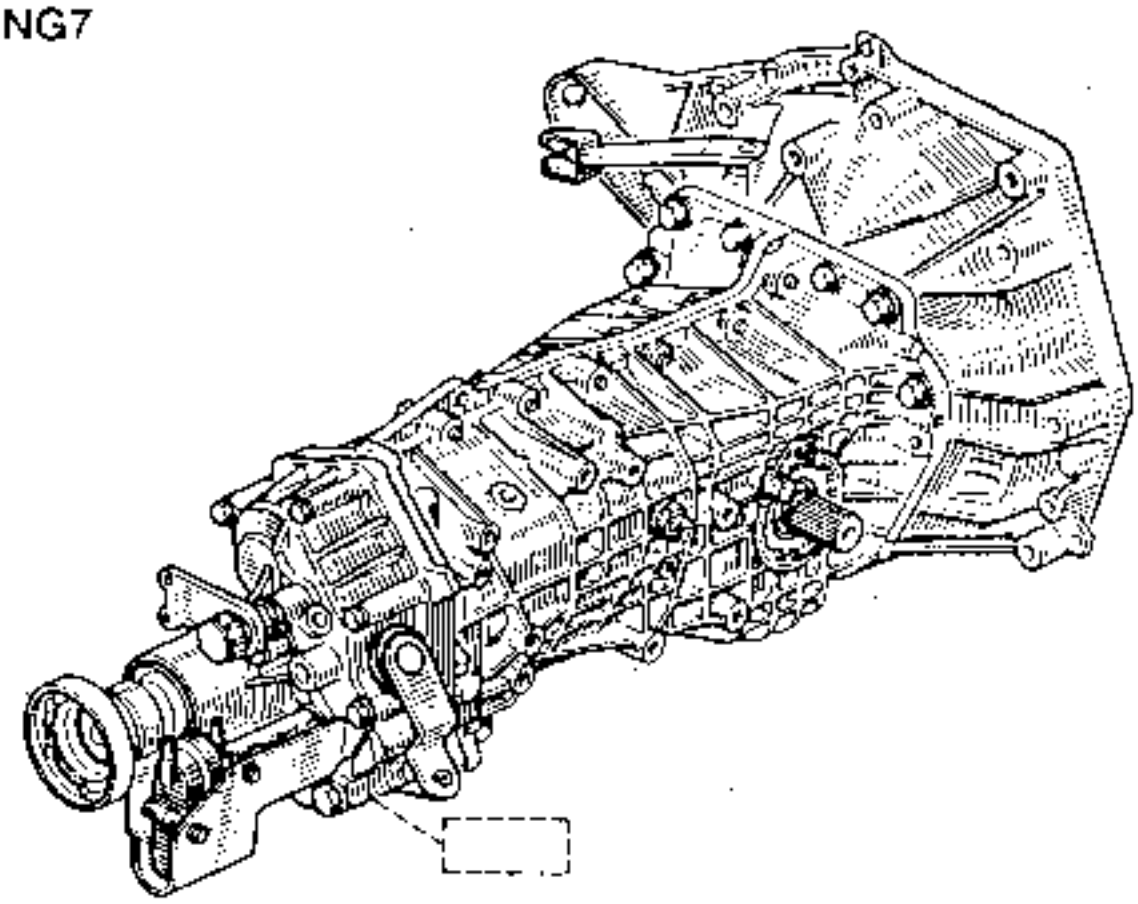
NG1 - NG3



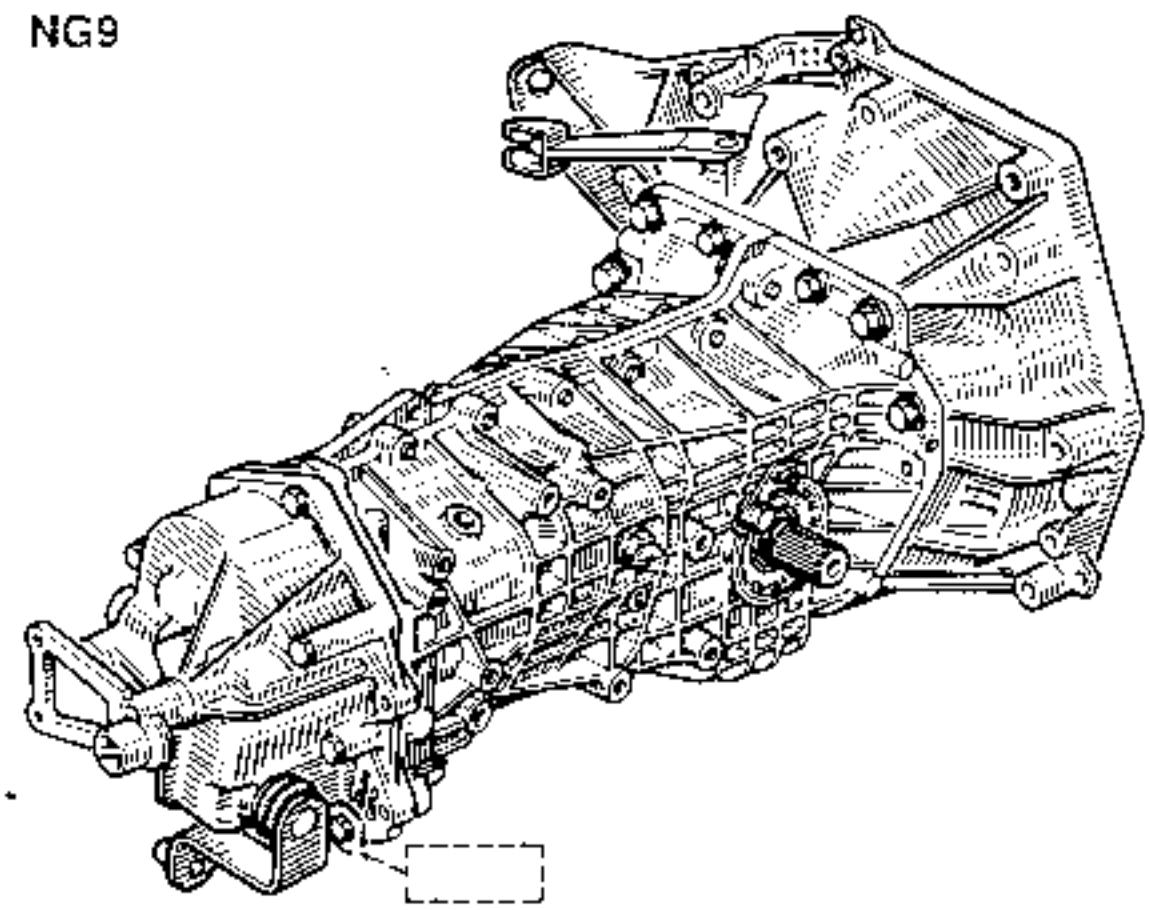
NG5



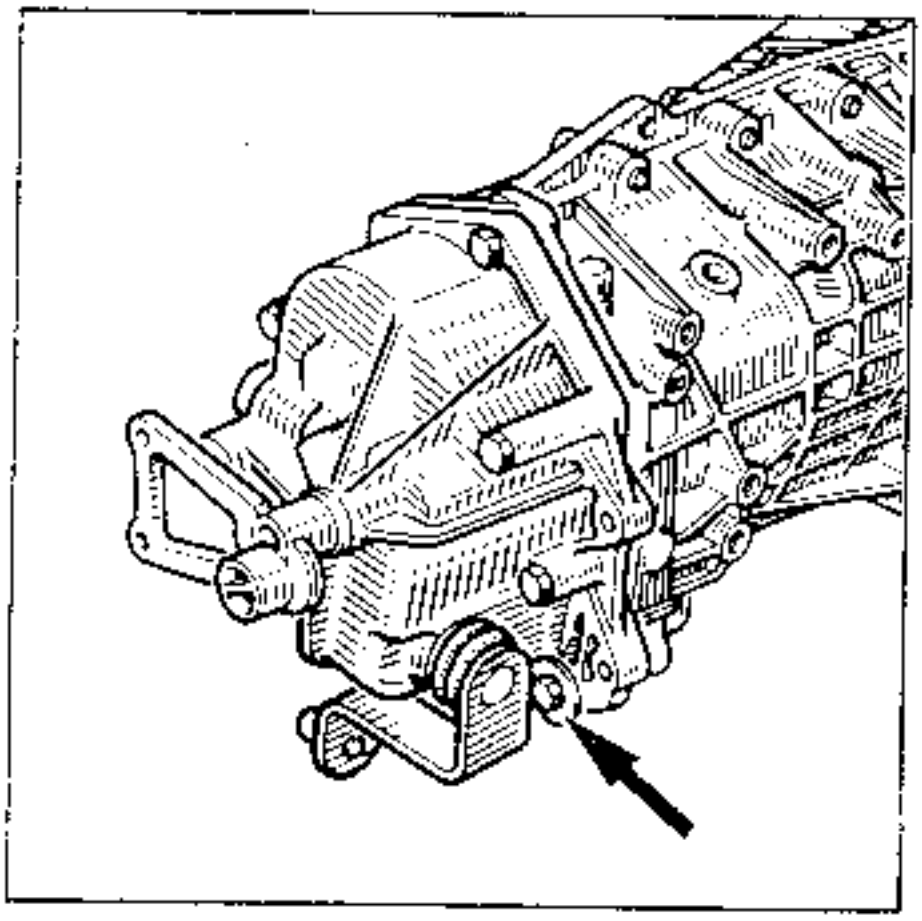
NG7



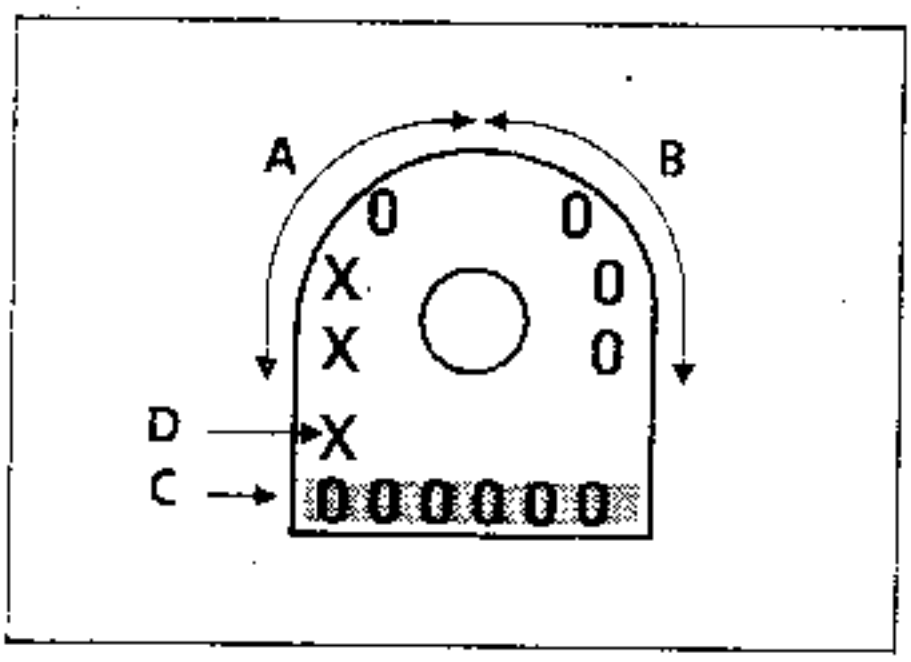
NG9



## IDENTIFICATION



A plate is mounted on the rear casing and shows:
- at A: the gearbox type
- at B: the gearbox suffix
- at C: the fabrication number
- at D: the manufacturing factory



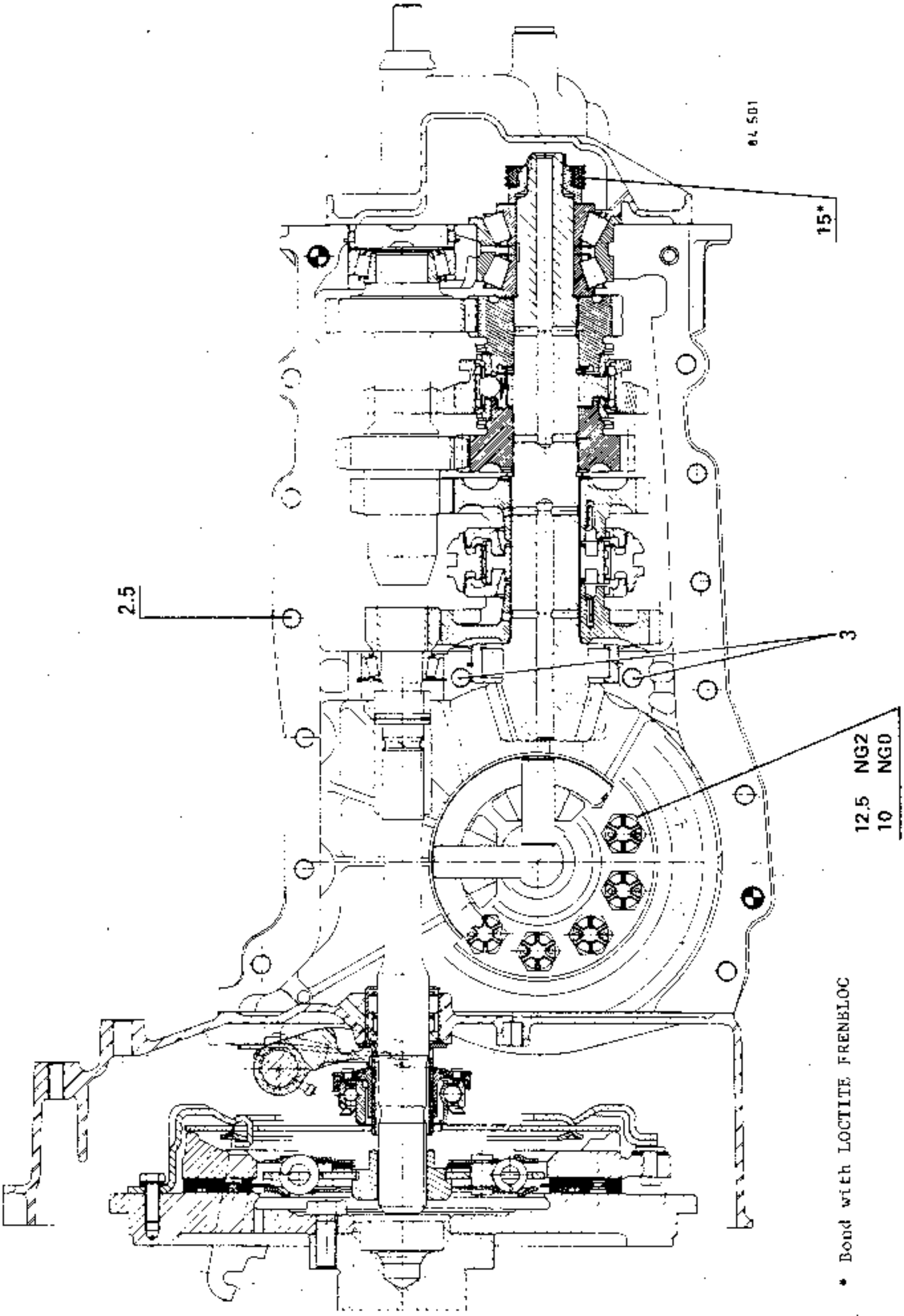

## SPECIFICATIONS

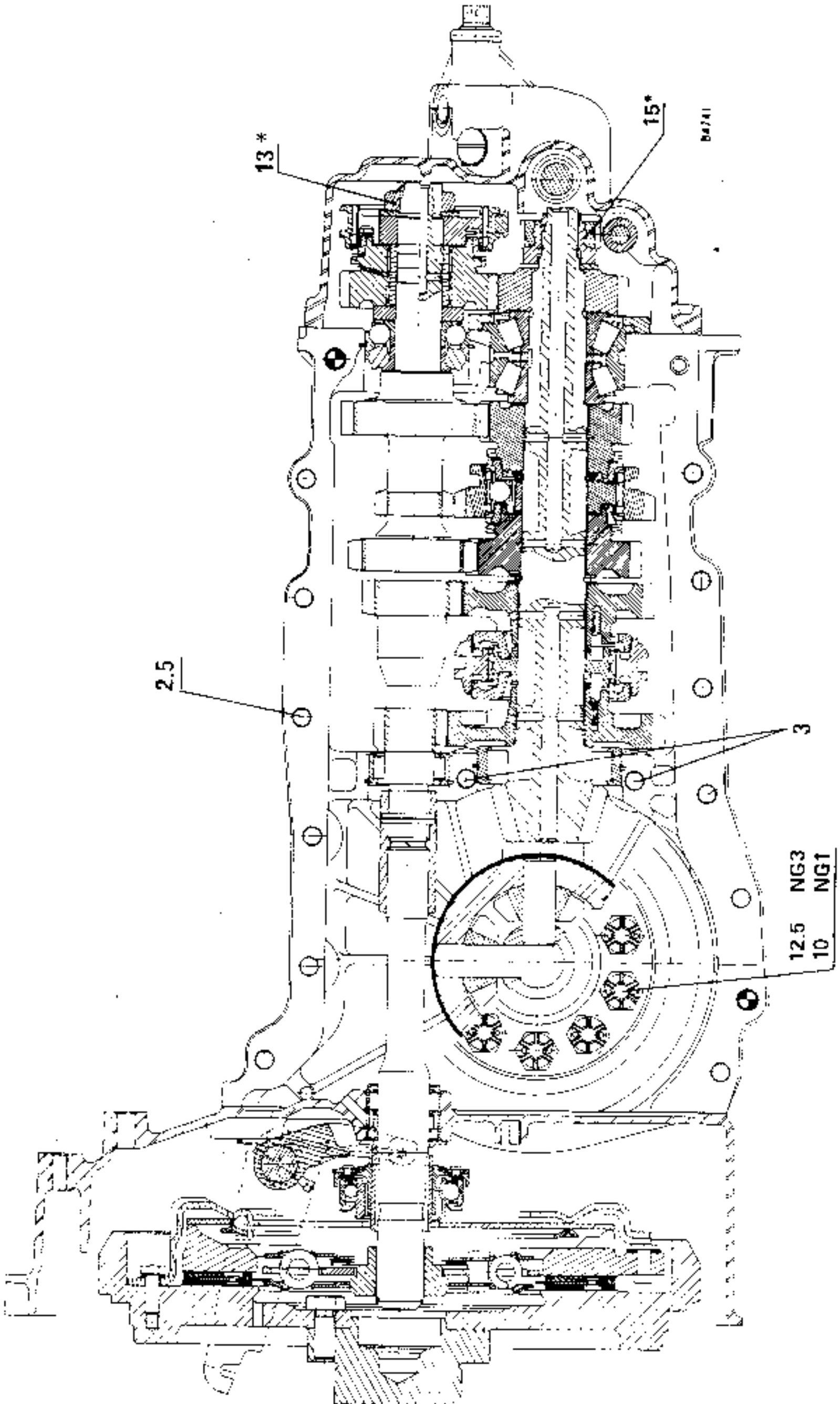
- Light alloy casing, cast under pressure, consisting of two half casings joined by a vertical and longitudinal joint face. The rear casing houses the fifth gear.

- Four or five synchronized forward gears:
  - 1st/2nd: RENAULT synchro
  - 3rd/4th/5th: BORG-WARNER synchro

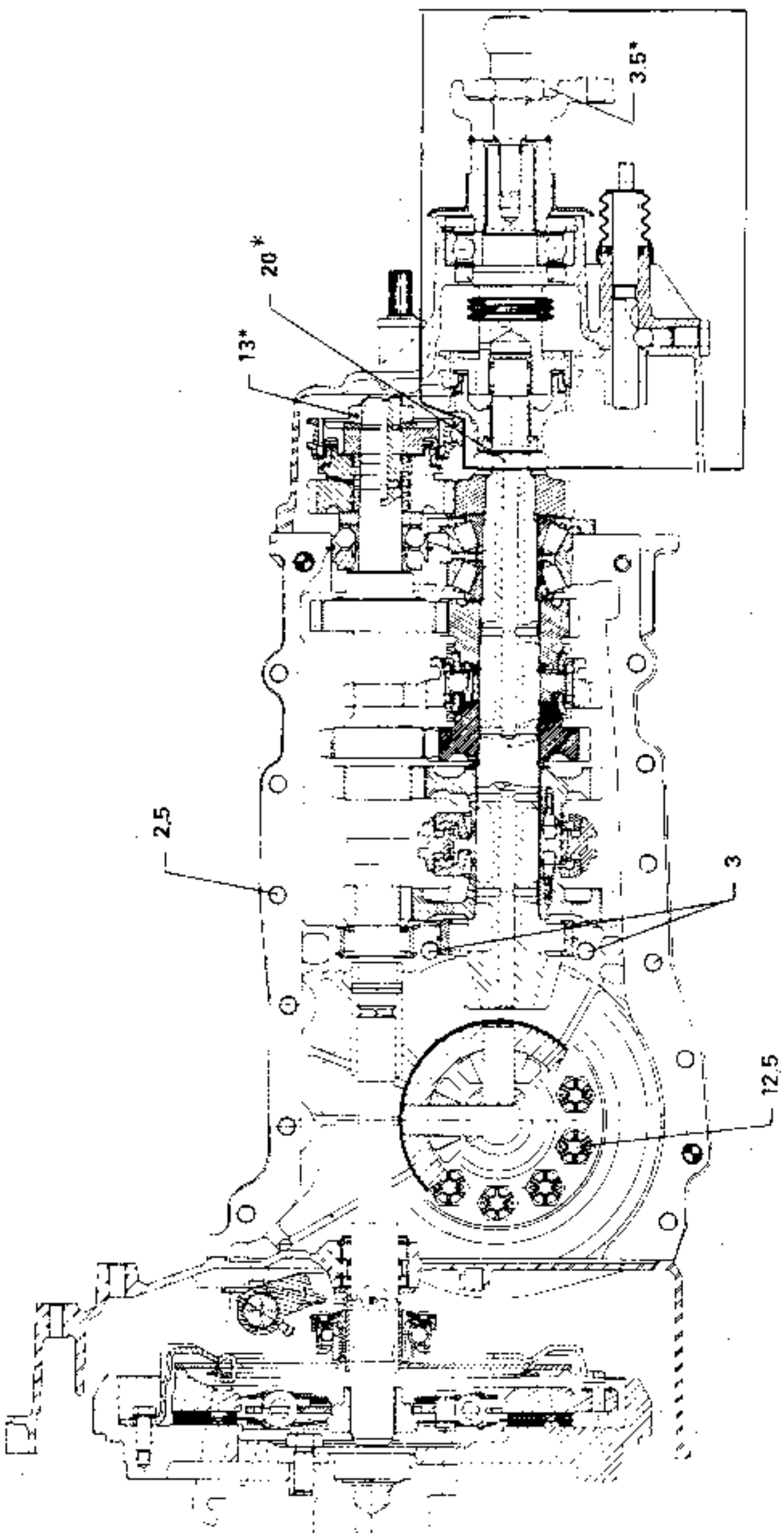
- One reverse gear.

- NG7: one longitudinal driveshaft dog clutch system.

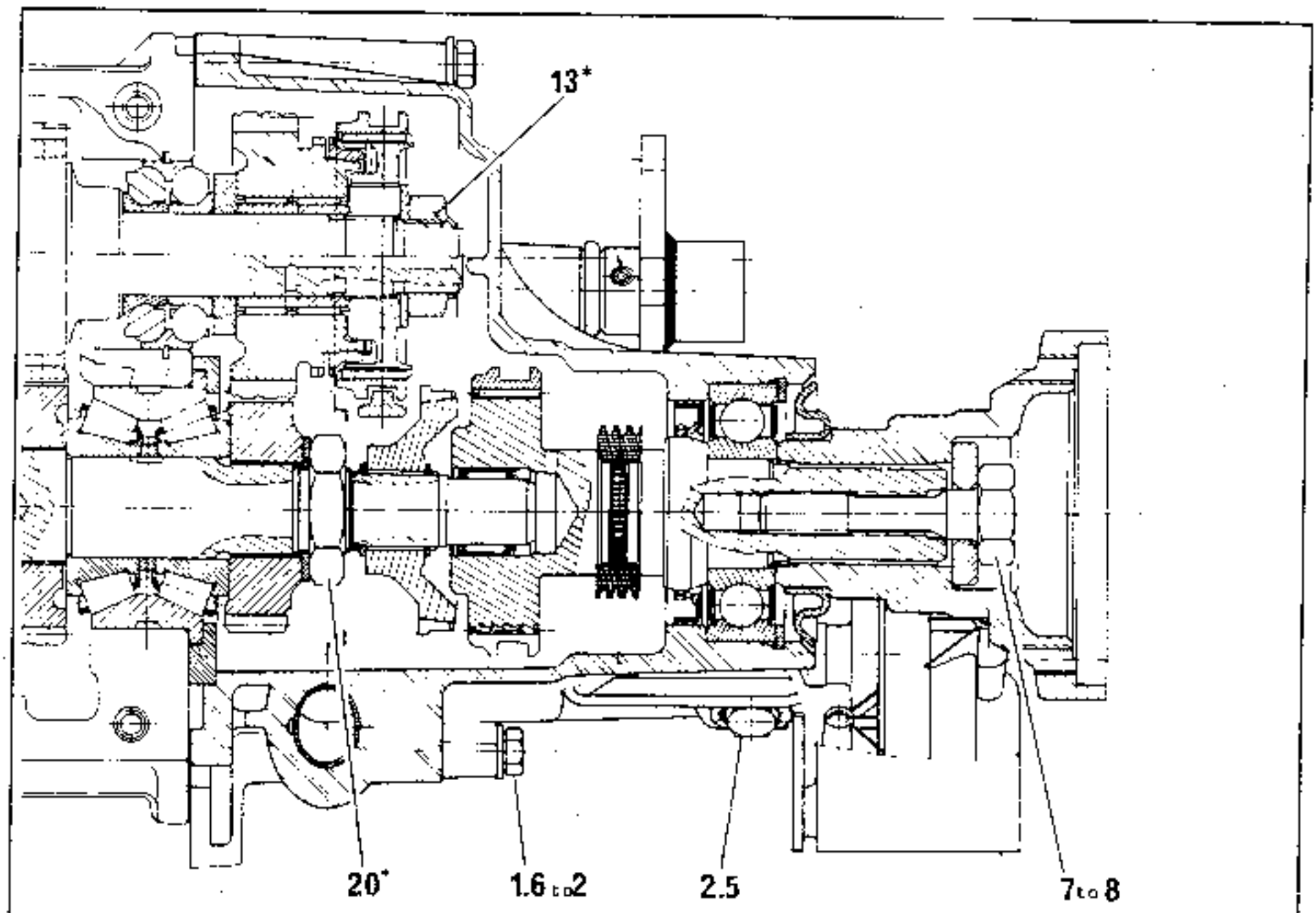

15*
2.5
3
12.5 NG2
10 NG0
* Bond with LOCTITE FRENBLOC



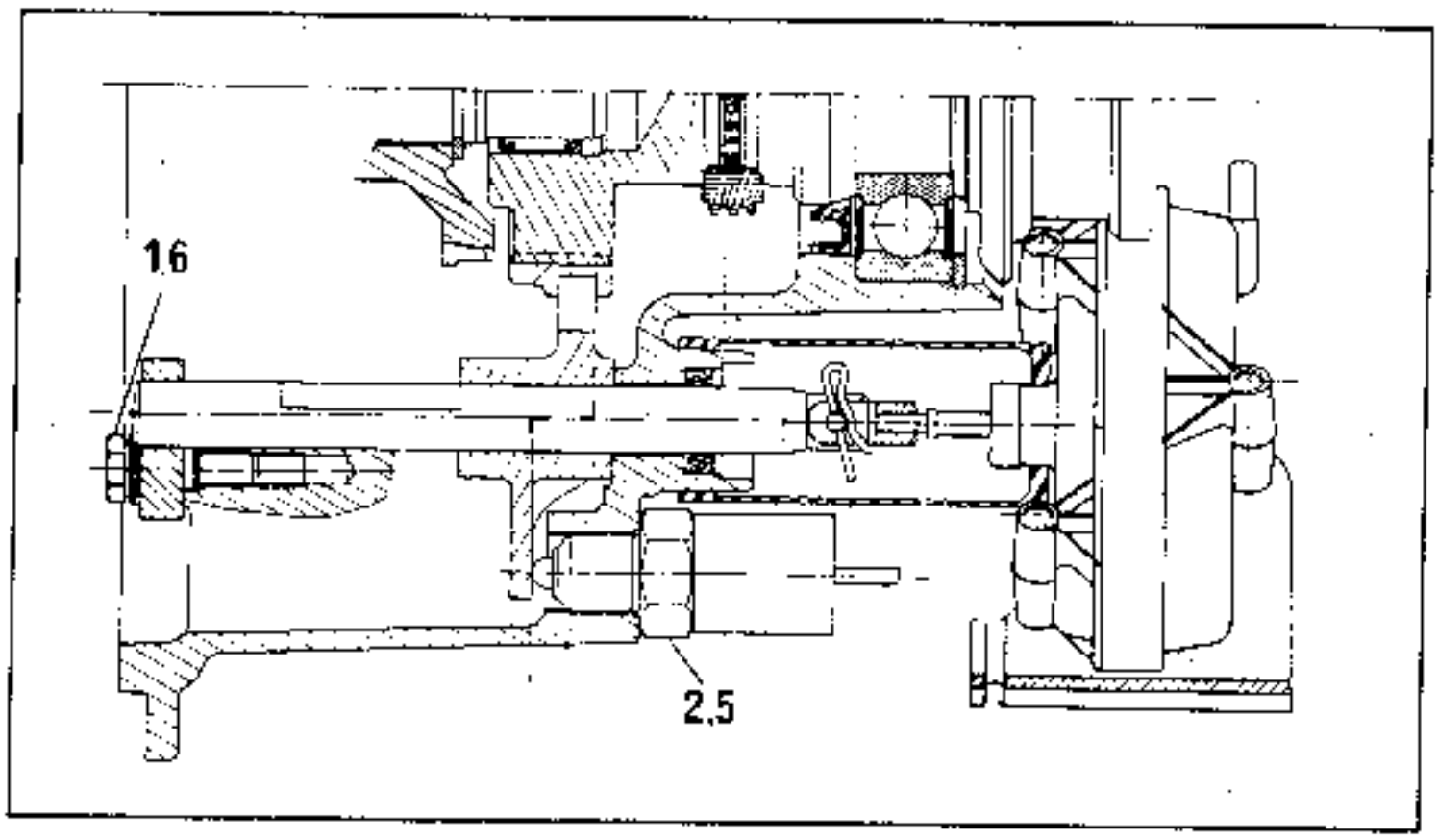

* Send with LOCTITE FRENBLOC

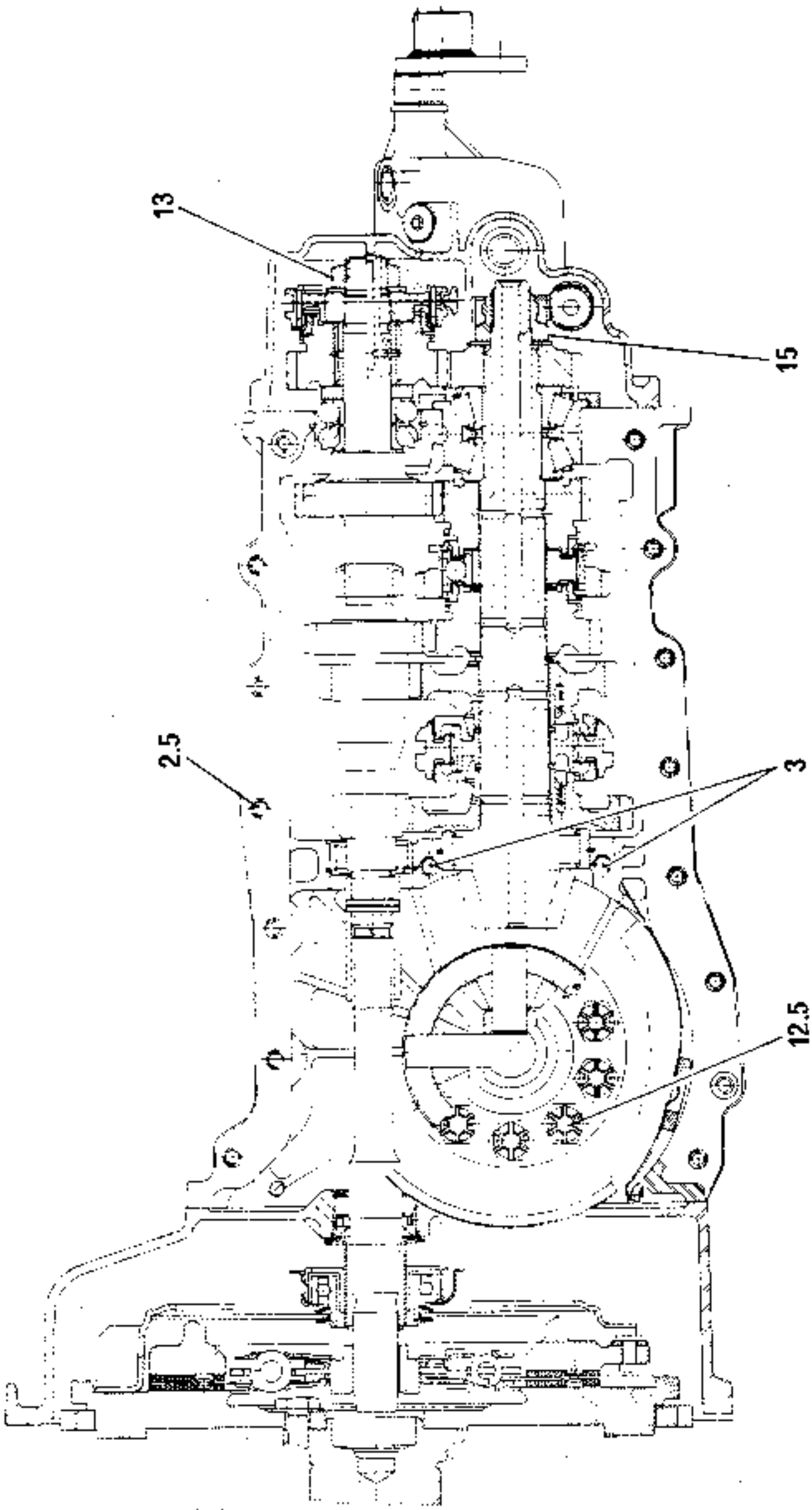



* Bond with LOCTITE FRENBLOC




* Bond with LOCTITE FRENBLOC




13
15
2.5
3
12.5
• Bond with LOCTITE FRENBLOC

## NG0

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | REVERSE |
|---|---|---|---|---|---|---|---|---|
| 001 | 1340<br>1360 | 9/34 | 5/17 | 11/42 | 17/37 | 22/31 | 34/33 | $\frac{12}{37}$ 19 |
| 002 | 1350 | | | | | | 33/34 | |
| 003 | 1340<br>1360 | | | | | | 34/33 | |
| 004 | 1362 | | 6/20 | | | | | |
| 006 | 1271 | | | | | | 33/34 | |
| 009 | 1344<br>1354 | 9/31 | 6/18 | | | | 34/33 | |
| 010 | 1362 | 9/34 | 6/20 | | | | | |
| 011 | 1341<br>1351 | | | | | | | |
| 015 | 1350 | | 5/17 | | | | 33/34 | |
| 016 | 1344<br>1354 | 9/31 | 6/18 | | | | 34/33 | |
| 019 | 1271 | 9/34 | 6/20 | | | | | |
| 020 | 1340<br>1350<br>1360<br>2350 | 9/32 | 5/16 | | | | 33/34 | |
| 021 | 1340<br>1350<br>1360 | | | | | | 34/33 | |
| 023 | 1340<br>1350<br>2350 | 9/34 | 5/17 | | | | 33/34 | $\frac{11}{39}$ 23 |
| 025 | 1344<br>1354<br>2354 | 9/31 | 6/18 | | | | 34/33 | |
| 026 | 1344<br>1354 | | | | | | | |
| 027 | 1362 | 9/34 | 6/20 | | | | | |
| 028 | 1362 | | | | | | | |

## NG0

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | REVERSE |
|---|---|---|---|---|---|---|---|---|
| 034 | 1340<br>1350<br>1360<br>2350 | 9/32 | 5/16 | 11/45 | 17/37 | 22/31 | 34/33 | $\frac{11}{39}$ 23 |
| 035 | 1340<br>1350<br>1360 | | | | | | | |
| 037 | 1340<br>1350<br>2350 | 9/34 | 5/17 | | | | | |
| 039 | 1344<br>1354<br>2354 | 9/31 | 6/18 | | | | | |
| 040 | 1344<br>1354 | | | | | | | |

## NG2

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | REVERSE |
|---|---|---|---|---|---|---|---|---|
| 000 | 1277<br>1272 | 9/34 | 6/20 | 11/42 | 17/37 | 22/31 | 34/33 | $\frac{12}{37}$ 19 |
| 017 | 1277<br>1272 | | | | | | | $\frac{11}{39}$ 23 |
| 018 | 1277 | 9/31 | 6/18 | | | | | |
| 042 | 1277 | 9/34 | 6/20 | 11/45 | | | | |

## NG1

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 002 | 1340<br>1350<br>1360 | 9/34 | 5/17 | 11/42 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{12}{37}$19 |
| 003 | 1362 | | 6/20 | | | | | | |
| 006 | 1344<br>1354 | 9/31 | 6/18 | | | | | | |
| 007 | 1276 | 9/34 | 6/20 | | | | | | |
| 009 | 1341<br>1351 | | | | | | | | |
| 010 | 1344<br>1354 | | | | | | | | |
| 012 | 1340<br>1350<br>1360 | | 5/17 | | | | | | |
| 013 | 1362 | | 6/20 | | | | | | |
| 014 | 1344<br>1354 | 9/31 | 6/18 | | | | | | |
| 018 | 1276 | 9/34 | 6/20 | | | | | | |
| 022 | 1340<br>1350<br>1360<br>2350 | 9/32 | 5/16 | | | | | | |
| 023 | 1340<br>1350<br>1360 | | | | | | | | $\frac{11}{39}$23 |
| 024 | 1340<br>1350<br>2350 | 9/34 | 5/17 | | | | | | |
| 027 | 1341<br>1351 | 9/31 | 6/19 | | | | | | |
| 028 | 1341<br>1351<br>1342 | 9/34 | 6/20 | | | | | | |
| 029 | 1341<br>1351 | 9/31 | 6/19 | | | | | | |

## NG1

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 030 | 1342 | 9/34 | 6/20 | 11/42 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{11}{39}$23 |
| 031 | 1344<br>1354<br>2354 | 9/31 | 6/18 | | | | | | |
| 032 | 1344<br>1354 | | | | | | | | |
| 033 | 1362 | 9/34 | 6/20 | | | | | | |
| 034 | 1342<br>1352<br>1362 | | | | | | | | |
| 040 | 1271 | 9/29 | 8/23 | 11/45 | | | 34/33 | 37/29 | |
| 041 | 1341<br>1351<br>1361 | 9/31 | 6/19 | | | | | | |
| 046 | 1344<br>1354 | | 6/18 | 11/42 | | | | | |
| 048 | 1341<br>1351<br>1361 | | 6/19 | 11/45 | | | | | |
| 051 | 1340<br>1350<br>1360<br>2350 | 9/32 | 5/16 | | | | 33/34 | 36/31 | |
| 052 | 1340<br>1350<br>1360 | | | | | | | | |
| 053 | 1340<br>1350<br>2350 | 9/34 | 5/17 | | | | | | |
| 054 | 1341<br>1351 | | 6/20 | | | | | | |
| 055 | 1341<br>1351 | | 5/17 | | | | | | |
| 056 | 1344<br>1354 | 9/31 | 6/18 | | | | | | |

## NG1

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 057 | 1342<br>1352<br>1362 | 9/34 | 6/20 | 11/45 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{11}{39}$ 23 |
| 060 | 1276 | | | | | | | | |
| 061 | 1344<br>1354<br>2354 | 9/31 | 6/18 | | | | 34/33 | 37/29 | |
| 068 | B296 | 9/34 | | | | | 33/34 | 36/31 | |
| 078 | | | 6/19 | | | | | | |

## NG3

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 000 | 1363 | 9/34 | 6/20 | 11/42 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{12}{37}$ 19 |
| 001 | 1345 | | | | | | | | |
| 005 | 1277<br>1272 | | | | | | | | |
| 008 | 1270 | 9/32 | 6/18 | | | | | | |
| 010 | 1272 | 9/34 | 6/20 | | | | | | $\frac{11}{39}$ 23 |
| 011 | 1345 | | | | | | | | |
| 015 | 1277 | 9/31 | 6/18 | | | | | | |
| 016 | 1277<br>1272 | 9/34 | 6/20 | | | | | | |
| 019 | 1270 | 9/32 | 6/18 | | | | | | |
| 020 | 1343<br>1353 | 9/31 | | | | | | | |
| 021 | 1343<br>1353<br>1363 | 9/34 | 6/20 | | | | | | |
| 025 | 1365 | | | | | | | | |

## NG3

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 039 | 1366<br>J115 | 9/31 | 6/18 | | | | | | |
| 042 | 1345<br>1355 | | | | | | | | |
| 043 | 1345<br>1355<br>1365 | 9/34 | 6/20 | | | | | | |
| 044 | 1343<br>1363<br>J112 | | | | | | | | |
| 045 | 1270 | 9/32 | 6/18 | | | | | | |
| 047 | 1277 | 10/31 | 8/22 | | | | 34/33 | 37/29 | |
| 062 | 1277 | 9/34 | 6/20 | | | | | | |
| 063 | 1343<br>1353<br>J112<br>S112 | 9/31 | 6/18 | 11/45 | 17/37 | 22/31 | | | $\frac{11}{39}$ 23 |
| 064 | 1363 | 9/34 | 6/20 | | | | | | |
| 067 | B297 | 9/29 | | | | | | | |
| 069 | B290 | 9/32 | | | | | | | |
| 072 | B297<br>B29H | 9/32 | | | | | 33/34 | 36/31 | |
| 073 | B297<br>Suisse | 9/34 | | | | | | | |
| 075 | B297 | 9/29 | 8/22 | | | | 34/33 | 37/29 | |
| 076 | B297<br>B29H | 9/32 | 6/18 | | | | | | |
| 077 | B297 | 9/34 | 6/19 | | | | 33/34 | 36/31 | |
| 079 | B29H<br>B29B<br>B29J | 9/32 | 6/18 | | | | | | |

## NG3

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 083 | B29H<br>B29B<br>B29J | 9/32 | | 11/45 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{11}{39}$ 23 |
| 084 | J-S112<br>J117 | 9/31 | 6/18 | | | | | | |
| 085 | J112 | 9/34 | 6/18 | | | | | | |
| 087 | J115<br>S115 | 9/31 | 6/18 | | | | 34/33 | 37/29 | |
| 088 | B292 | 9/32 | 6/18 | | | 28/43 | 37/43 | 43/40 | |
| 089 | B292 | 9/32 | | | | | | | |
| 090 | B29E | 9/31 | | | | | | | |
| 091 | J116 | 9/34 | 6/19 | | | 22/31 | 33/34 | 36/31 | |
| 092 | B290 | 9/32 | 6/18 | | | | 34/33 | 37/29 | |
| 093 | B29J | 9/32 | 6/18 | | | | | | |

## NG5

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 000 | 1223 Alpine | 8/31 | 6/14 | 11/42 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{12}{37}$ 19 |
| 001 | 1223 Coupe | 8/33 | | | | | | | |
| 002 | 1223 Gordini | 8/31 | | | | | | | |
| 003 | 122B | 9/34 | 6/13 | | | | | | $\frac{11}{39}$ 23 |
| 004 | 122B | | | | | | | | $\frac{12}{37}$ 19 |
| 005 | 122B | | | | | | | | |
| 006 | 122B | | | | | | | | |
| 007 | 1223 Alpine | 8/31 | 6/14 | | | | | | |
| 008 | 1223 Coupe | 8/33 | | | | | | | |
| 009 | 1223 Gordini | 8/31 | | | | | | | $\frac{11}{39}$ 23 |
| 010 | 122B | 9/34 | 6/13 | 11/45 | | | | | |
| 011 | 122B | | | | | | | | |
| 012 | 122B | | | 11/42 | | | | | |
| 013 | 122B | | | | | | | | |

## NG7

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 000 | 1351 | 9/34 | 6/20 | 11/45 | 17/37 | 22/31 | 34/33 | 37/29 | $\frac{11}{39}$ 23 |
| 001 | 1354 | | | | | | | | |
| 002 | 1353 | | | | | | | | |
| 003 | K483<br>K48K | 9/31 | 6/18 | | | | 33/34 | 36/31 | |
| 004 | K486 | | | | | | | | |
| 005 | J117<br>J116 | 9/34 | 6/19 | | | | | | |

## NG9

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 000 | L-K483<br>L 489<br>L-K 48K | 9/31 | 6/18 | 11/45 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{11}{39}$ 23 |
| 001 | L-K488 | 9/31 | 6/18 | | | | 34/33 | 37/29 | |
| 002 | L-K-S486 | 9/29 | 8/23 | | | | 33/34 | 36/31 | |
| 003 | L-K48K | 10/31 | 8/22 | | | | 34/33 | 37/29 | |
| 005 | L489 | 9/34 | 6/19 | | | | | | |
| 006 | L-K486<br>Espagne | 9/31 | 6/18 | | | | 33/34 | 36/31 | |
| 007 | L489<br>Arabie | 9/32 | 6/19 | | | | | | |
| 008 | L-K48S | 9/31 | 6/18 | | | | | | |

## NG GEAR RATIOS FOR USA AND CANADA

### NG0

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | REVERSE |
|---|---|---|---|---|---|---|---|---|
| 012 | 1341<br>1348<br>1351<br>1358 | 9/34 | 6/20 | 11/42 | 17/37 | 22/31 | 34/33 | $\frac{12}{37}$ 19 |
| 024 | 1341<br>1348<br>1351<br>1358 | | | | | | | |
| 038 | 1341<br>1348<br>1351<br>1358 | 9/31 | 6/19 | 11/45 | | | | $\frac{11}{39}$ 23 |
| 041 | 1341<br>1348<br>1351<br>1358 | | | 11/42 | | | | |

### NG1

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 004 | 1341<br>1348<br>1351<br>1358 | 9/34 | 6/20 | 11/42 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{12}{37}$ 19 |
| 030 | 1341<br>1348<br>1351<br>1358 | | | | | | | | |
| 037 | 1368 | 8/33 | 5/18 | | | | | | $\frac{11}{39}$ 23 |
| 055 | 1341<br>1348<br>1351<br>1358 | 9/34 | 5/17 | 11/45 | | | | | |
| 058 | 1368 | 8/33 | 5/18 | | | | | | |

## NG GEAR RATIOS FOR USA AND CANADA

### NG3

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 065 | 136A | 9/34 | 6/20 | 11/45 | 17/37 | 22/31 | 33/34 | 36/31 | $\frac{11}{39}$23 |

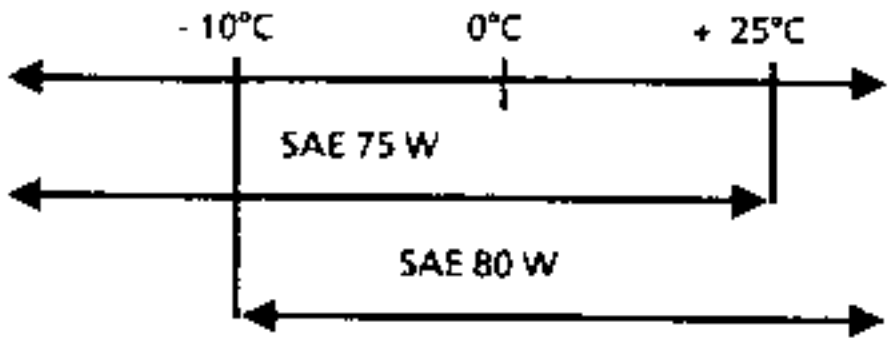
### NG9

| SUFFIX | VEHICLE | FINAL DRIVE | SPEEDO DRIVE | 1st | 2nd | 3rd | 4th | 5th | REVERSE |
|---|---|---|---|---|---|---|---|---|---|
| 003 | L-K48A | 10/31 | 8/22 | 11/45 | 17/37 | 22/31 | 34/33 | 37/29 | $\frac{11}{39}$23 |

**CAPACITY (in litres)**

| | |
|---|---|
| NG0 | 2 |
| NG2 | |
| NG1 | 2.2 |
| NG3 | |
| NG9 | |
| NG7 | 2.4 |

**VISCOSITY**




**GRADE**

In order to be more resistant to the high temperatures to which the B29E, B292 and Turbo petrol vehicles are subject, the gearboxes on these vehicles must be lubricated exclusively with the new "high temperature" oil approved by Renault:

**TRANSELF TRX 80 W.**

Therefore, two grades of oil are recommended:

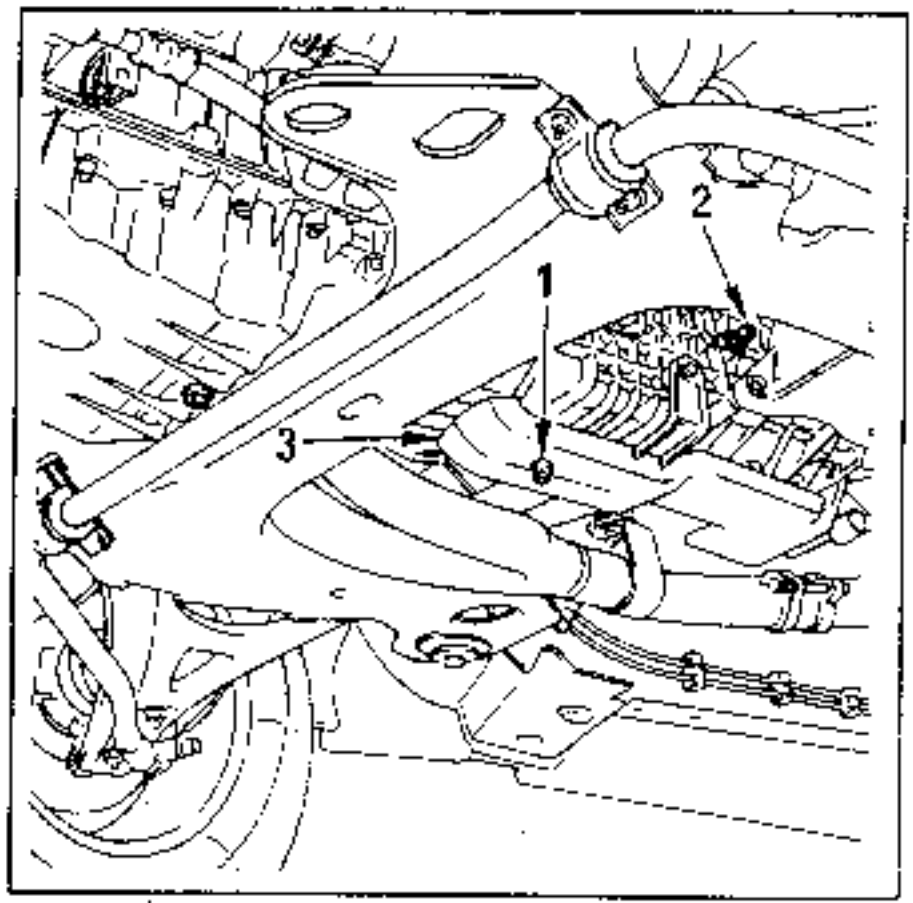
| VEHICLE | GRADE |
|---|---|
| **NORMALLY ASPIRATED** **except** B29E & B292 | APIGL5 - MILL2105 B C |
| **TURBO PETROL** B29E B292 | TRANSELF TRX 80 W* |

(*) If you have any problems obtaining this oil locally, it can be ordered from the Parts Department under number **77 01 417 403** (only in 28 litre drums).

**Drain:** via plug **(1)**.

**Refill and check level:** plug **(2)**.

**NOTE:** On some versions, protection plate **(3)** must be removed to gain access to drain plug **(1)**.



## SPECIAL PRECAUTIONS

TRANSELF TRX 80 W oil is a high-technology product which requires certain precautions to be taken to prevent foreign bodies getting into it as they could damage the oil and make gear changing difficult.

### STORING OIL DRUMS OUTSIDE

The drums must be stored sheltered from bad weather (rain, snow, where they might be splashed) and they must be stored horizontally.

### STORING AND USING AN OPEN OIL DRUM

Particular attention should be paid to all drums which have been opened for use as regards their protection against the ingress of any material or liquid into the drum.

**In particular:**

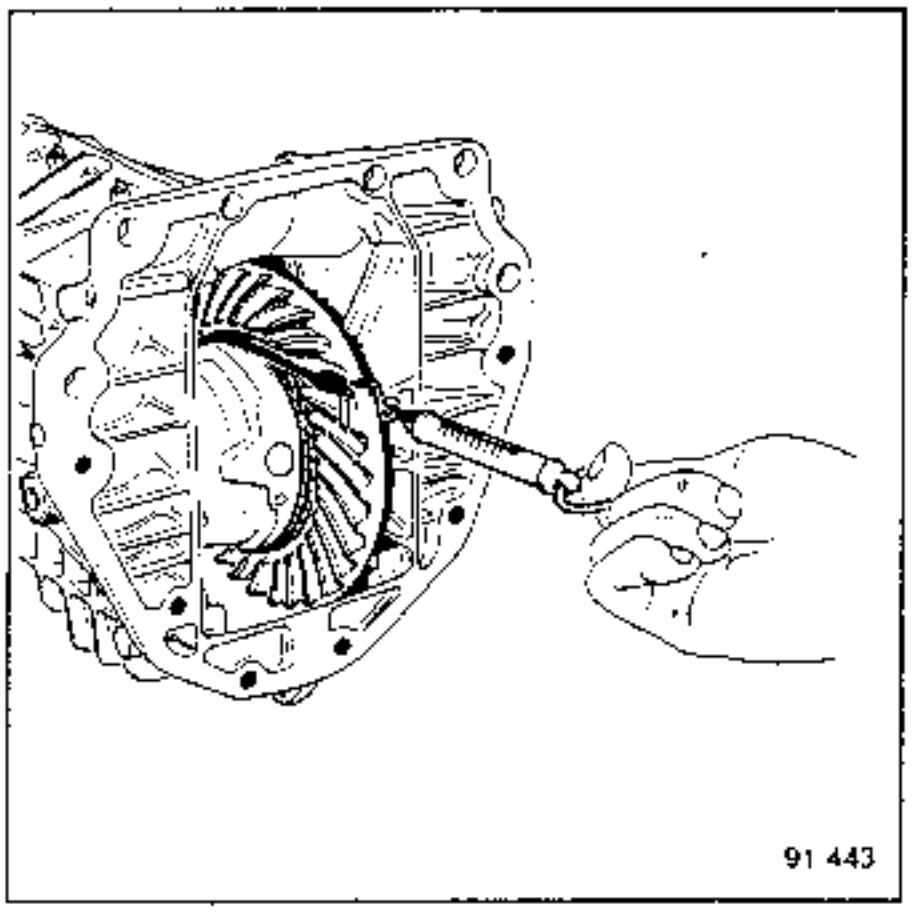
1) Do not pierce the top of the drums, although this may be indicated on them.
2) Do not place containers holding liquid on the drums.
3) Do not leave drums outside.
4) If oil is removed using a syringe, the drum must be closed again after use.
5) Do not set a drum down near a washing bay.
6) If transferring oil to larger drums, ensure that they are completely clean beforehand.

### PRESSURE WASHING

1) **In situ:**
Blank off the gearbox vent-to-atmosphere breather.

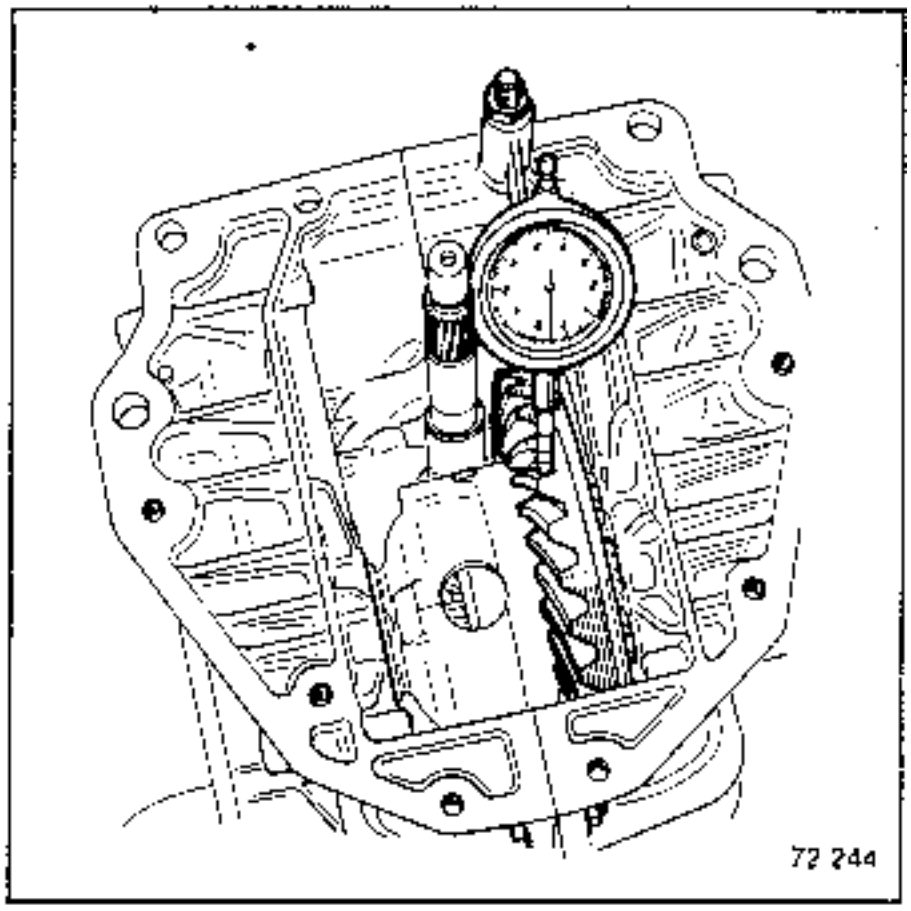
2) **Gearbox removed:**
All apertures connecting internally with the gearbox must be blanked off correctly to ensure that water does not get into the gearbox.

## DIFFERENTIAL BEARING PRE-LOAD (daN)



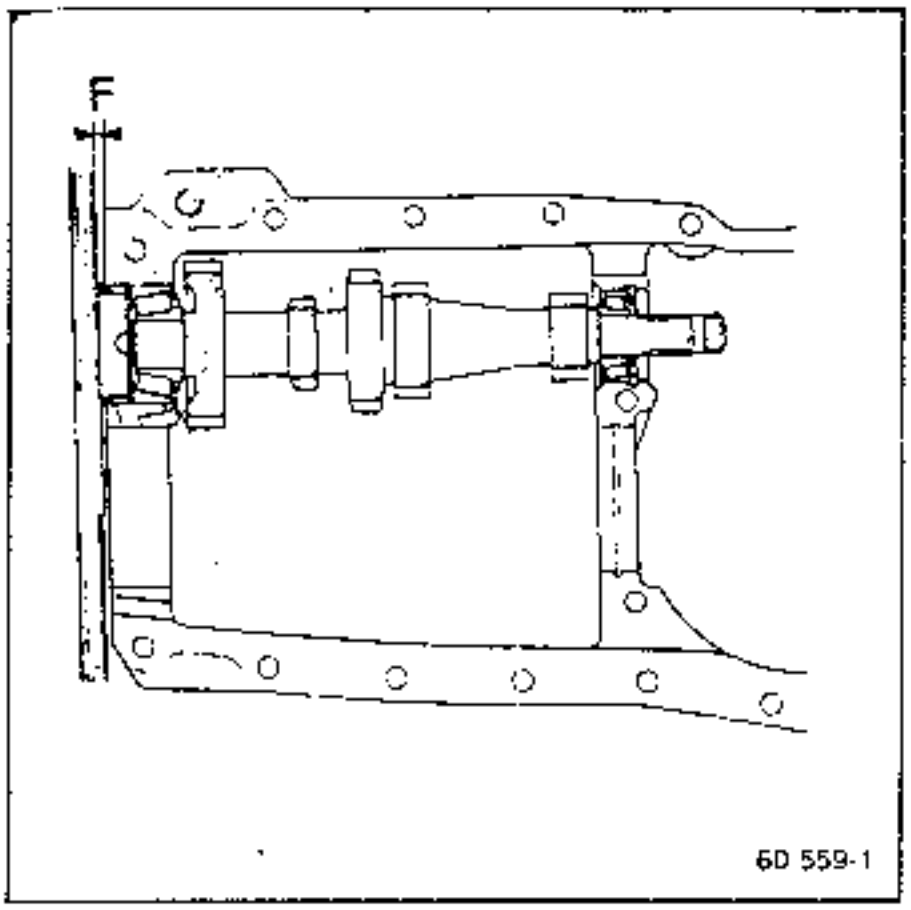

| Re-used bearings | New bearings |
|---|---|
| Free turning without play | 4 to 6 daN |

## BACKLASH



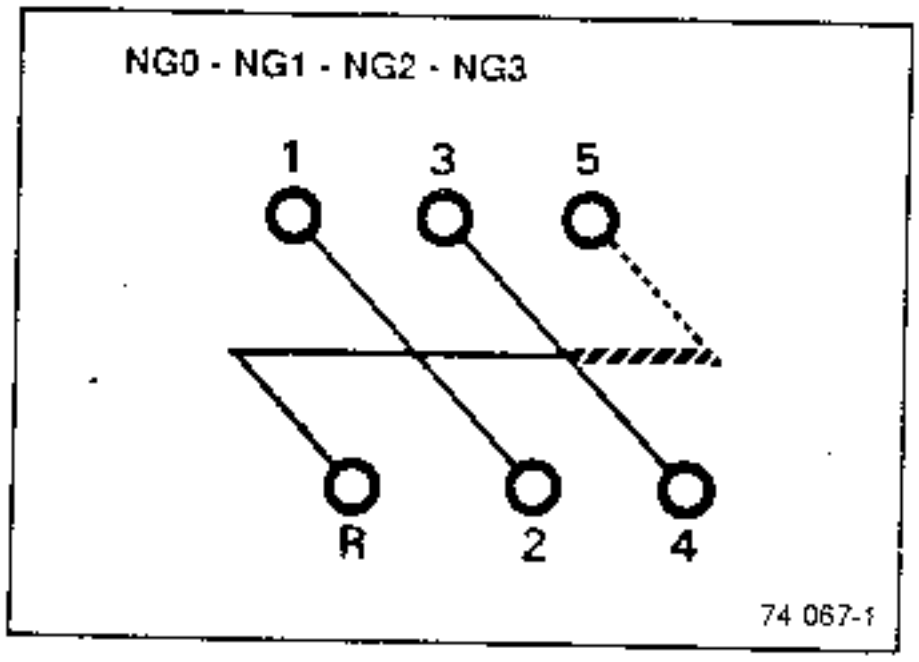

| Backlash |
|---|
| 0.12 to 0.25 mm |

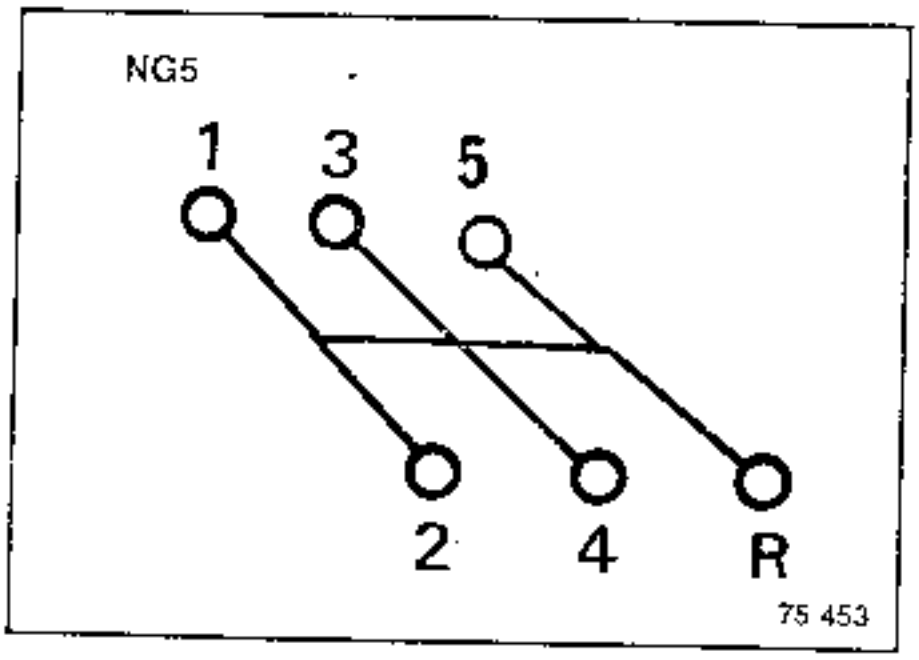
## NG0 and NG2 PRIMARY SHAFT BEARINGS

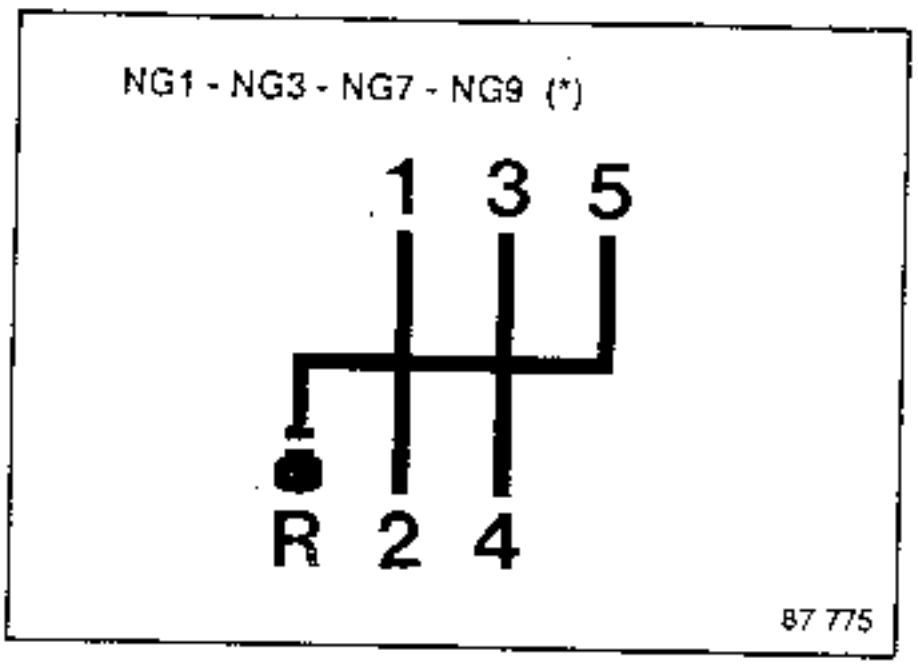



Clearance F = 0.02 to 0.12 mm

## SELECTOR GRILLE

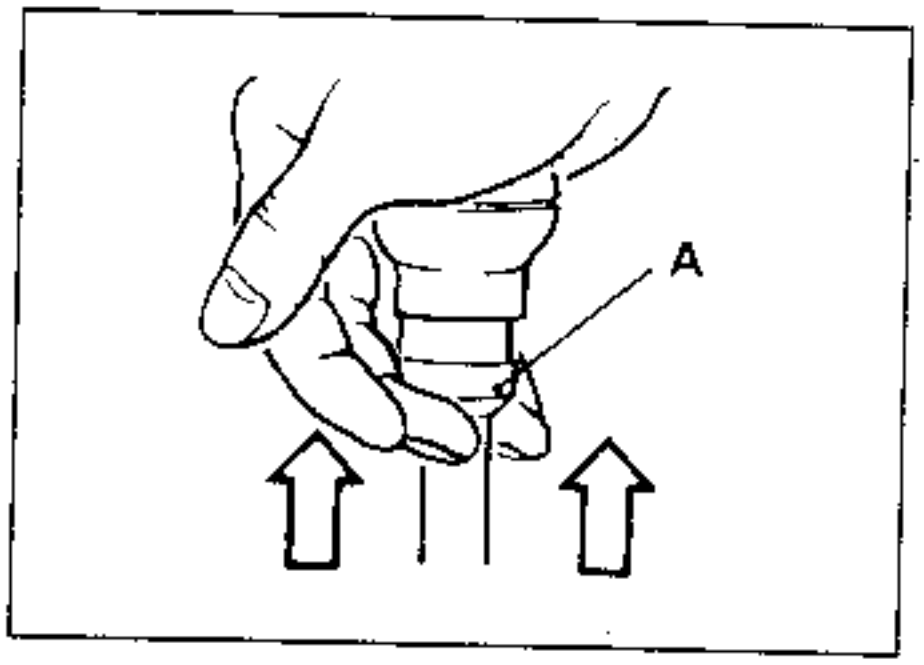



*) Gearboxes with the reverse gear positive locking system

To select reverse, lift ring (A) so that it touches the knob and move the lever.




Composition

| 4 -speed | 5 -speed | Differential number of planet wheels |
|---|---|---|
| NG0 | NG1 - NG5 | 2 |
| NG2 | NG3 - NG9 | 4 |
| | NG7 | 2 |
| | NG7 003 and 005 | 4 |

## MATCHED PARTS

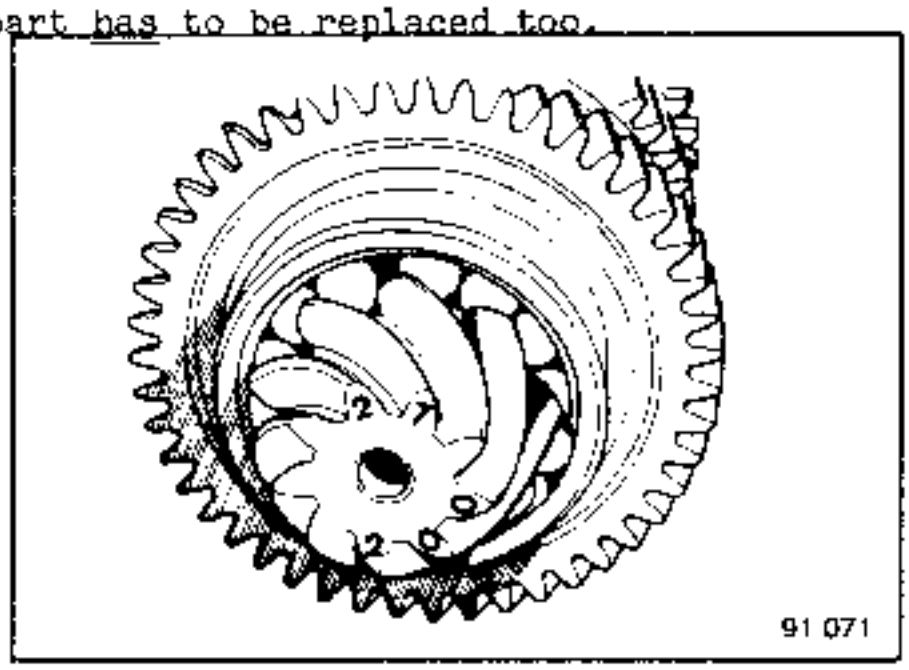
- Crown wheel and pinion.
- Synchro hub and slide gears
- Differential bearing race and track.

## FINAL DRIVE MATCHING

The final drive and crown wheel are ground together during manufacture.

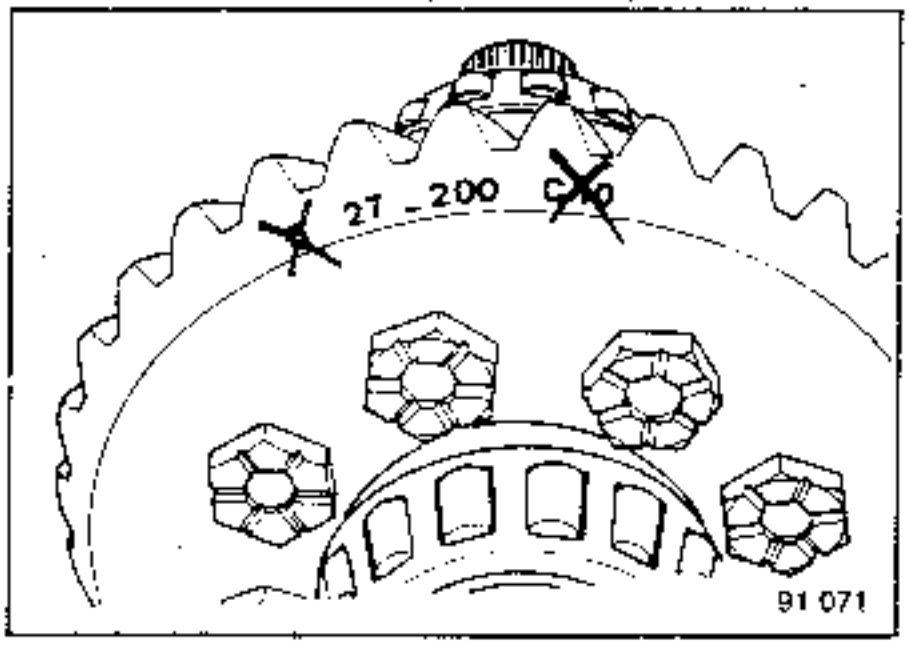
They cannot, therefore, be separated.

If one part is replaced then the other part has to be replaced too.




There is a common marking on the crown wheel and pinion.

For example: 27-200 (27th crown wheel machined on 200th day of the year).



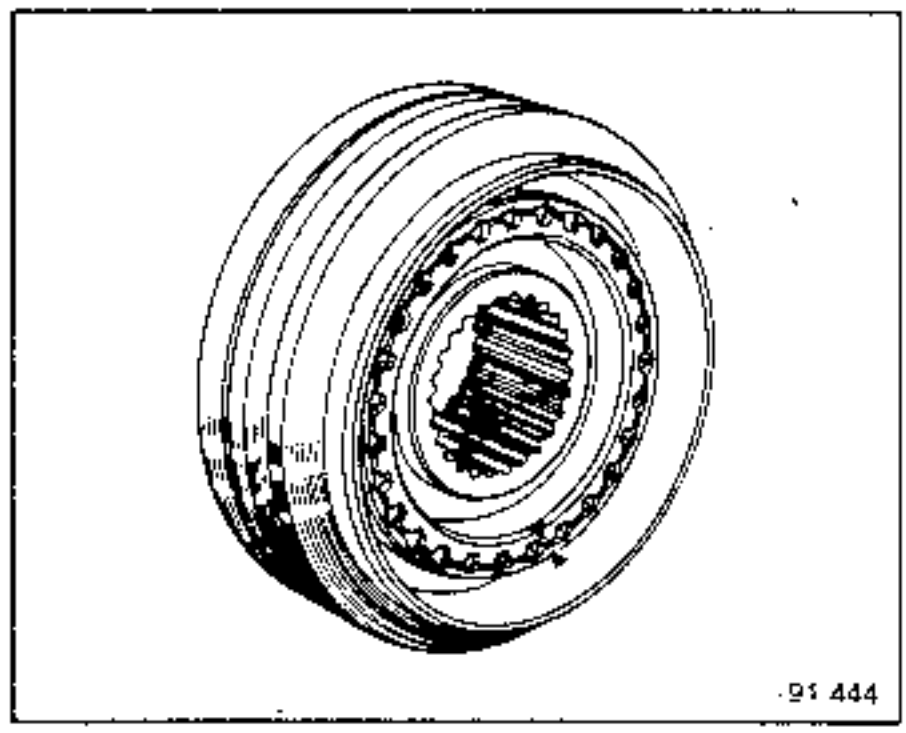

The backlash cannot be adjusted.

- the final drives on NG3 gearboxes can be cut in two different ways and fitted either way;

- electronic speedometer:
  the sensor ring gear cannot be dismantled.

## MATCHING THE SYNCHRO HUB/SLIDE GEAR

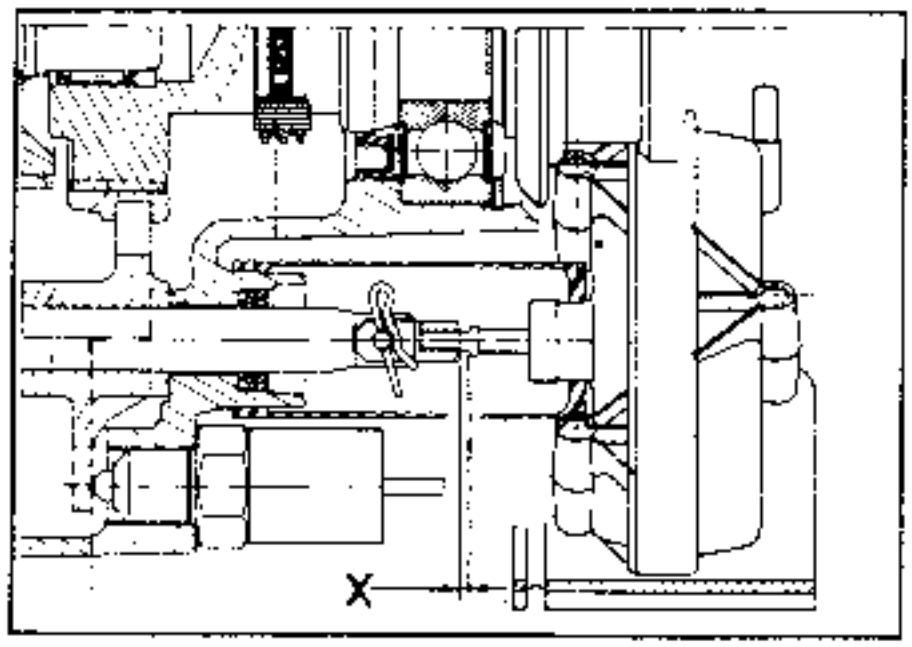
In all cases, it is advisable to mark the slide gears in relation to the hubs.




**NG7:**
The speedometer ring gear is moulded onto the hub (output shaft). If the ring gear is damaged the gearbox output shaft will have to be changed.
The gearbox output shaft lip seal can only be dismantled when the rear casing has been removed and the shaft and bearing control shafts dismantled.

Assembling the clevis pin on the vacuum capsule:
When replacing the vacuum capsule, ensure that the distance for locating the clevis pin on the control rod is correct:

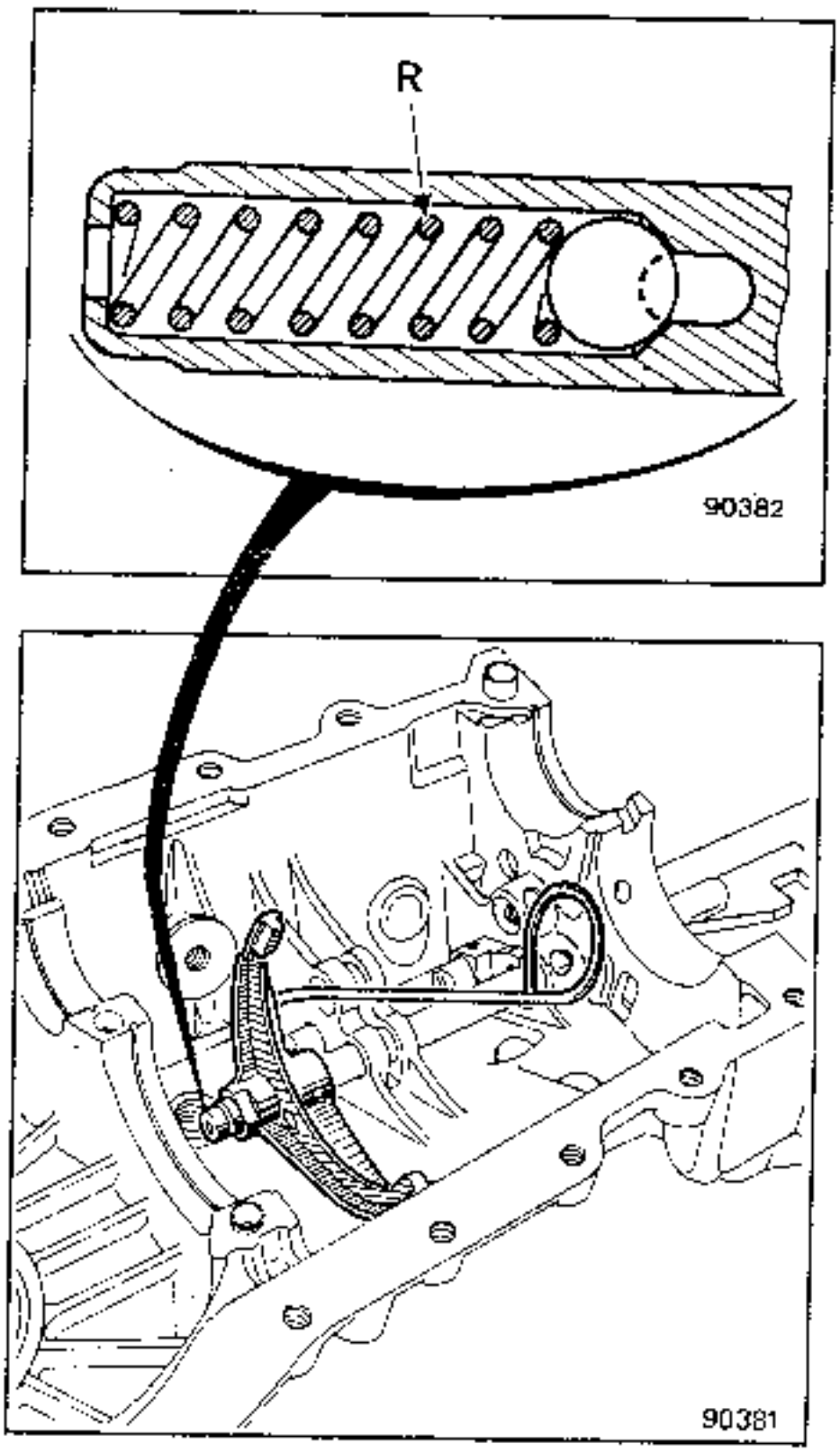
**X = 2 to 3 mm**



## 2ND GEAR SYNCHRO ASSISTANCE

This is a device enabling the quality of the 2nd gear change to be improved.

**Operation**
When changing into second gear, a proportion of the stress applied to the fork to move the slide gear is absorbed by spring **(R)** on the shaft, so as to enable the selector lever to move immediately but to retard the complete movement of the fork.




After fitting the rollpin, make sure that the fork slides on its shaft.

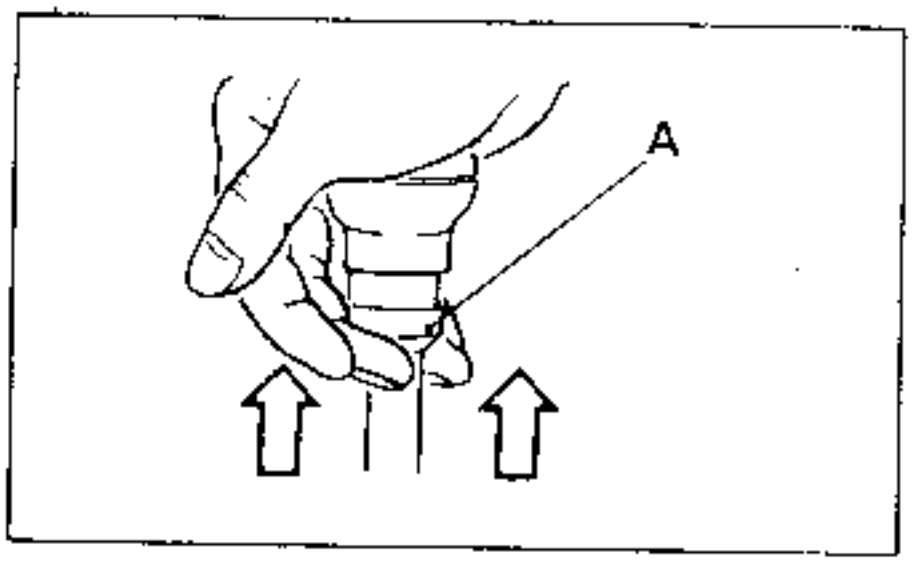
**NOTE:** In addition to this modification a 1st/2nd speed shaft locking plunger is fitted instead of a locking ball.

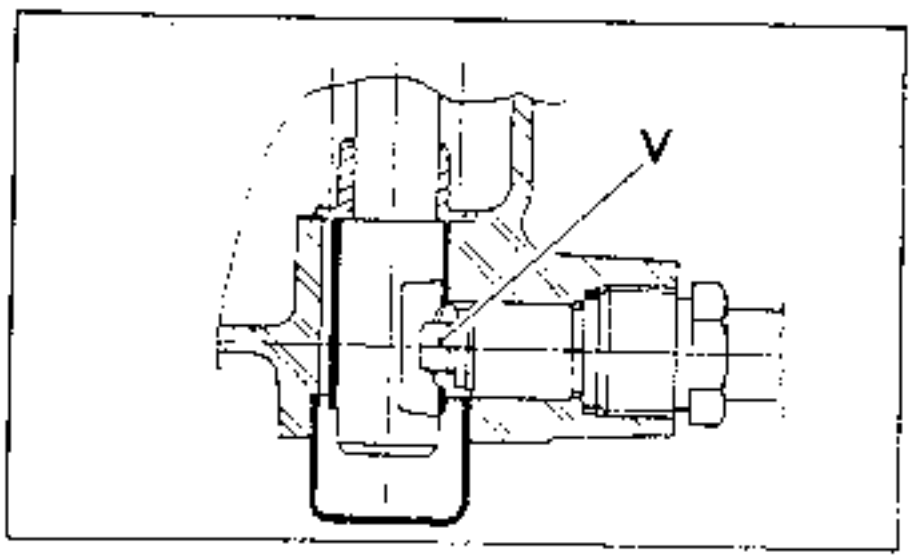
## REVERSE GEAR POSITIVE LOCKING DEVICE

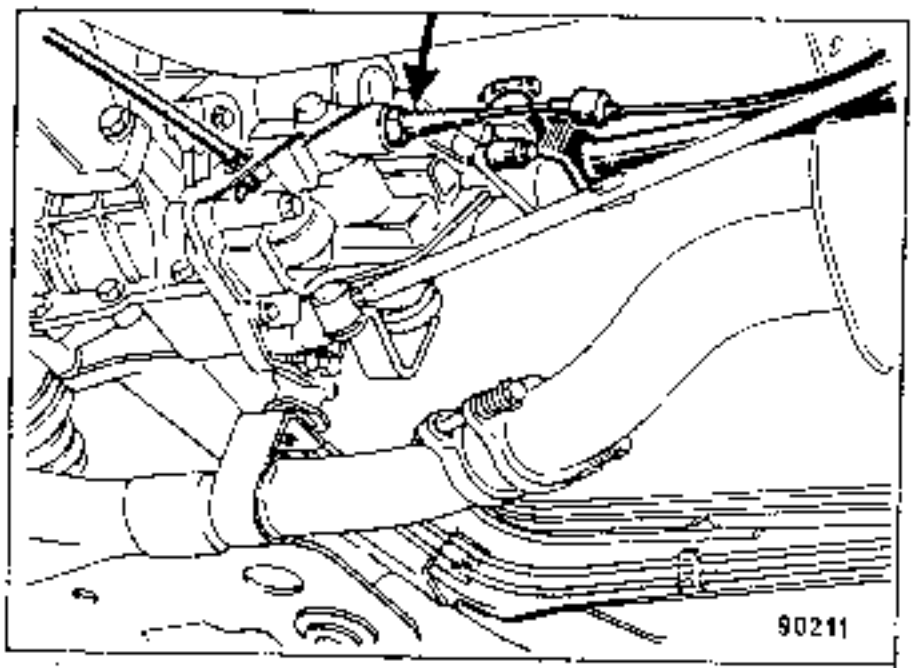
This system prevents reverse being engaged by mistake when changing quickly from 3rd to 2nd.

**Operation**
To select reverse, raise ring **(A)** and move the lever; the ring acts by means of a cable on the finger of a lock **(V)** mounted on the gearbox rear casing.

When this finger moves aside, reverse gear can be selected.

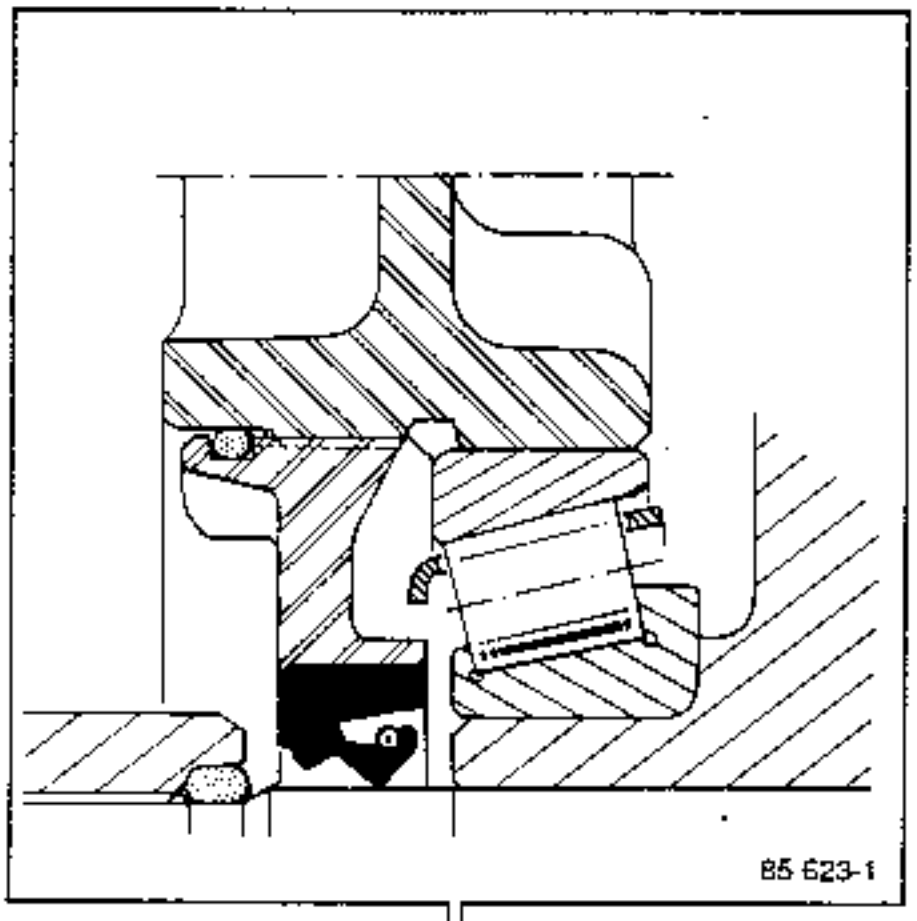


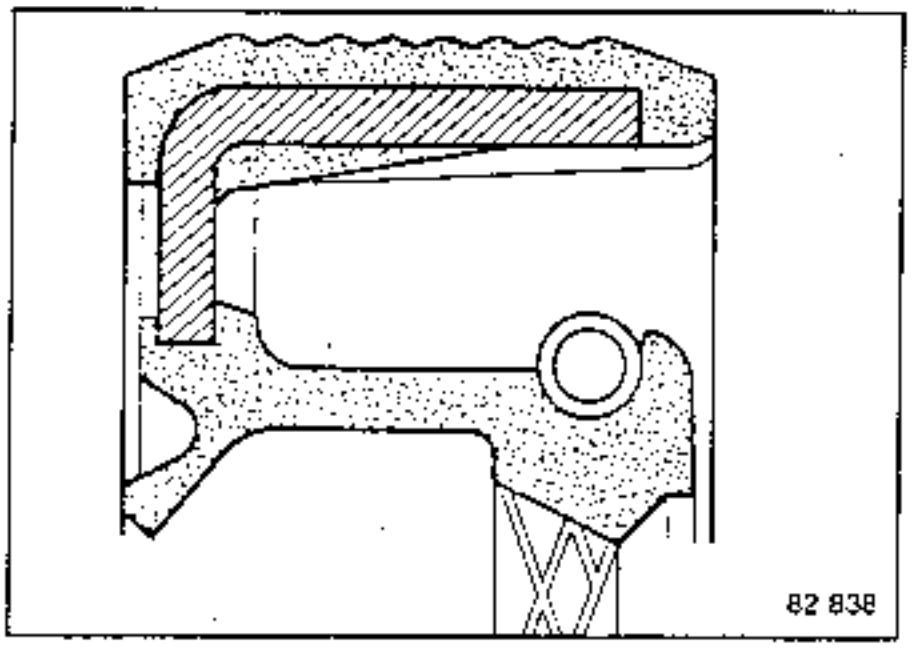



# I - Modification to the mounting of the differential lock nut and the type of lip seal

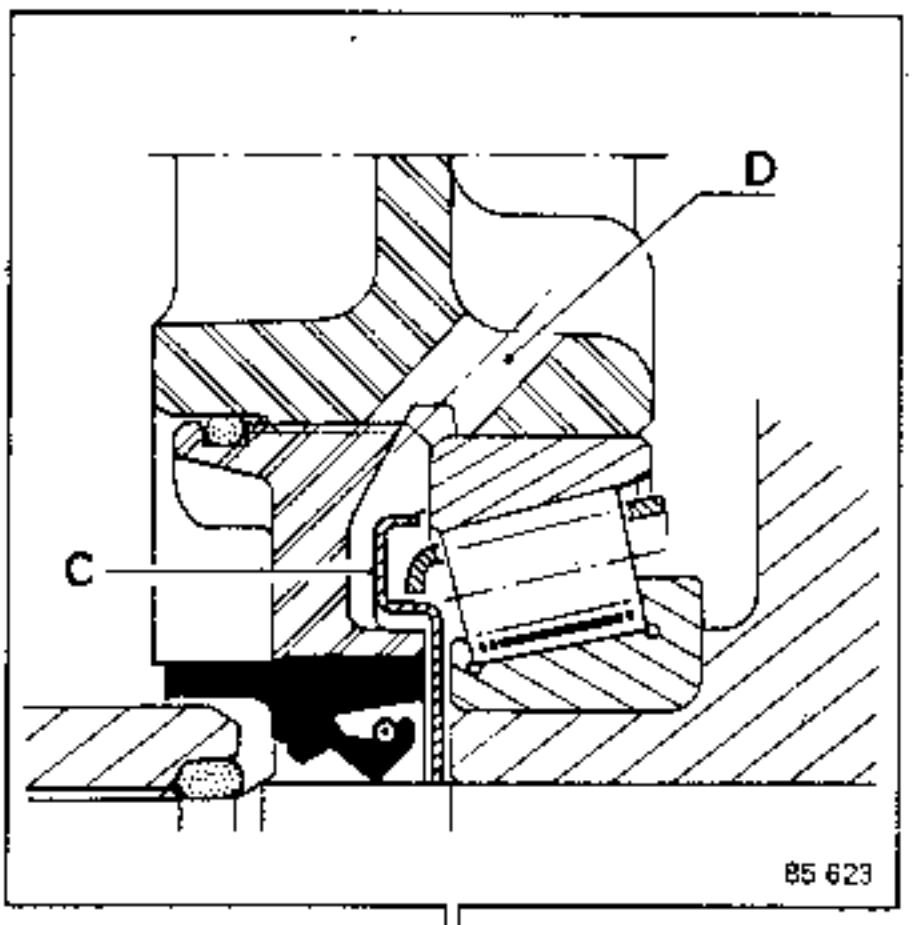
1st type



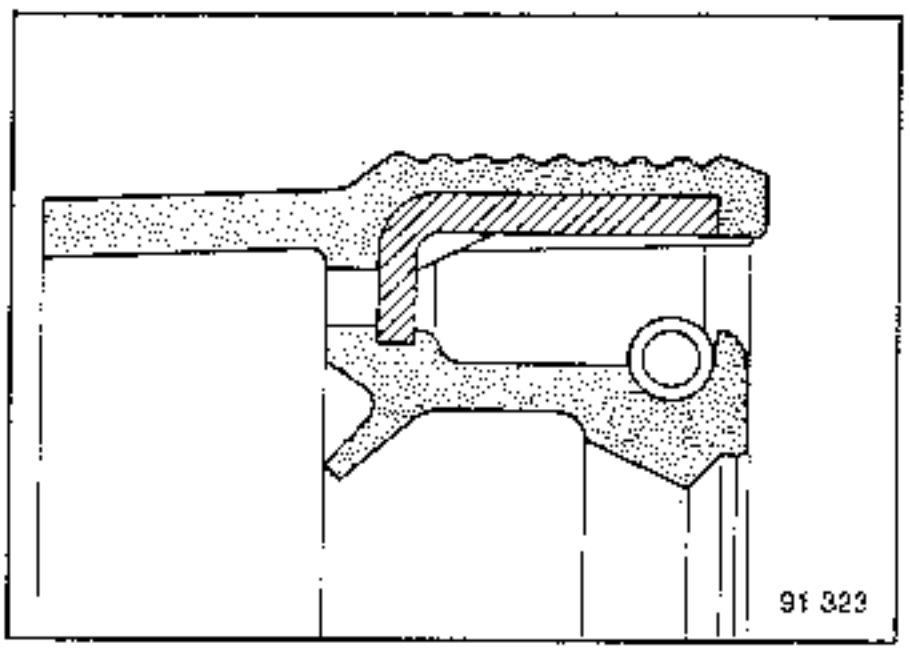

Seal with two lips




2nd type




Front bush-type seal



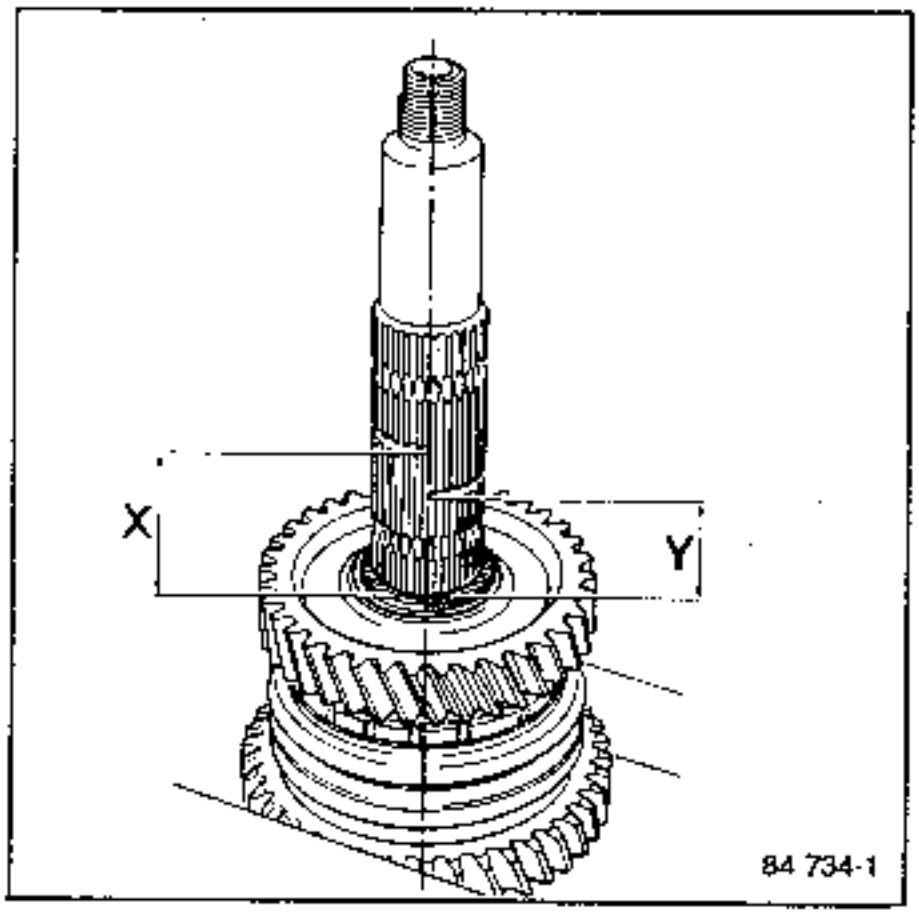

**ATTENTION**

The Parts Department only supplies the second type of nut equipped with a deflector **(C)**.
When fitting a new nut to a casing which does not have oilway **(D)**, deflector **(C)**, which is fitted quite tightly in the nut, MUST be removed.

**Special point:**
Addition of an oil deflector **(C)** on the differential lock nut mounted on a casing with additional oilway **(D)**.

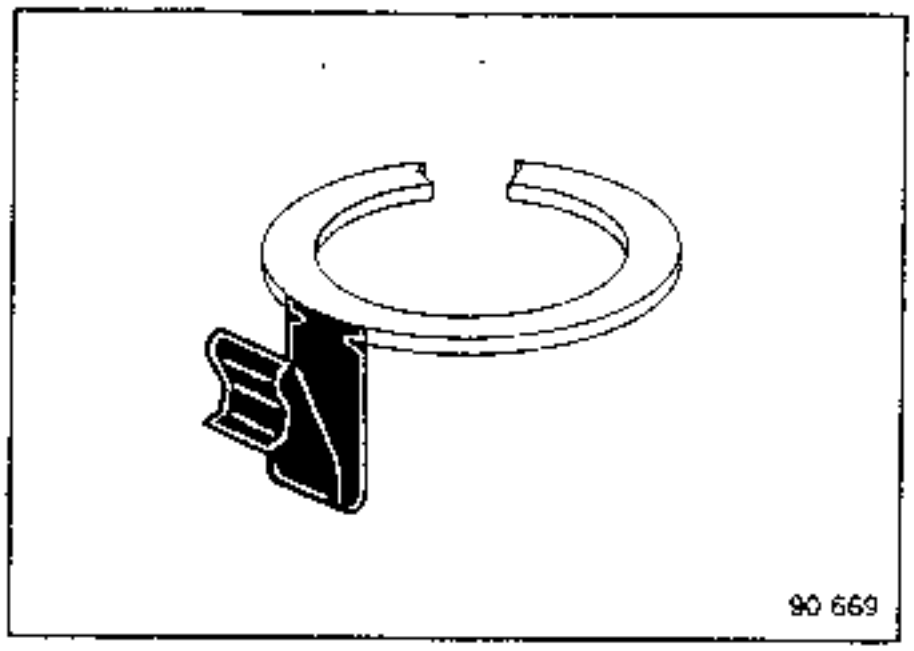
## II - Modification to the direction for fitting the 3rd/4th speed synchro, following movement of the snap ring groove on the secondary shaft

All the parts are identical but dimensions X and Y on the secondary shaft are different.

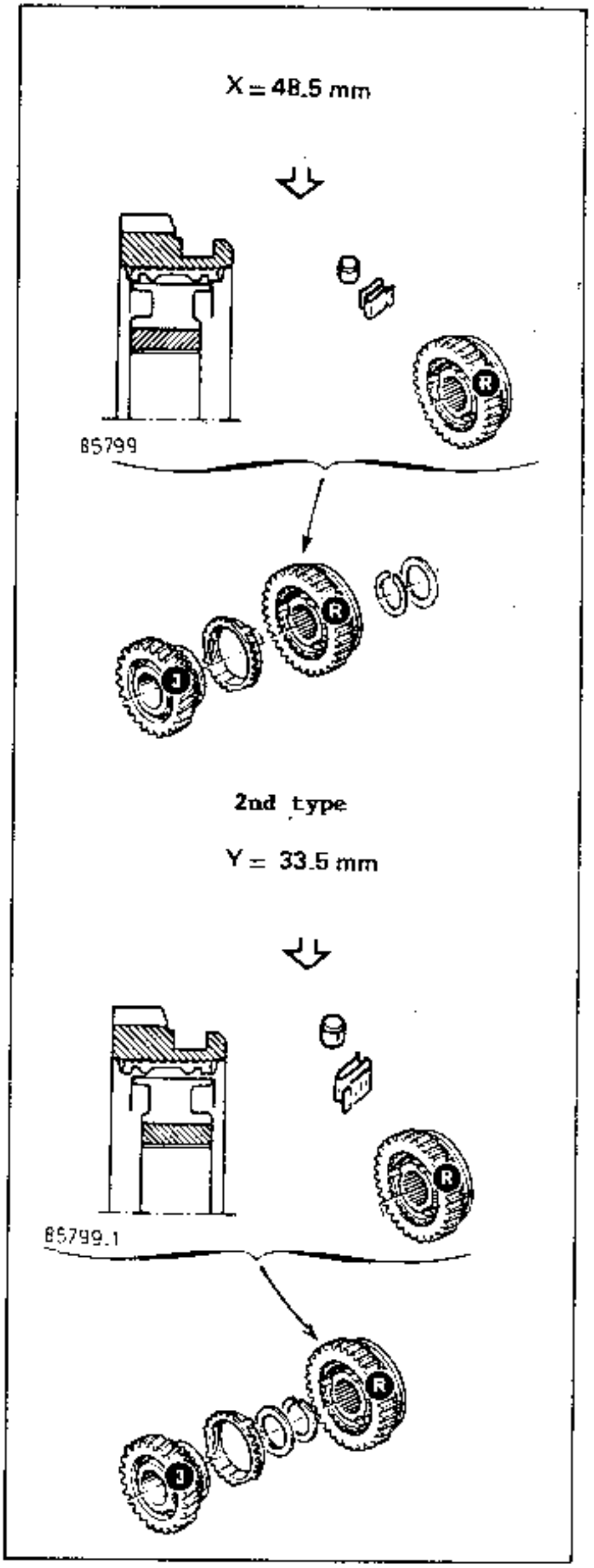



- 1st type: X = 48.5 mm
- 2nd type: Y = 33.5 mm

Make sure the synchro roller springs are fitted the correct way round.



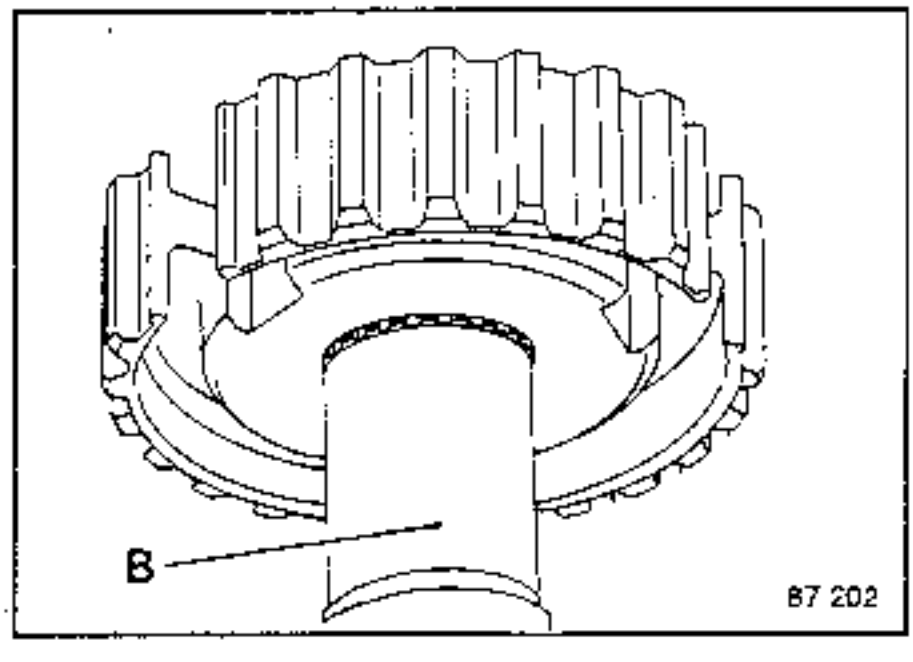

The locking tabs must be fitted so that they are on the snap ring side.



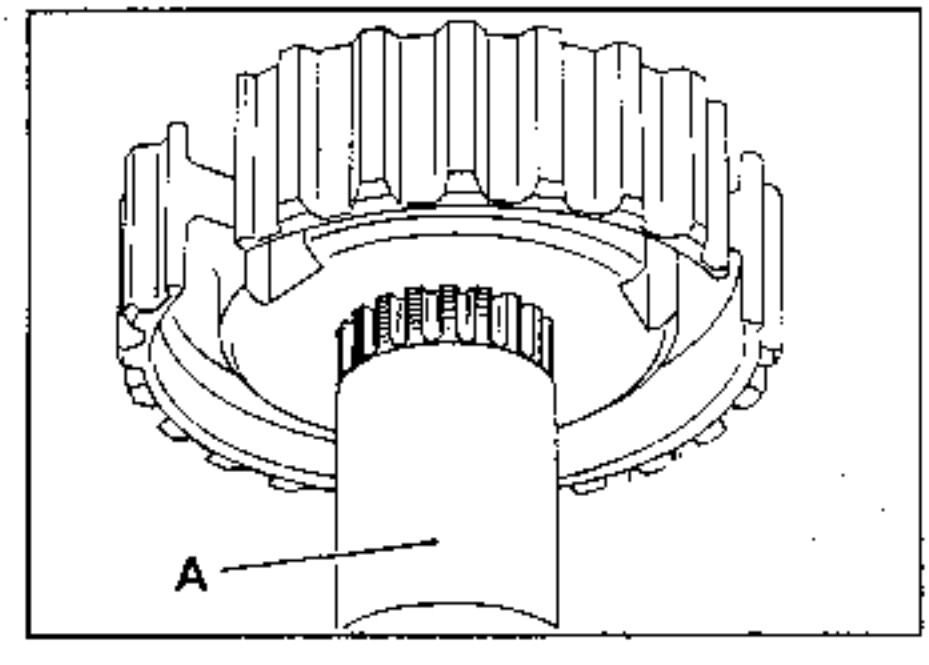
## III - Modification to the 5th speed assembly

The primary and secondary shaft splines holding the 5th speed synchro hub and fixed gear have been modified.

**1st type**
Shaft with straight splines **(B)**.




**2nd type**
Shaft with helical splines **(A)**.




### IDENTIFICATION

To identify the different shafts, place the shaft vertically and fit the 5th speed hub (primary shaft) or the 5th speed fixed gear (secondary shaft) on the splines.

The hub or fixed gear engages completely in the splines.

The hub or fixed gear does not engage completely in the splines.

### SPECIAL POINT

When reassembling the parts, the synchro hub and fixed gear must be bonded with **Loctite SCELBLOC.**

In this case the hub or fixed gear are a torque fit, the tightening torque required being between 100 daN and 1500 daN.

- An extractor tool must be used to dismantle these parts.
- When reassembling the parts, they must be coated with **Loctite FRENBLOC.**

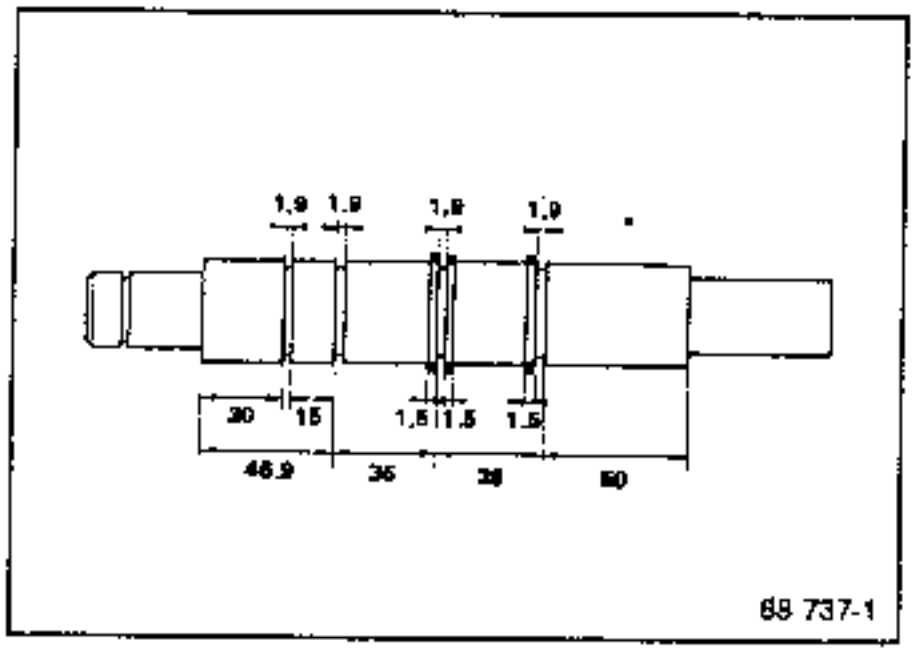
### NOTE

If excess Loctite is applied the 5th speed idler gear needle pin may become jammed.

## IV - Secondary shaft: enlargement of the snap ring grooves and splined washers

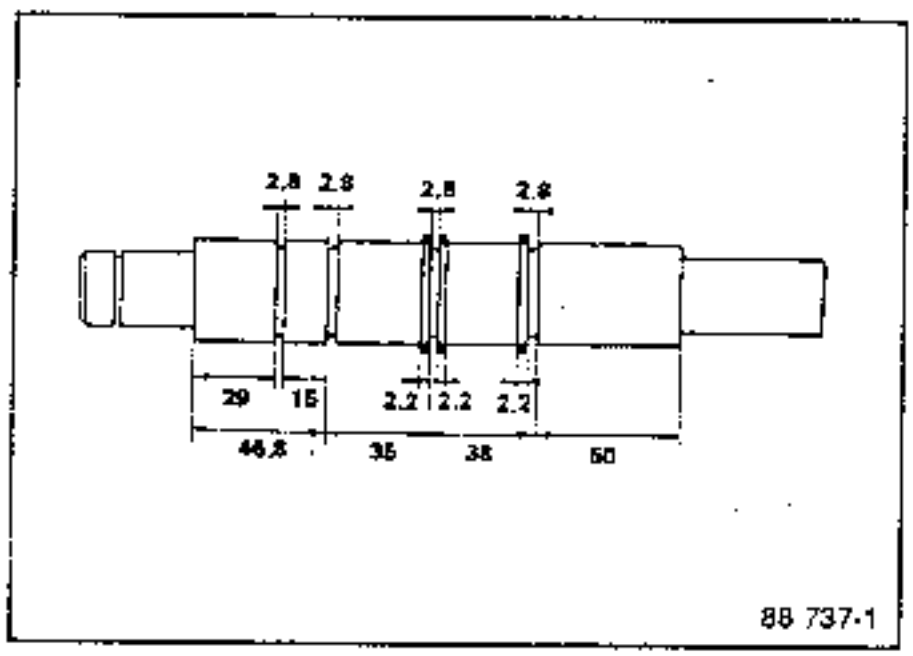
**1st type**

Snap ring: **1.9 mm**
Splined washer: **1.5 mm**




**2nd type**

Snap ring: **2.8 mm**
Splined washer: **2.2 mm**




Only the 2nd type of 1st speed idler gear can be used, irrespective of the original type fitted.

There may be an end play of approximately 2mm on a secondary shaft of the 1st type.

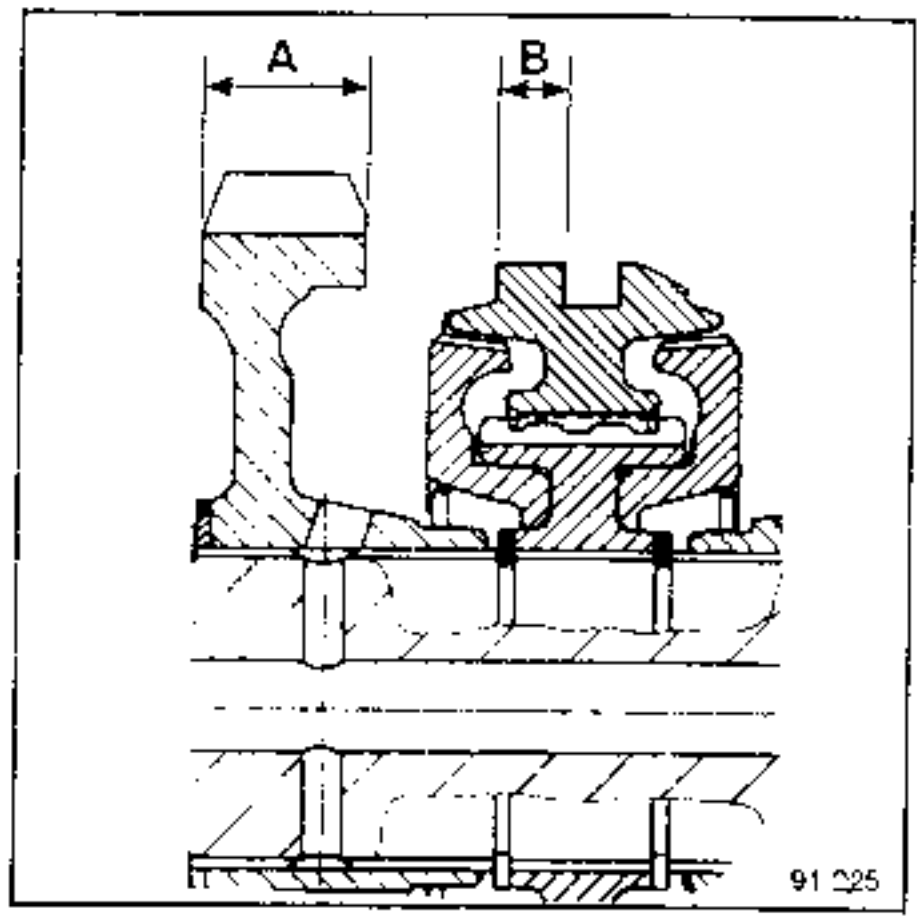
## V - Strengthening of the first speed idler gear teeth

In order to strengthen the first speed idler gear teeth, the rim width of the gear has been increased by 1.5 mm.

Fitting a larger gear means that the 1st/2nd speed slide gear has had to be modified.

Consequently, a first speed idler gear with an enlarged rim (dimension **A = 19 mm**) can only be assembled with a modified 1st/2nd slide gear (dimension **B = 6.4 mm**).

| | 1st speed drive gear | 1st/2nd idler gear |
|---|---|---|
| | Dimension A in mm | Dimension B in mm |
| 1st type | = 17.5 | = 7.9 |
| 2nd type | = 19 | = 6.4 |




**NOTE:** The second type of slide gear may be assembled with idler gears of the first or second type.

## VI - Lubrication

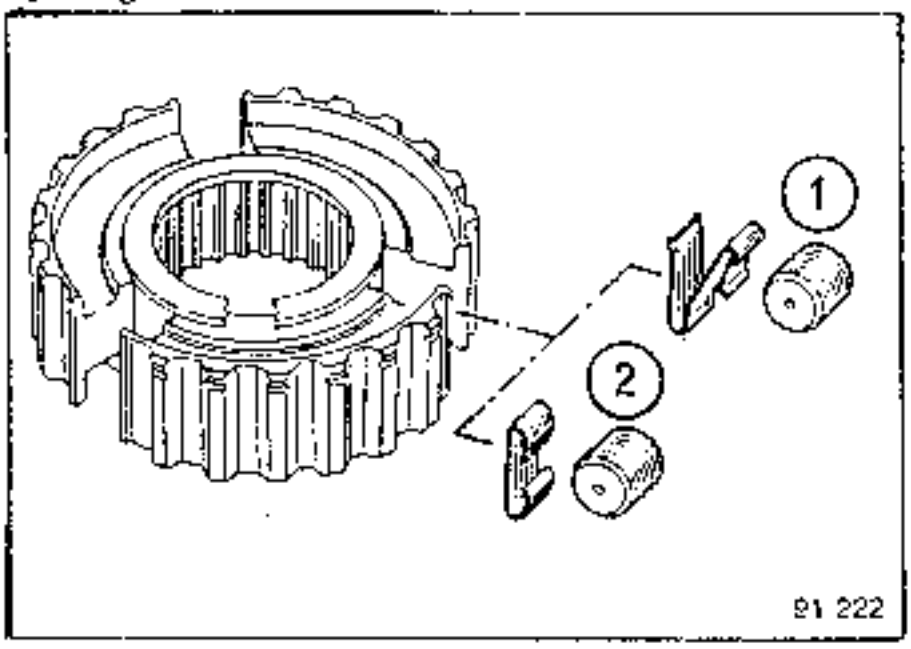
**The gearbox oil grade for TURBO PETROL B29E and B292 VEHICLES has been modified.**

In order to provide better resistance to the high temperatures to which the gearboxes on these vehicles are subject, the manual gearboxes must only be lubricated with the high temperature oil recently approved by Renault:

**TRANSELF TRX 80 W**

## VII - Changing the type of spring on the 3rd/4th speed synchro roller (BORG-WARNER)

The "Z"-shaped springs used until now have been replaced by "heart-shaped" springs.



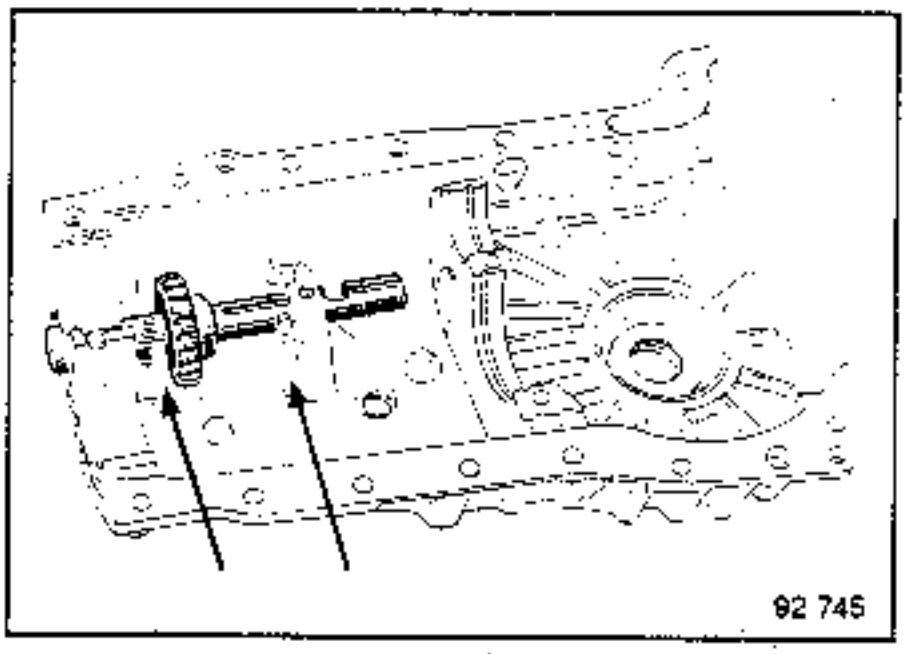

1 - 1st type
2 - 2nd type

In order that heart shaped springs can be fitted, the inlet chamfer for the bevel shoulder under the 3rd and 4th speed idler gear synchros has been modified.

Consequently, the heart-shaped springs can only be used with modified idler gears.

## MECHANISM CASINGS

**On the lefthand casing:**
The reverse gear intermediate drive gear shaft bearings have been strengthened.

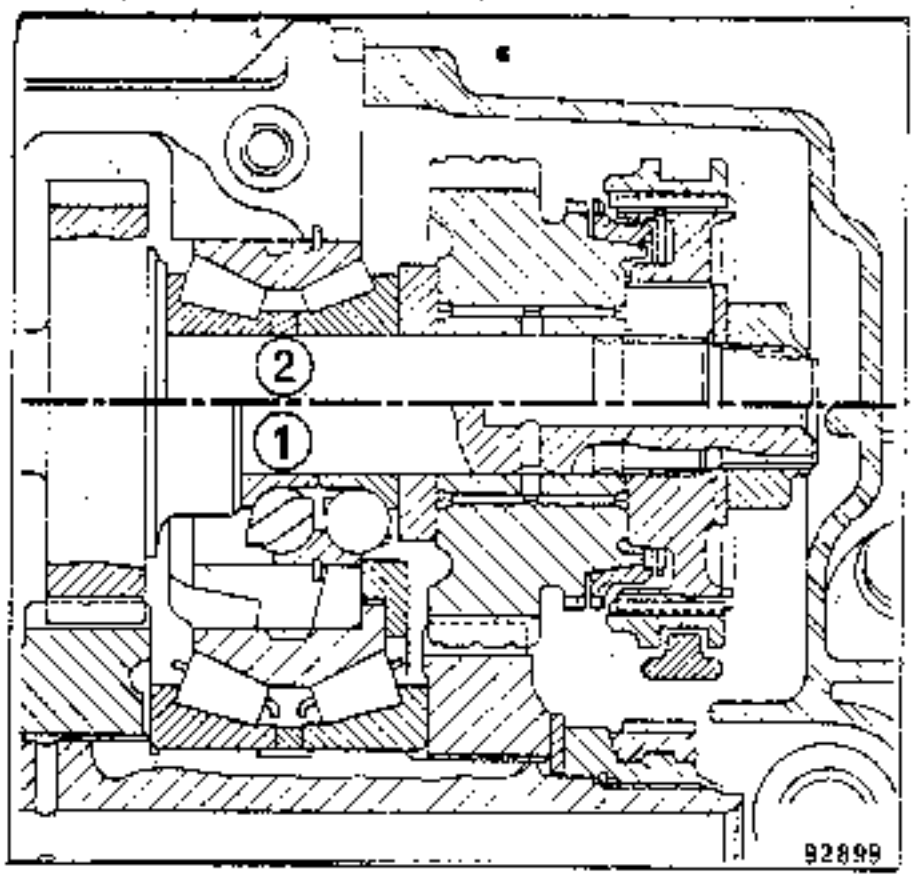


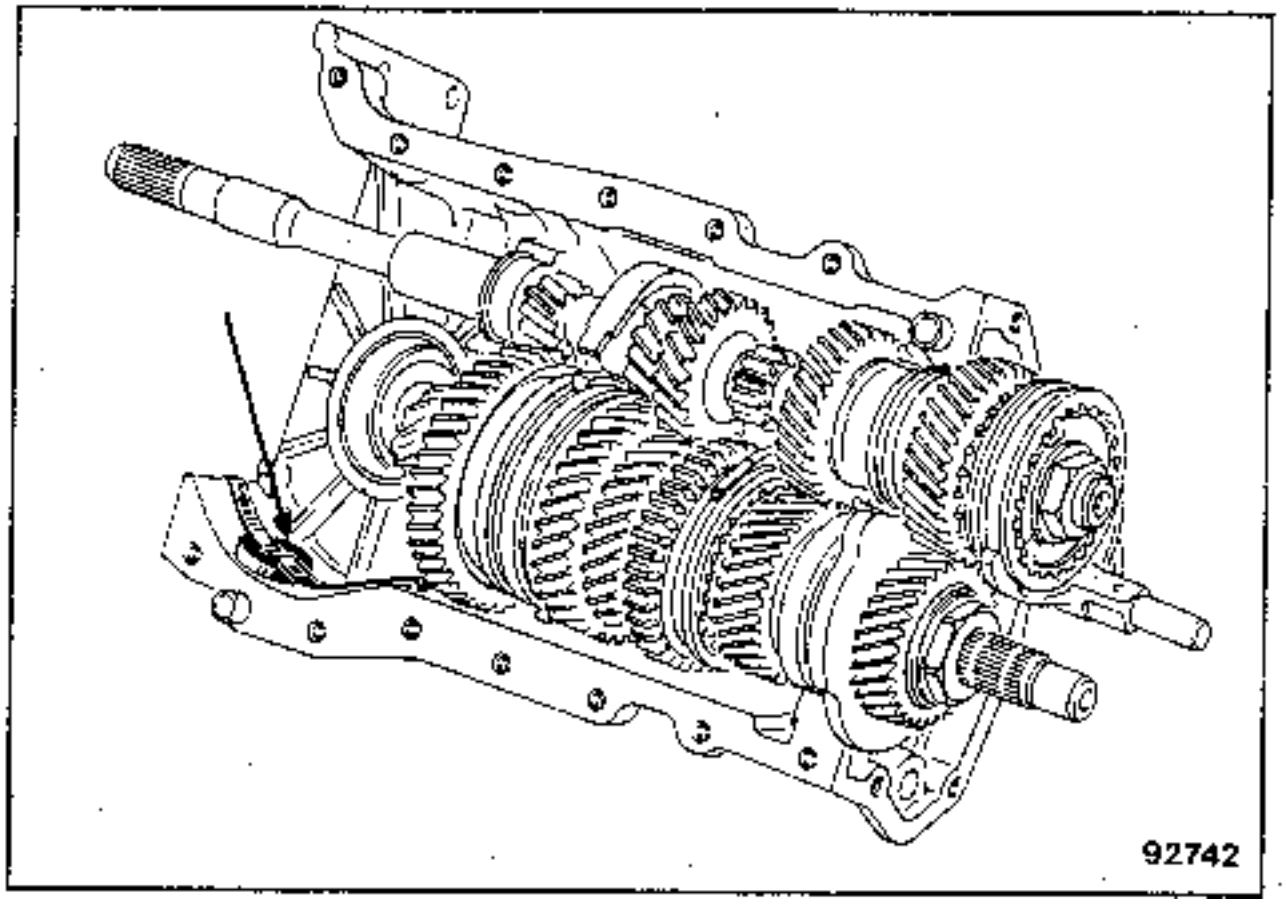

**On the righthand casing:**
A permanent magnet (of the type fitted to JB gearboxes) is secured by a bar and an unmagnetized drain plug.

## NG3: 088 - 089 - 090

- New "small module" teeth for the 3rd, 4th and 5th speed gears.

- Modified primary shaft with a set of taper roller bearings 2 instead of a bearing with a dual row of balls on the rear bearing journal.



| Description | Pack size | Parts no. | To be used for: |
|---|---|---|---|
| No. 20 grease | 1 g sachet | 77 01 032 832 | Sun wheel splines<br>Shaft splines<br>Fork pivot<br>Release bearing guide<br>Fork pads } Clutch |
| Loctite "518" | 24 ml syringe | 77 01 421 162 | Housing assembly faces |
| CAF 4/60 THIXO | 100 g tube | 77 01 404 452 | Screwed plugs and switches<br>Locking ball plugs<br>Ends of spring pins on drive-shafts |
| Loctite FRENBLOC (Locking and sealing resin) | 24 cc bottle | 77 01 394 071 | Primary & secondary shaft nuts<br>5th speed fixed gear and hub<br>Engagement actuator |
| Loctite SCELBLOC (Locking and sealing resin) | 24 cc bottle | 77 01 394 072 | 5th speed fixed gear<br>5th speed hub } (depending on type of assembly) |
| Perfect-Seal "LOWAC" (Fluid coating, seals) | 100 g tube | 77 01 417 404 | Paper gaskets on rear and step down covers except NG7 |
| Gearbox oil | | | Immersion of all parts |

## Parts to be replaced systematically

**when they have been removed:**

- all paper gaskets;
- all lip-type oil seals;
- all differential housing bolts;
- all rollpins;
- reverse lever bolt;
- all O-ring seals;
- the thrust pad guide tube;
- all snap rings;
- the primary and secondary shaft nuts;
- the speedometer drive gear;
- the output flange bolt (NG7);
- the spring washer on the 5th speed fixed gear.

## GRATING WHEN ONE GEAR IS ENGAGED
## (after first checking the clutch)

KEY :

Check

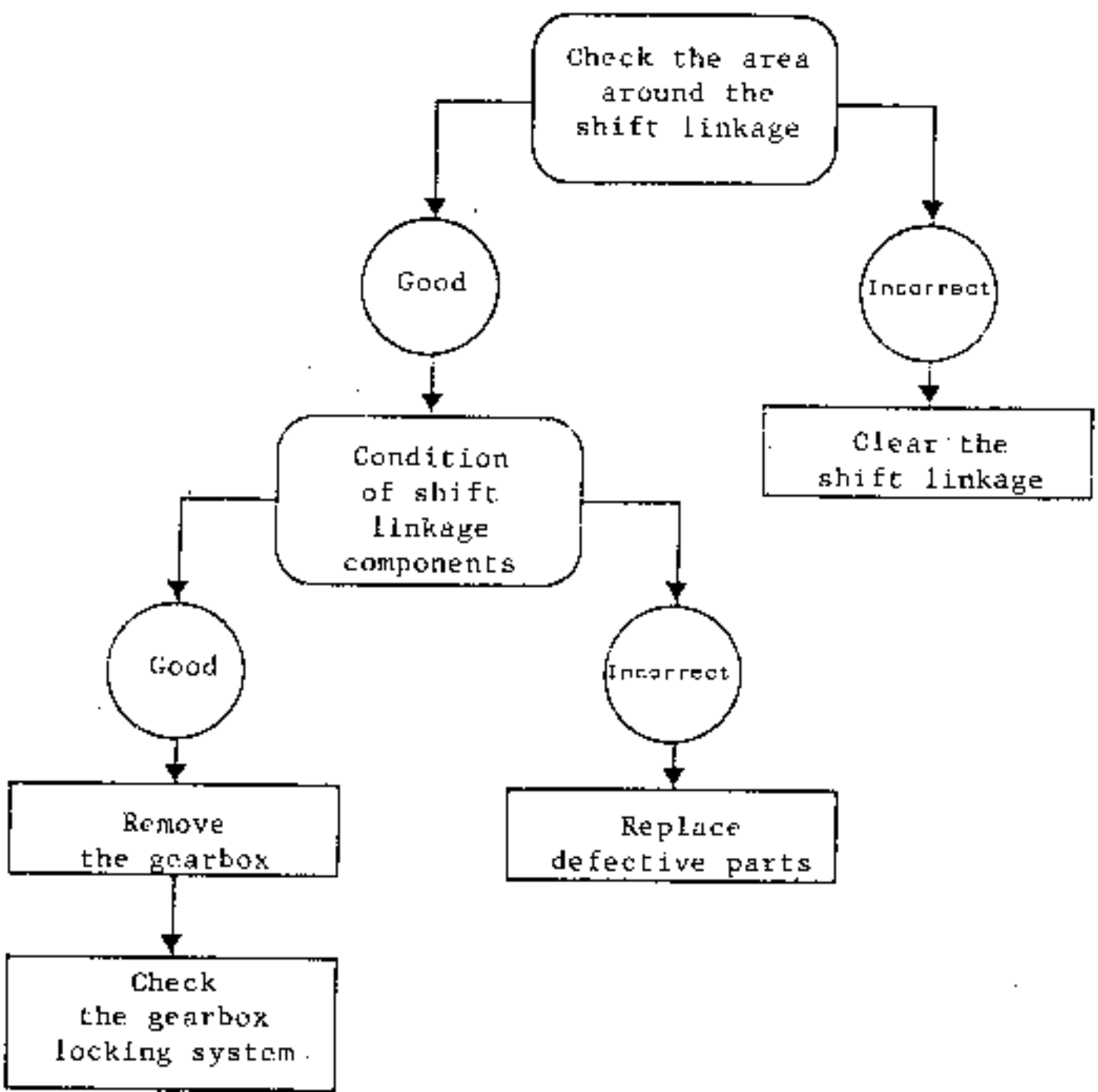
Operation to be carried out

Remove the gearbox

↓

Check the synchroniser assembly of gear in question:
- Gear and synchroniser ring friction cones
- The synchroniser hub and springs
- The gear and sliding gear dogs

## IMPOSSIBLE TO ENGAGE GEARS
## (after first checking the clutch)

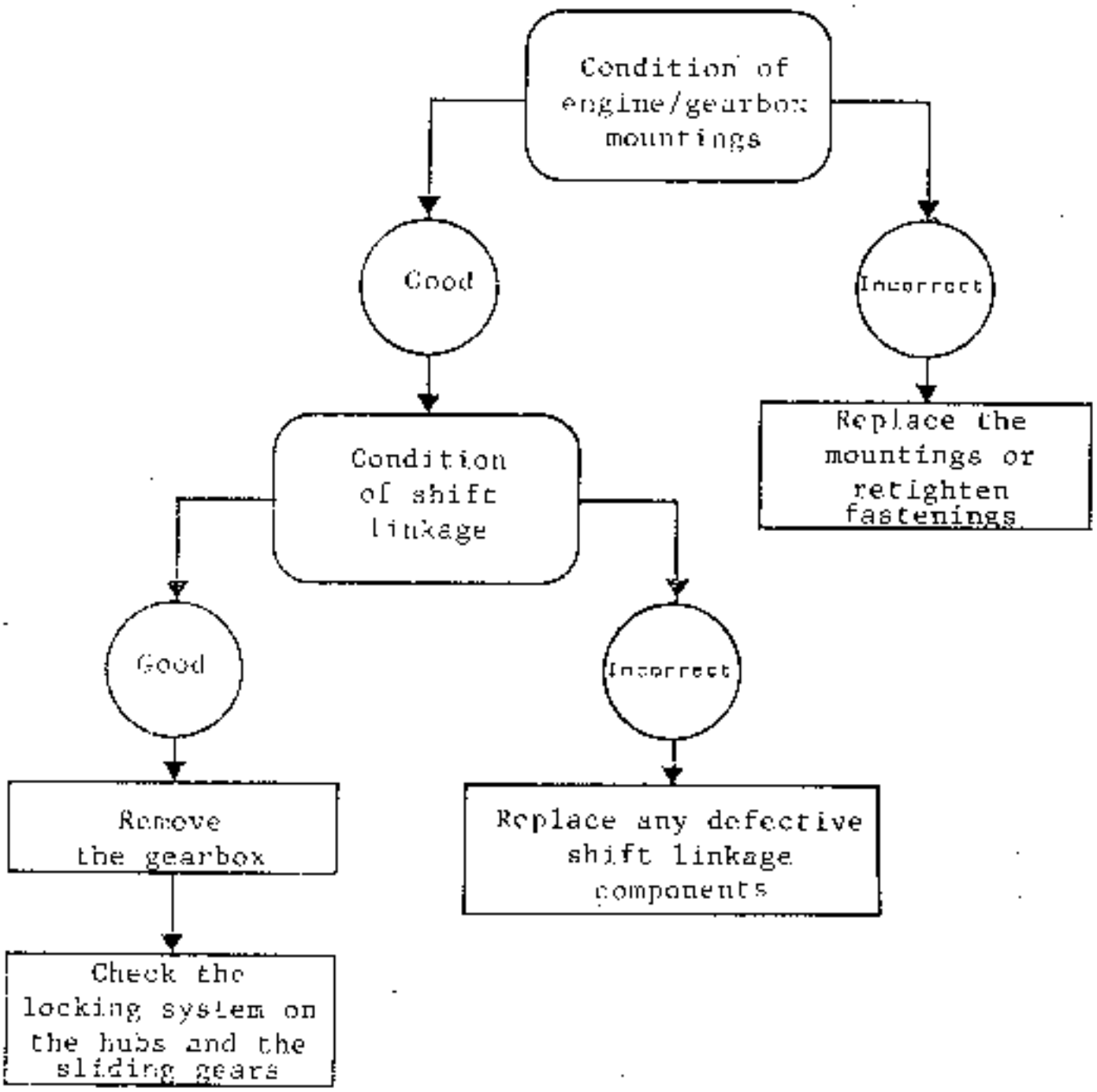


KEY:

Check

Operations to be carried out

## SLIPPING OUT OF GEAR

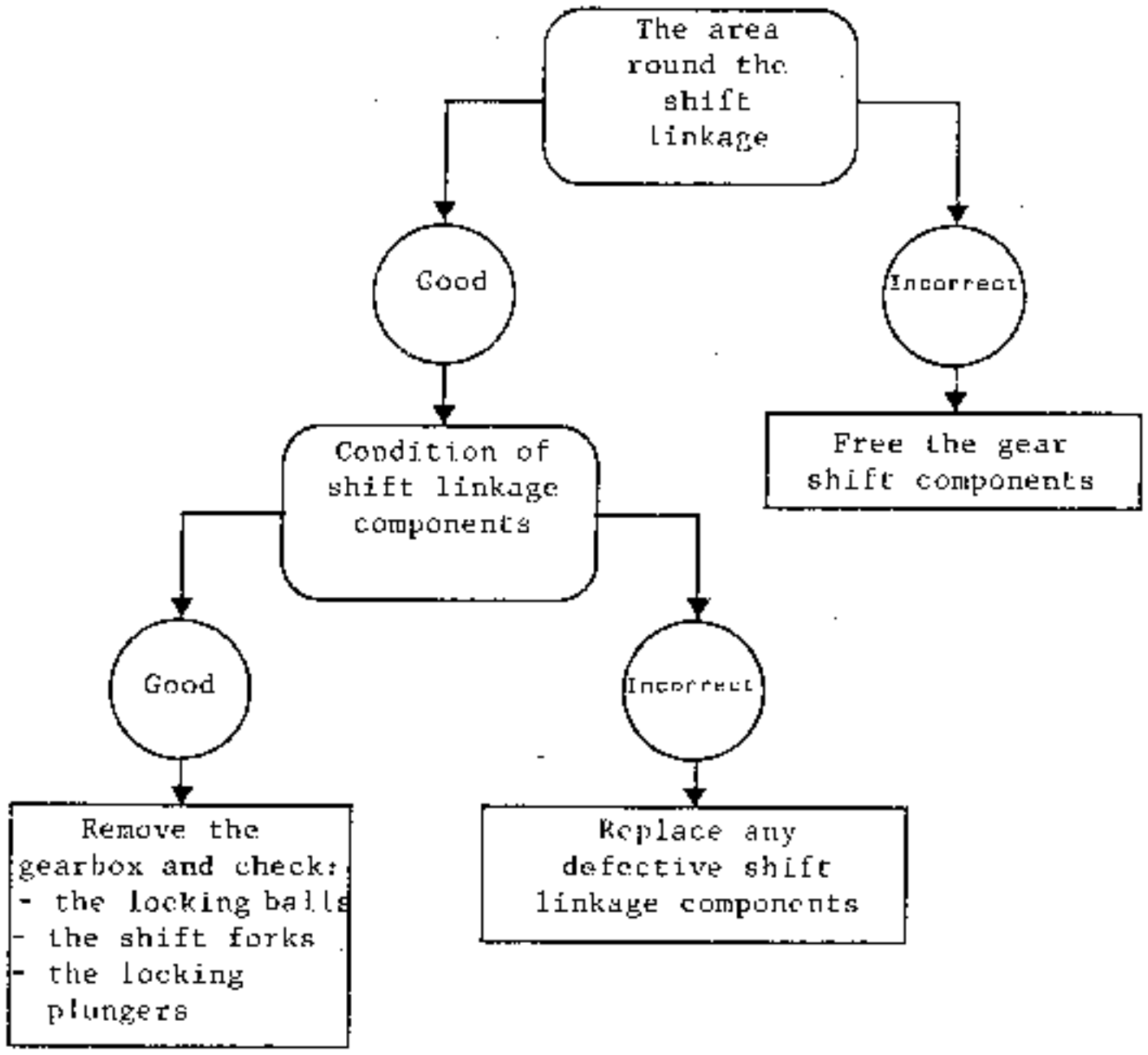


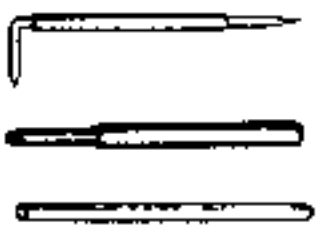
## JAMMING IN ONE GEAR

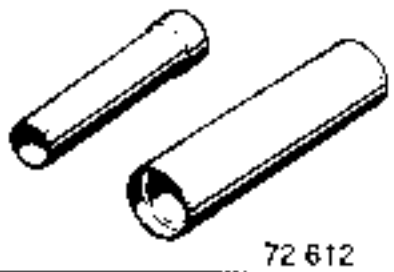
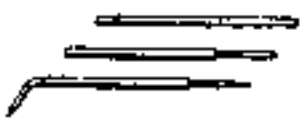
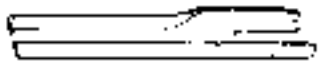
KEY:

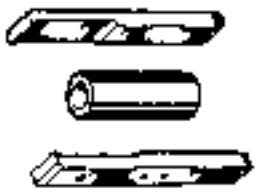
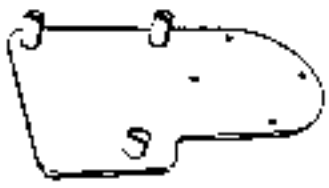
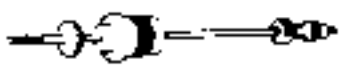
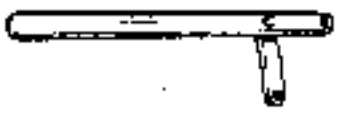
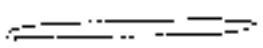
Check

Operations to be carried out



| Illustration | Methods Reference | Part no. | Description |
|---|---|---|---|
|  68 994 | B. VI. 022-01 | 00 01 216 401 | Extractor without shell |
|  71 625 | B. VI. 28-01 | 00 01 227 301 | Extractor with interchangeable claws |
|  68 997-1 | B. VI. 31-01 | 00 01 259 401 | Set of 3 punches for fitting 5 mm ø spring pins |
|  69 001 | B. Vi. 39 | 00 01 322 500 | Drift for 4 and 10 mm rollpins |
|  69 005 | B. Vi. 41 | 00 01 234 800 | Shell with 23.5 mm opening for bearing extractor **B.Vi.22-01** |
| | B. Vi. 47 | 00 01 331 100 | Shell with 28 mm opening for bearing extractor **B.Vi.22-01** |
|  69 006 | B. Vi. 48 | 00 01 330 300 | Set of 2 jaws with big tips (for use with **B.Vi.28-01**) |
|  69 009 | B. Vi. 204-01 | 00 00 020 401 | 32 mm wrench for secondary shaft nut |

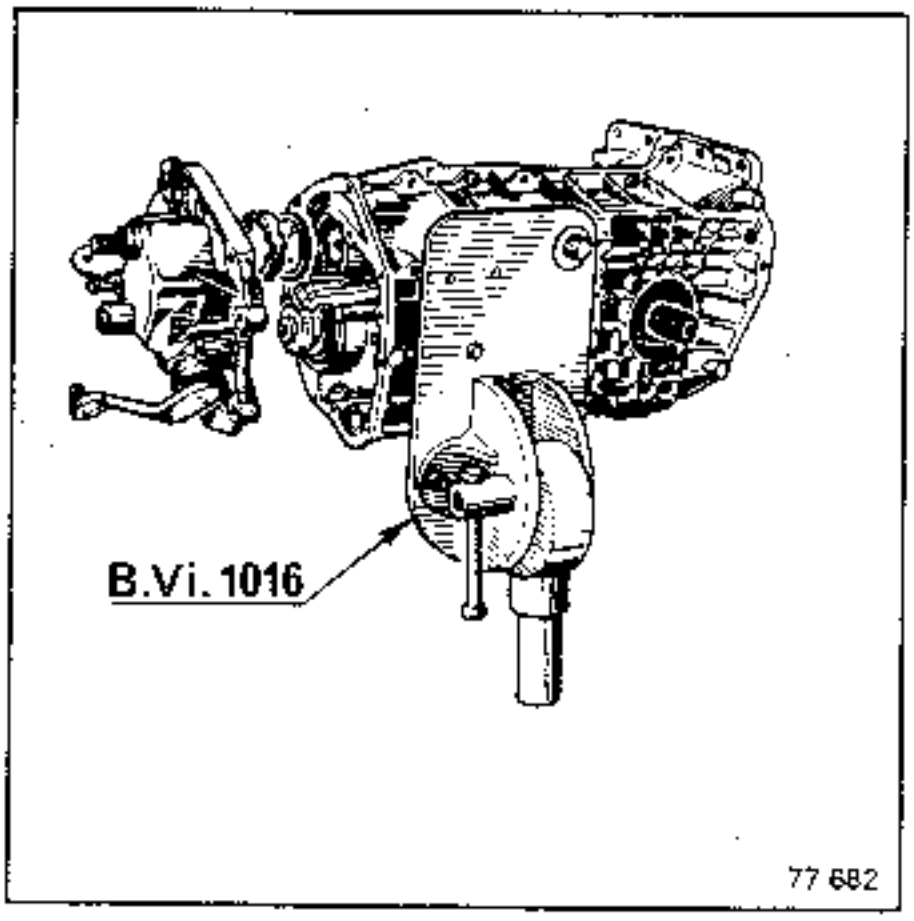
| Illustration | Methods Reference | Part no. | Description |
|---|---|---|---|
|  72 612 | B. Vi. 488 | 00 00 048 800 | Clutch shaft oil seal inserting and protecting tool |
|  72 612 | B. Vi. 526 | 00 00 052 600 | Clutch shaft oil seal inserting and protecting tool |
|  77 743 | B. Vi. 606 | 00 00 060 600 | Set of punches for replacing 6 mm dia. spring pins |
|  79 405 | B. Vi. 747 | 00 00 074 700 | Fork for removing and refitting the selector spring |
|  87 188 | B. Vi. 807-01 | 00 00 080 701 | Differential ring nut wrench New type of sealing |
|  81 786 | B. Vi. 813 | 00 00 081 300 | Differential ring nut oil seal protector When passing over splines |
|  84 912 | B. Vi. 883 | 00 00 088 300 | Differential collar press tool |
|  84 617 | B. Vi. 905-02 | 00 00 090 502 | Tools for replacing the speedometer drive shaft. |

| Illustration | Methods Reference | Part no. | Description |
|---|---|---|---|
|  87 216 | B. Vi. 1003 | 00 00 100 300 | Extractor for removing the 5th speed hub from the primary shaft |
|  87 57? | B. Vi. 1007 | 00 00 100 700 | Set of 2 claws and a protective end fitting for gear wheel extractor (for use with **B.Vi.28-01**) |
|  77 749 | B. Vi. 1016 | 00 00 101 600 | Gearbox support plate |
|  92 914 | B. Vi. 1154 | 00 00 115 400 | Differential oil seal fitting tool |
|  84 328 | Emb. 880 | 00 00 088 000 | Clutch fork pin extractor |
|  69 306-1 | Rou. 015-01 | 00 01 331 601 | Protective end cup with 16 mm dia. bore for shaft |
|  7 672 | Rou. 604-01 | 00 00 060 401 | Hub locking tool |
|  69 376 | Car. 041 | 00 01 310 400 | Extractor for 6 mm dia. door hinge pins |

## SEPARATING THE CASINGS

The parts must be dismantled and handled on a bench with an anti-impact covering (thick rubber or plastic)

Secure the gearbox to stand **B.Vi. 1016.**

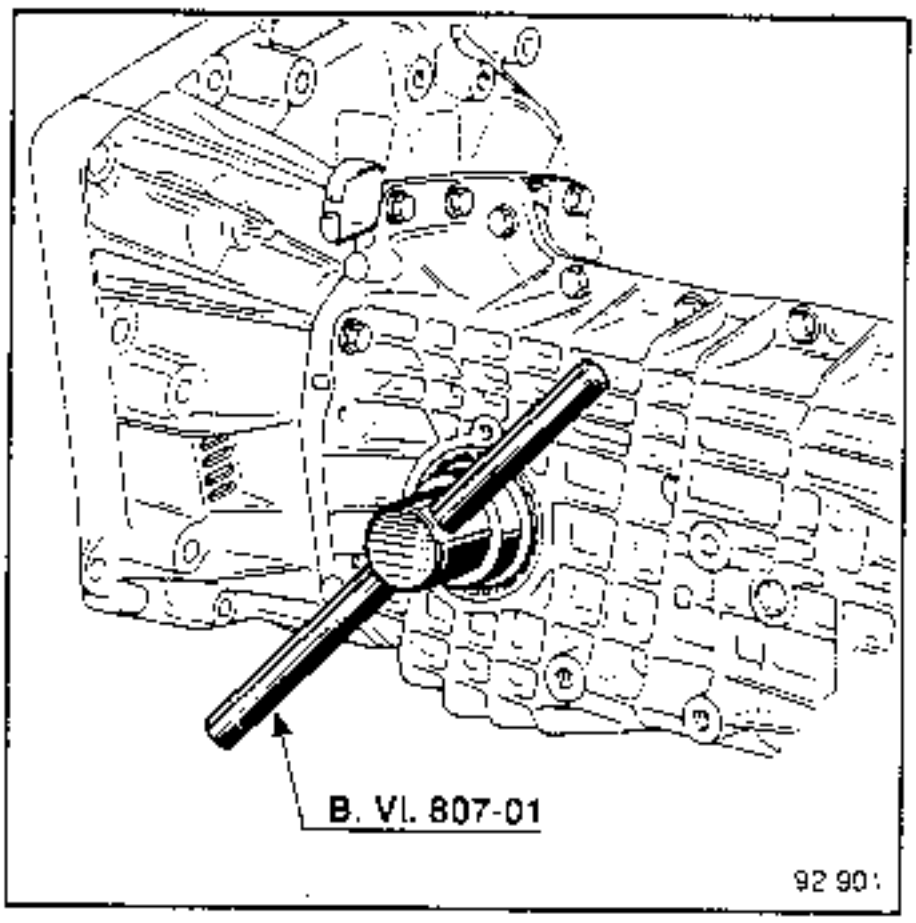



Make a mark on the casings and differential lock nuts.

Remove the lock plates.

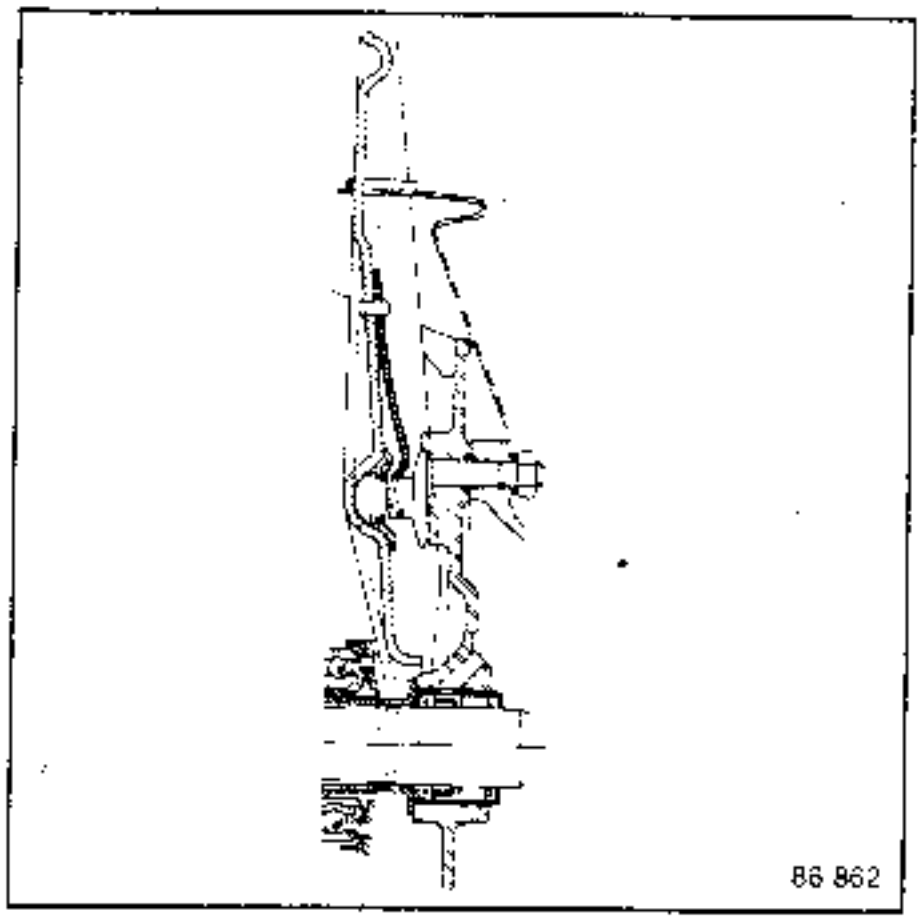
Using tool **B.Vi.807-01**, slacken one nut by 1/6 of a turn so as to cancel the differential bearing pre-load.

Remove the O-ring seals from the sunwheels.



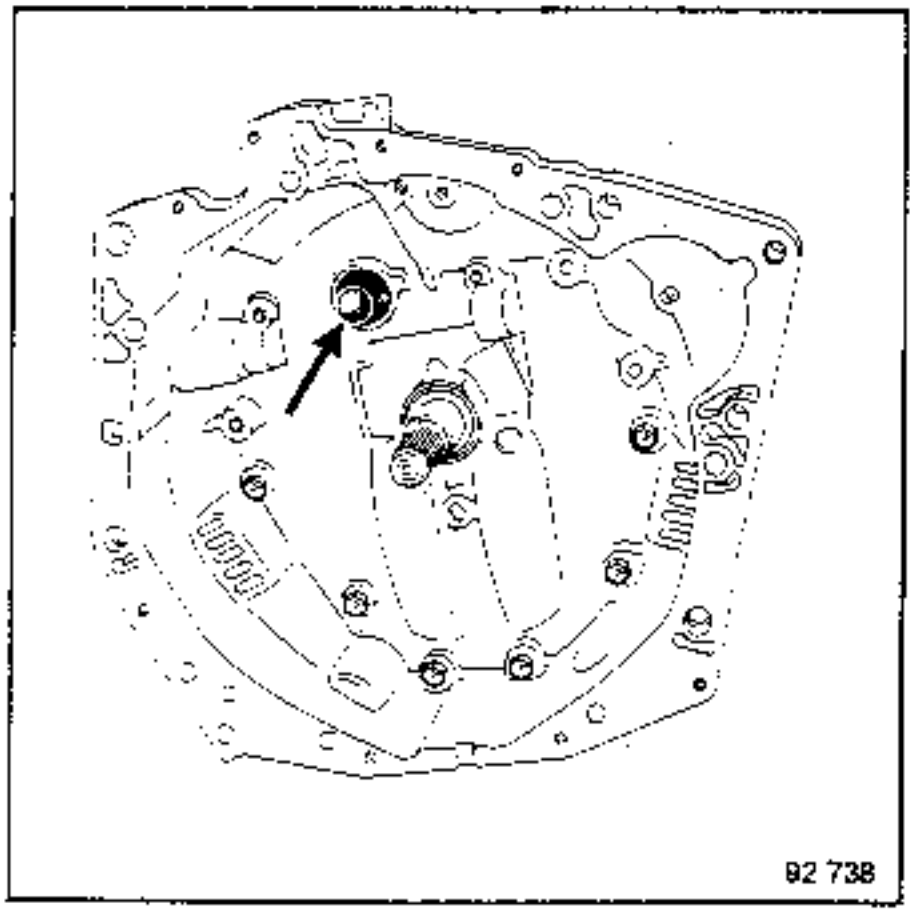

Remove the thrust pad.

Disengage the fork from the pivot and remove it.

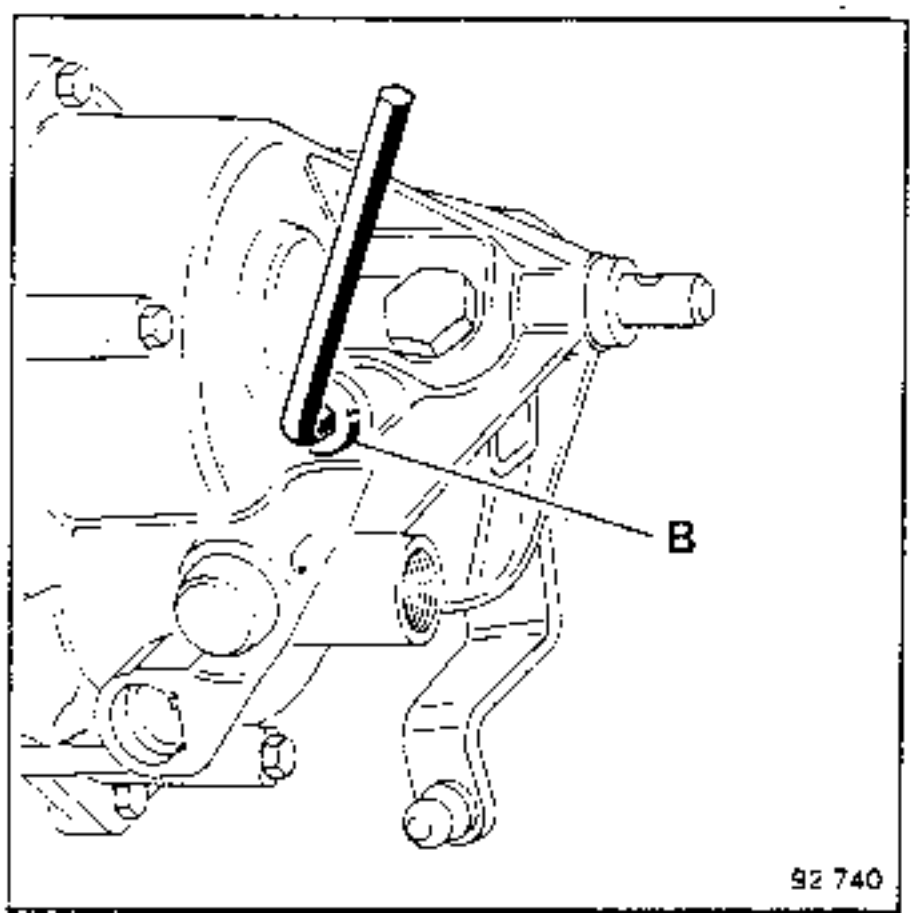


## SEPARATING THE CASINGS

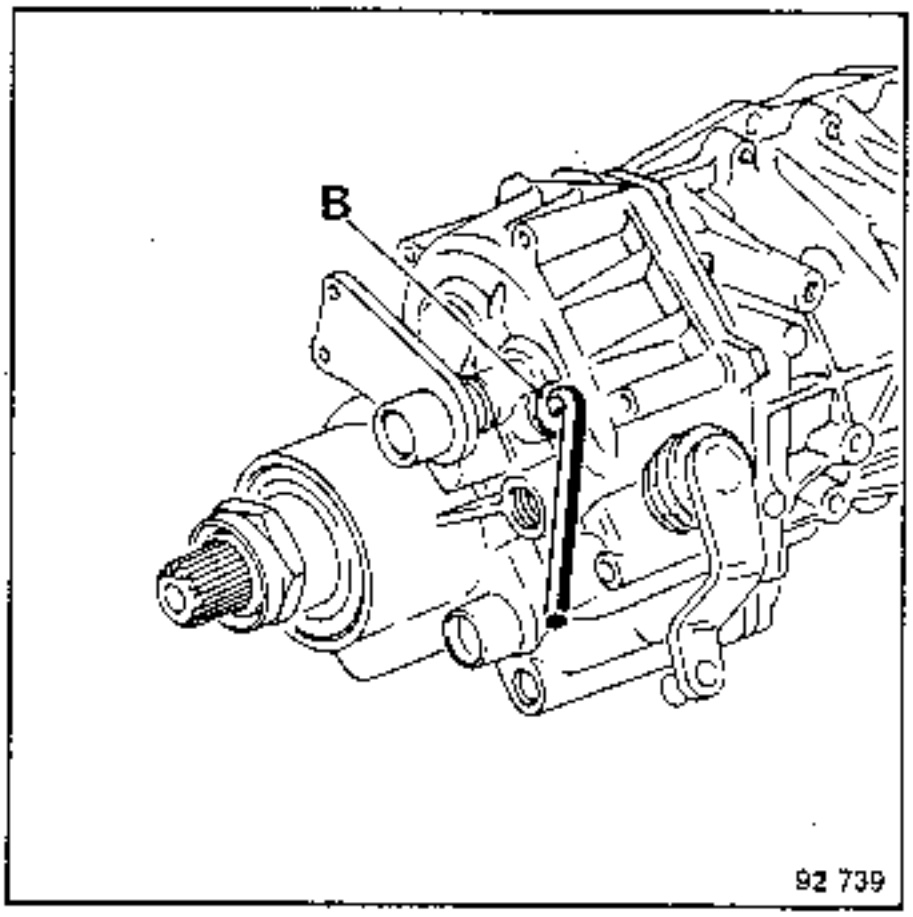
Remove:
- the pivot;
- the clutch casing mounting bolts;
- the clutch casing;



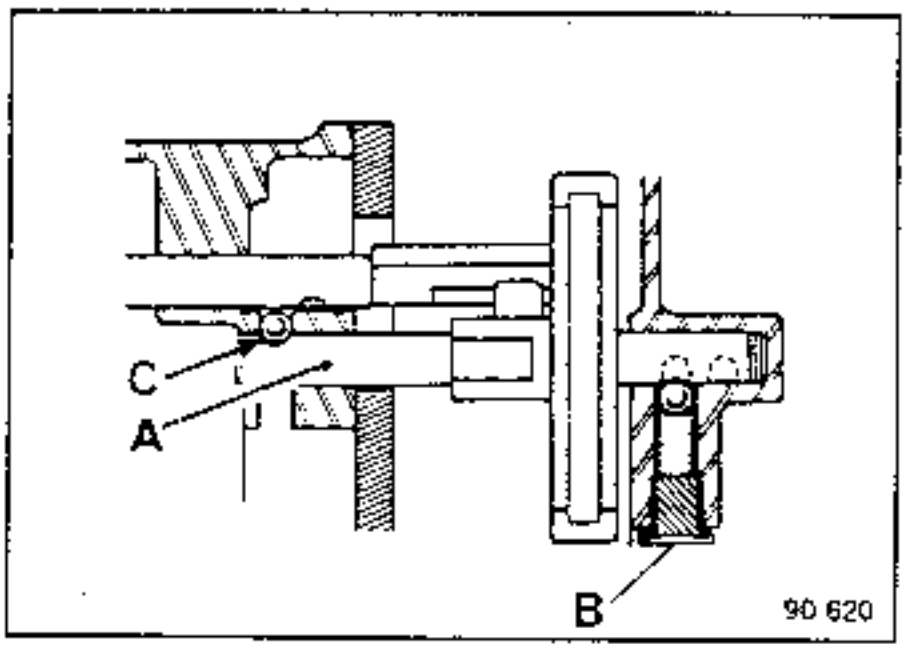

- the 5th speed locking ball (B) - NG1 - NG3 - NG9.




NG7:




Engage 4th gear so that the 5th speed shaft **(A)** locks since there is a risk of locking ball **(C)** falling into the gearbox.



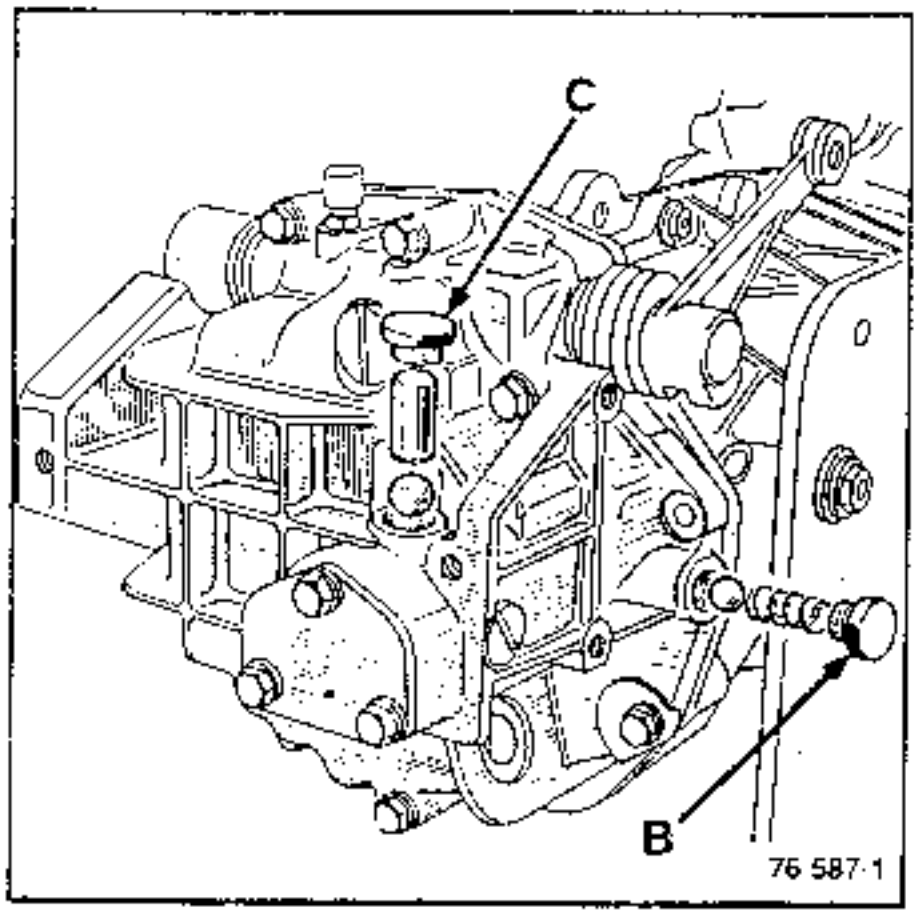

Remove the rear casing.

Engage neutral once again.

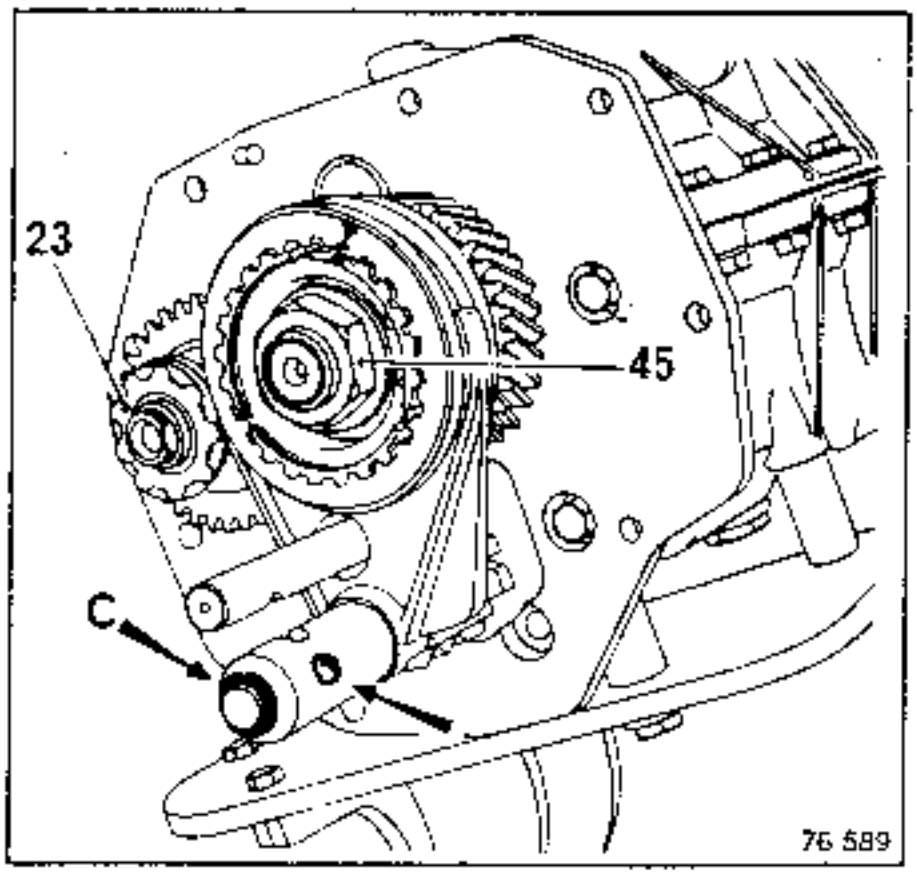
## SEPARATING THE CASINGS

**MG5: Special point:** Gearbox in neutral

Remove:
- plug **(B)**, the 5th speed spring and locking ball;
- plug **(C)**, the plunger, and locking ball between the 5th speed shaft and 3rd/4th speed shaft.

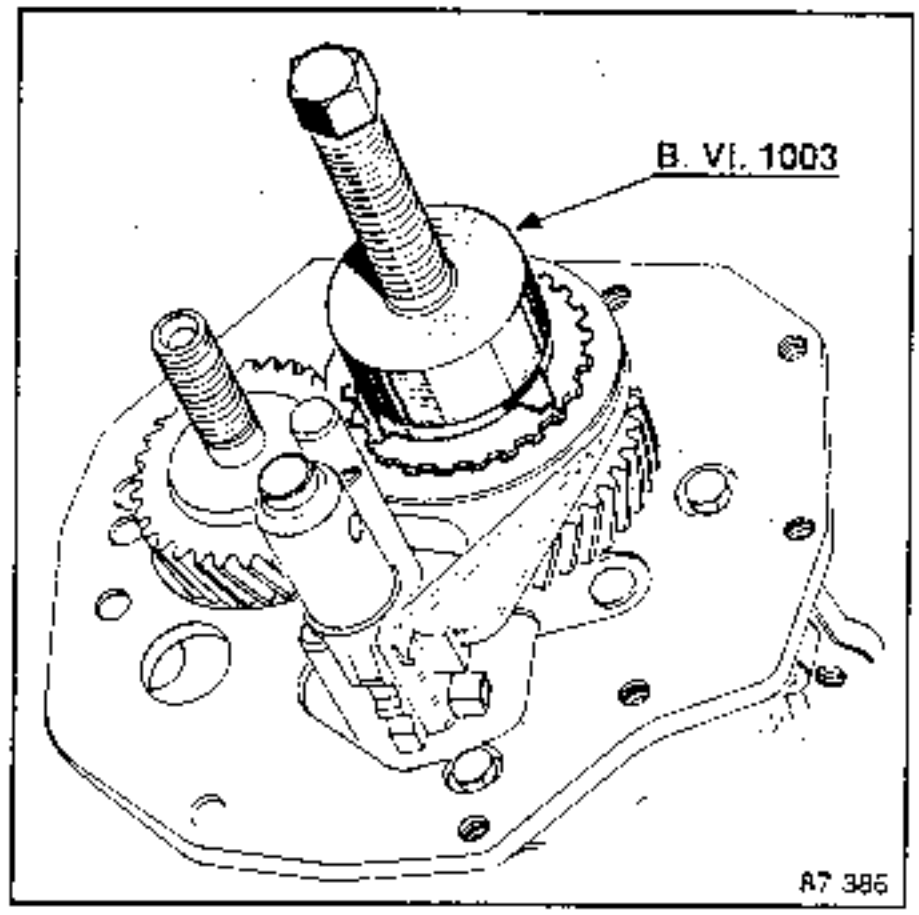



Remove the rear casing.
Recover the 5th speed fork ball.
Engage two gears (5th and 3rd or 4th).
Break the seal on and unfasten parts 45 and 23 (using wrench **B.V.204-01**).

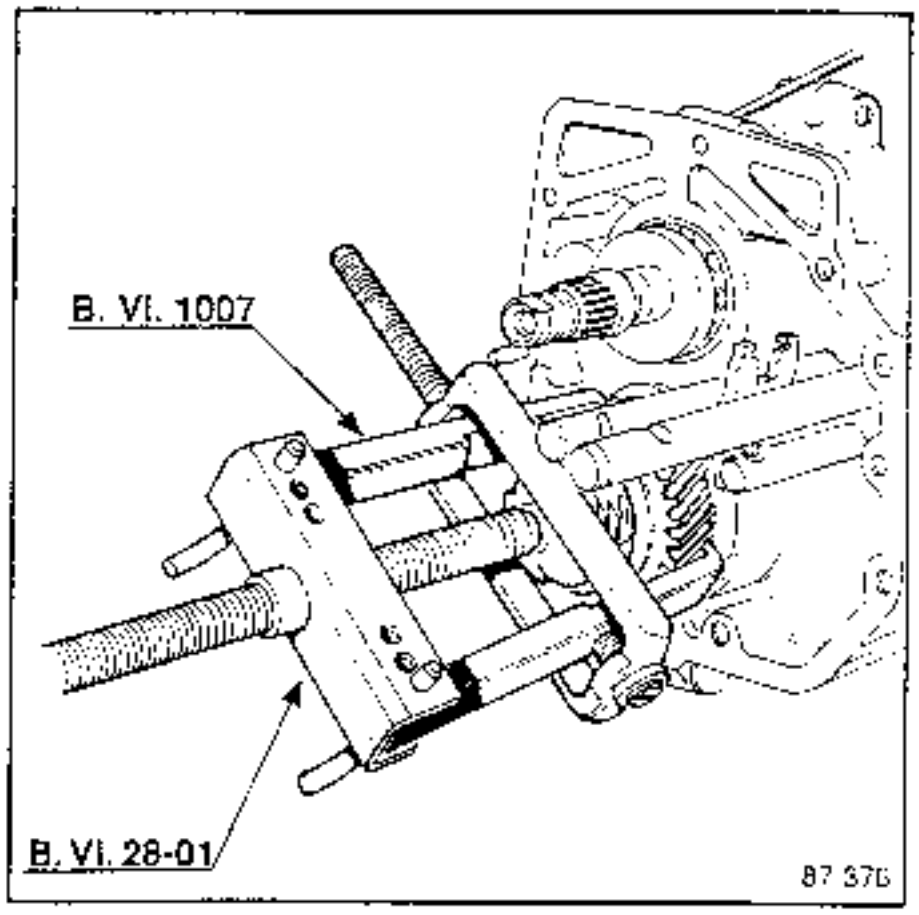



Remove circlip **(C)** from the end of the reverse gear shaft.

Remove:
- the 5th speed synchro assembly (hub-slide gear and shaft fork) using tool **B.Vi.1003**;




- the 5th speed fixed gear using tool **B.Vi.28-01** fitted with jaws **B.Vi.1007**;



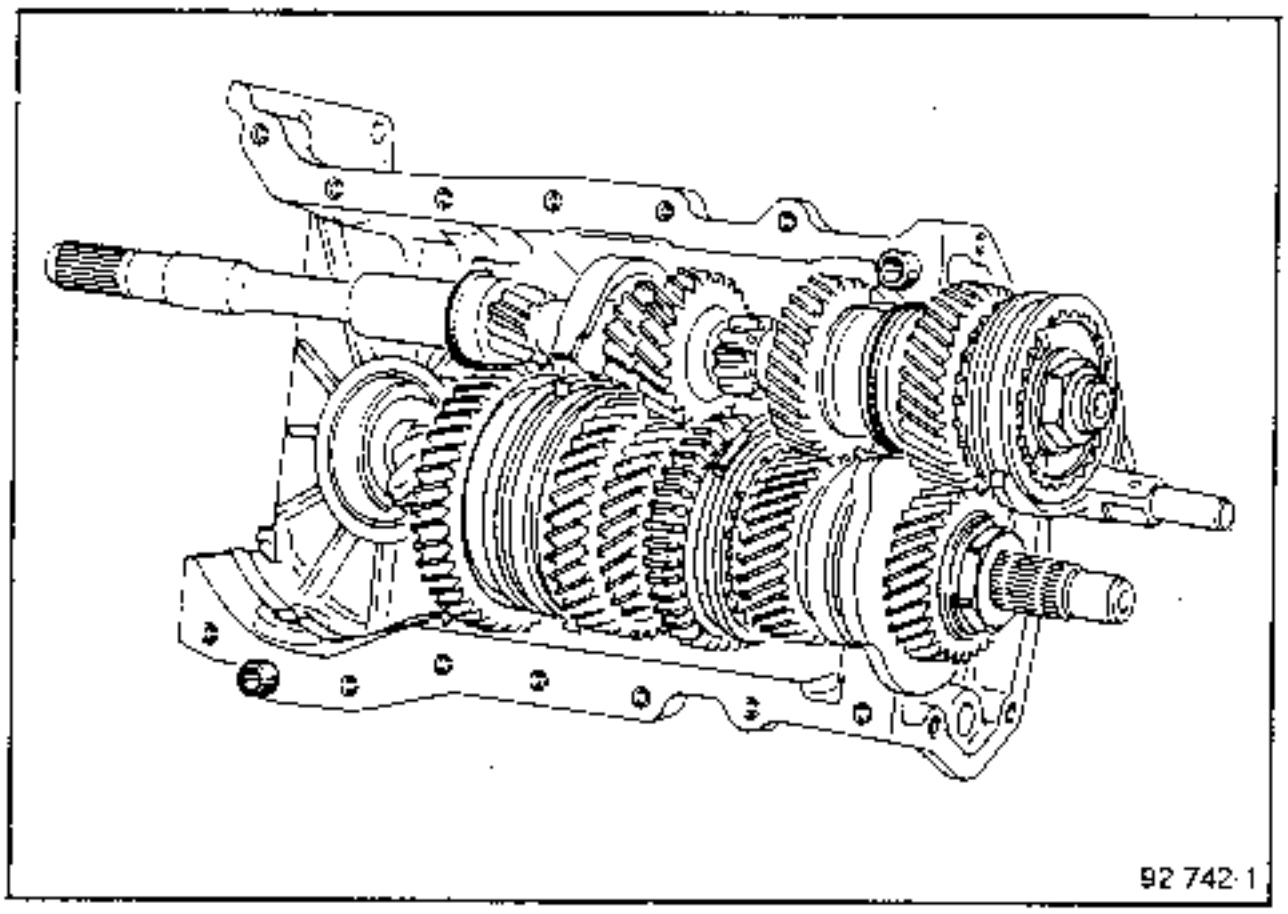

- the spacer plate and its seal.

## SEPARATING THE CASINGS

**All types:**

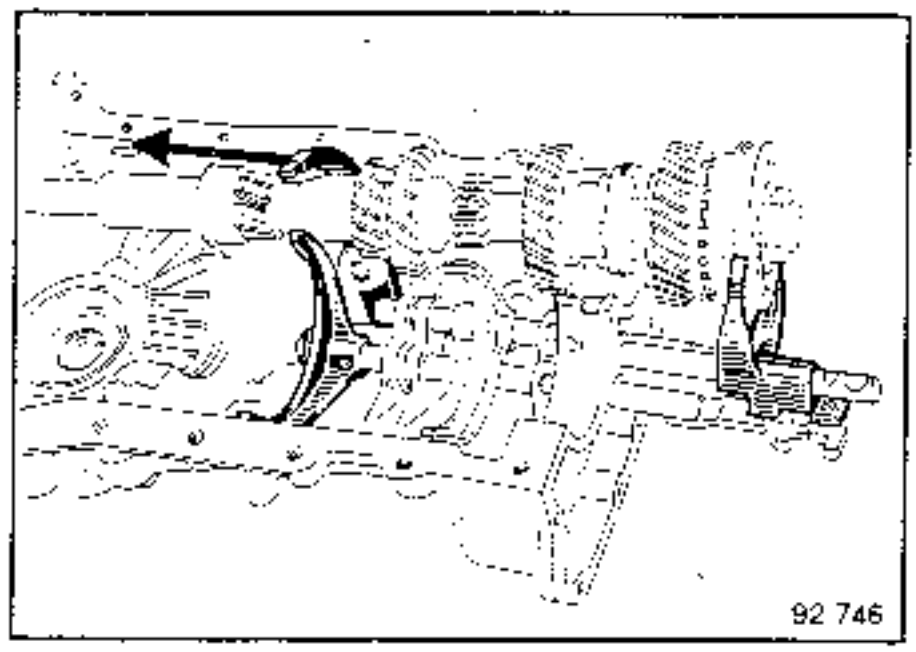
Separate the casings.

Remove:
- the differential;




- the secondary shaft gear train;

- the primary shaft, after first moving the reverse gear lever (arrow in diagram).

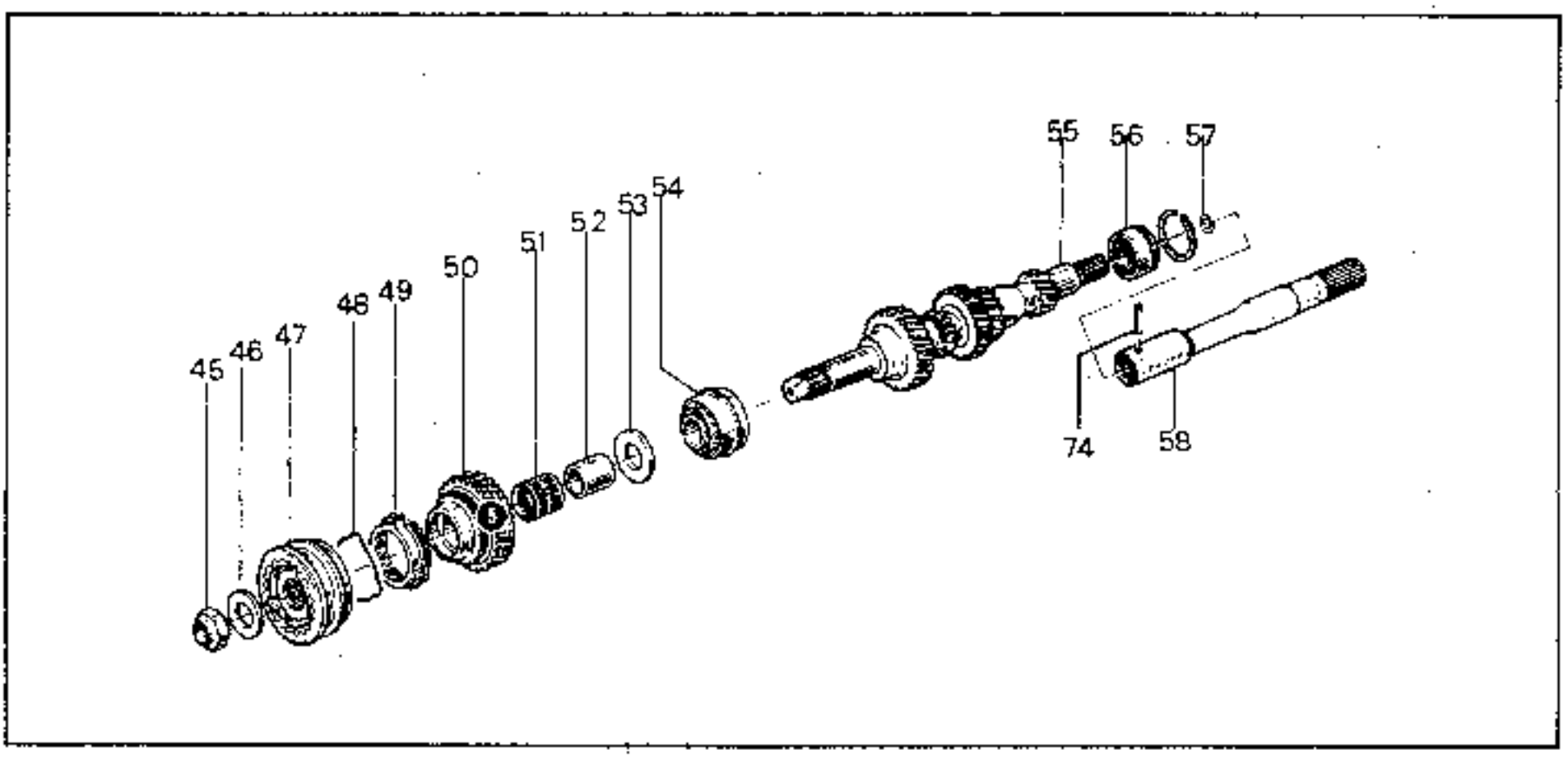



**Cleaning the half-casings**

Never scratch the bearing faces and seatings with metal tools to clean them. They must always be cleaned with a cloth soaked in a cleaning product and dried off with clean compressed air.

**If necessary, remove any burrs.**

## PRIMARY SHAFT




## Dismantling - Reassembling

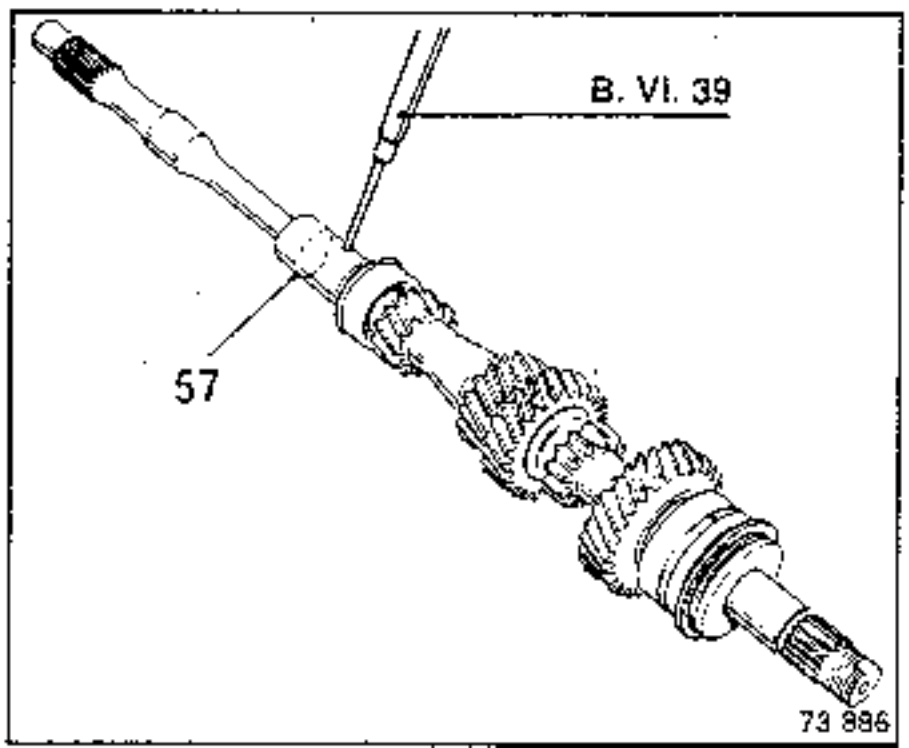
This operation is performed after the casings have been separated.

| TIGHTENING TORQUE (in daNm) |
|---|
| Primary shaft nut .....13 |

| CONSUMABLES |
|---|
| Immerse the parts in gearbox oil<br>**Loctite FRENBLOC:**<br>- 5th speed synchro hub<br>- Primary shaft nut |

### DISMANTLING

Separate the clutch shaft from the primary shaft, knocking out the rollpin using drift **B.Vi.39.**




Recover the Grower washer **(57).**

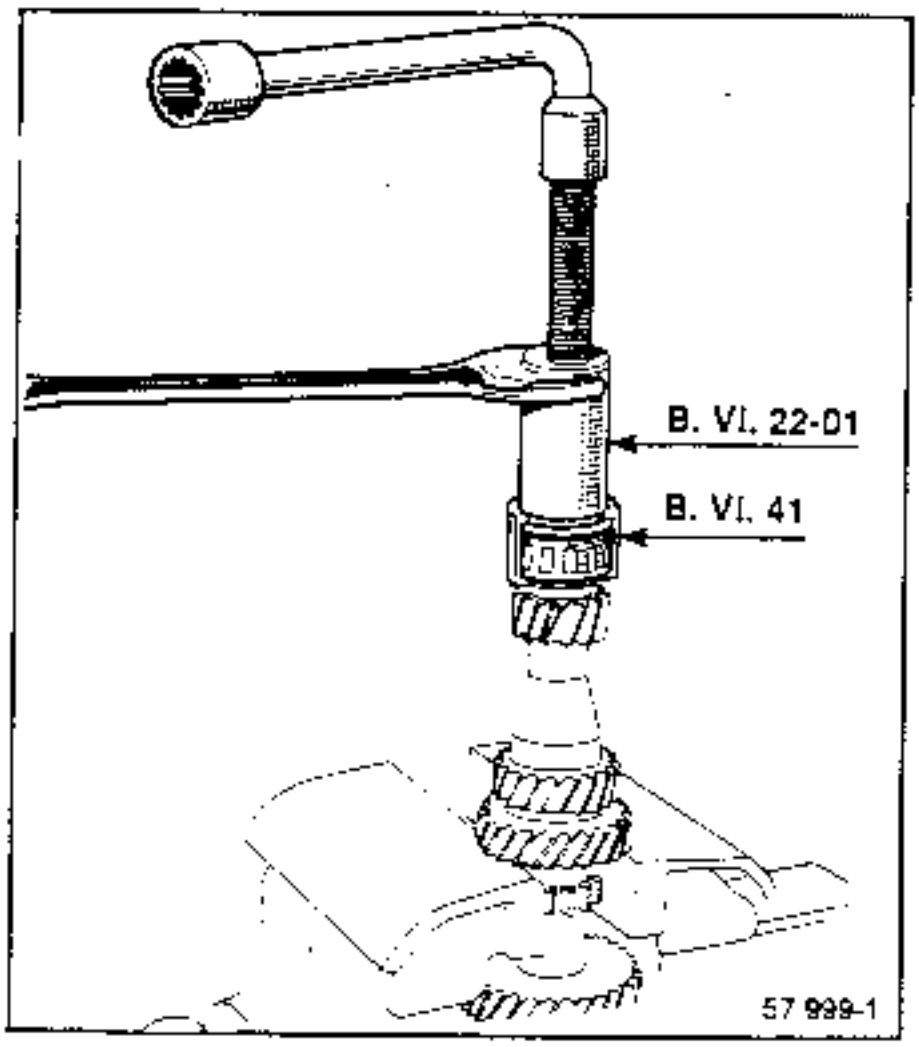
Remove bearing outer race **(56)** and its rollers.

**ATTENTION:** The bearing rollers are not held in place (there is no inner bearing race).

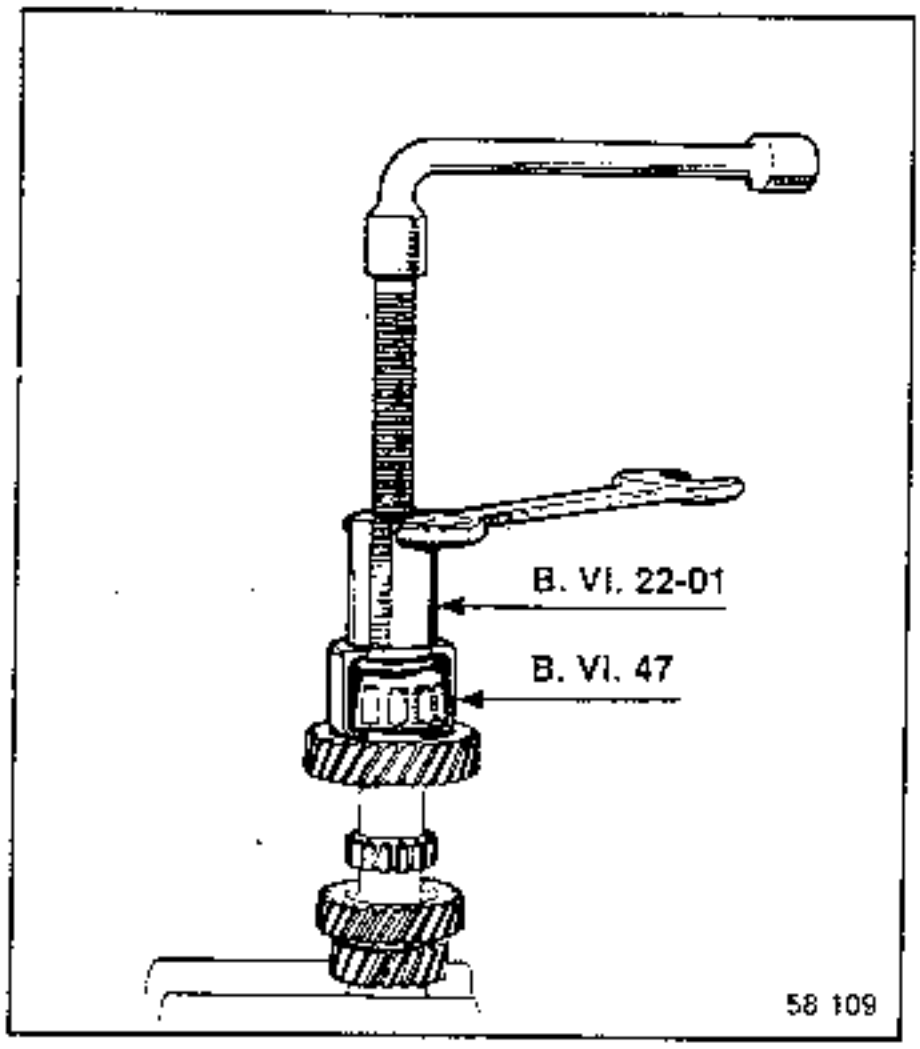
**PRIMARY SHAFT**

**NGO - NG2 (4-speed):**

Take out the bearing at the 1st speed end using tool **B.Vi.22-01** fitted with shell **B.Vi.41.**

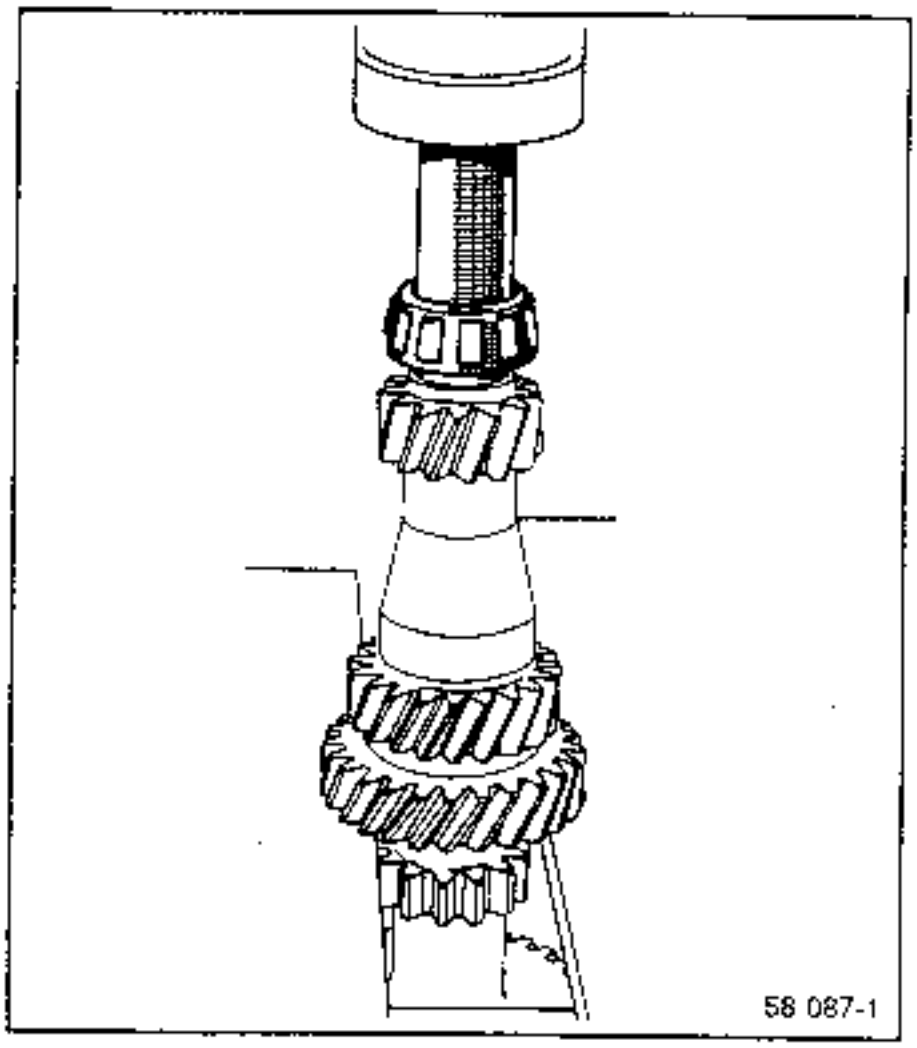


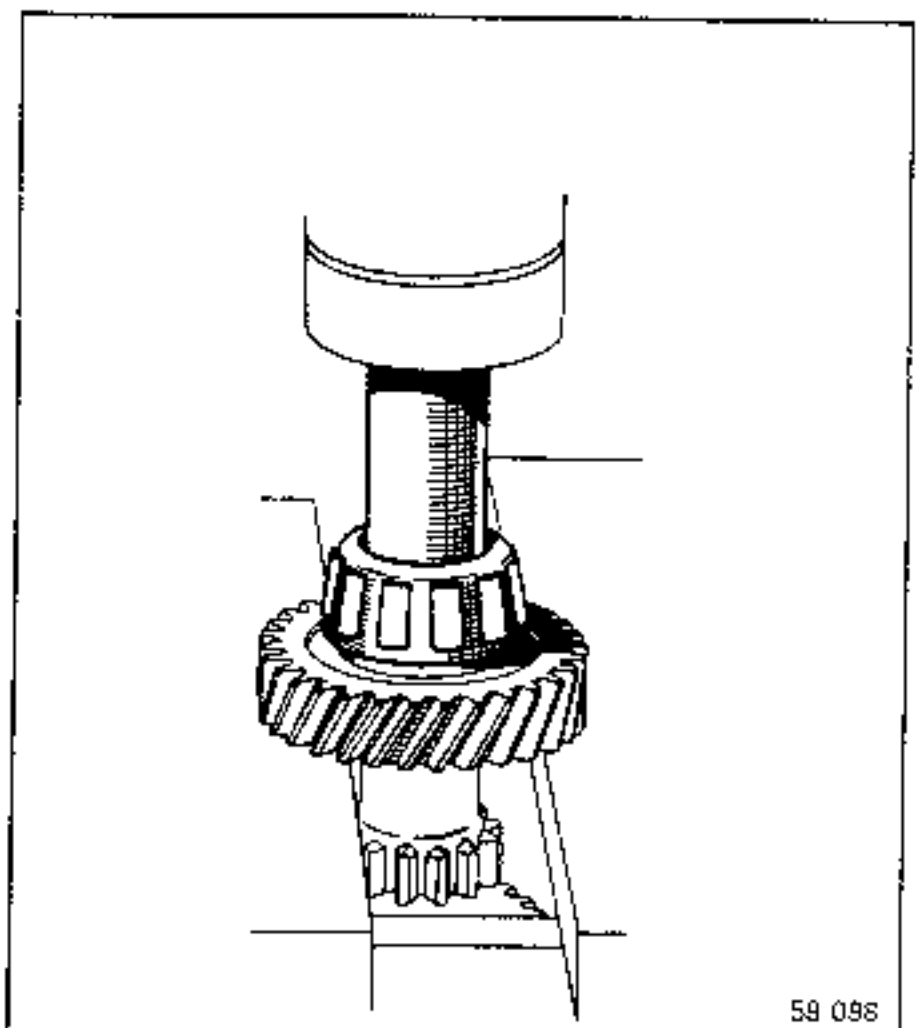

Take out the second bearing using extractor **B.Vi.22-01** fitted with shell **B.Vi.47.**




**Reassembling:**

Fit the bearings on the press.



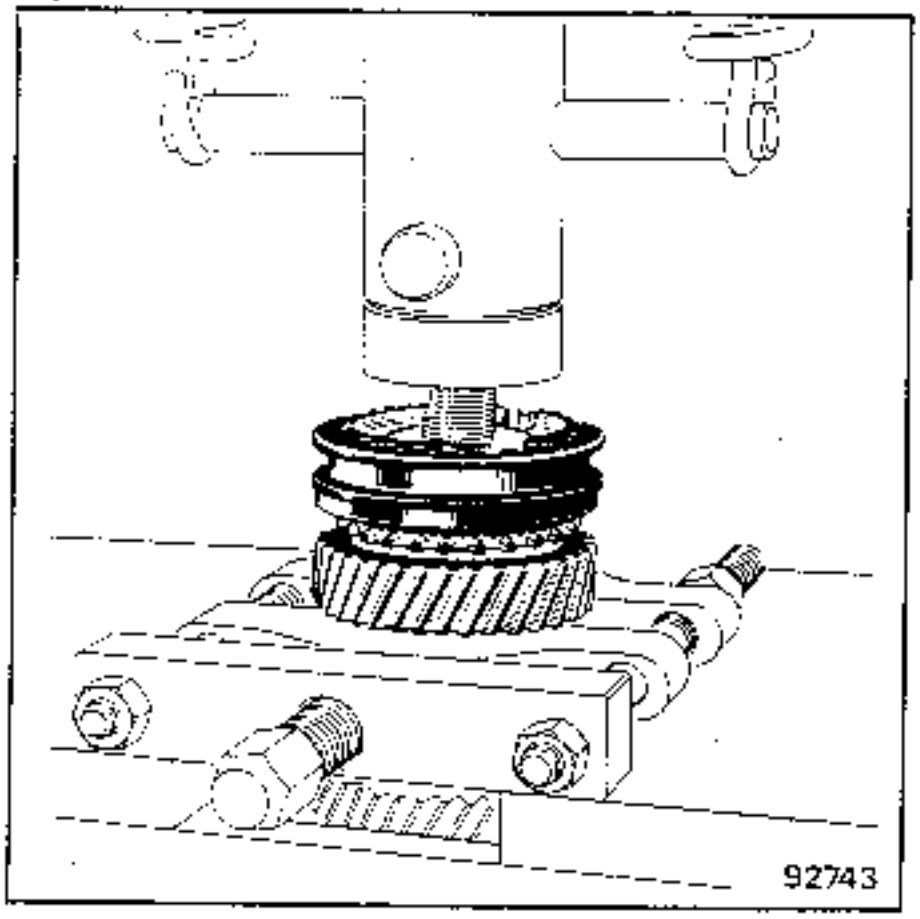



**PRIMARY SHAFT**

**NG - 5 speed:**

- Clamp the primary shaft in a vice fitted with soft jaws (near the 4th speed drive gear).

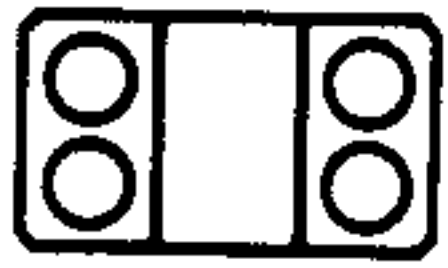
- Release and unscrew the nut (30 mm socket).
- Take the weight under the 5th speed idler gear to take the hub out of the synchro.

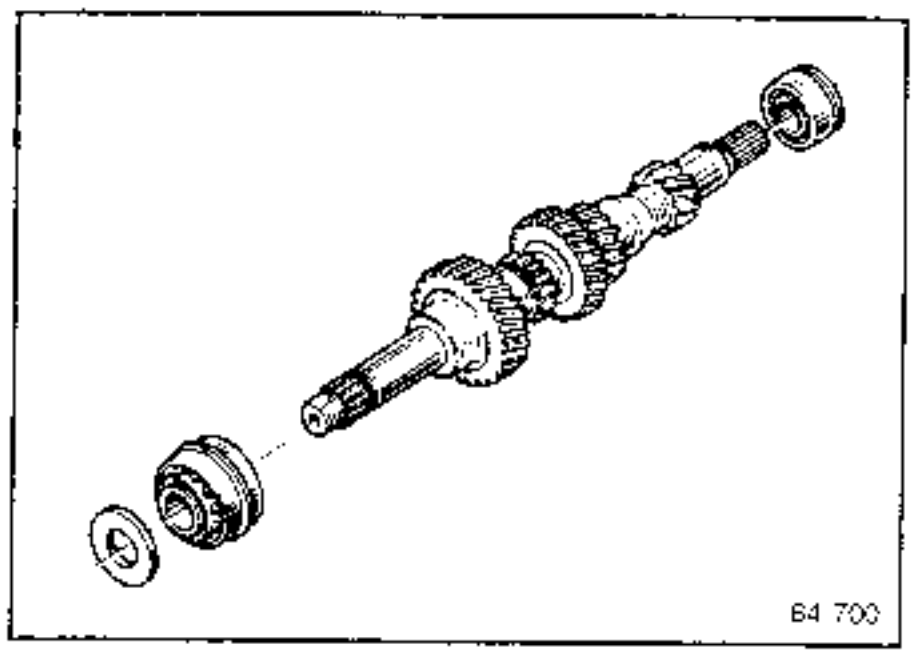



At the 5th speed drive gear end the primary shaft is fitted with:

**1st type**

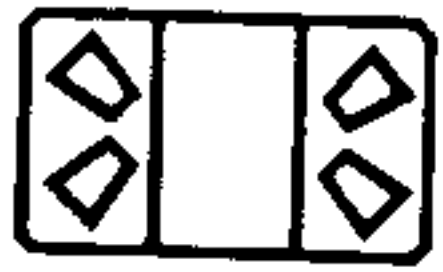
A bearing with a double row of balls 1.





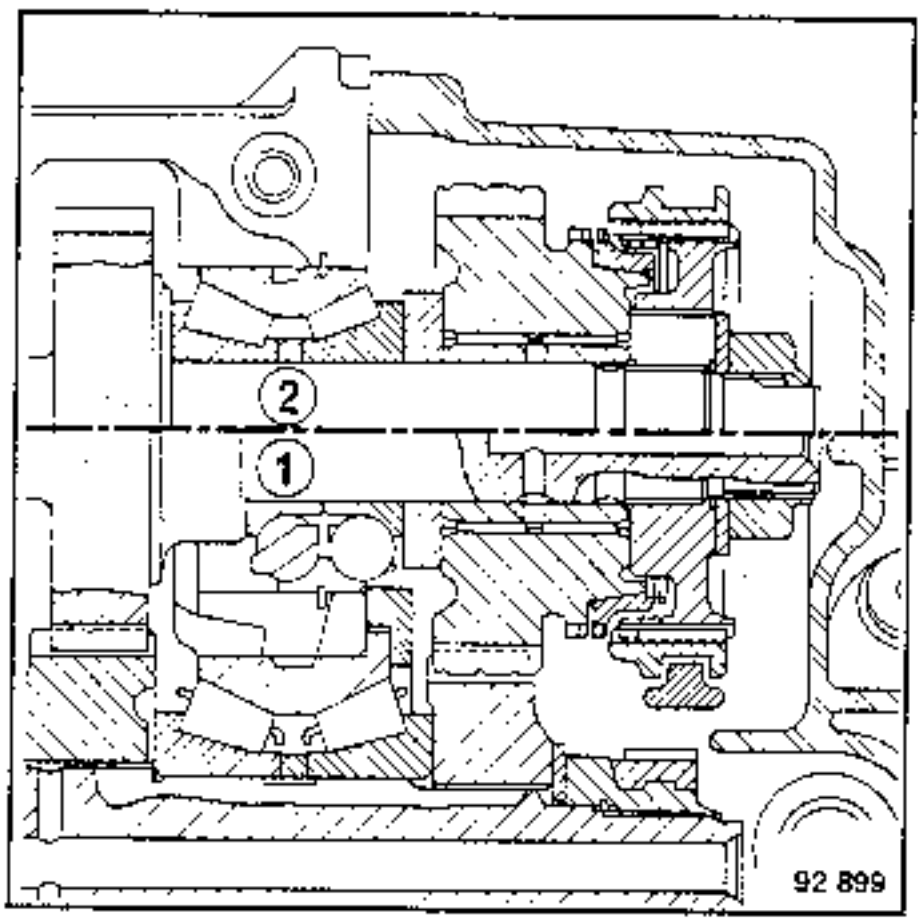

**2nd type**

A bearing with tapered rollers 2.

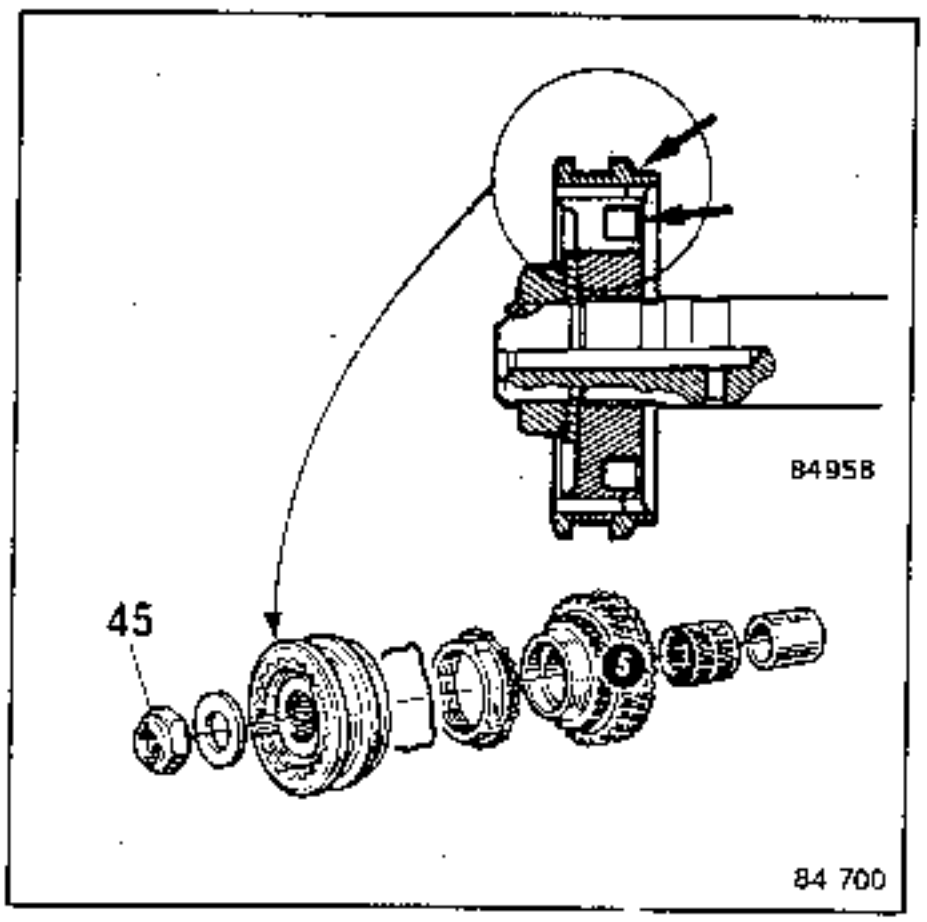


These bearings are removed and refitted by hand.

PRIMARY SHAFT



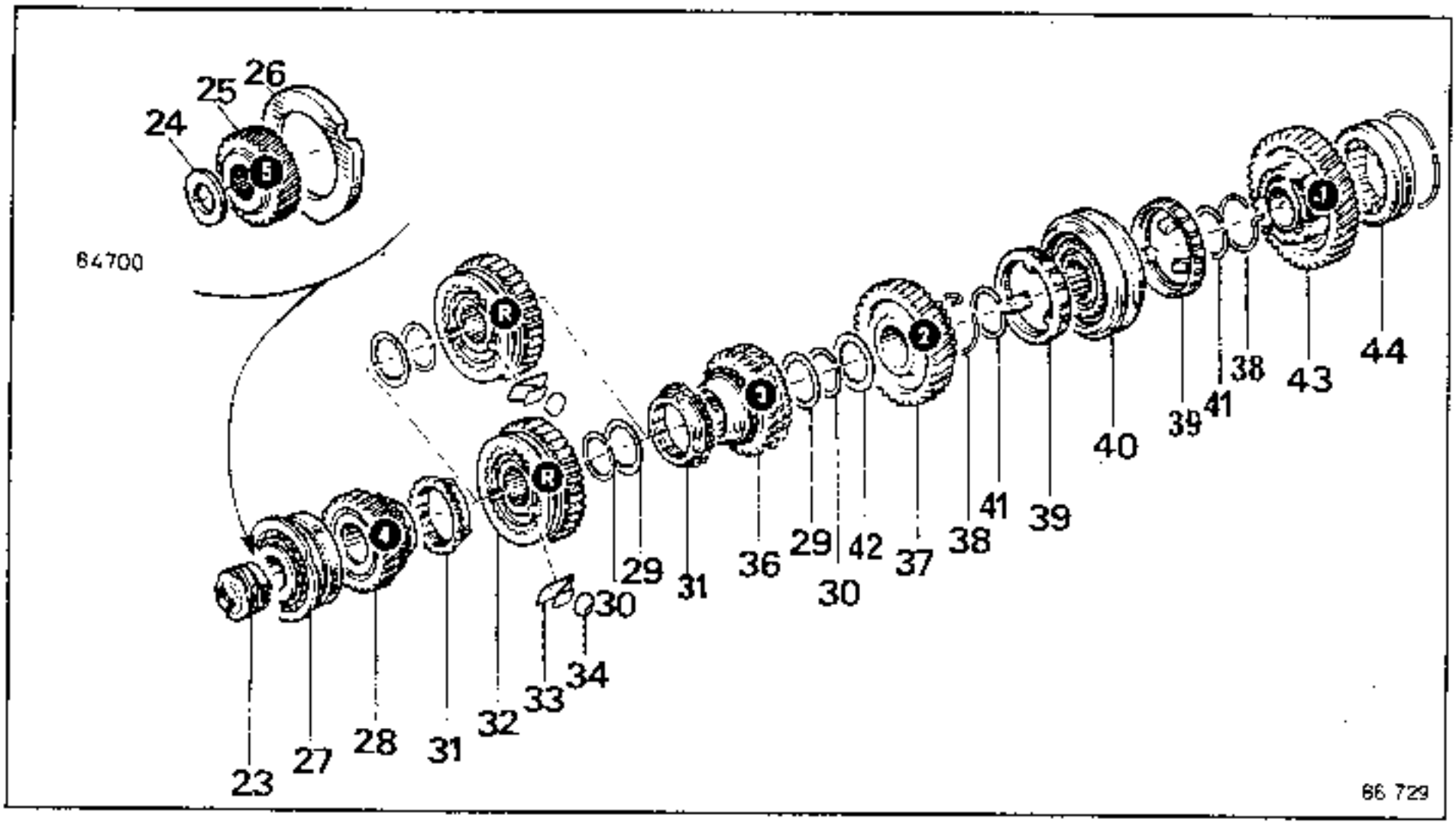

Bond the 5th speed synchro hub with **Loctite FRENBLOC** and ensure that the assembly is fitted the correct way round.




Fit the bosses on the synchro ring in the notches in the hub.

Put 3 drops of **Loctite FRENBLOC** on the threads of the new nut, torque tighten it and lock it.

SECONDARY SHAFT




## Dismantling - Reassembly

This operation is performed after the casings have been separated.

| TIGHTENING TORQUES (in daNm) | |
|---|---|
| Secondary shaft nut (except NG7) | 15 |
| NG7 secondary shaft nut | 20 |

| CONSUMABLES |
|---|
| Immerse all the parts in gearbox oil<br>**Loctite FRENBLOC:**<br>- 5th speed fixed gear<br>- Secondary shaft nut |

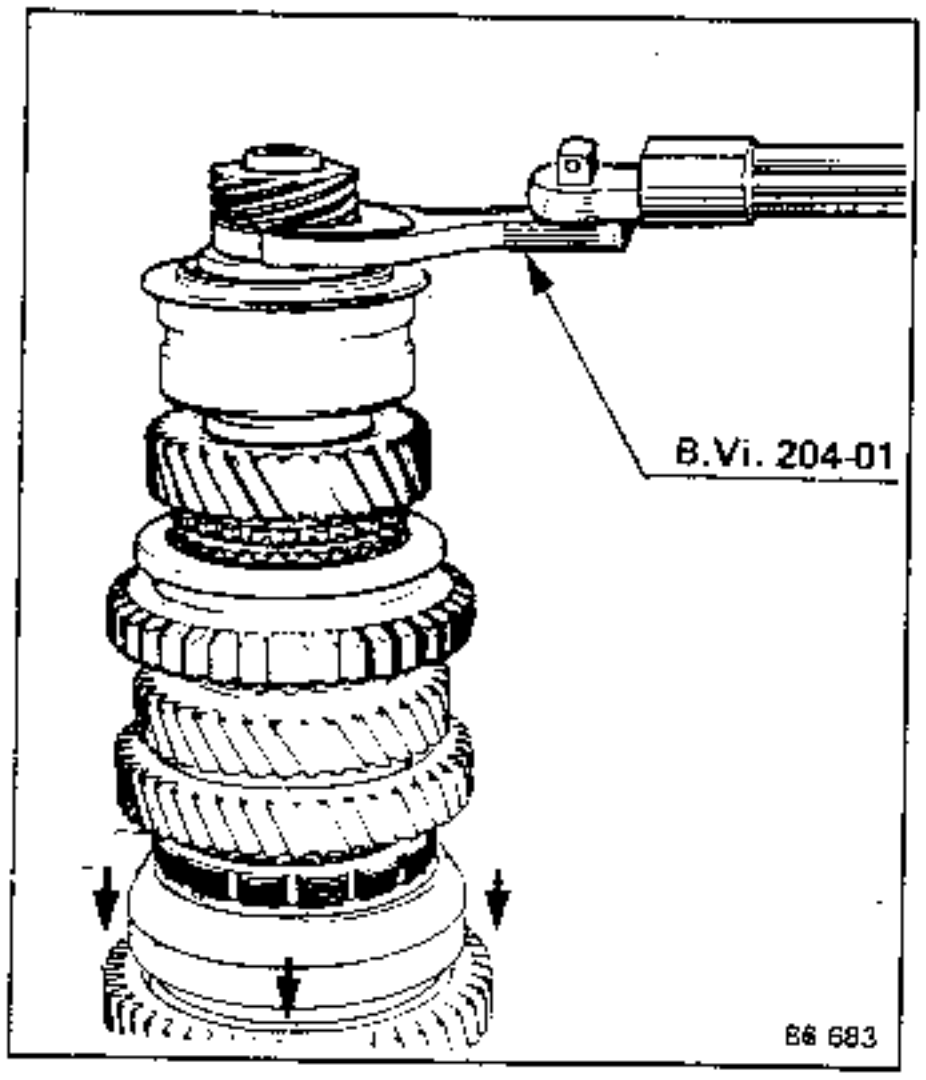
## SECONDARY SHAFT

### Dismantling

Clamp the secondary shaft in a vice fitted with soft jaws (near the 1st speed drive gear).

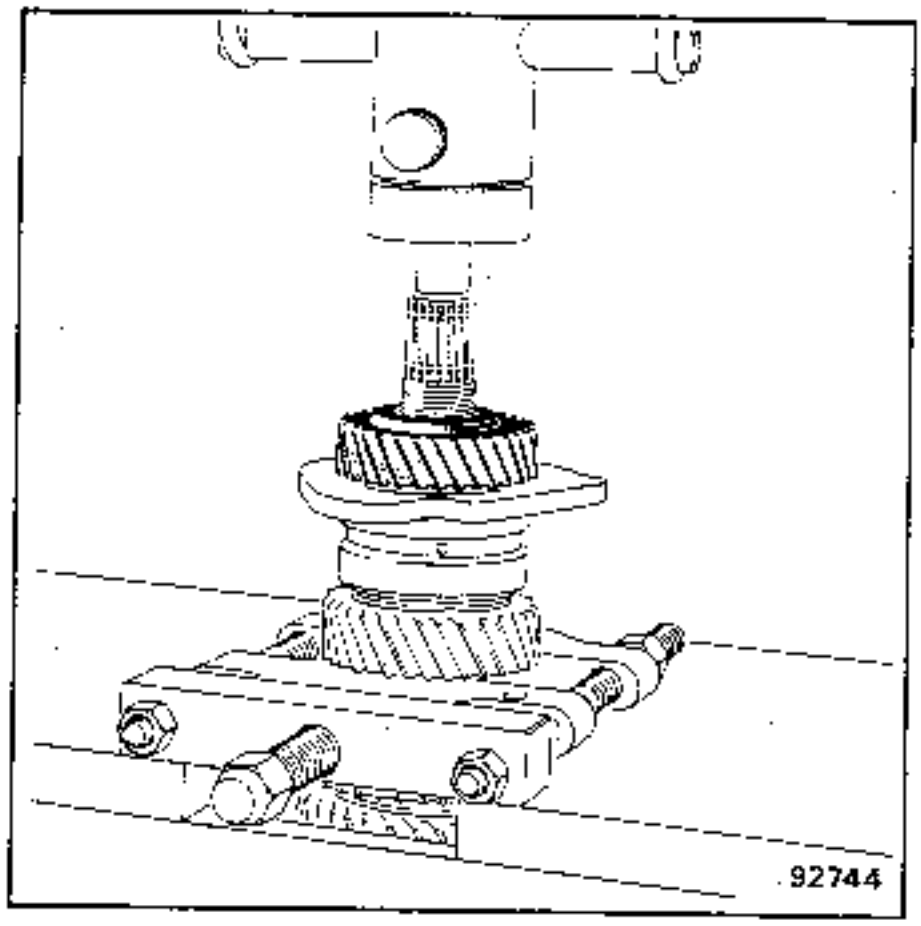
Engage first gear (as shown by the arrows in the diagram).

Release and unscrew the nut using tool **B.Vi.204-01.**



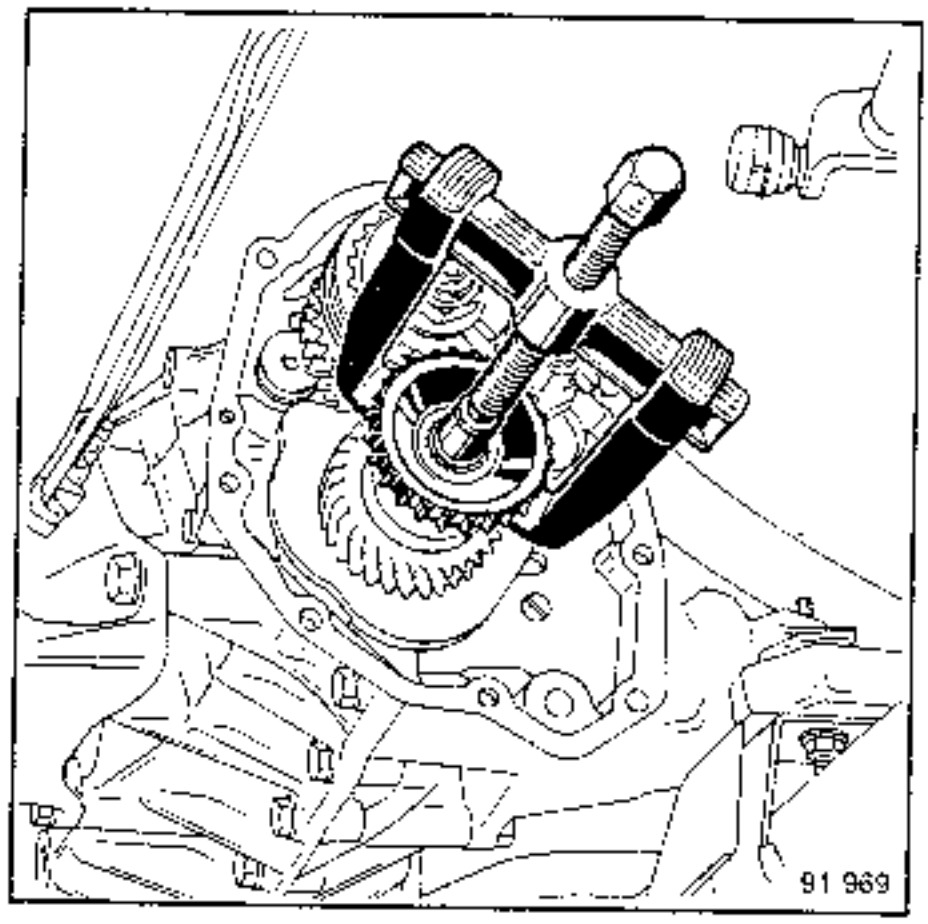

**5-speed gearboxes:**

Take the weight under the 4th speed drive gear and take out the 5th speed fixed gear assembly and bearing.




**NG7 - Special point:**

Remove:
- the snap ring;
- the dog clutch drive using an extractor of the **FACOM U32-120** type or similar;



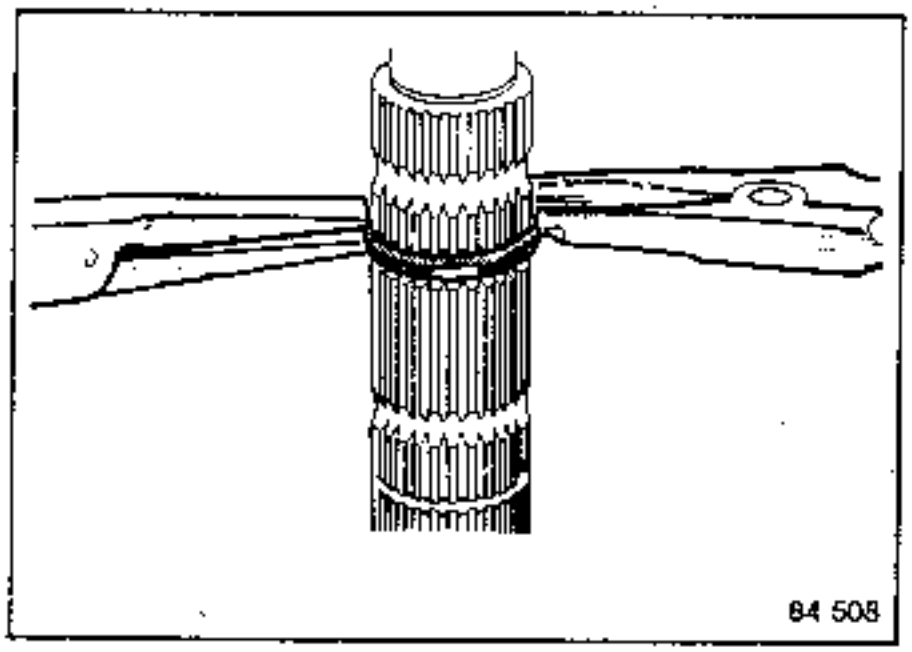

- the nut using a 36 mm long socket (for example **FACOM K36LA**).

## SECONDARY SHAFT

### Dismantling

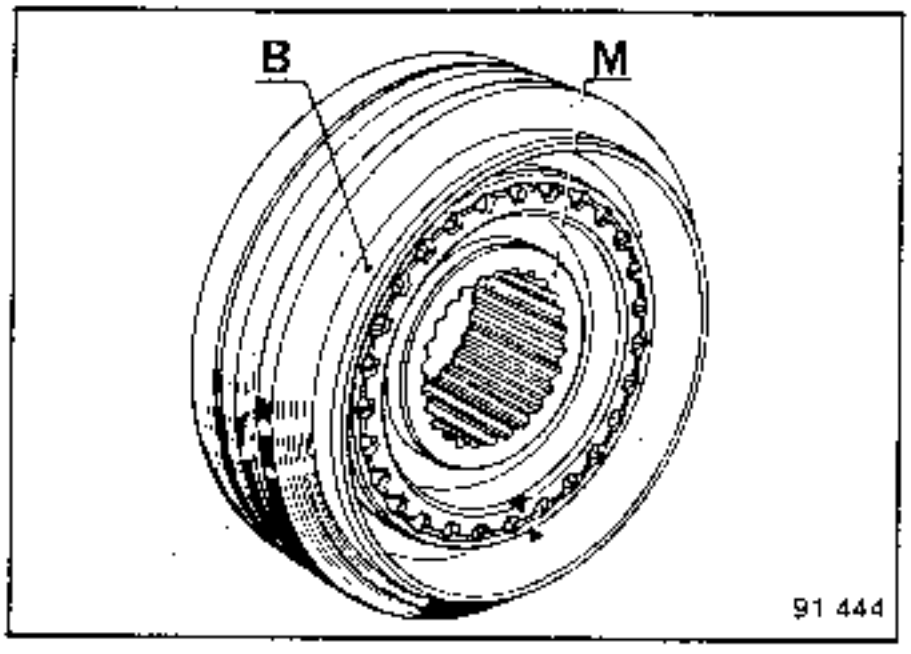
The hubs are free-mounted and held by snap rings so they cannot move sideways.

To remove the snap rings, use circlips pliers on one side to move the jaws apart and flat-ended pliers on the opposite side so that the snap rings do not twist.



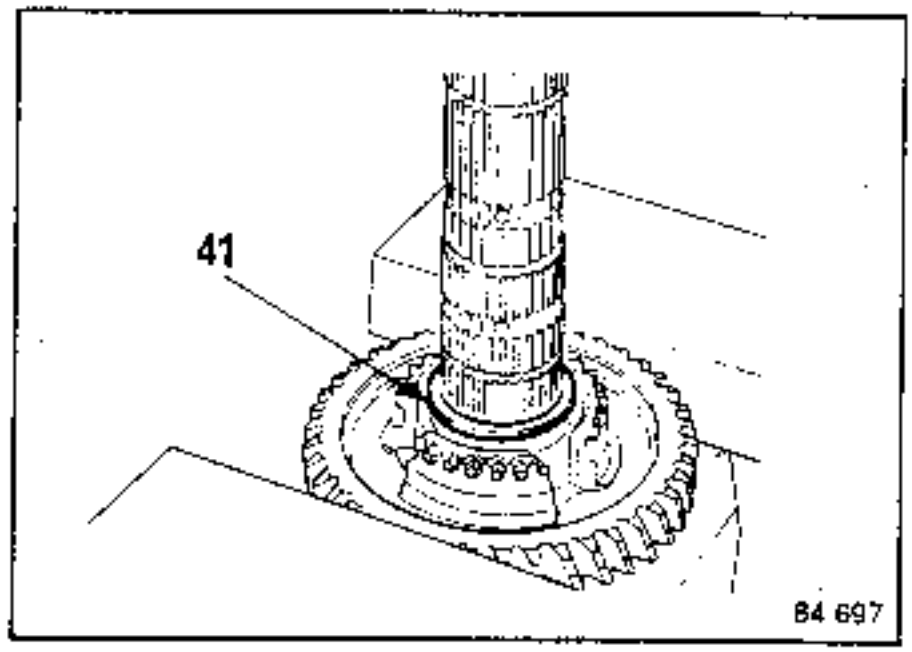

The snap rings cannot be used again. They must be replaced systematically.

Mark the hubs **(M)** in relation to slide gears **(B)**.




Before removing snap ring **(41)** in front of the 1st speed drive gear, remove the secondary shaft from the vice since it is no longer held in place.

**ATTENTION:** The rollers of bearing **(44)** are not held in place on the secondary shaft (no inner track ring).




**NOTE:**

The bearings must be replaced as soon as any scratches, hot spots or excessive wear is noticed.

The teeth of the drive gears and dogs must never have notches on them or be excessively worn. You must also ensure that the surfaces of the shaft and the internal walls of the drive gears do not show any signs of seizure or abnormal wear.

**Hubs - Slide gears:**

Ensure that the hubs and their slide gears are not notched and that they move smoothly, without excessive play or jamming.

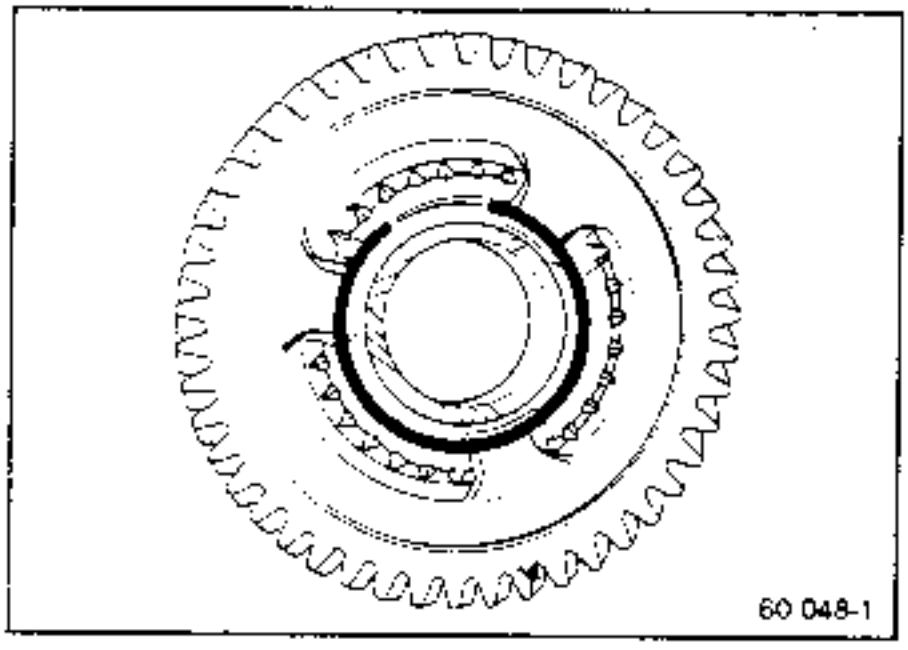
## SECONDARY SHAFT

### Reassembly

Replace the snap rings systematically whenever they have been dismantled.

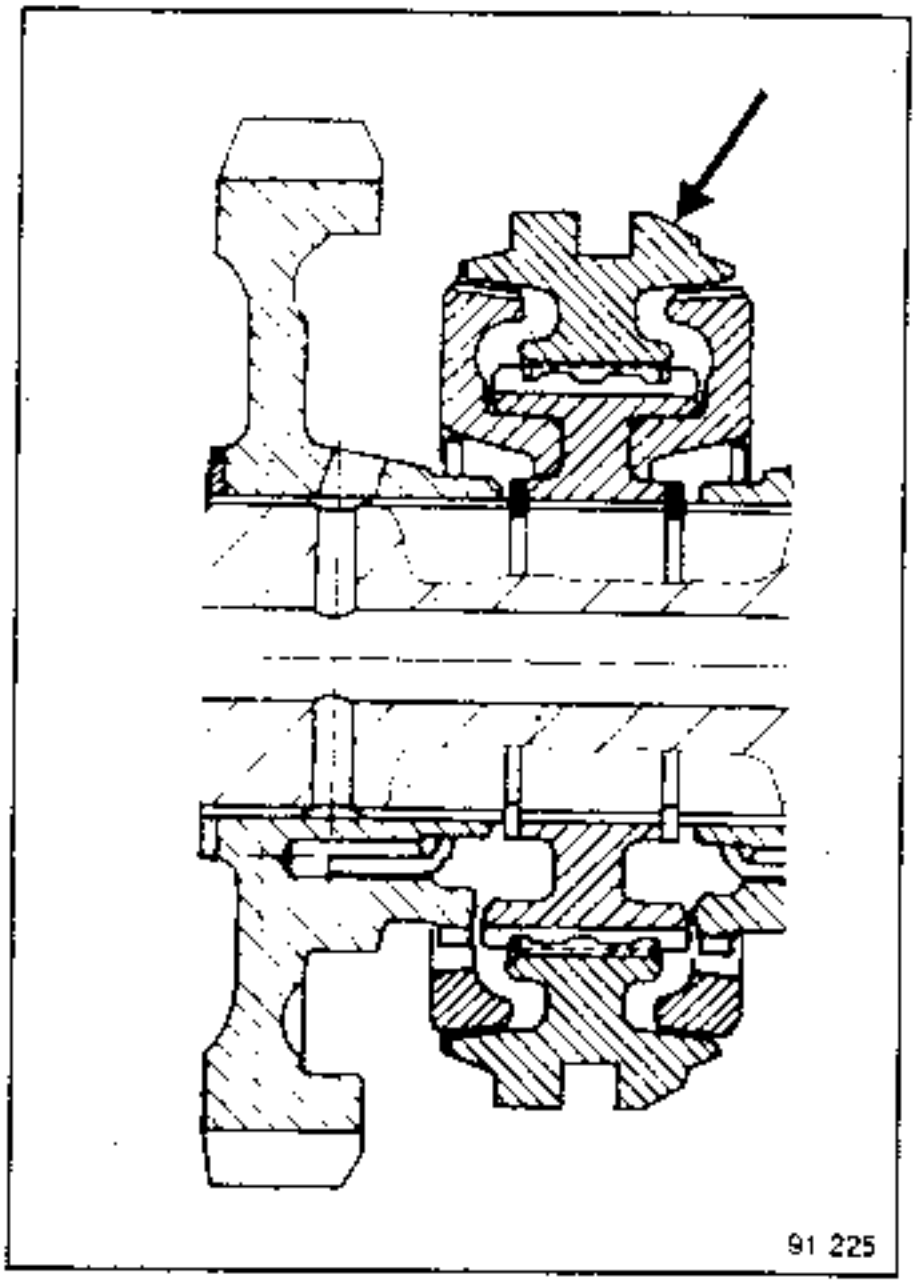
**. 1st/2nd speed synchro and idler gears**

Place the synchro rings on the 1st and 2nd drive gears with the ends folded into the aperture in the drive gears.




Ensure that the following are fitted in the correct direction:

- the bearing bush under the head, with the large offset at the 1st speed drive gear end;
- the 1st/2nd speed slide gear, with the chamfer at the 2nd speed end.



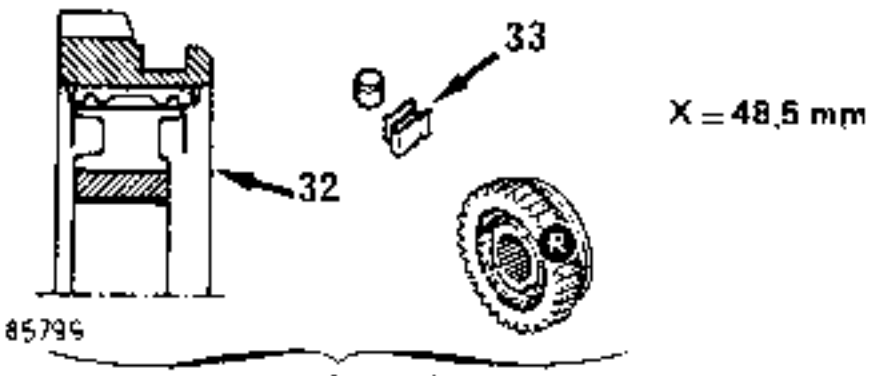

The 1st/2nd and 3rd/4th speed hubs are a slide fit on the secondary shaft. On reassembly, find the position in which they slide most freely on the shaft.

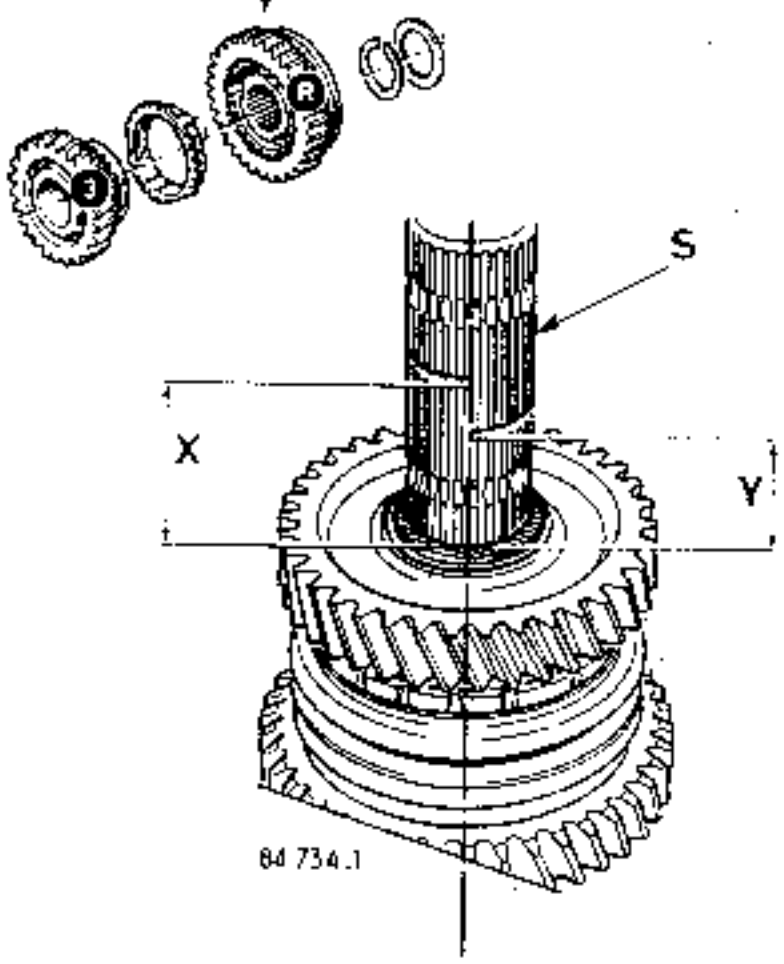
Take care to align the notches on the idler gear with the lugs on the synchro ring.

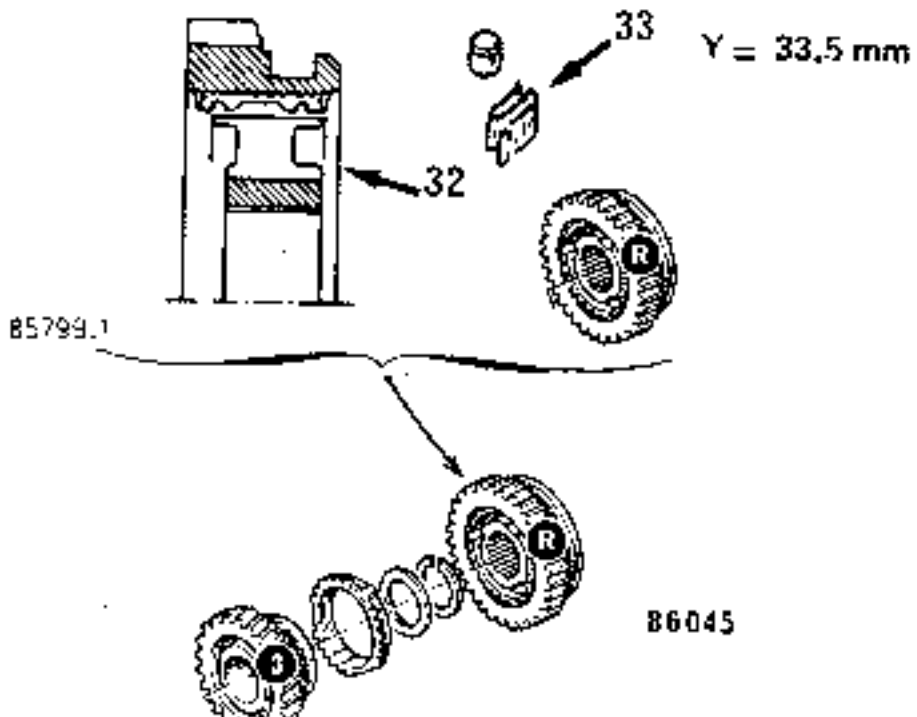
## SECONDARY SHAFT

### . 3rd/4th speed synchro and idler gears

There are two possible types of assembly for the 3rd/4th speed synchro hub depending on whether the secondary shaft (S) is dimension x or y.

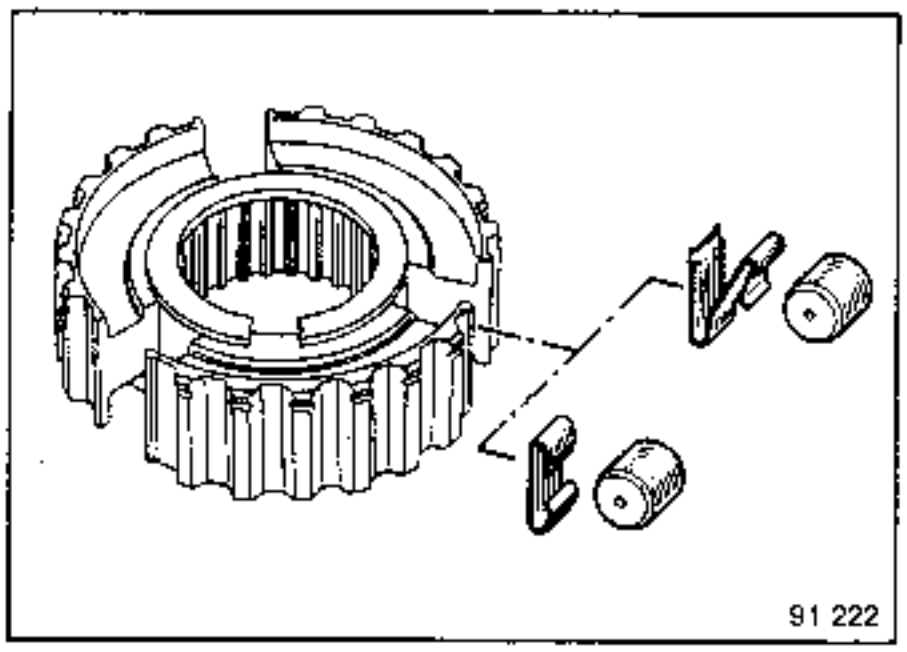


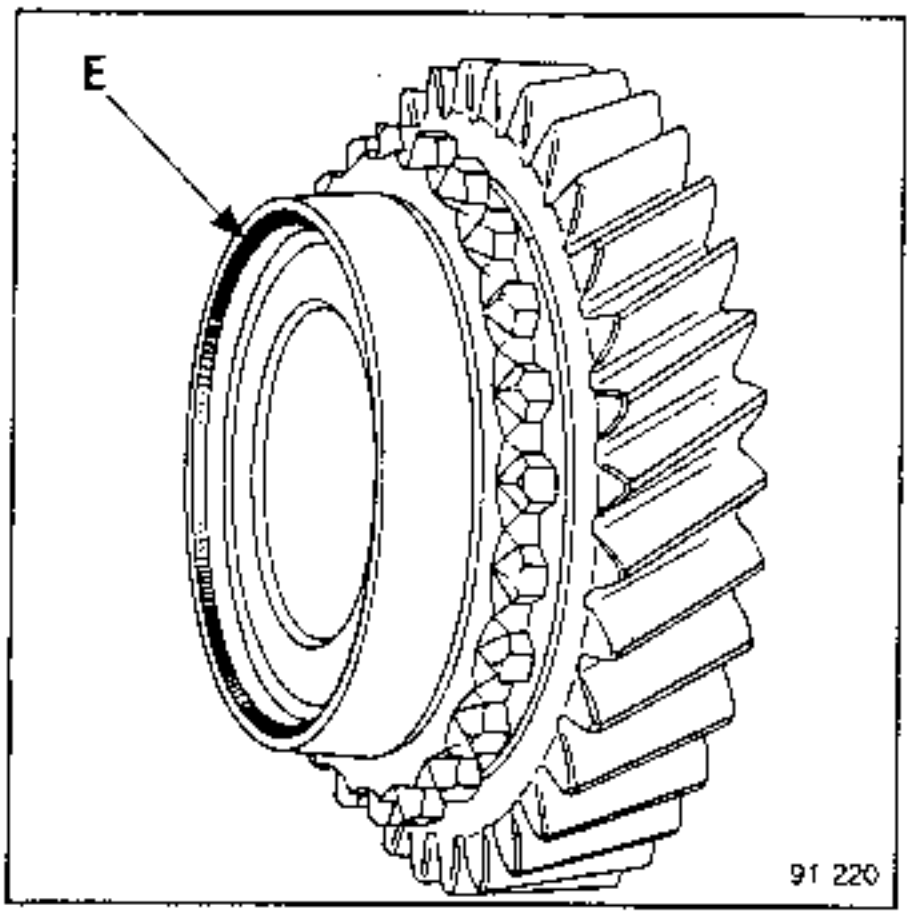

**ATTENTION:**

Two types of synchro roller spring are used: the "Z"-shaped springs have been replaced by "heart-shaped" springs.



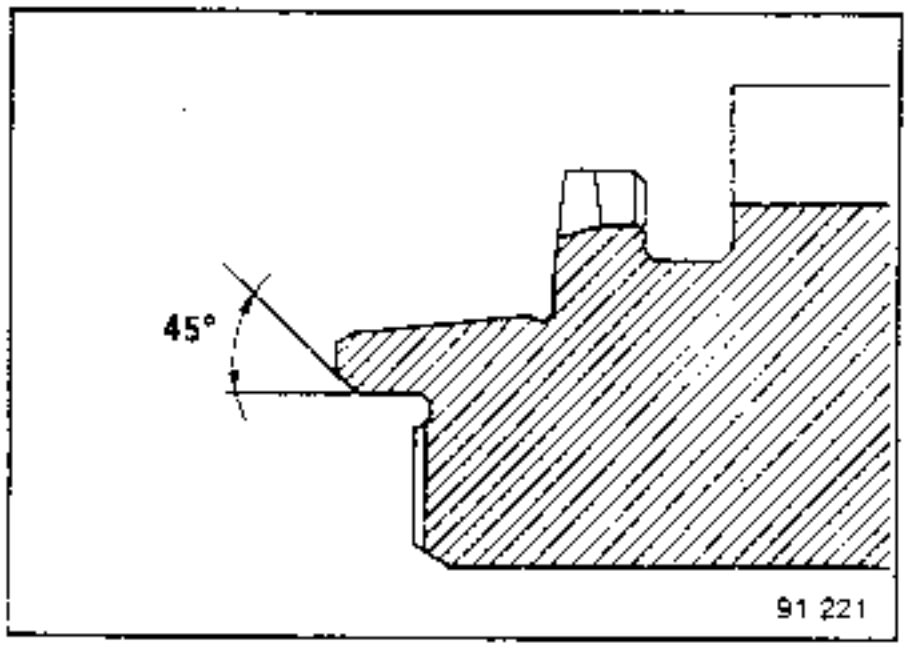

In order that heart shaped springs can be fitted, inlet chamfer (E) for the bevel shoulder under the 3rd and 4th speed idler gear synchros has been modified.

Consequently, the heart-shaped springs can only be used with modified idler gears.

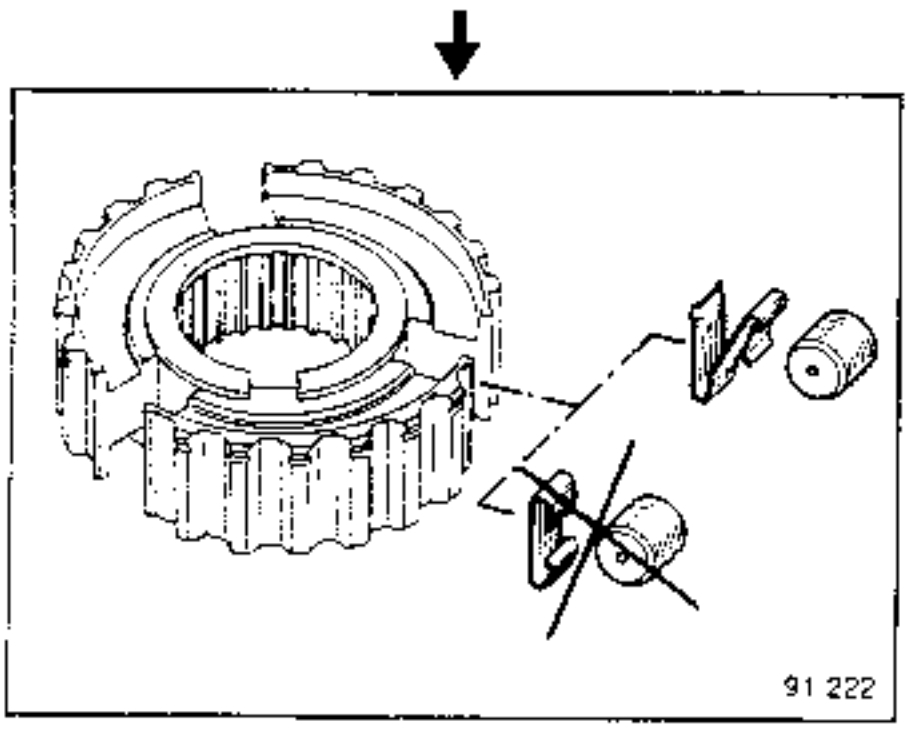


SECONDARY SHAFT

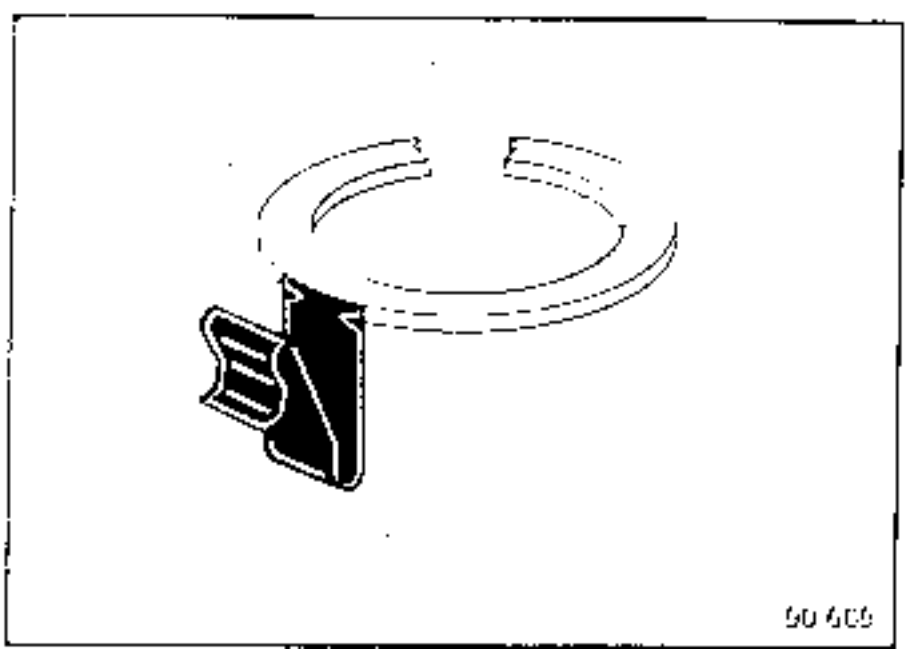
Detail (E) of the idler gear



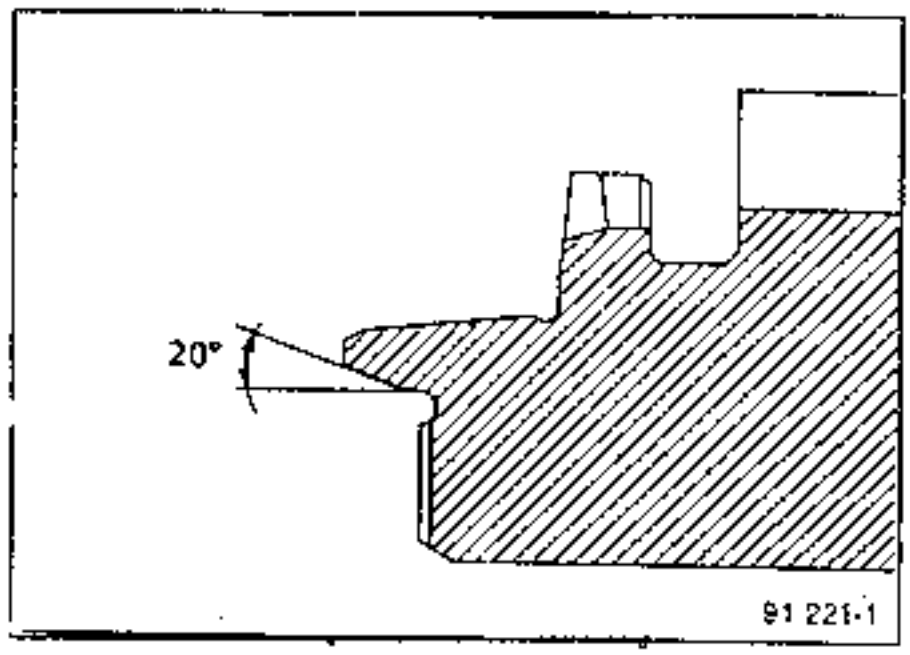

45° inlet chamfer **(E)** for the bevel shoulder under the synchro ring can only be fitted with the Z-shaped spring.



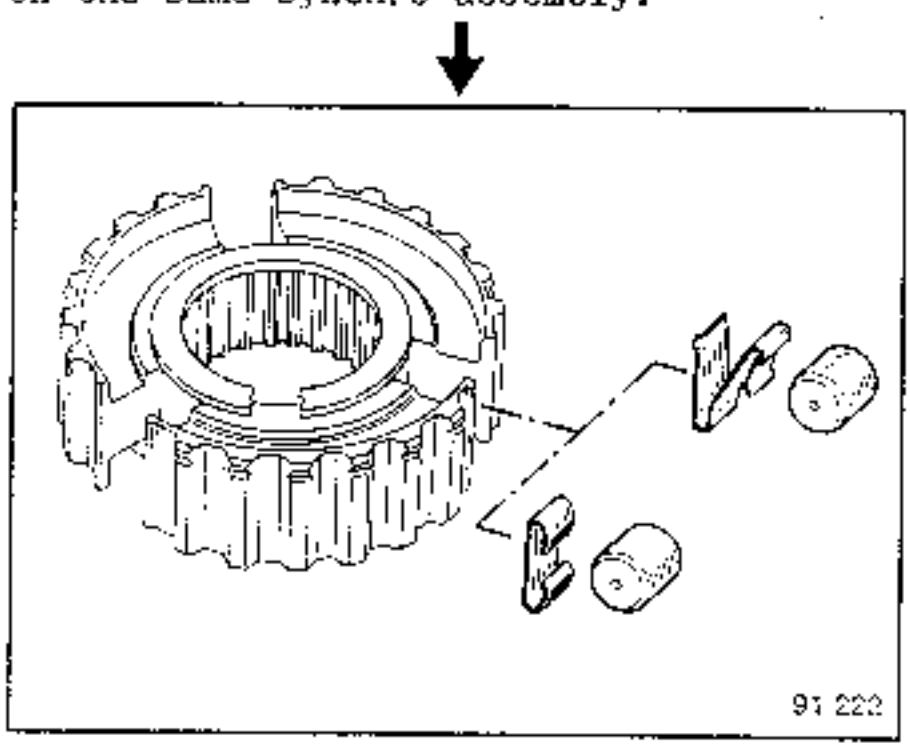

**Remember:**
The Z-shaped springs for the synchro rings must be fitted with the locking tabs at the snap ring end.




Detail (E) of the idler gear




**Special point:**
Idler gears with a 20° inlet chamfer **(E)** can be fitted either with the heart-shaped or the Z-shaped springs. However, the two types of spring must not be used on the same synchro assembly.




Make sure that the heart-shaped springs are fitted with the flat part at the synchro hub end.

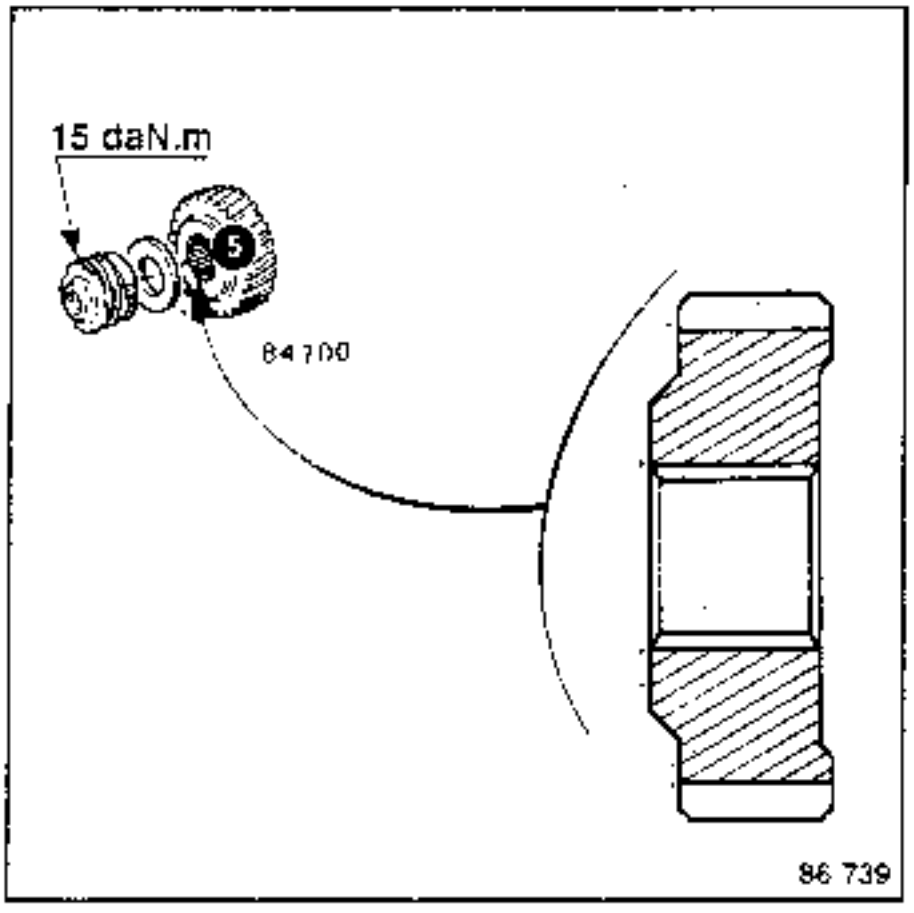
Ensure that the notches on the hub are aligned with the bosses on the synchro ring.

## SECONDARY SHAFT

Fit:
- the the set of taper roller bearings, checking that the pre-load spacer is fitted between the two cones.

- the bearing thrust plate.

Make sure that the fixed gear is fitted the correct way round and bond it with **Loctite FRENBLOC.**




Fit the spring washer.

Put 3 drops of **Loctite FRENBLOC** (120° apart) on the threads of the new nut, torque tighten and lock it.

**NOTE:** When tightening the nut, rotate the set of taper roller bearings to ensure that they locate correctly.

## NG7: Special points

**Checks to be carried out:**

- the 5th speed fixed gear torque - it must be greater than 1000 daN;

- the secondary shaft guide end out-of-round - it must be less than 0.15 mm.

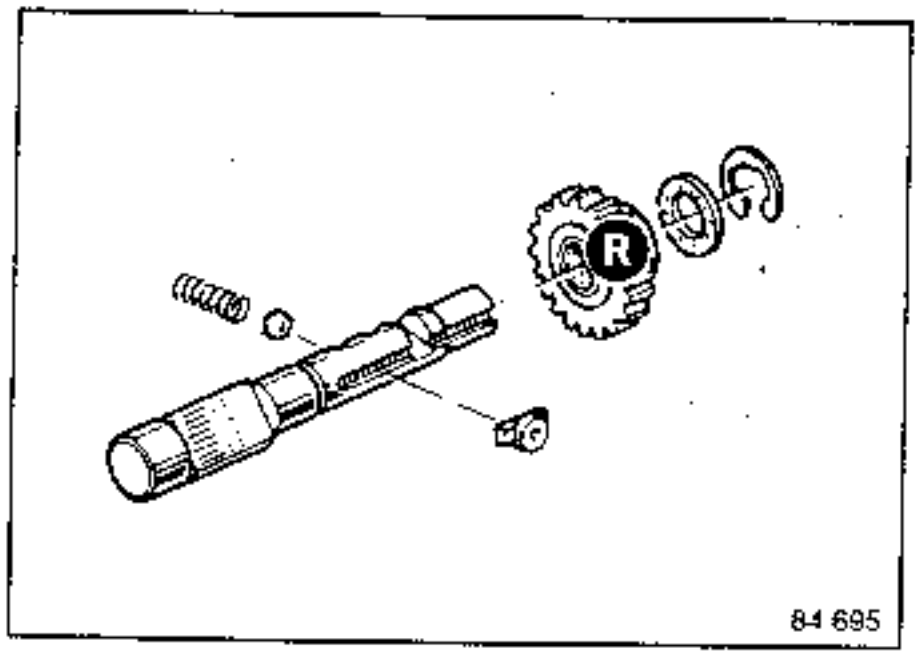
Fit:
- the snap ring;

- the dog drive (sealed with **Loctite FRENBLOC**);

- the second snap ring.

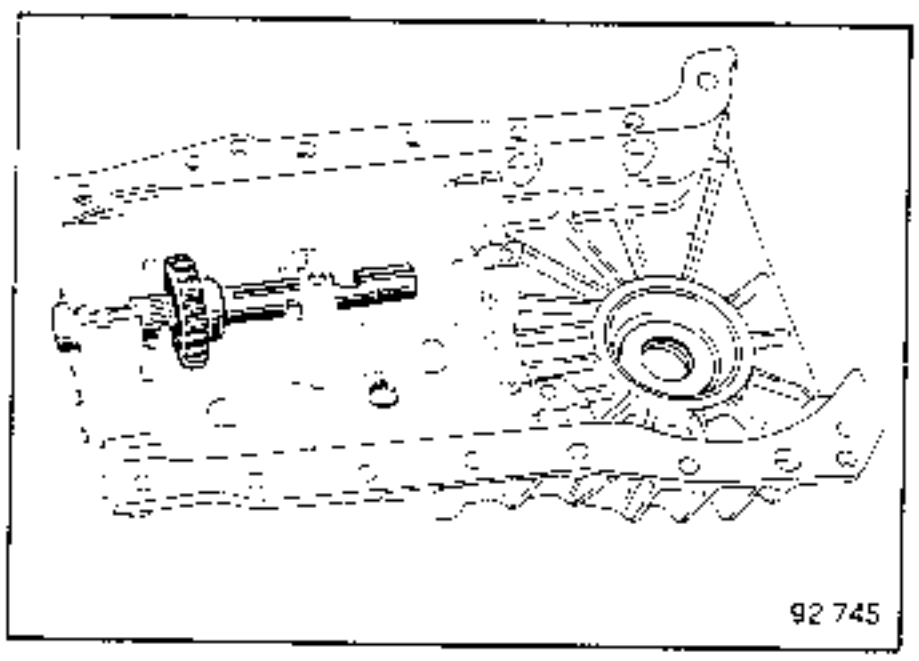
## REVERSE GEAR SHAFT

This operation is performed after the casings have been separated.



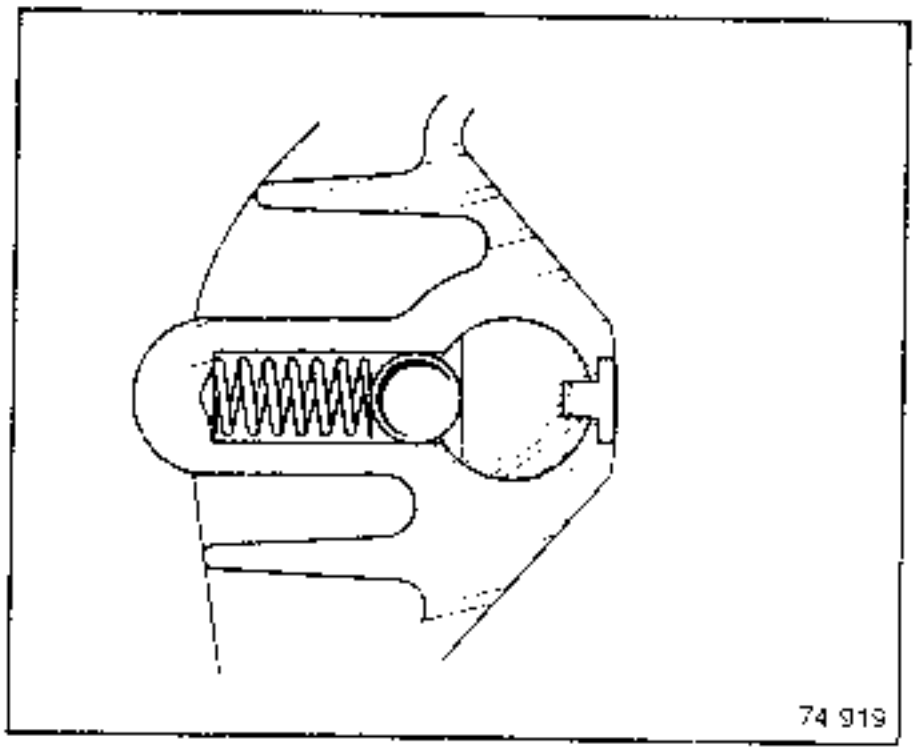

### DISMANTLING

Remove the circlip holding the drive gear and take out the shaft, drive gear, friction washer and guide.




### REASSEMBLY

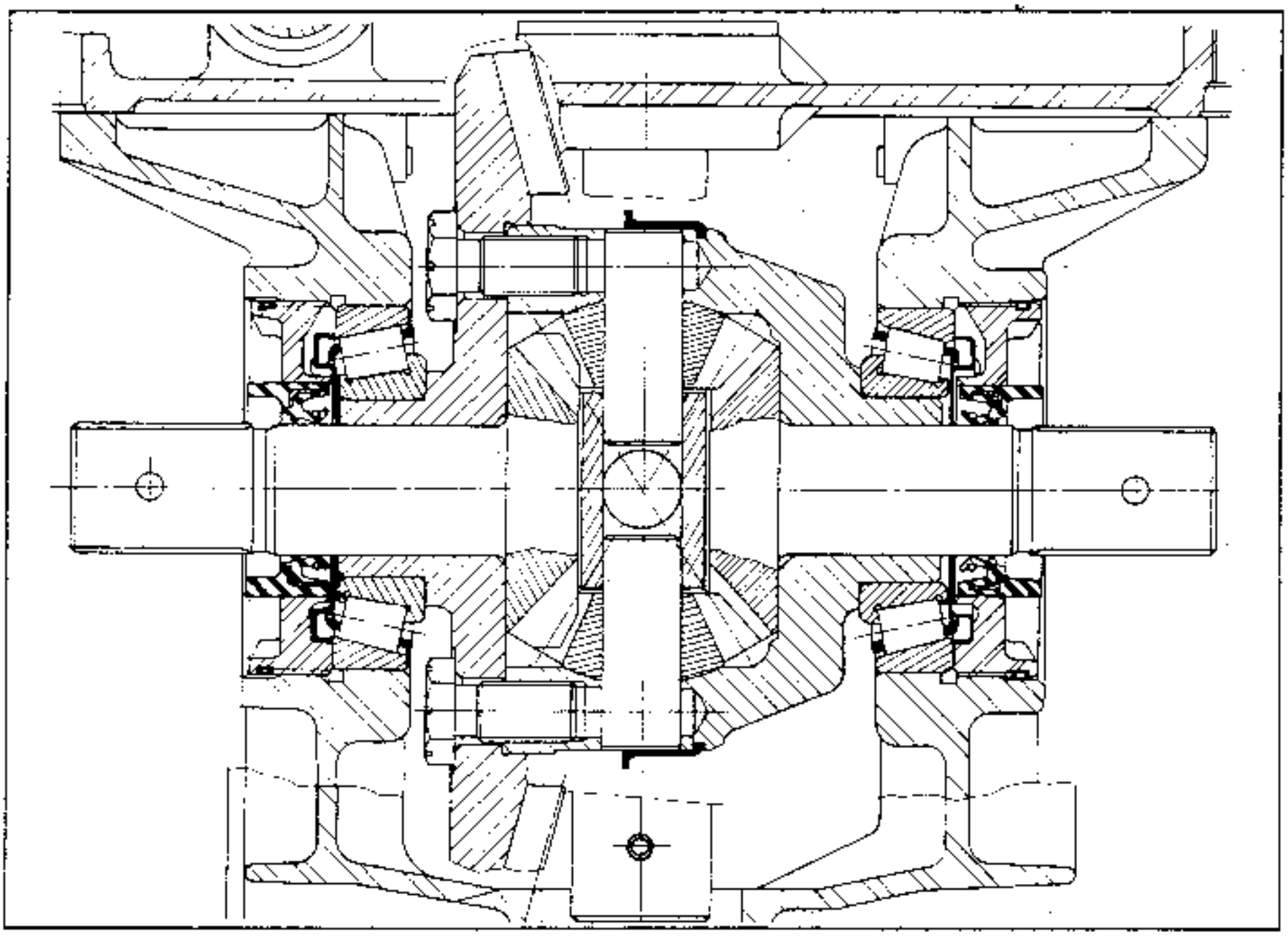
In the half-casing:
- place the locking ball and spring;
- engage the shaft and fit the drive gear (with the hub at the differential end) then the friction washer (bronze face at drive gear end);
- fit the guide from inside the bore an engage the shaft completely;




- fit the drive gear retaining circlip and check that it sits correctly in the groove on the shaft.

## DIFFERENTIAL

CROSS-SECTION



## Dismantling - Reassembly

This operation is performed when the casings have been separated.

| TIGHTENING TORQUES (in daNm) |
|---|
| Crown wheel bolts<br>- NG0 - 1 - 5 ..... 10<br>- NG2 - 3 - 7 - 9 ..... 12.5 |

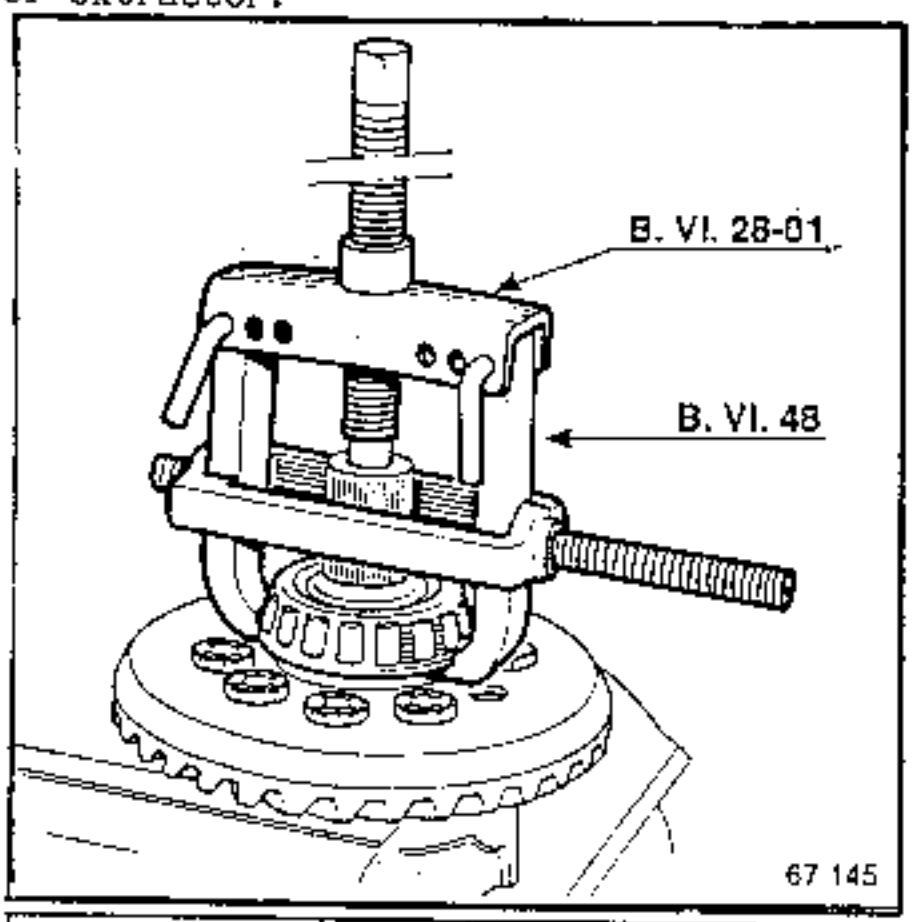
| CONSUMABLES |
|---|
| Immerse the parts in gearbox oil<br>**Loctite FRENBLOC:** Crown wheel bolts |

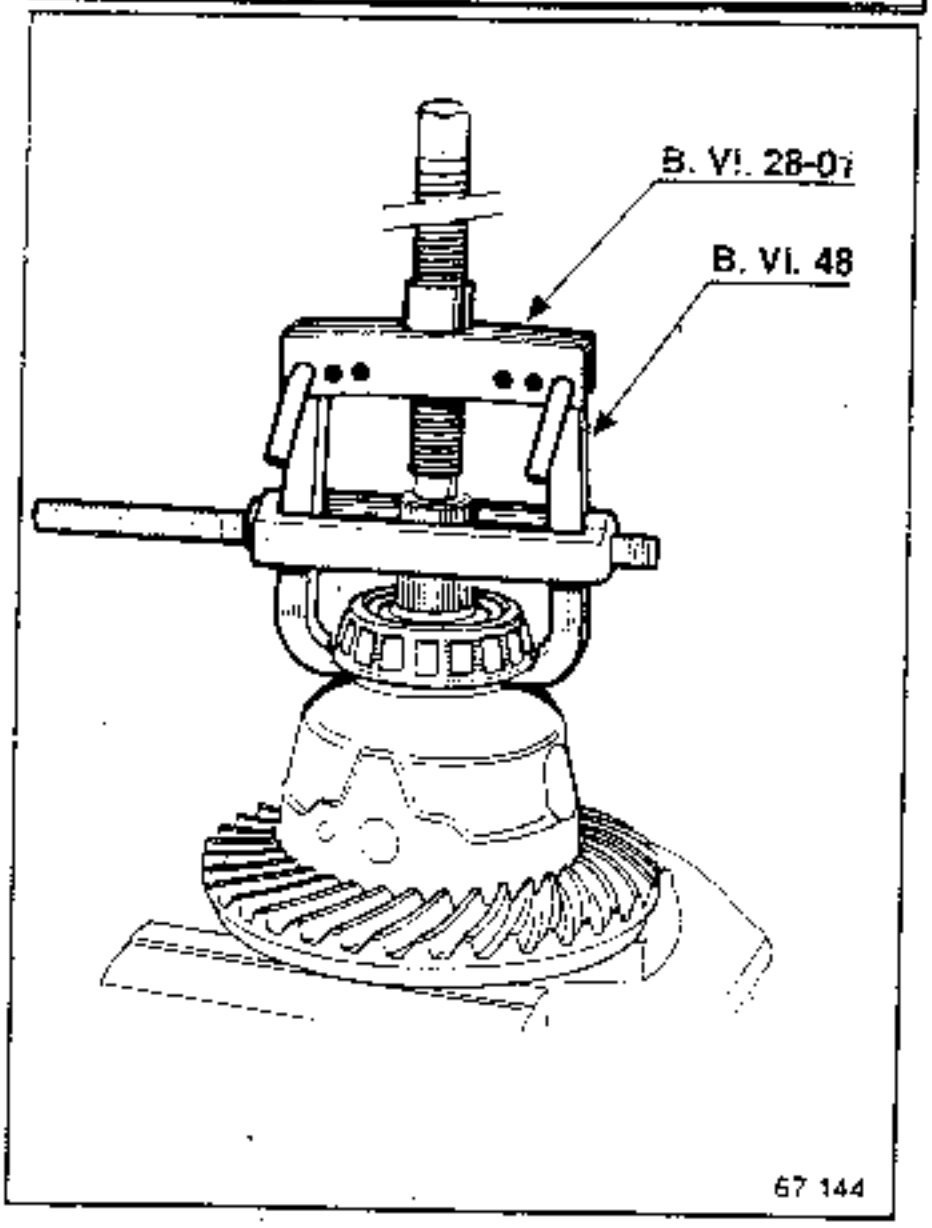
## DIFFERENTIAL

**Dismantling:**

Remove the two bolts securing the crown wheel.

Take out the bearings at the crown wheel and housing ends using tool **B.Vi.28-01** fitted with jaws **B.Vi.48** or a similar type of extractor.

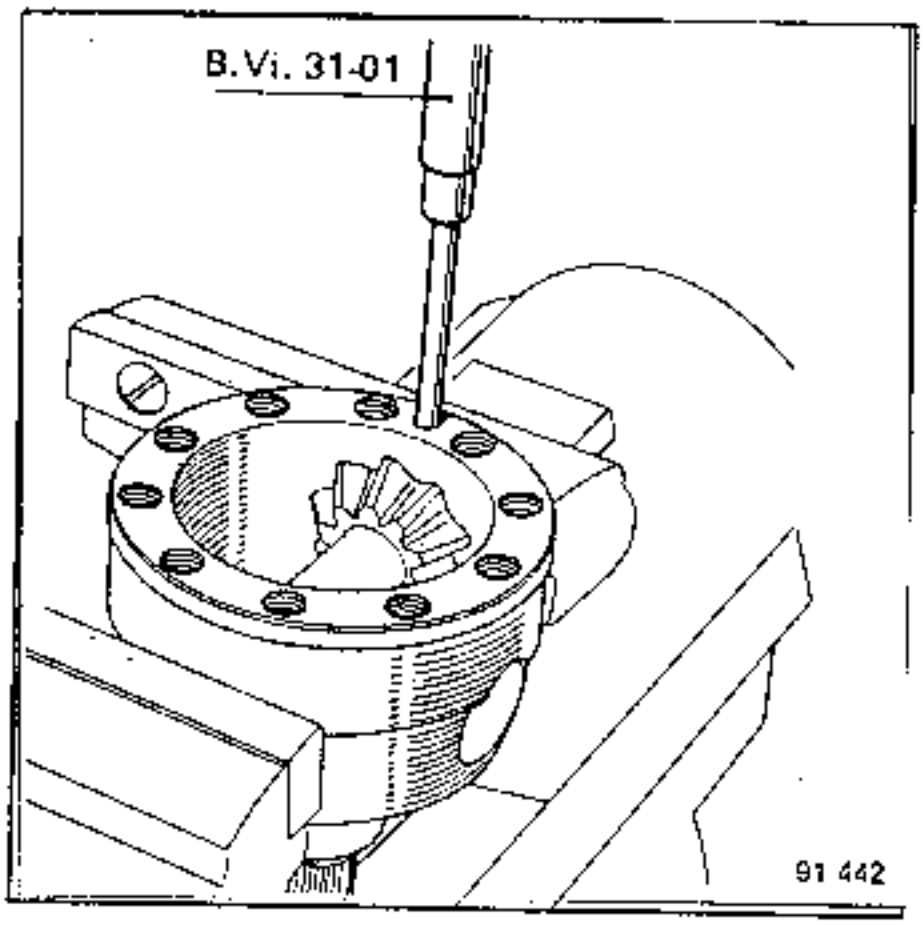


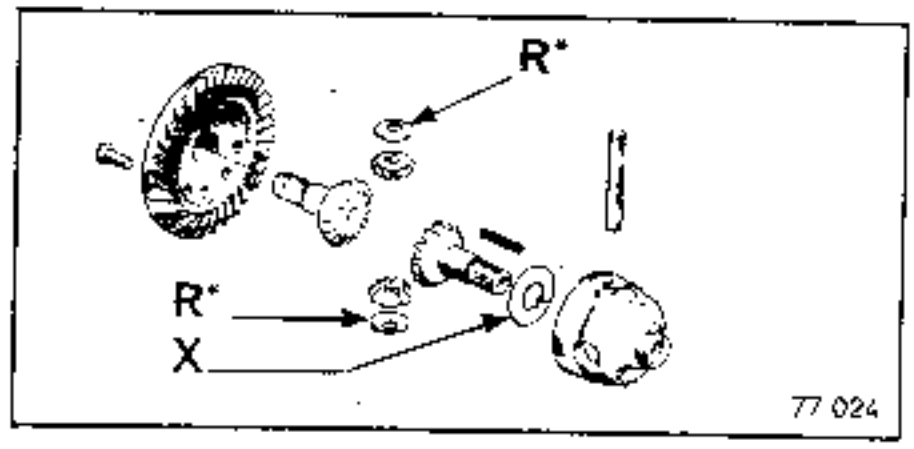

Remove the bolts securing the crown wheel to the housing **(these bolts cannot be recovered).**

**Differential with two planet wheels:**

Knock out the spring pin holding the planet wheel shaft using drifts **B.Vi.31-01** or **B.Vi.39.**




Separate the various parts.

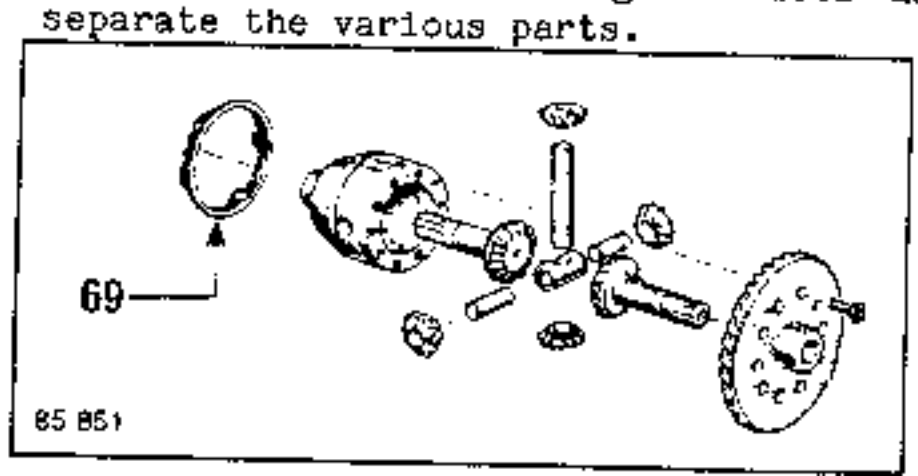



*Depending on type of assembly.

Attach washers **(R)** to their respective planet wheels and recover shim **(X).**

**Differential with four planet wheels and collar**

Destroy collar **(69)** using a chisel and separate the various parts.



**DIFFERENTIAL**

**Electronic speedometer:**

The sensor ring gear cannot be dismantled from the casing.

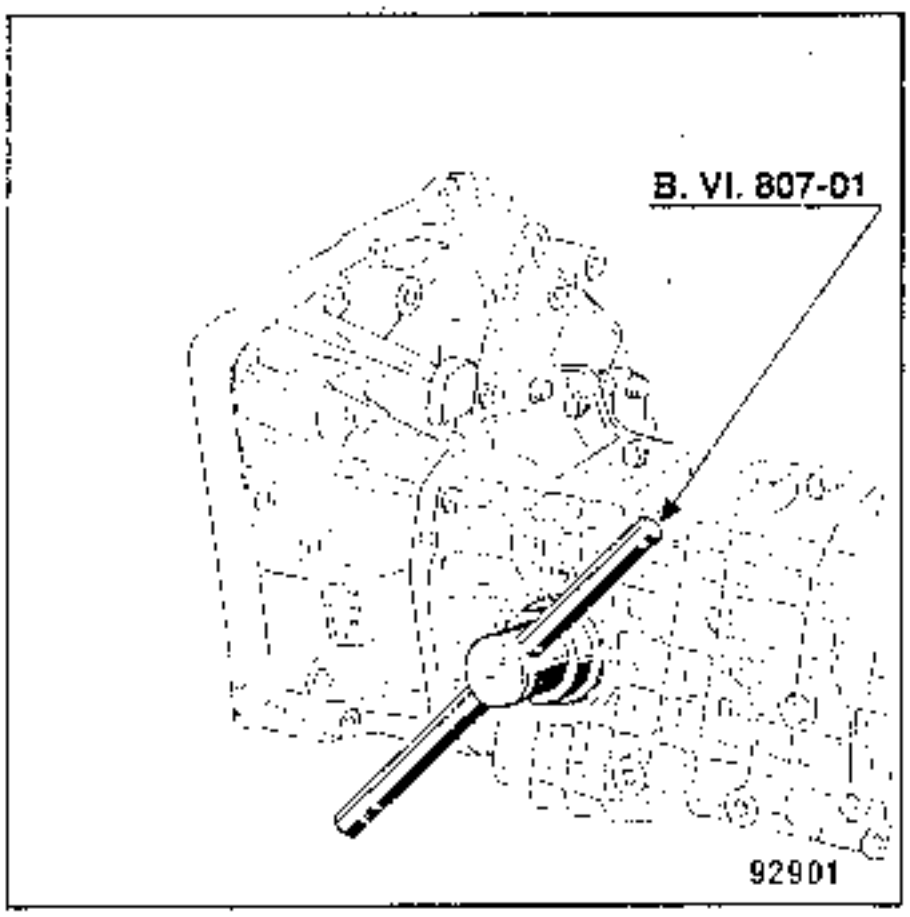
**ALL TYPES**

Separate the various parts.

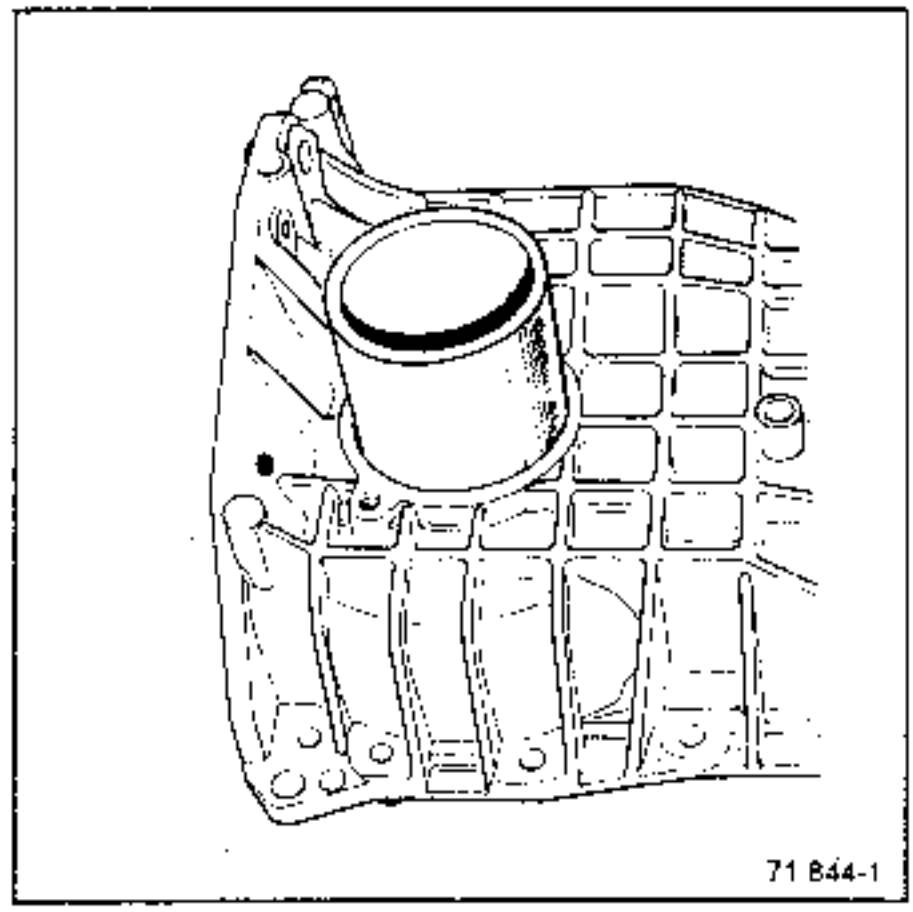
**Checking the parts:**

Check the condition of:
- the teeth
- the bearing seats
- the washers (on the planet wheels)
- the splines
- the casing.

Remove the nuts from the casings using wrench **B.Vi.807-01.**

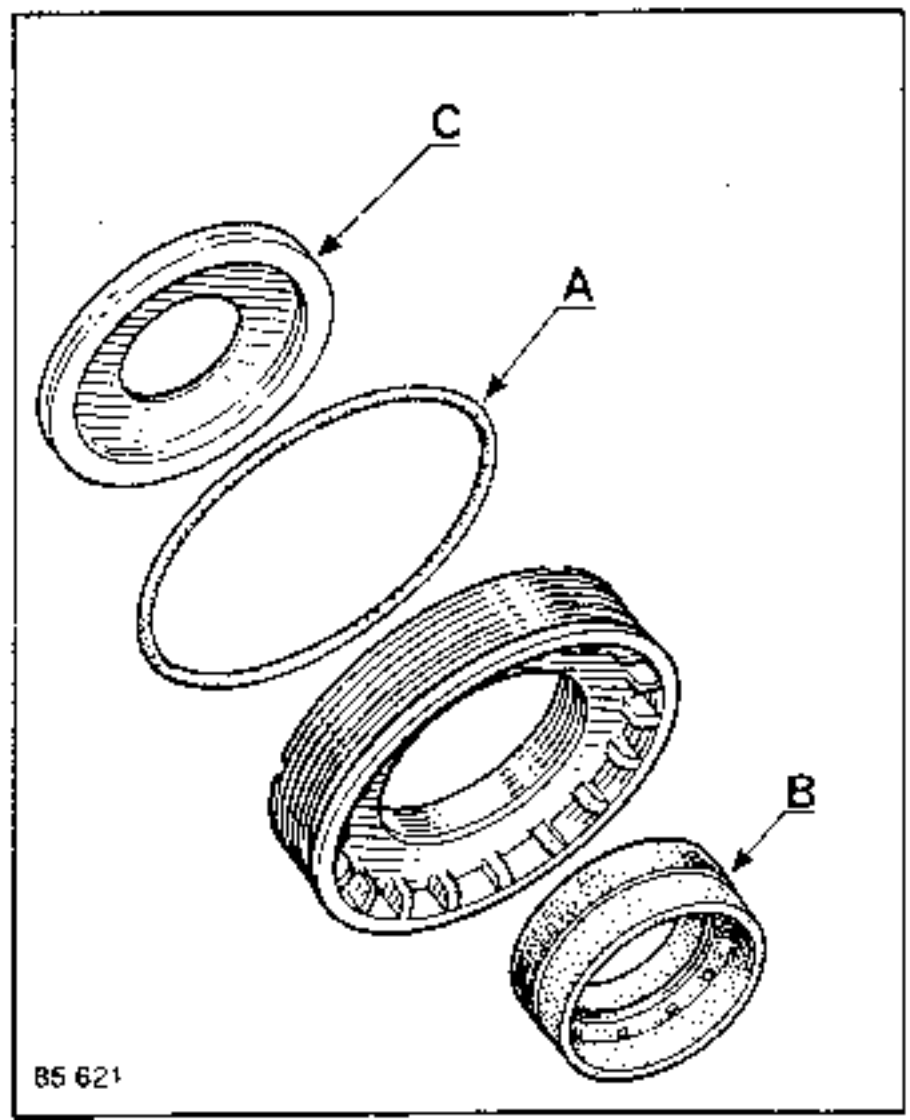



Knock out the bearing shells using a piece of tubing with an outer diameter of **71 mm.**




**NOTE:** The bearing shells and cones must be kept in their pairs.

From the nuts remove:
- O-ring **(A)**;
- deflector **(C)**;
- lip-seal **(B)**.



**DIFFERENTIAL**
**Reassembly:**

All the parts must be cleaned, checked and lubricated as they are assembled.

The bearings and spring pins must be replaced systematically.

The assembly and adjusting operations must be performed carefully and accurately, in the order given.

In the casing place:
- the bakelite washer with the oil way at the sunwheel end: use the **1.96 mm** thick shim. If the mesh clearance between the sunwheel and the planet wheels is too great, use a 2.02 mm thick shim;

- one sunwheel (immersed in the recommended oil);

- the planet wheels and their shims (the locking notch fits in the hole in the casing);

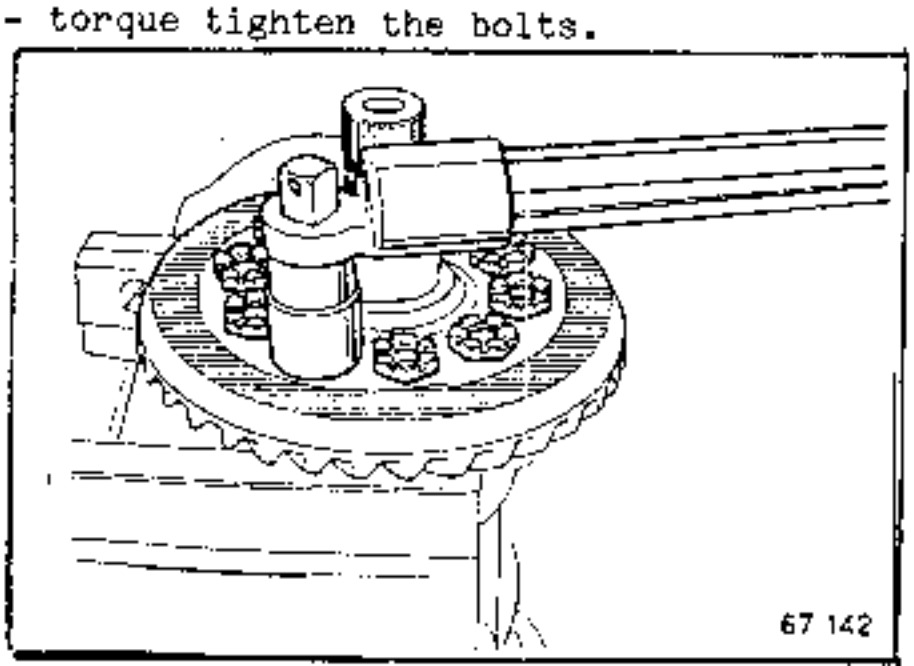
- engage the planet wheel shaft fitted with hub **(66)** (depending on the vehicle) aligning the hole in the shaft with the hole in the housing;

- fit a spring pin: insert it by approximately 5 mm inside the housing using drift **B.Vi.31-01** or **B.Vi.39;**

- fit the two other planet wheels and insert their shafts (depending on the assembly);

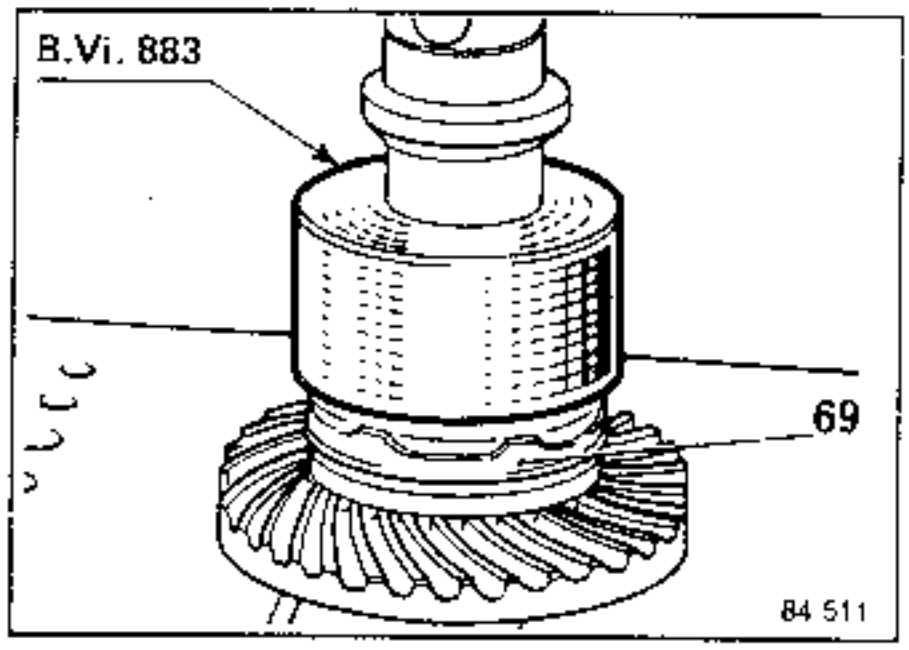
- fit the second sunwheel in the crown wheel;
- assemble the crown wheel on the housing using **new bolts which cannot be slackened;**

- torque tighten the bolts.

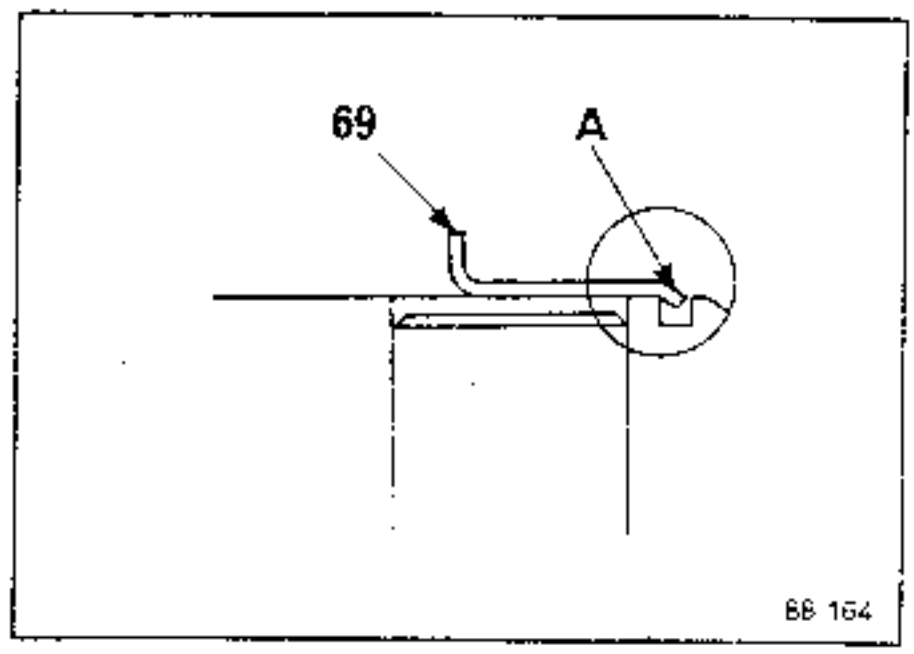



After assembly, the differential may be stiff to rotate.

Collar **(69)** is refitted using tool **B.Vi.883** with the bearing not fitted and on the press.




Check that ends **(A)** of the collar **(69)** are positioned correctly in the differential casing groove.




If they are not, lower the collar slightly using a bronze drift.

Accentuate the curve of the end at **(A)** very slightly if necessary.

**Differential with four planet wheels and no rollpins**

Proceed in the same way.

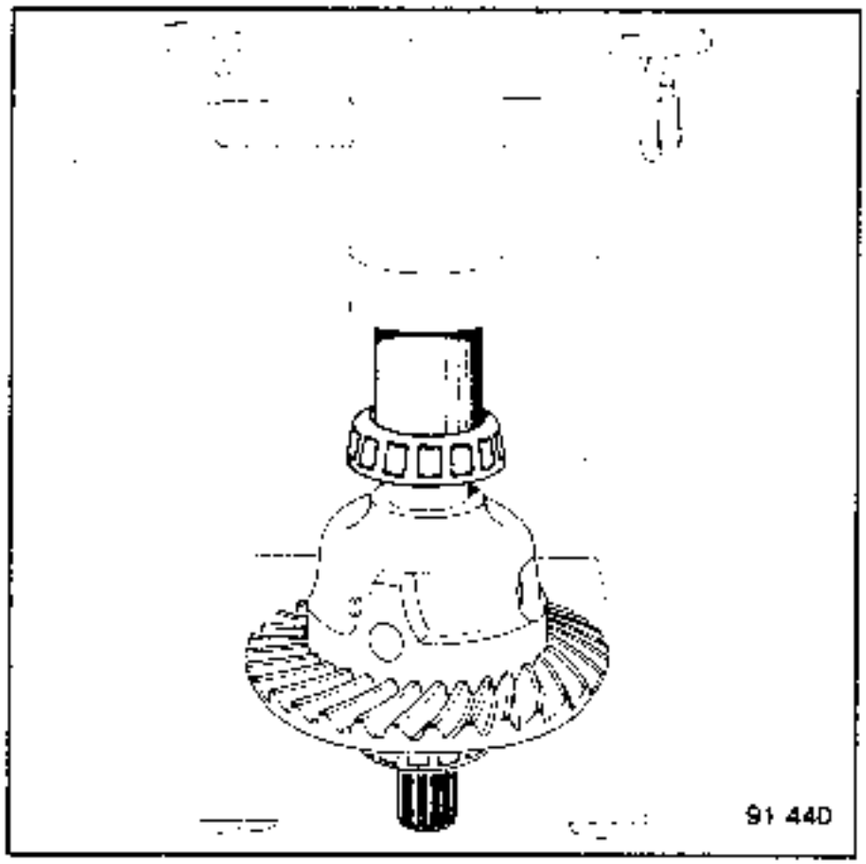
Do not fit washers or shims to the planet wheels.

## DIFFERENTIAL

### Reassembly:

Fit the bearings on the press.

The diameter of the bearing at the crown wheel end is smaller than that at the housing end.




Fit the bearing outer track rings so that they are slightly recessed in relation to the inner face of the casings and the adjusting nuts (without seals), taking care to tighten the nut more at the casing end.

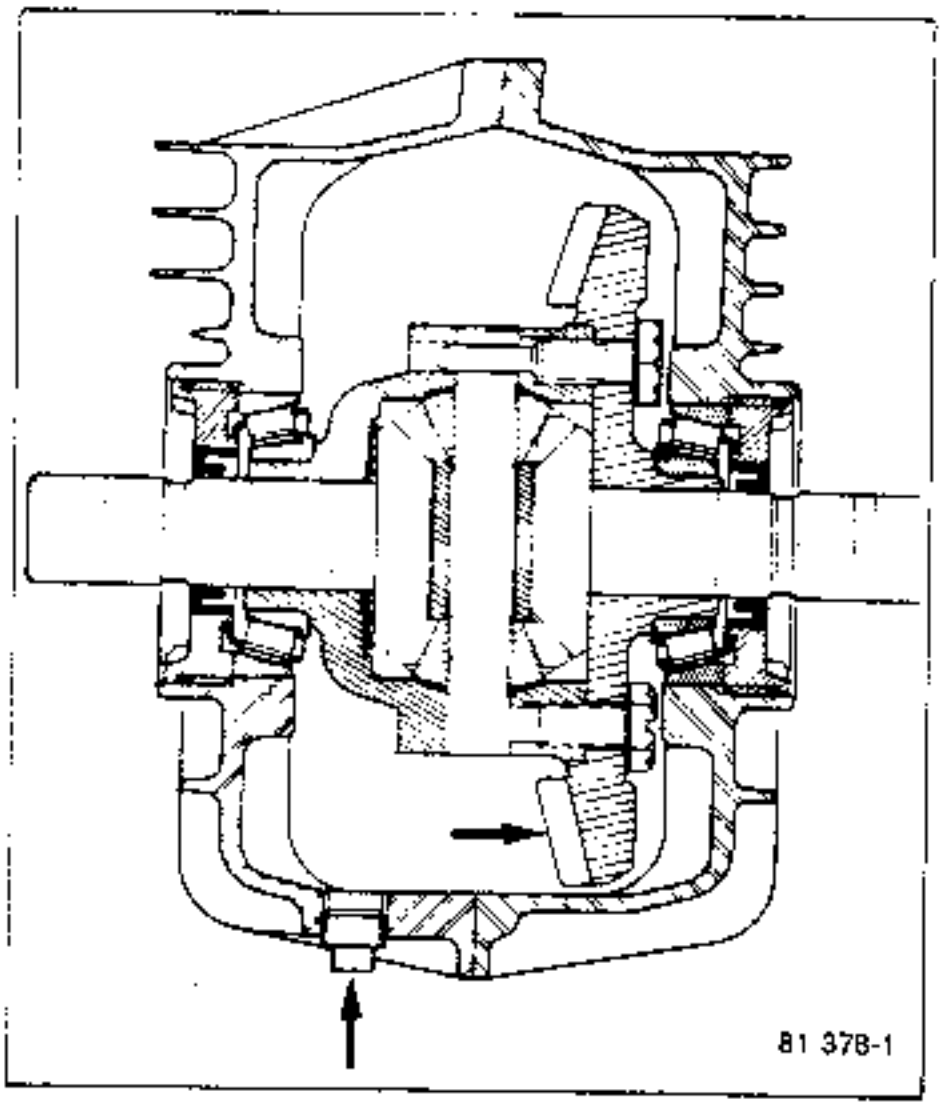
Adjust the differential bearing pre-load.

## DIFFERENTIAL

### Bearing pre-load

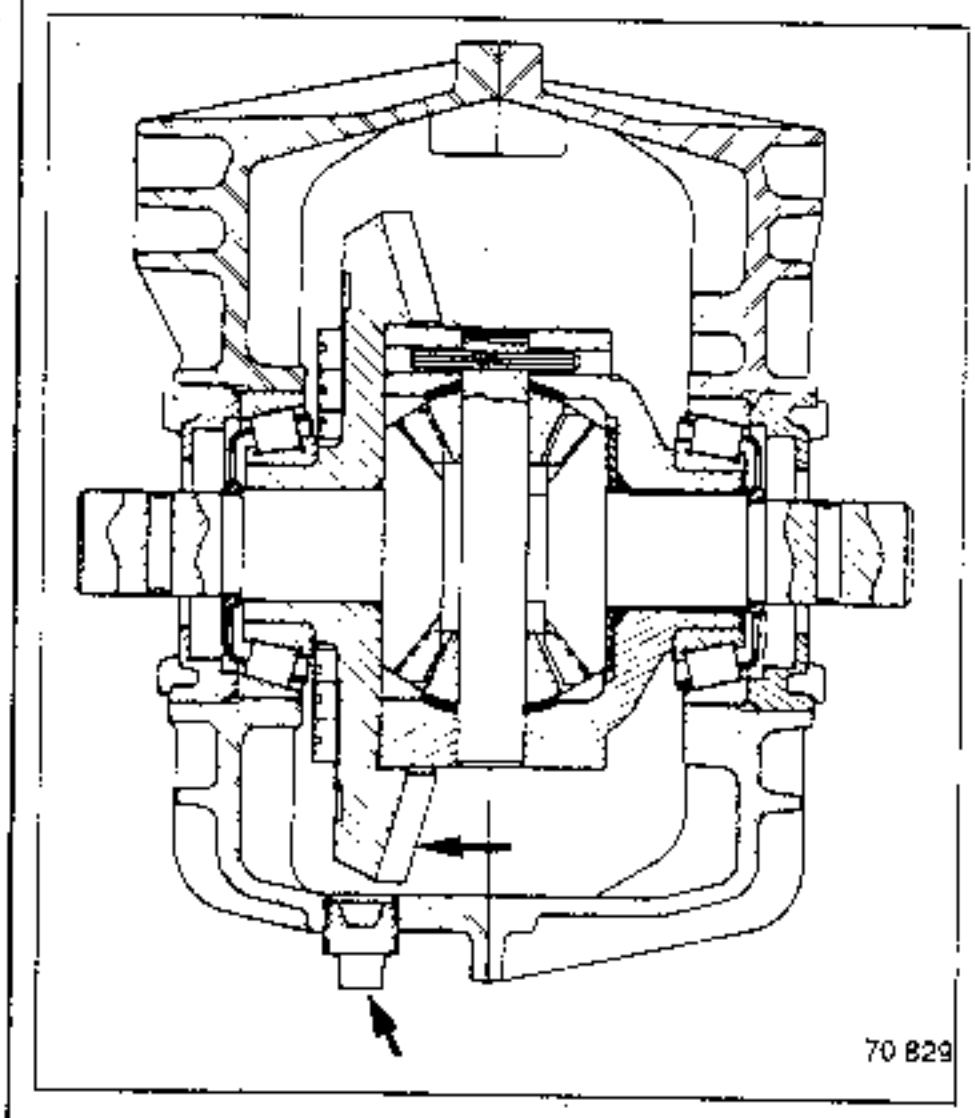
(Direction for fitting the crown wheel)

NG All types (except NG5)




End opposite drain plug

NG5

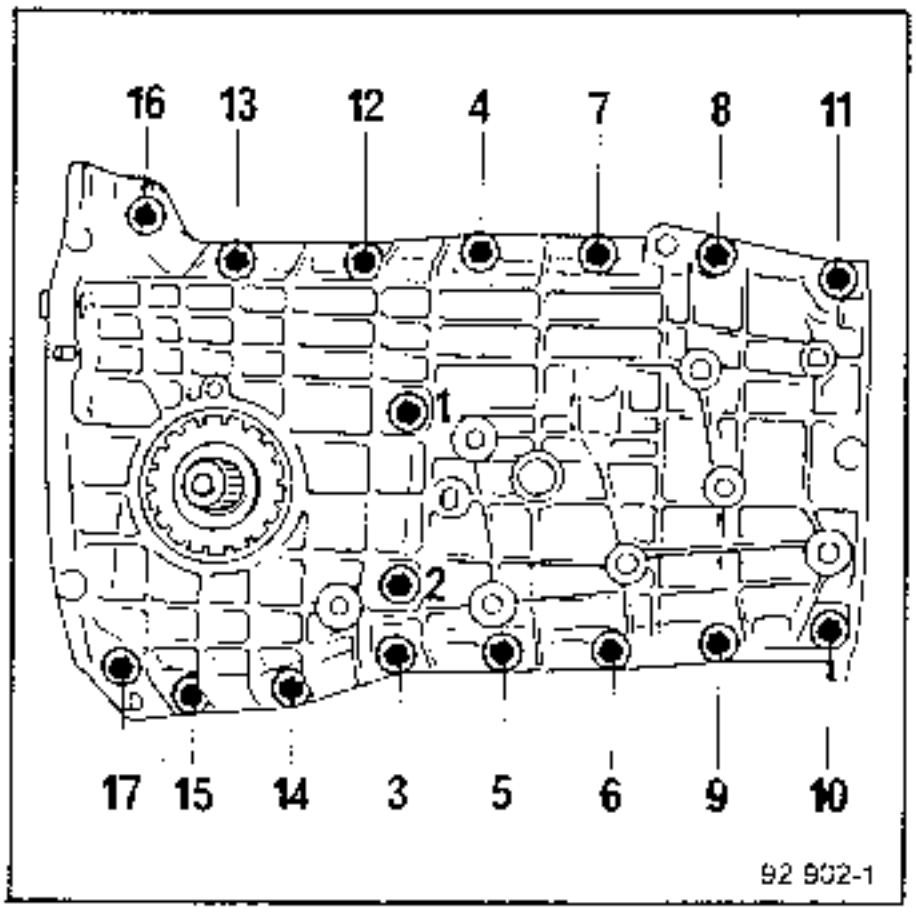



Drain plug end

## DIFFERENTIAL

### Bearing pre-load

Once the outer tracks of the differential bearings are fitted, fit the differential in the casings without the final drive pinion and torque tighten the bolts on the casings in the order shown.




The pre-load is adjusted by tightening or slackening the nuts using tool **B.Vi.807-01.**

**NOTE:** Do not fit new lip-seals to the adjusting nuts since there is a risk of their being damaged by the sunwheels when the gearbox is opened again.

Turn the differential and tighten the nuts, taking care to tighten the nut at the casing end slightly more than the one at the crown wheel end so that a backlash which is greater than normal is obtained on reassembly.

**Two possible cases may arise:**

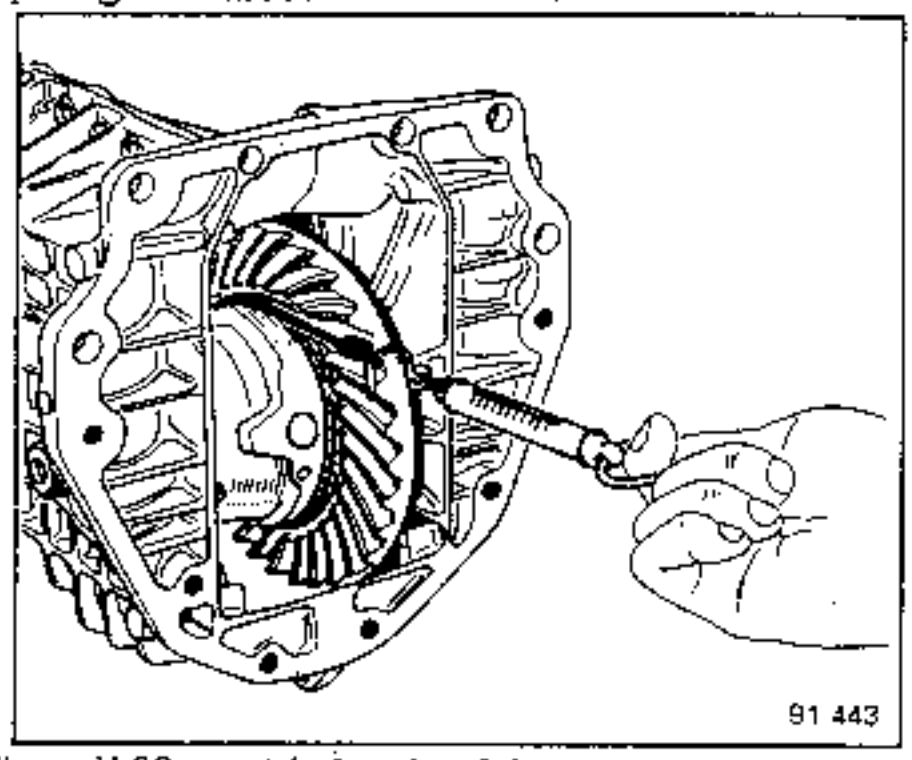
1. **Re-used bearings**
   When the differential turns freely and without play, stop tightening the nuts and the pre-load is adjusted.
2. **New bearings**
   When the differential turns freely and without play, tighten the nut at the casing end (it will be slightly hard to turn) then check the pre-load.

### Checking the pre-load

Turn the differential several turns to centre the bearings.

Wind a piece of string around the differential housing.

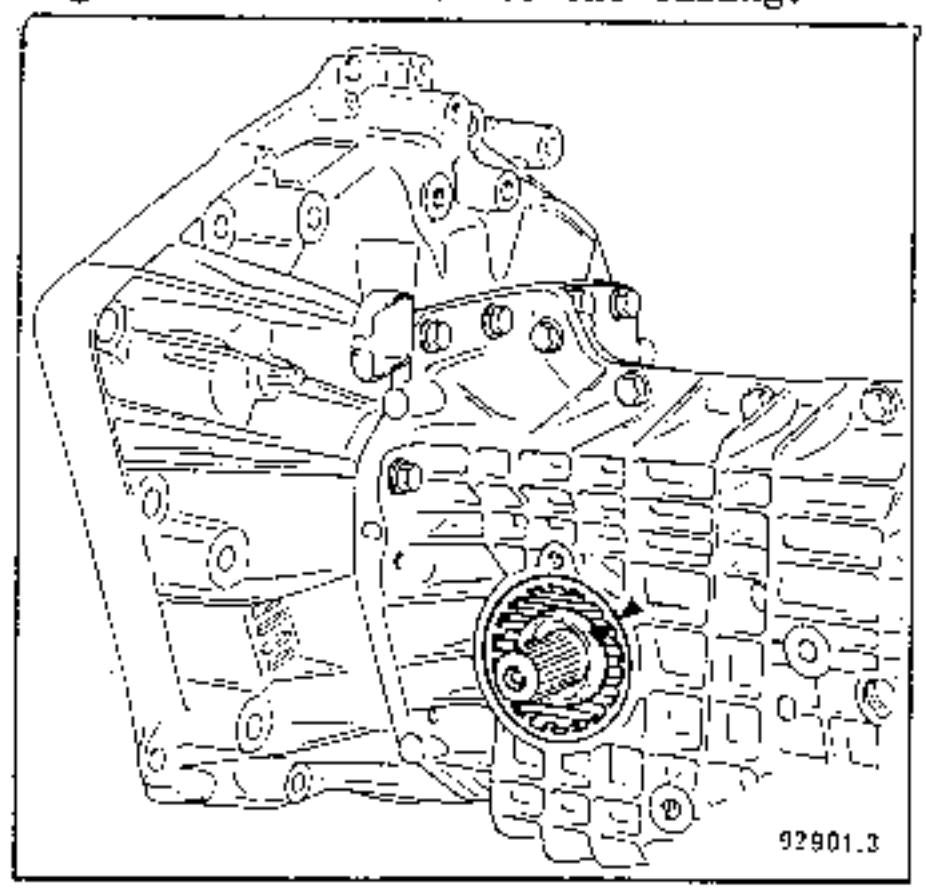
Pull steadily on the string using a spring balance.




The differential should rotate under a load of between 4 and 6 daN. This load is the amount required to turn the differential continuously.

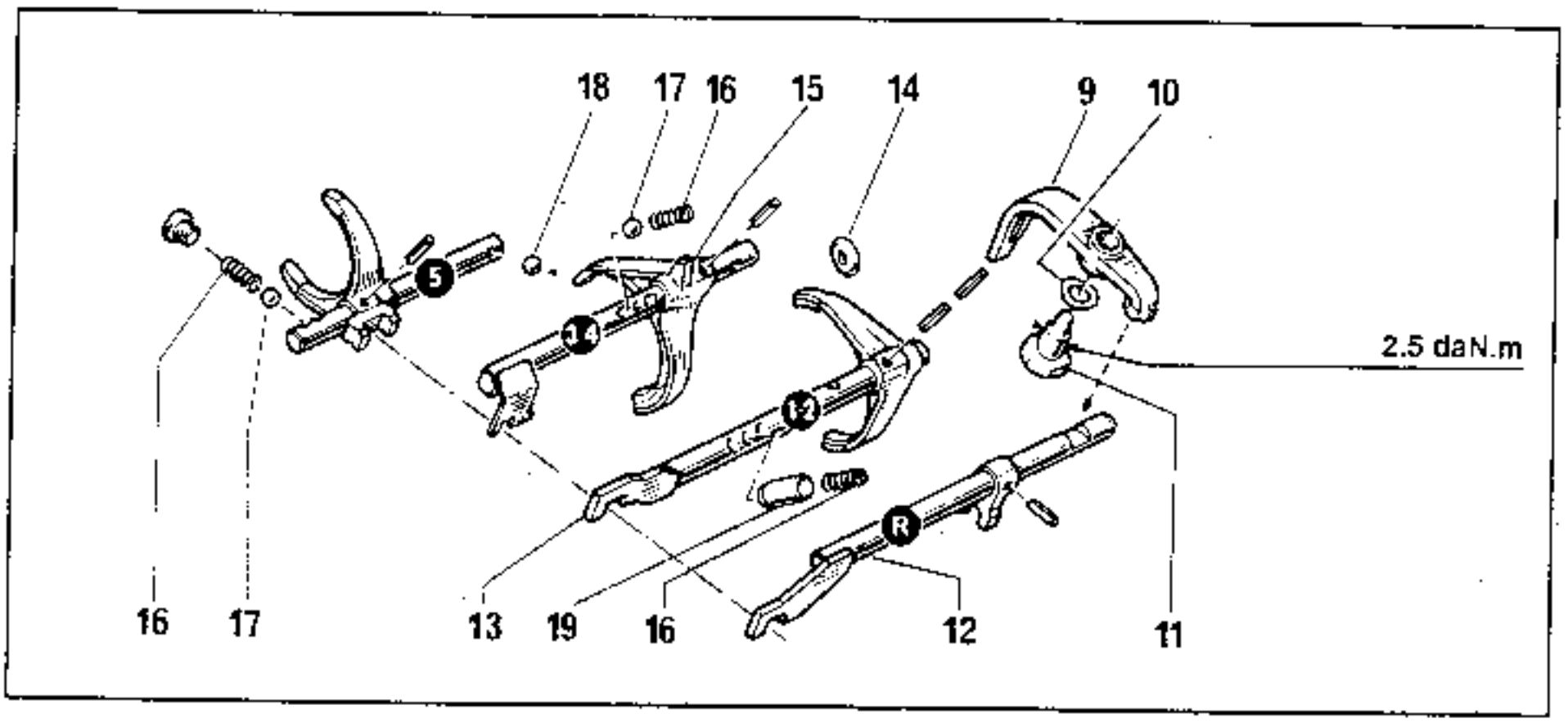
If the adjustment is not correct, tighten or slacken one ring nut slightly and re-check the pre-load.

In both cases, after the pre-load has been adjusted, mark the position of the ring nuts in relation to the casing.



## INTERNAL CONTROLS

EXPLODED VIEW




This operation is performed after the casings have been separated.

| TIGHTENING TORQUES (in daNm) |
|---|
| Reverse gear lever bolt ..... 2.5 |

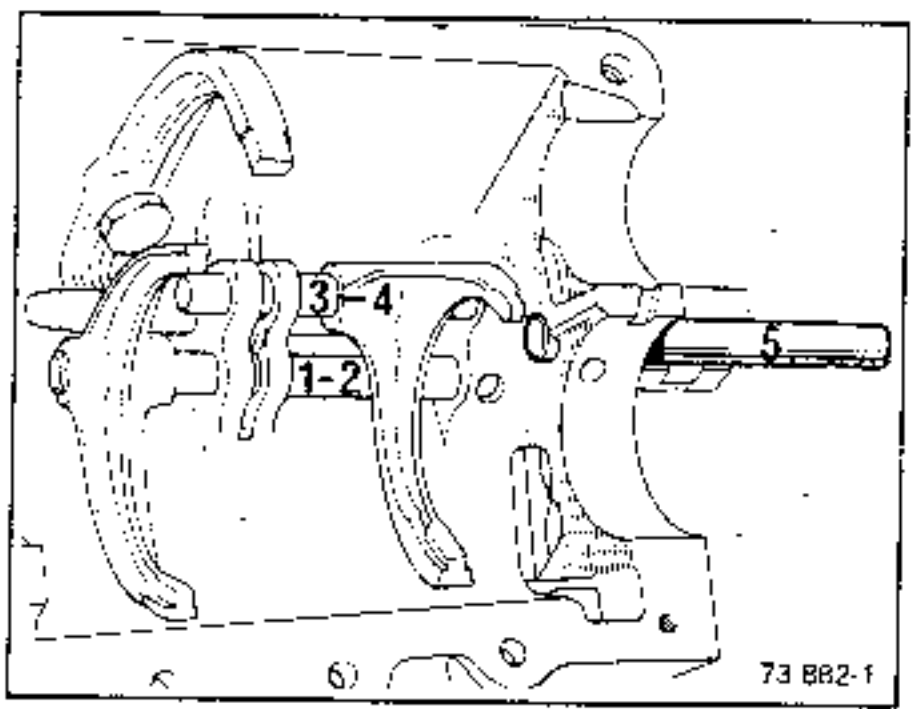
| CONSUMABLES |
|---|
| **Loctite FRENBLOC:**<br>- Reverse gear lever bolt |

### DISMANTLING

Remove the reversing lights switch.

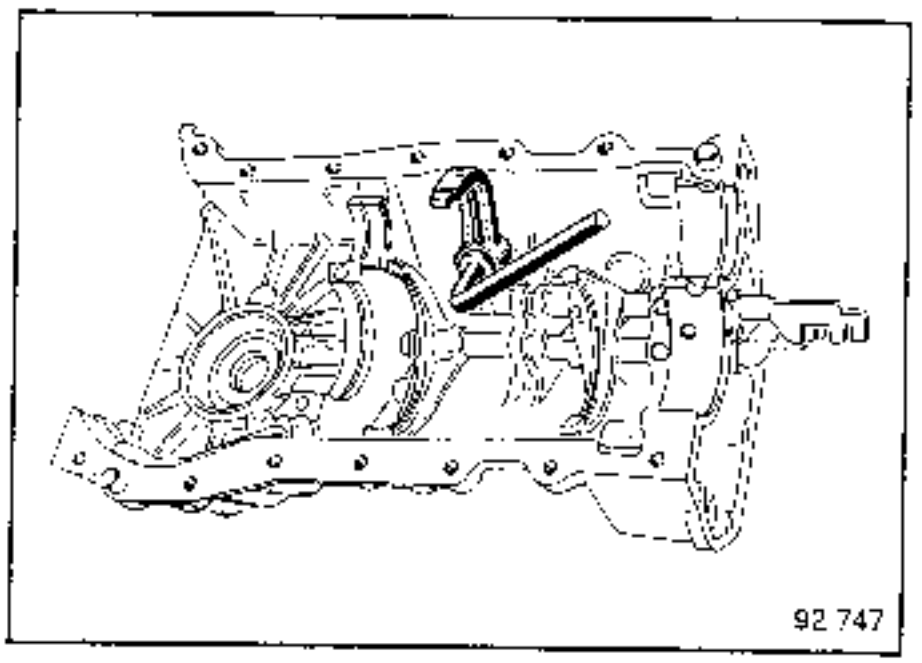
Place the shafts in the neutral position.

Remove the 5th speed shaft-fork assembly and locking ball **18**.




Select 1st gear.

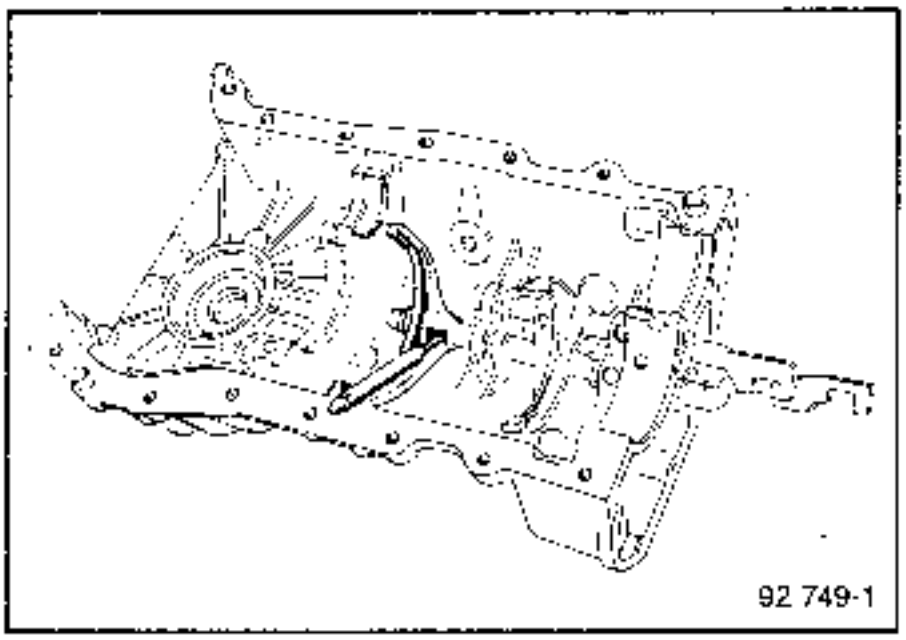
Remove the reverse gear switch.




Return to neutral and push the reverse gear outwards.

**INTERNAL CONTROLS**

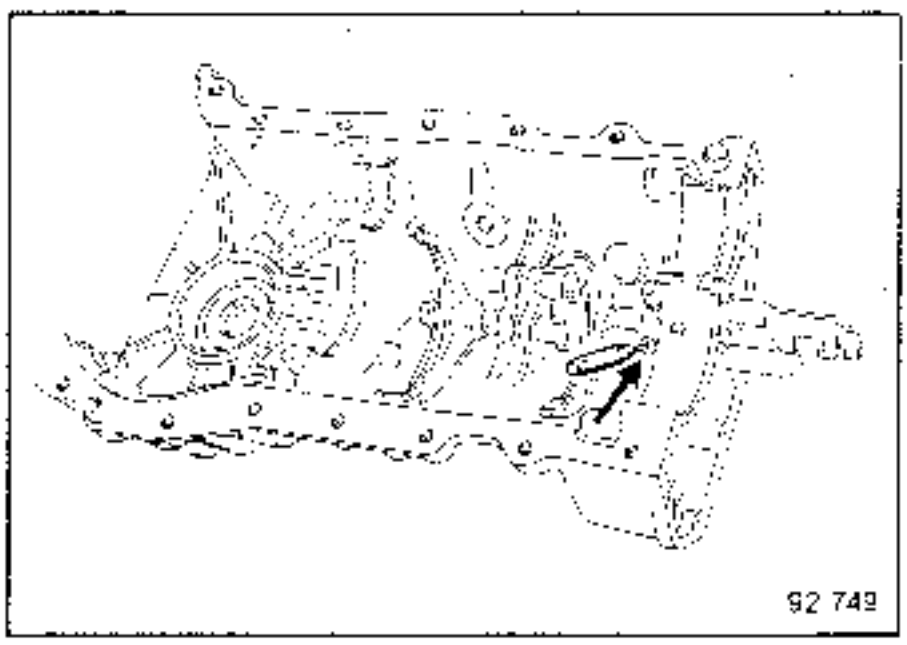
Knock out the spring pins from the 1st/2nd and 3rd/4th speed forks using drift **B.Vi.31-01** and a 4 mm pin drift.




Place the reverse gear in neutral again.

**NG - All types (except NG7)**

Remove:
- the 3rd/4th speed shaft and fork;
- the locking disc;
- the 1st/2nd speed shaft and fork; using a 2 mm pin drift, compress the locking plunger spring so that the assembly can overcome the notch for the shaft locking ball.




Recover the ball, plunger and springs.

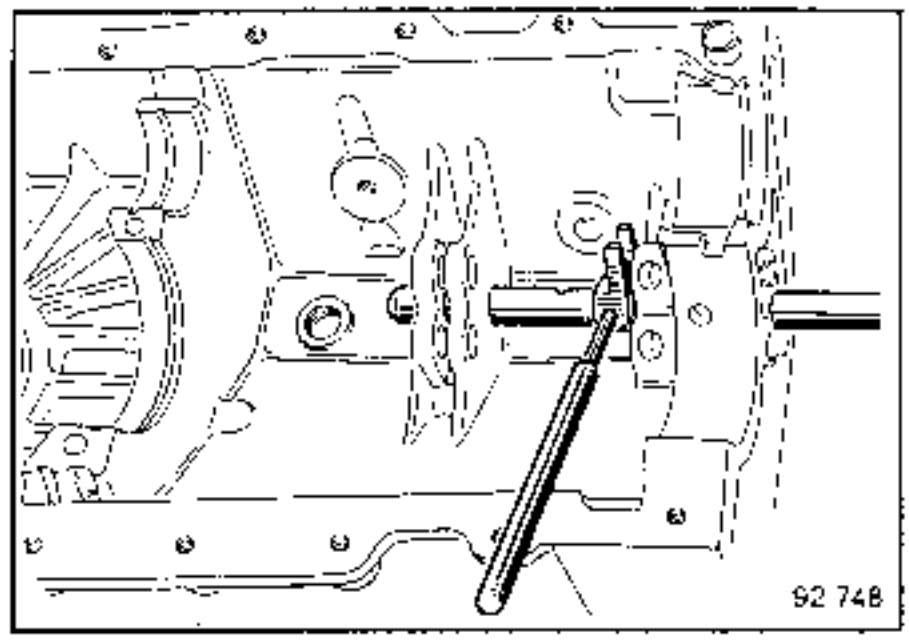
**NG7: Special point**

Remove the 1st/2nd speed shaft before the 3rd/4th speed shaft.

**All types**

Knock out the pin from the fork on the reverse gear.

Remove the shaft and fork.




**NOTE:** As the rollpin is against the casing, turn the shaft so that it can be removed completely with pliers.

The shafts must not be deformed in any way, and there must be no signs of wear on the seat of the locking balls. In addition, they should slide freely in their journals without excessive play.

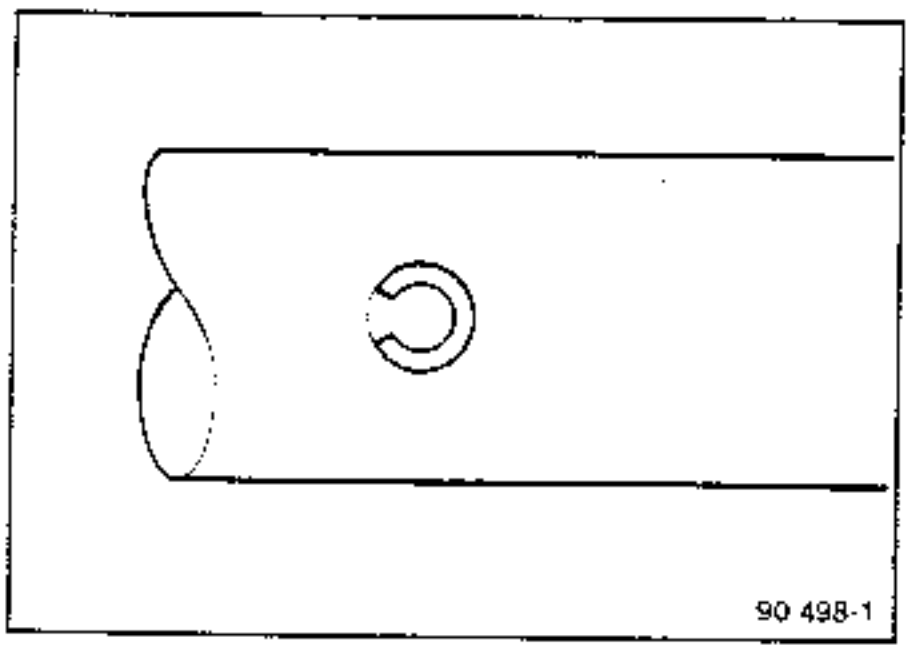
**Checking the forks:**
The surface of the forks in contact with the slide gears must not be deformed or worn.

## INTERNAL CONTROLS

**Reassembly:**

Replace all the spring pins, making sure they are fitted in the correct direction:

- the groove on the spring pins must be along the centreline of the shafts.

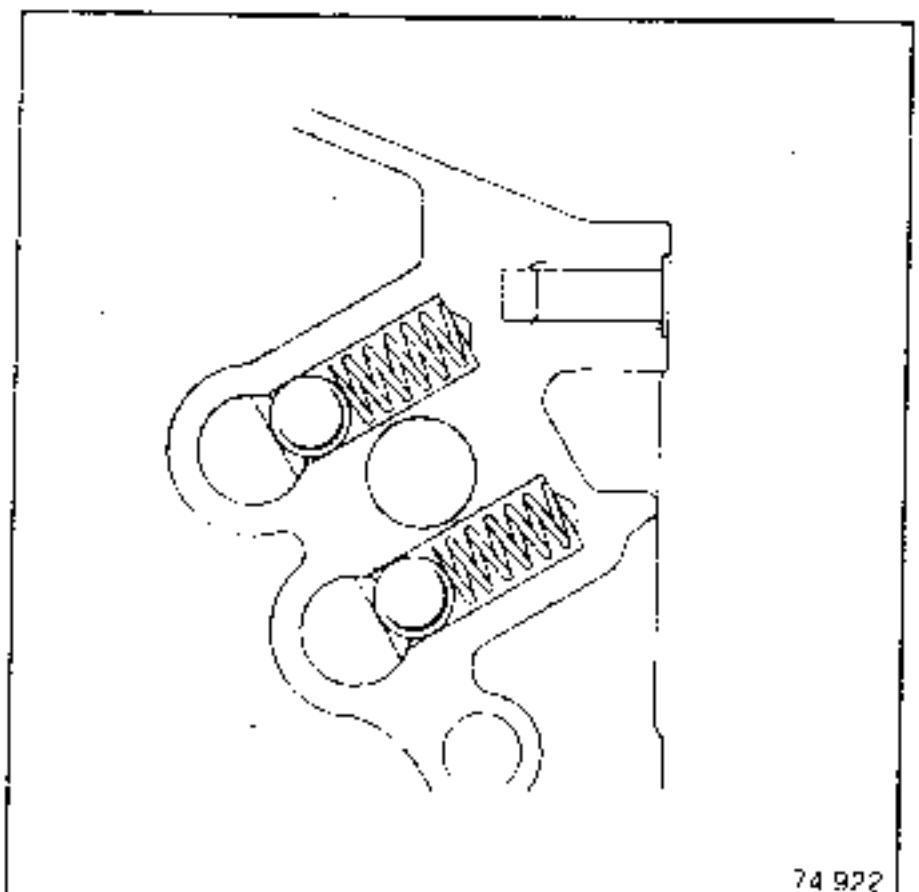



- **1st type:**

The 1st/2nd and 3rd/4th shaft locking balls and springs are all the same.

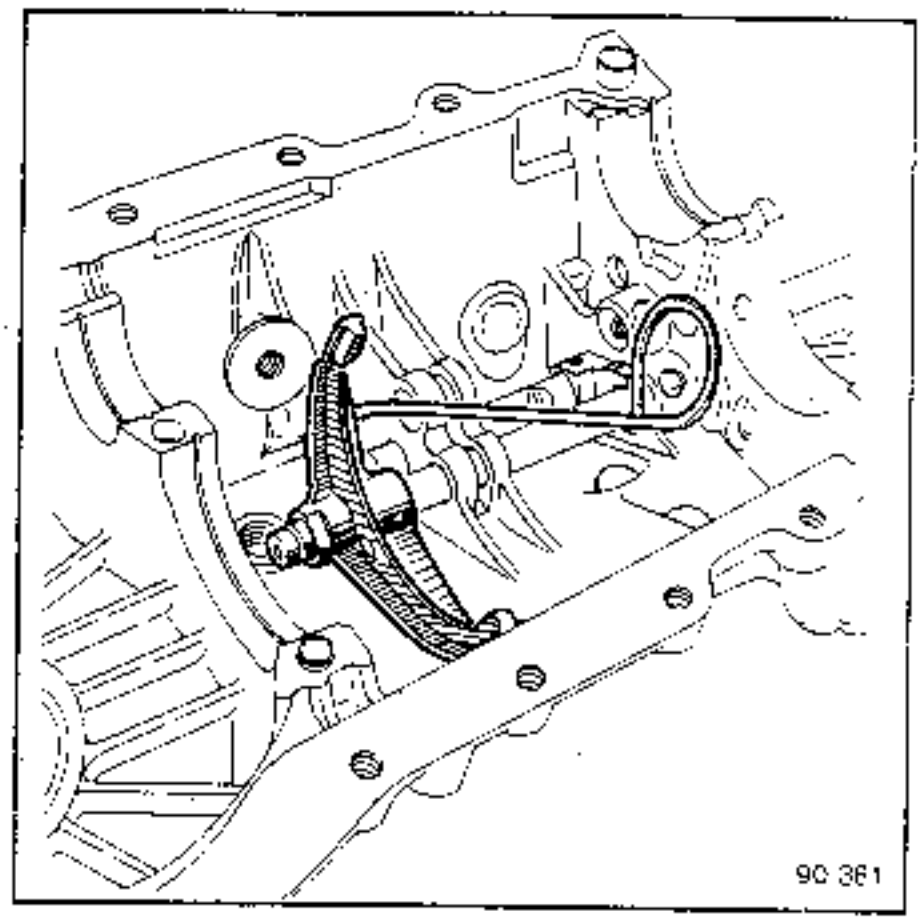
- **2nd type:** 2nd speed synchro assistance

The ball is replaced by a plunger and the 1st/2nd and 3rd/4th speed locking springs are different.

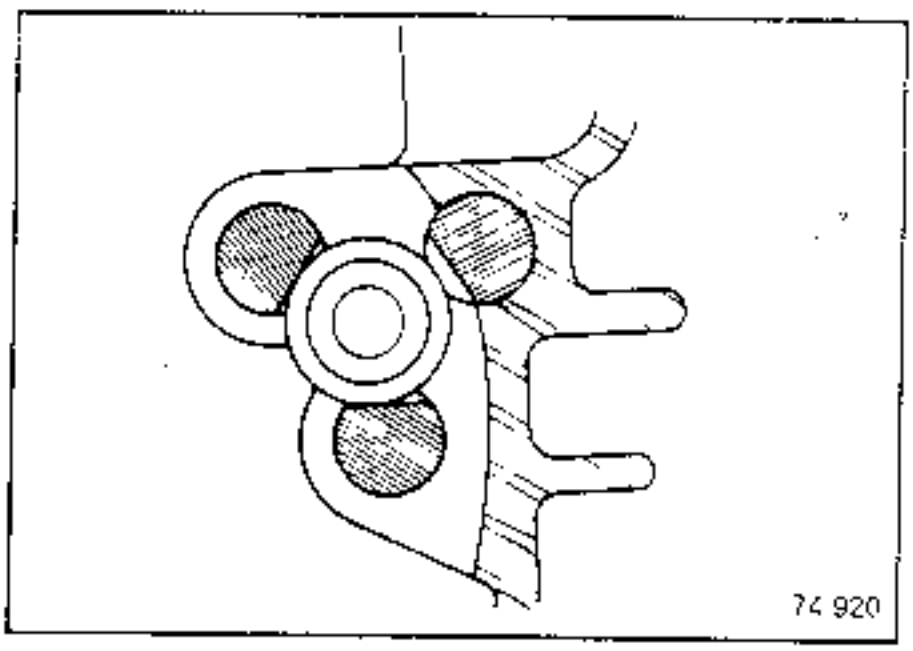



Fit in order:
- the reverse gear shaft and its fork;
- the spring and ball or plunger for the 1st/2nd speed shaft;
- engage the shaft and fit the fork.

Using a hook, align the holes in the fork with the hole in the shaft. Ensure that the fork is fitted the correct way, with the mounting holes facing the rear casing.




Fit the locking disc between the shafts.



## INTERNAL CONTROLS

Fit in place the 3rd/4th speed shaft locking ball and spring.

Engage the shaft by fitting the spring and rollpin.

**NG7: Special point**

Fit in place the 3rd/4th speed shaft and fork before the 1st/2nd speed shaft and fork.

**All types:**

Fit the reverse gear lever, engaging its end in the notch in the shaft.

Coat the threads of the reverse gear lever with **Loctite FRENBLOC** and torque tighten it.

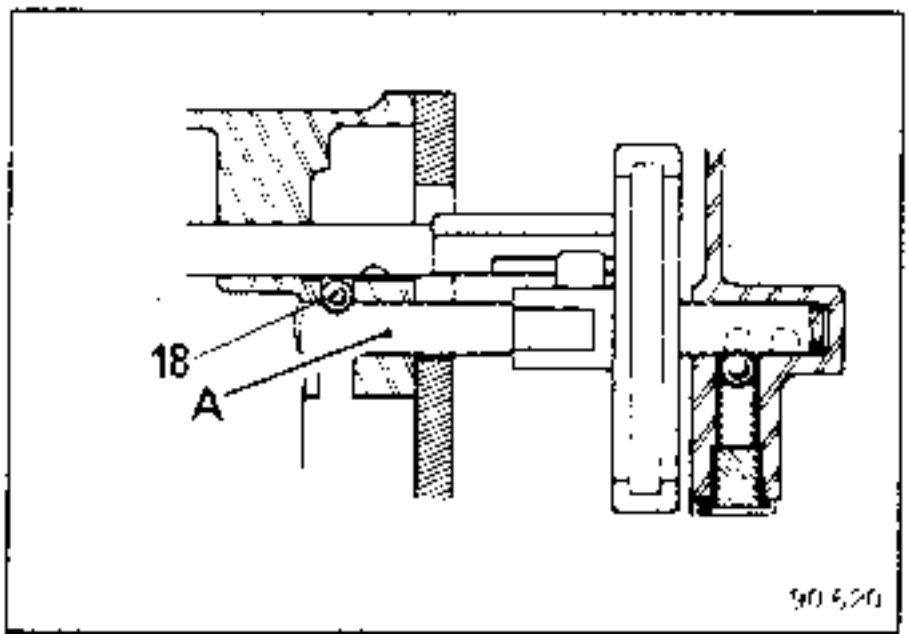
**2nd speed synchro assistance:**
After fitting the rollpin, make sure that the fork slides on its shaft.

Fit:
- the shafts in the neutral position;
- the interlocking ball **(18)** in its location;
- the 5th speed shaft-fork assembly **(A)**.

Check the operation:

- engage 4th gear;

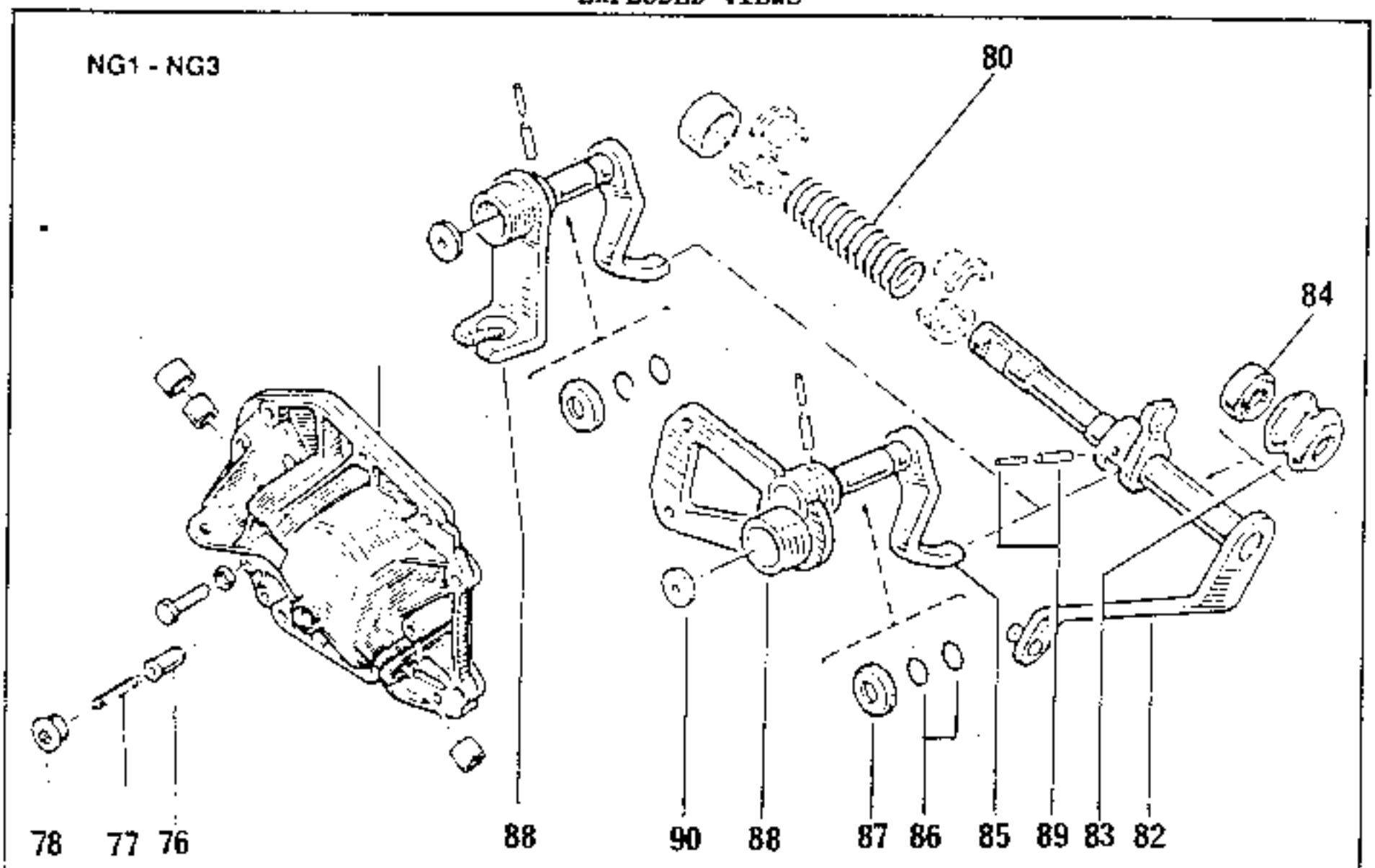
- push axially on the 5th speed shaft, it should be locked in position.



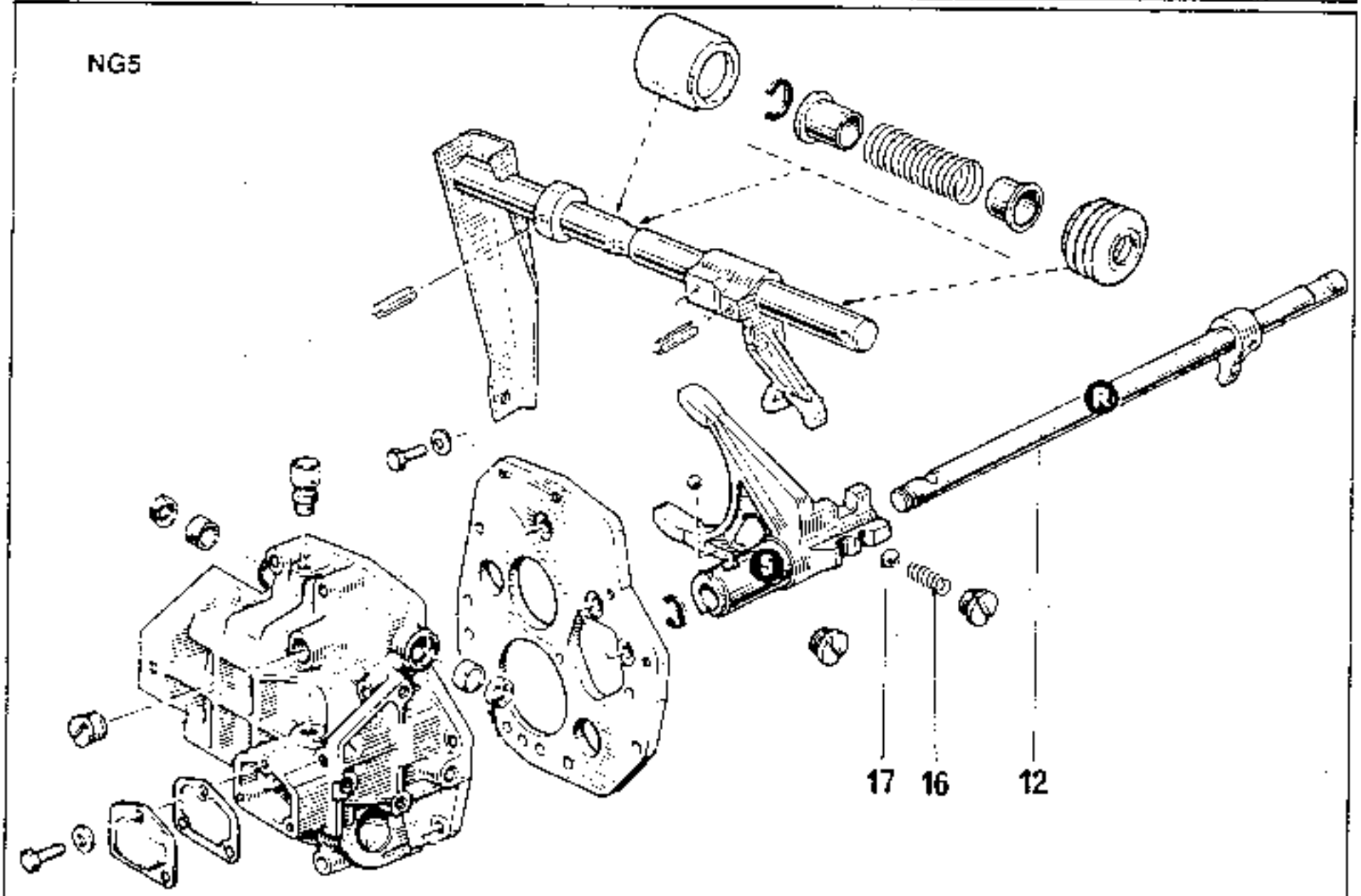
REAR CASING

EXPLODED VIEWS

NG1 - NG3




NG5

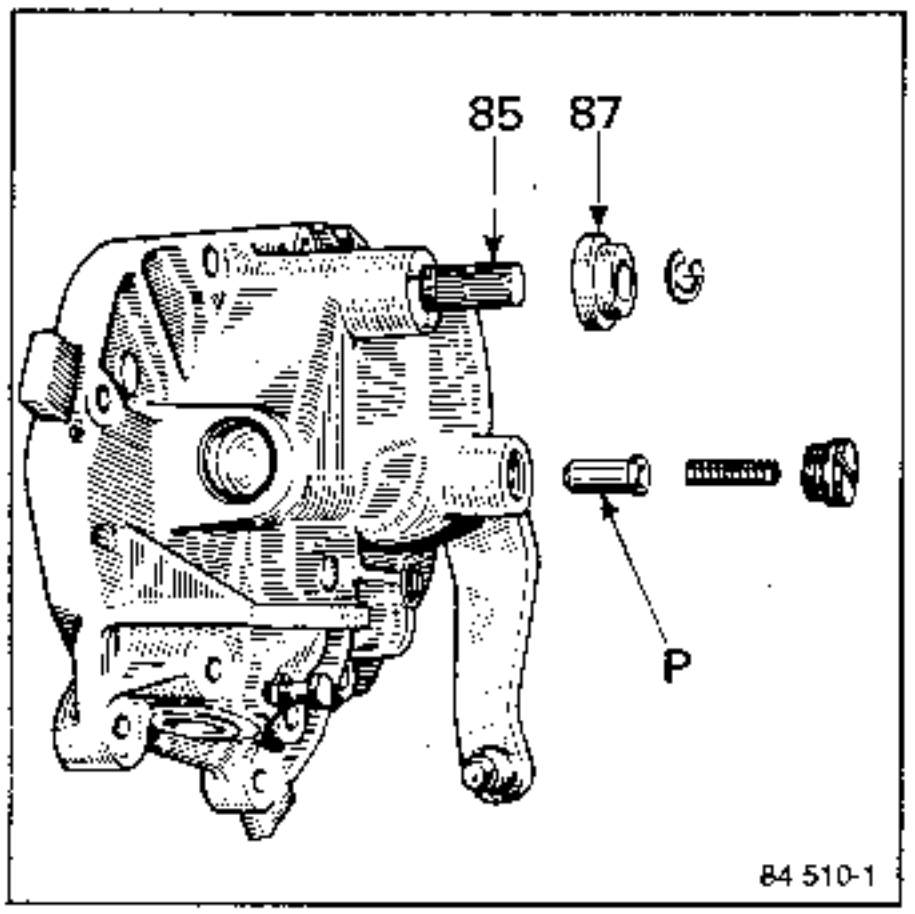


## REAR CASING

### NG1- NG3 (1st type)

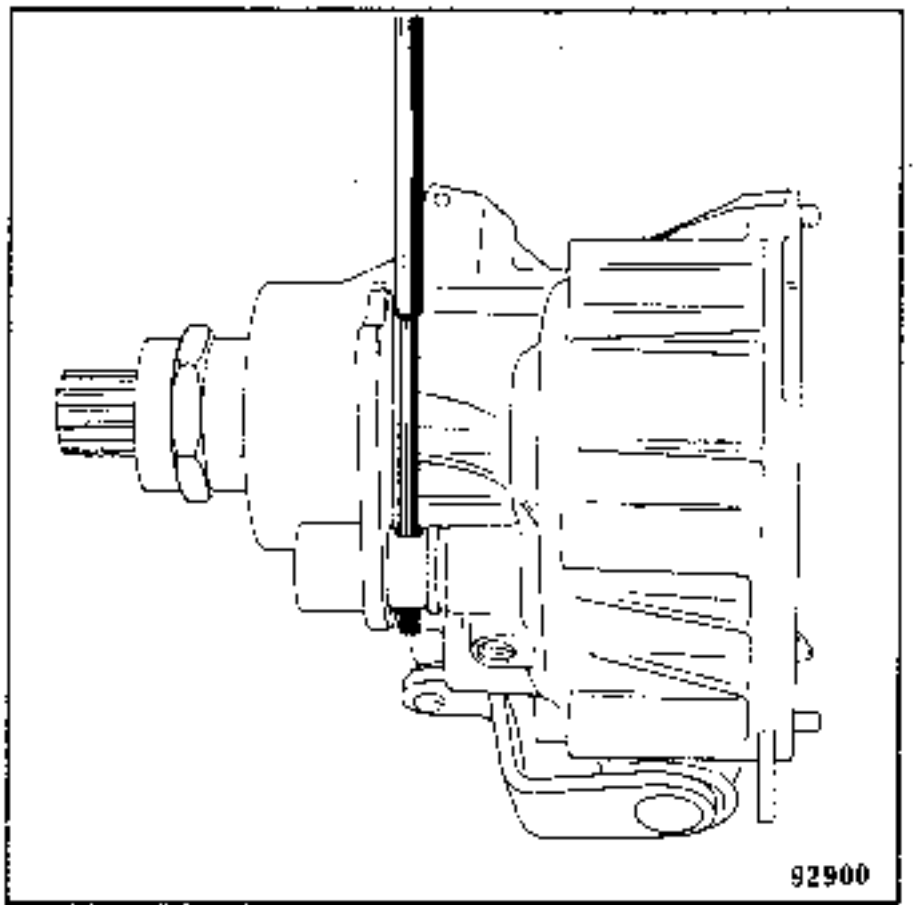
Remove the reverse gear detent plunger **(P)**.

Remove the circlip and dust protector **(87)** from the selector lever finger shaft **(85)**.

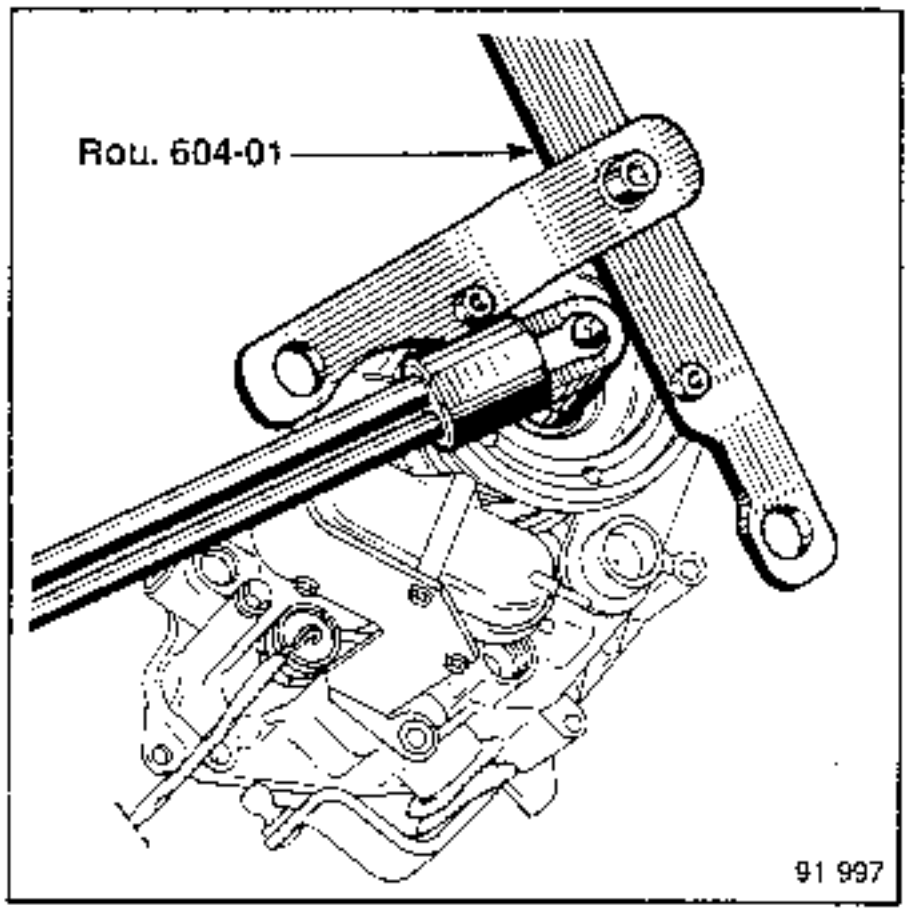



### NG3 (2nd type) - NG9 - NG7

Remove the rollpin from the ball joint cover mounting lever sleeve then remove the sleeve.

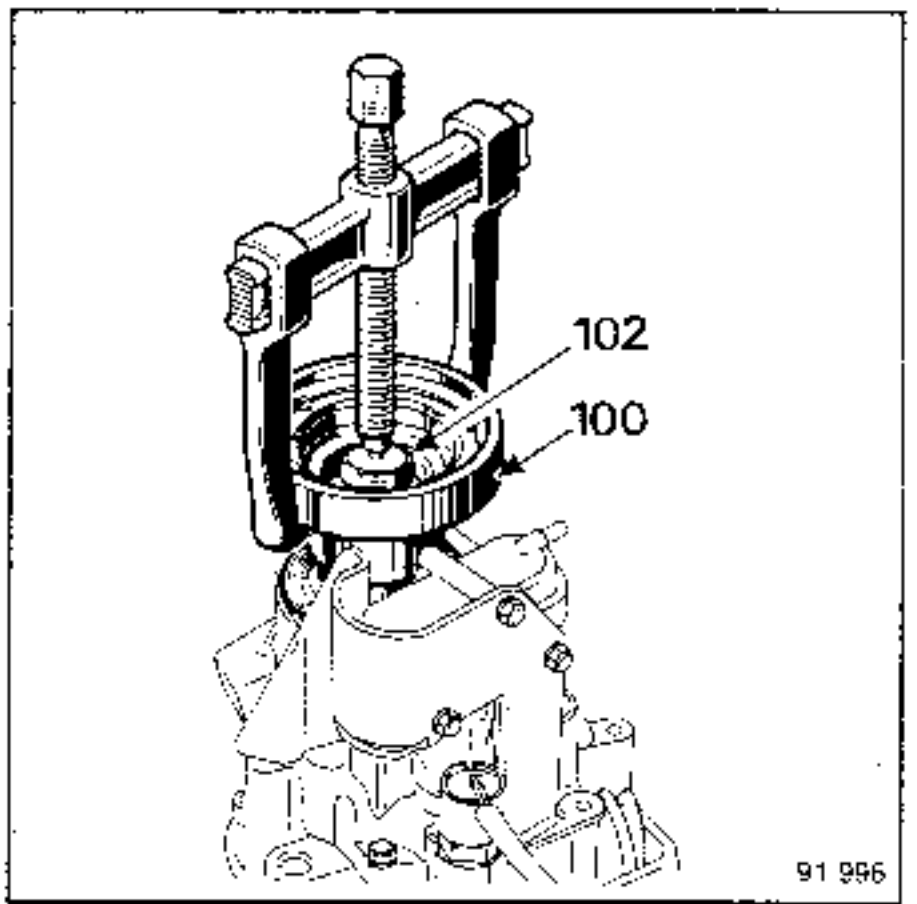



Fit tool **Rou.604-01** to the flange and remove bolt **(102)**.




**NOTE:** Bolt **(102)** must be replaced each time it is dismantled.

Using extractor **FACOM U32-102** or the like, extract flange **(100)**.

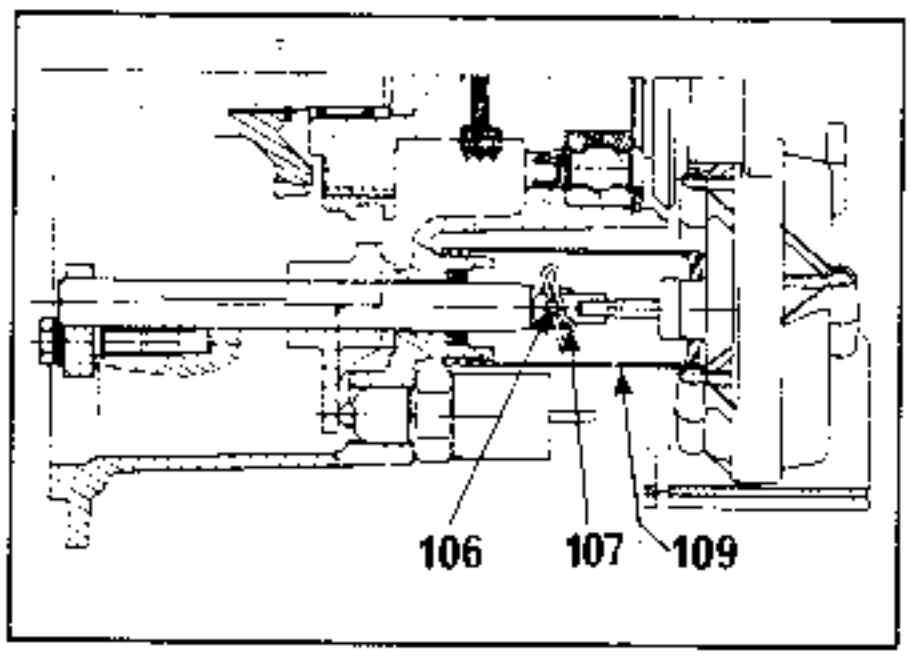


**REAR CASING**

Disengage protector **(109)**.

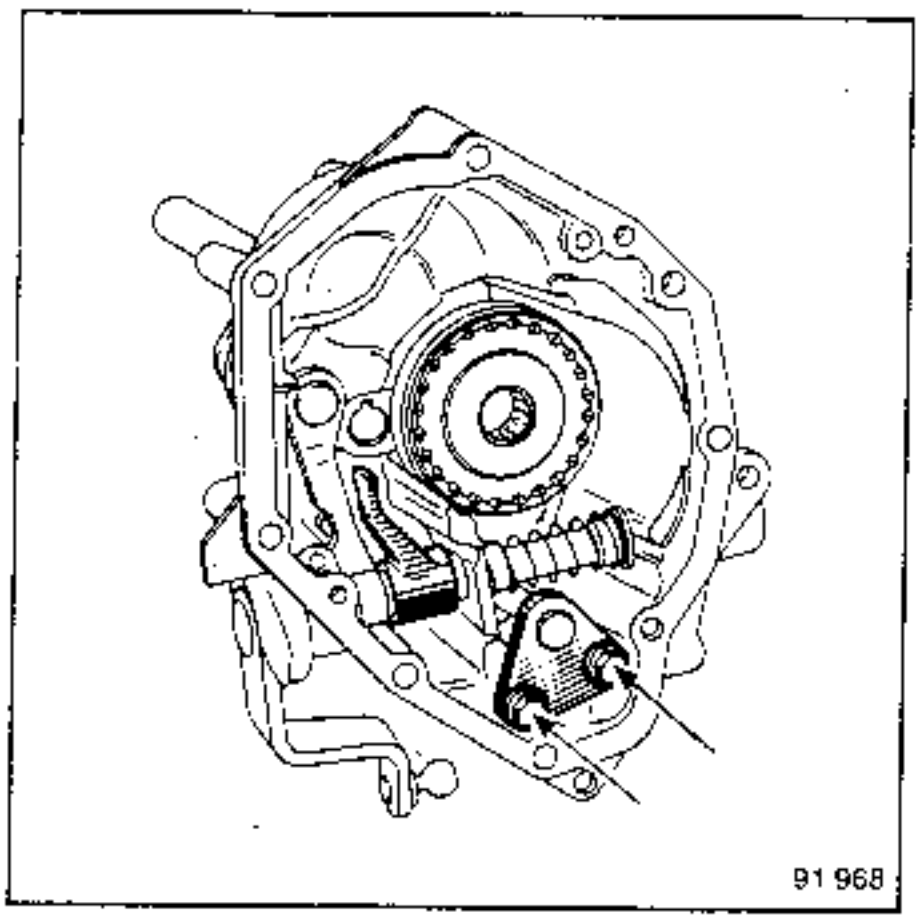
Remove pin **(107)** and shaft **(106)**.

Uncouple the vacuum capsule and remove it.



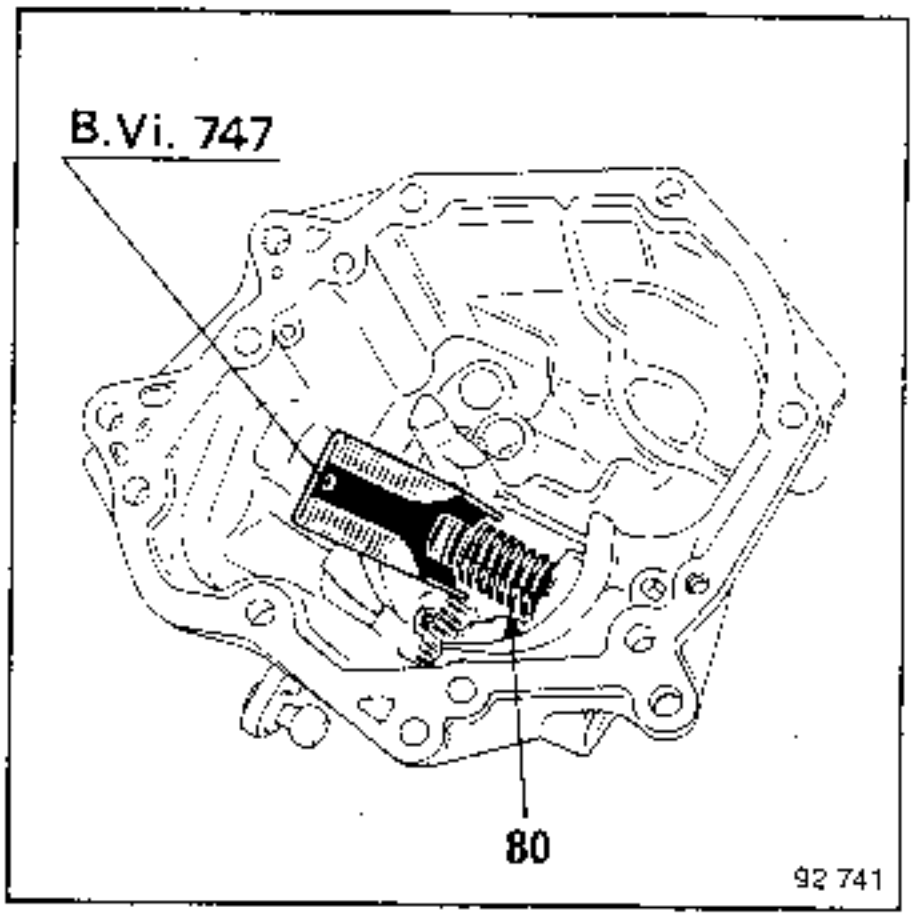

Take the rollpin out of the selector finger using **B.Vi.31-01.**

Remove the dog clutch shaft journal.




**All types:**

Using tool **B.Vi.747** compress spring **(80)** and remove the half shells **(79)**.




Pull the shaft outwards and recover the selector finger and spring.

Take out selector lever **(85)** and the shaft fitted with its O-rings **(86)**.

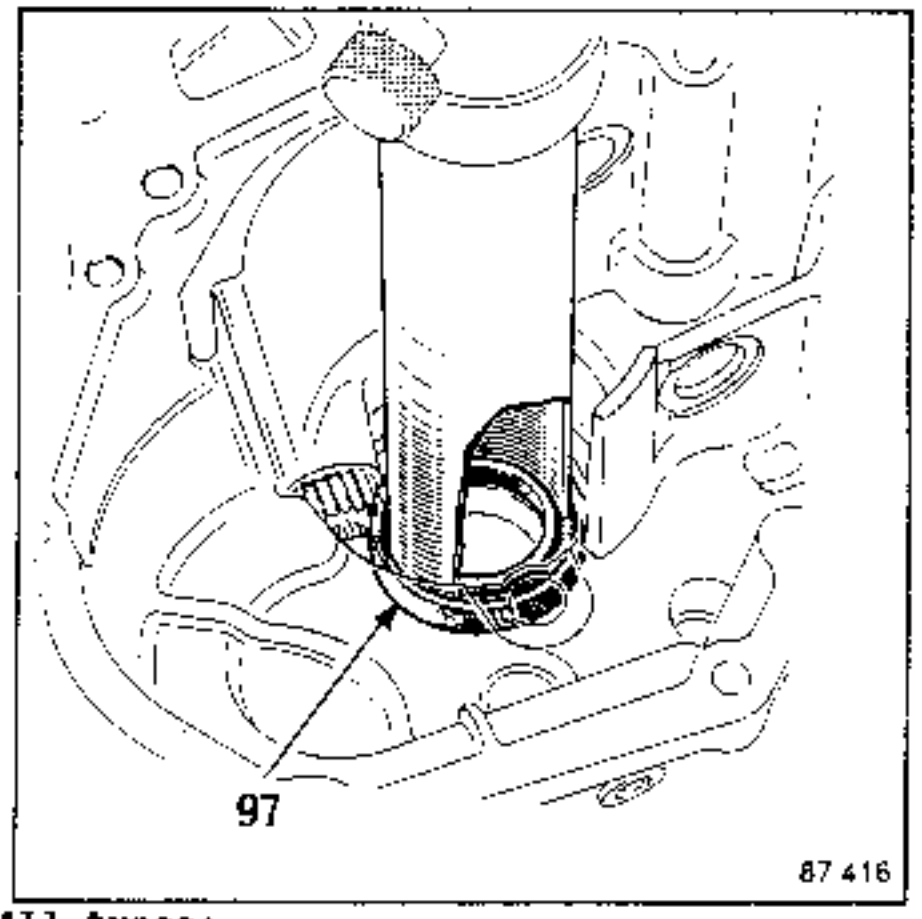
## REAR CASING

Mark the slide gear in relation to the hub and remove the slide gear/fork/dog shaft assembly.

On the press, knock the output shaft into the casing.

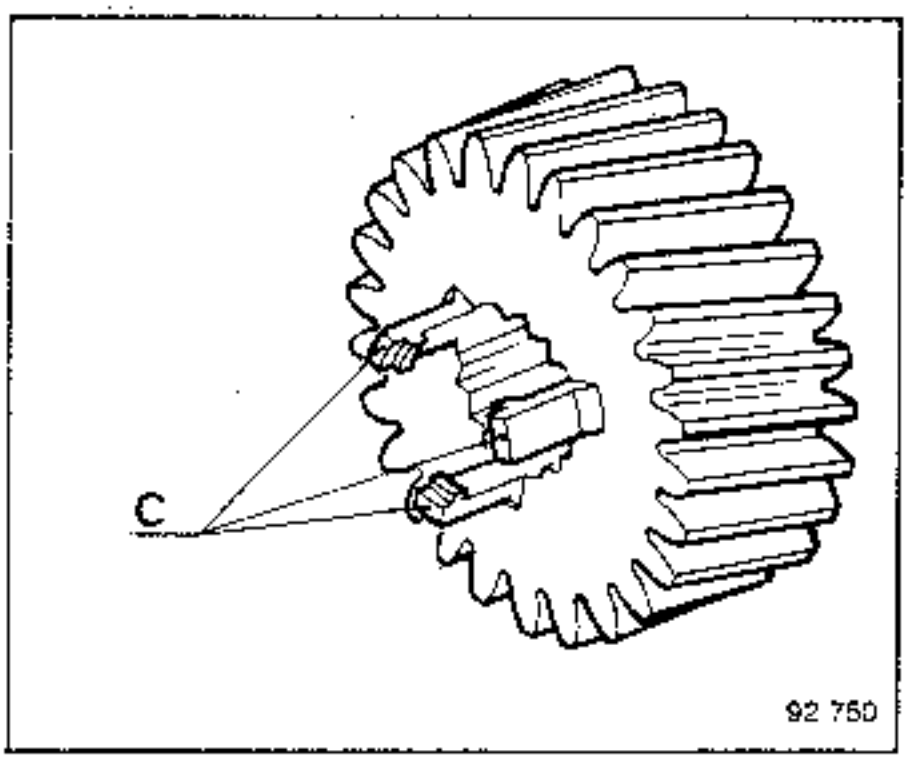
Remove circlip **(99)**.

Take out bearing **(98)** and lip-seal **(97)** on the press.



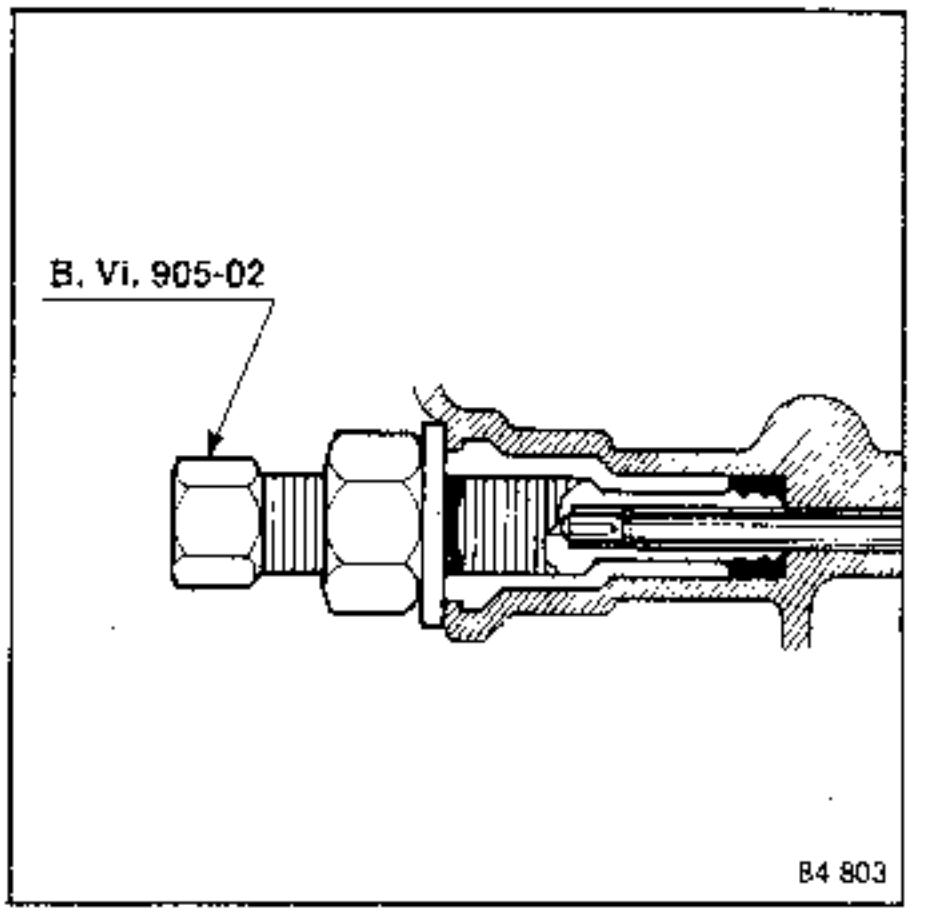

**All types:**

Move apart notches **(C)** holding the drive gear on the shaft. Pull the speedometer shaft.



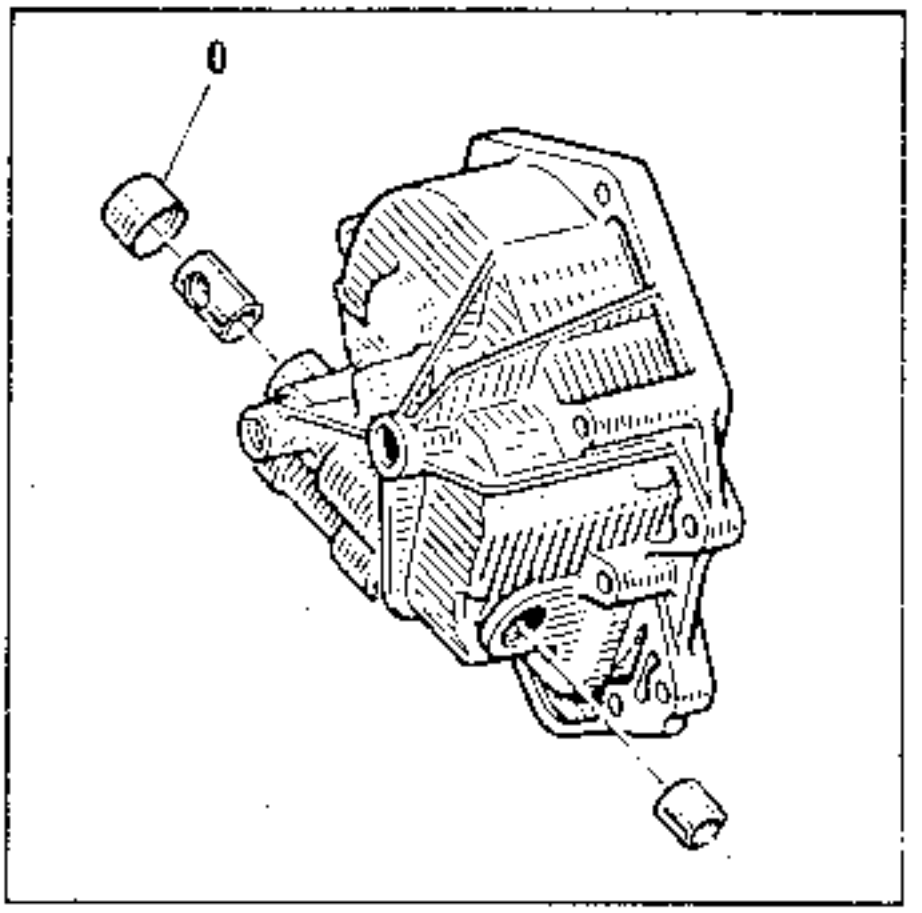

**NOTE:** The drive gear must be replaced each time it is dismantled.

Remove:
- the speedometer seal using tool **B.Vi.905-02.**




Using a screwdriver, remove the lip seal from the control shaft.

Knock out blanking cover **(O)** using a 16 mm piece of rod engaged in the control shaft bore.




Knock out the bushes using a piece of tubing with an outer diameter of 17 or 19 mm (depending on the assembly).

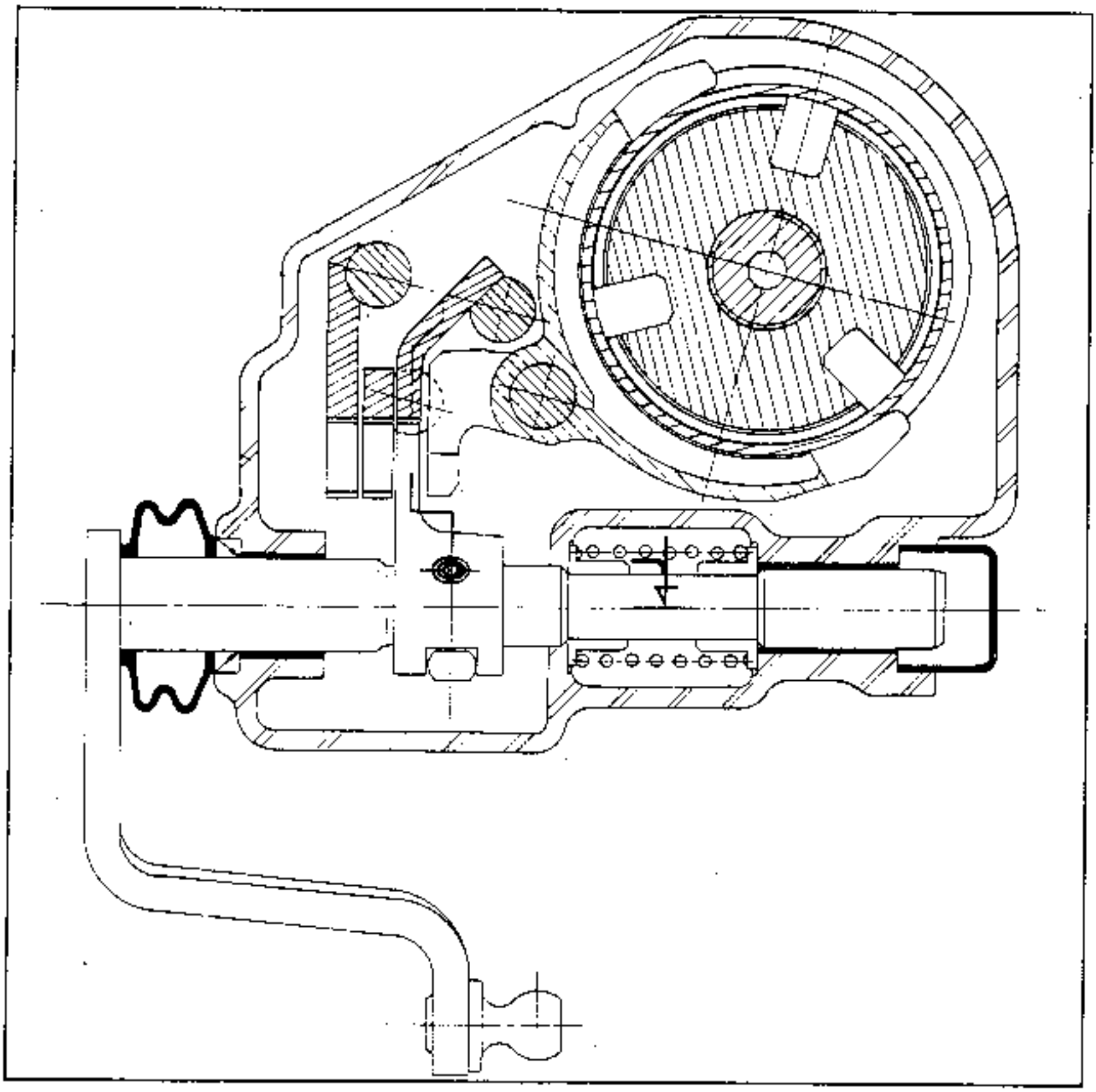
## REAR CASING

**Reassembly:**

| TIGHTENING TORQUES (in daNm) | |
|---|---|
| Vacuum capsule mounting bolts | 0.1 to 0.5 |
| Capsule support mounting bolts | 2.5 |
| Dog clutch shaft bearing bolts | 1.6 |
| Switch | 2.5 |
| Flange bolts | 7 |
| Output shaft nut (Espace Quadra) | 12 |

Fit the two bushes, using the piece of tubing, used on dismantling, and a small plastic hammer.

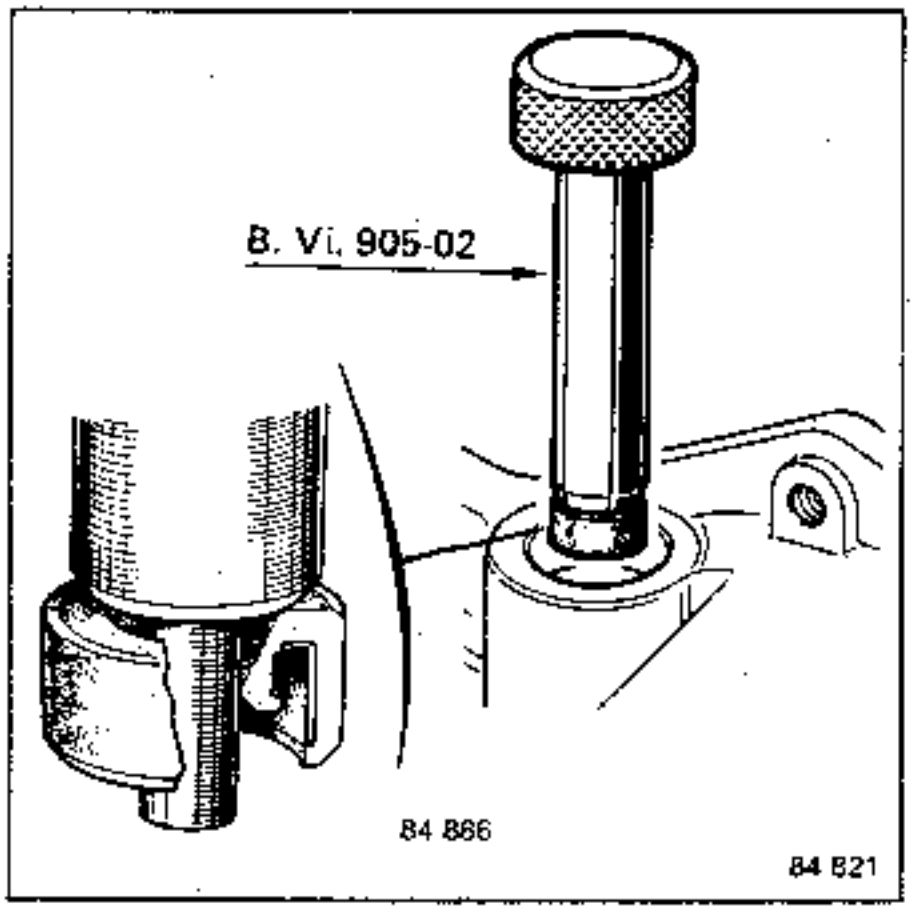
Make sure the parts are in the correct position.



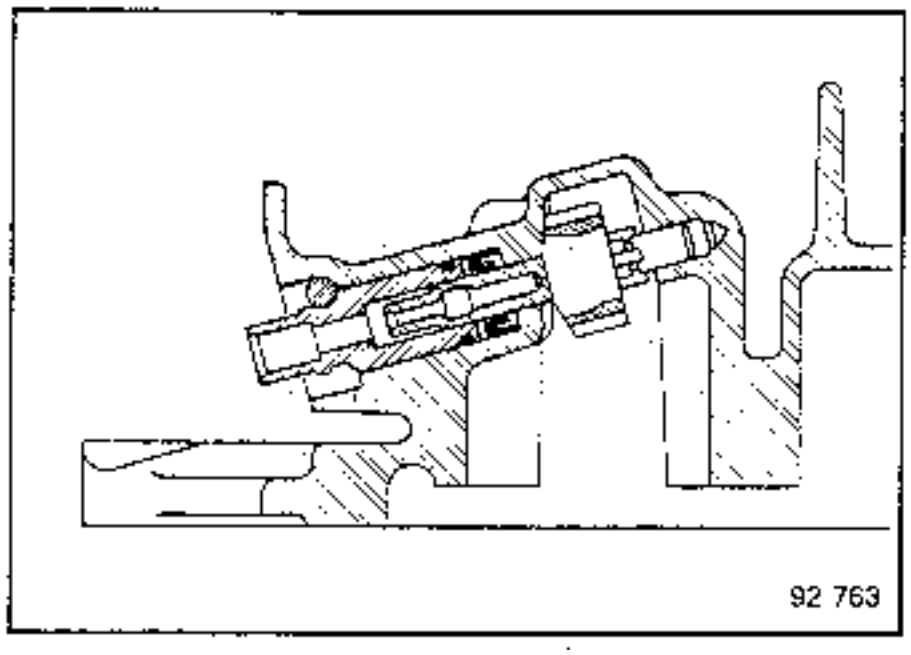
**REAR CASING**

Refit:

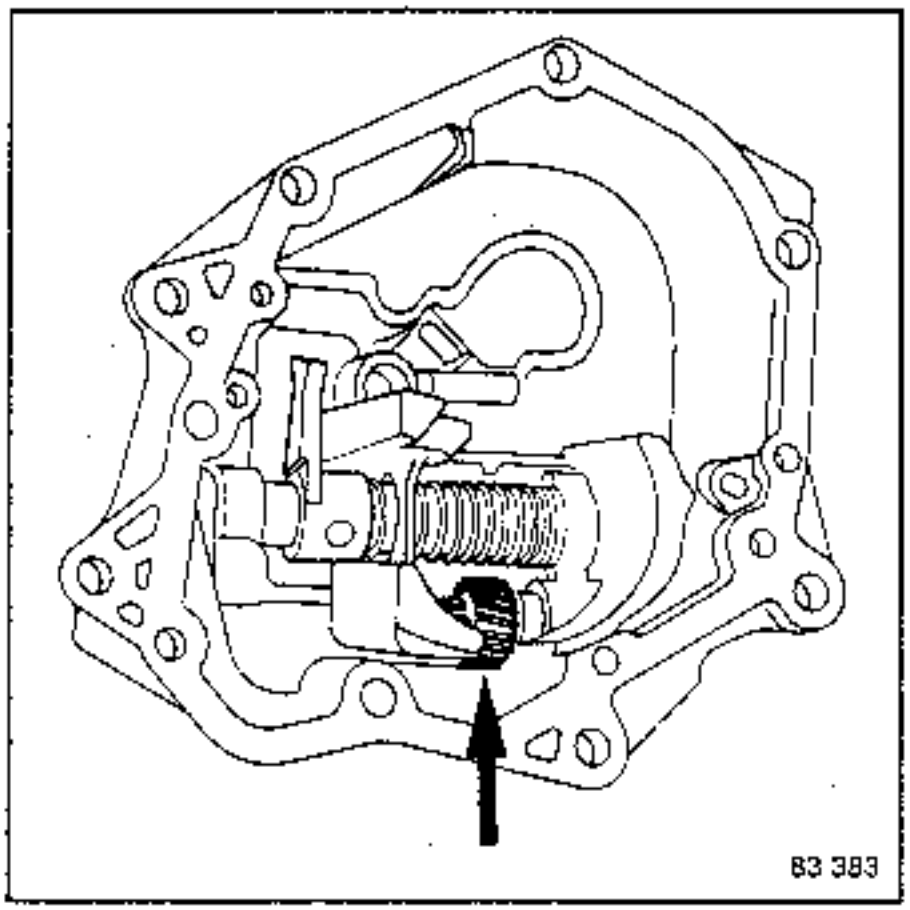
- the speedometer shaft seal (using tool **B.Vi.905-02**);




- the speedometer drive gear and shaft.




Ensure that the speedometer drive gear is correctly clipped in place on its shaft.

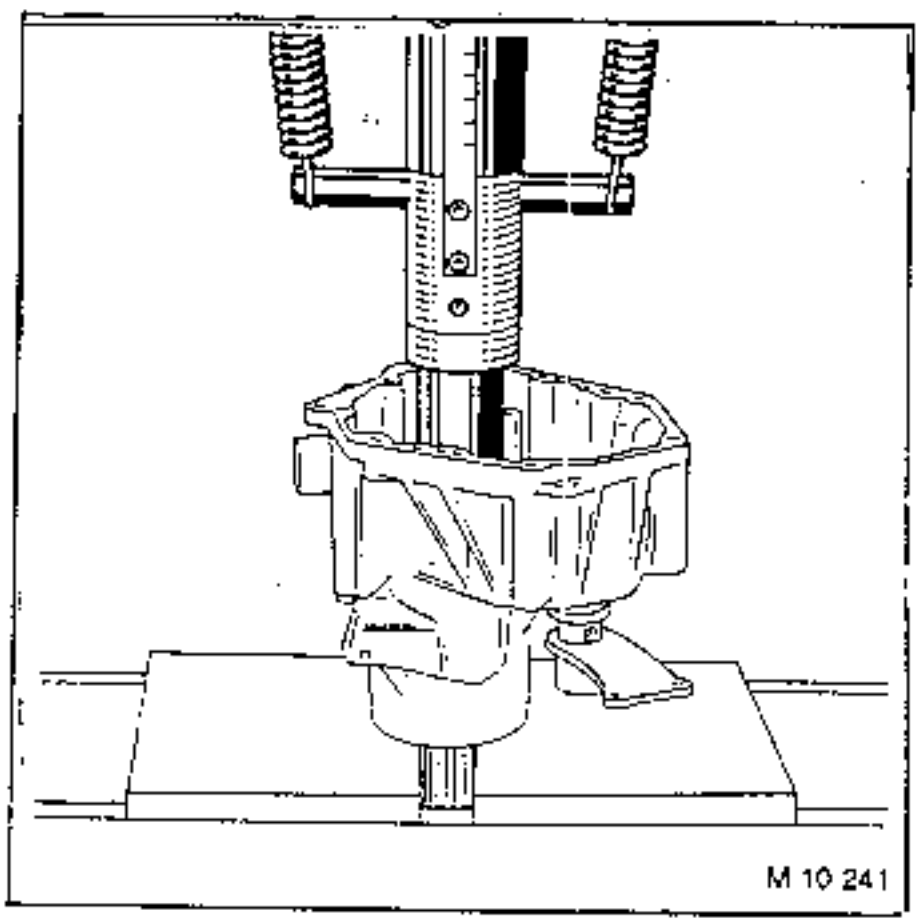


**REAR CASING**

**NG7:**
Fit the bearing on the press, taking the weight on the bearing outer track ring.

Fit circlip **(99)**.

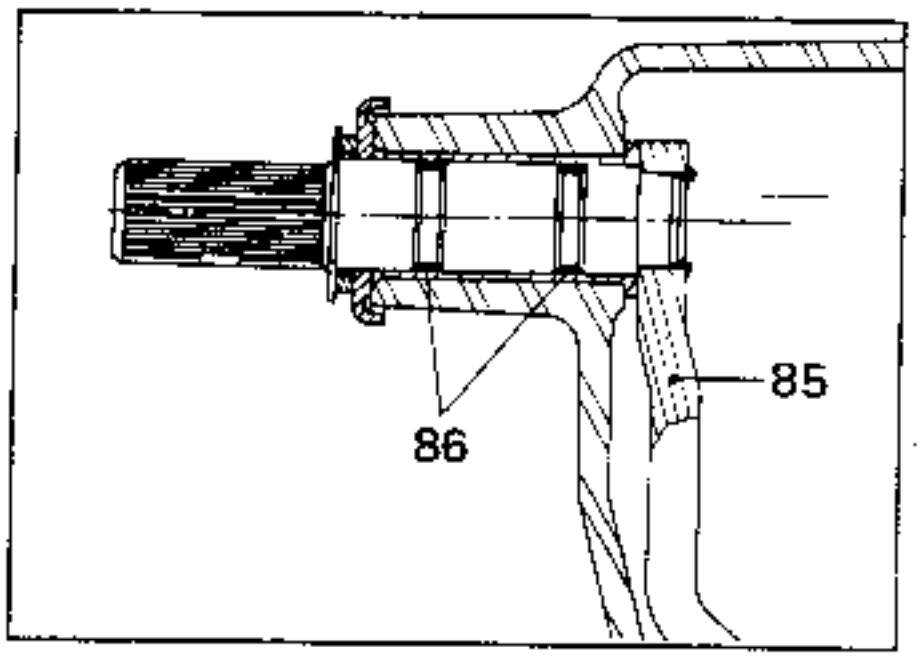
Fit the shaft on the press, taking the weight under the bearing inner track ring.




Turn the shaft and check that the speedometer drive gear rotates.

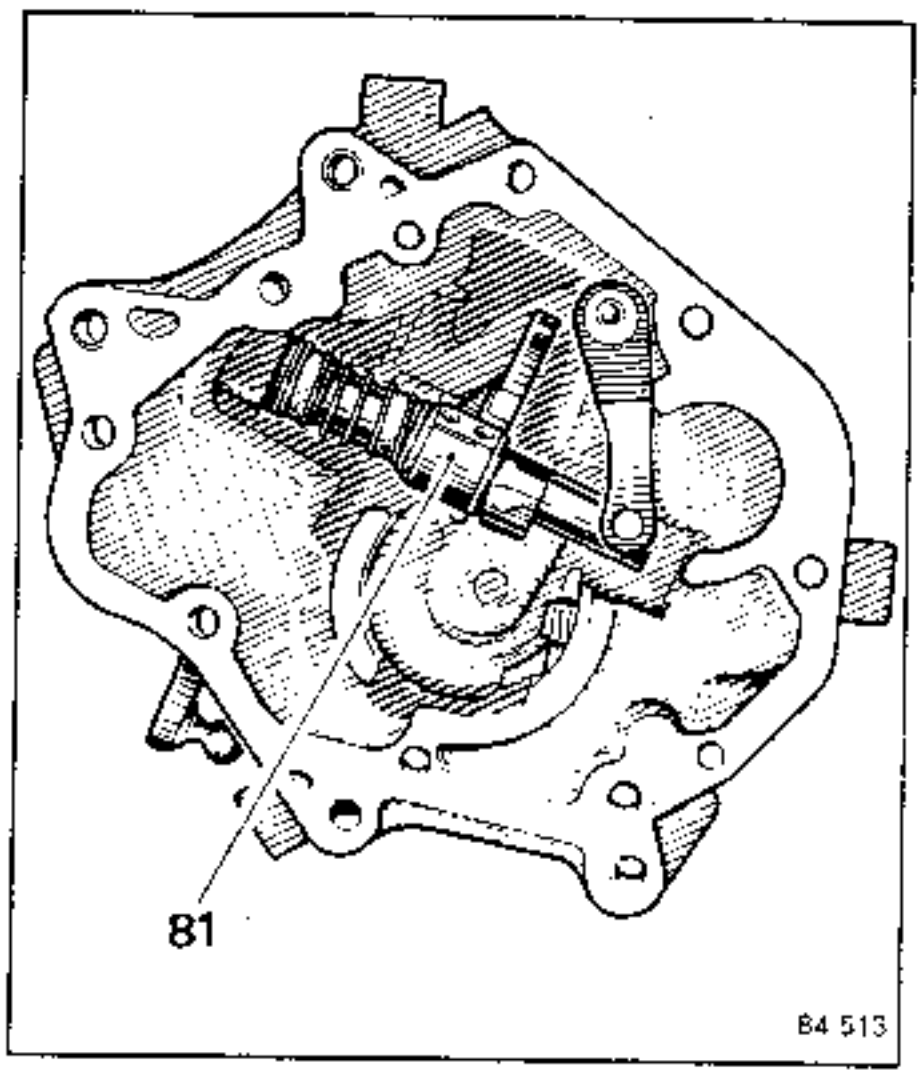
Remove any burrs with fine emery cloth so as not to damage the seals.

Fit the shaft and selector lever **(85)** fitted with the shim (1st type) and two greased O-rings **(86)**.




**NGO - NG2 - Special point**

The selector lever must be fitted after the selector finger **(81)** and shaft.



## REAR CASING

Refit in order:
- the greased lip-seal, so that it is against the shoulder on the casing;

- blanking cover (O) coated with **CAF 4/60 THIXO.**

Remove any burrs from the shaft with fine emery paper so as not to damage the new lip-seal.

Refit in the casing:
- the selector lever shaft fitted with the shim and the two O-rings (greased);

- the spring;

- the selector finger;

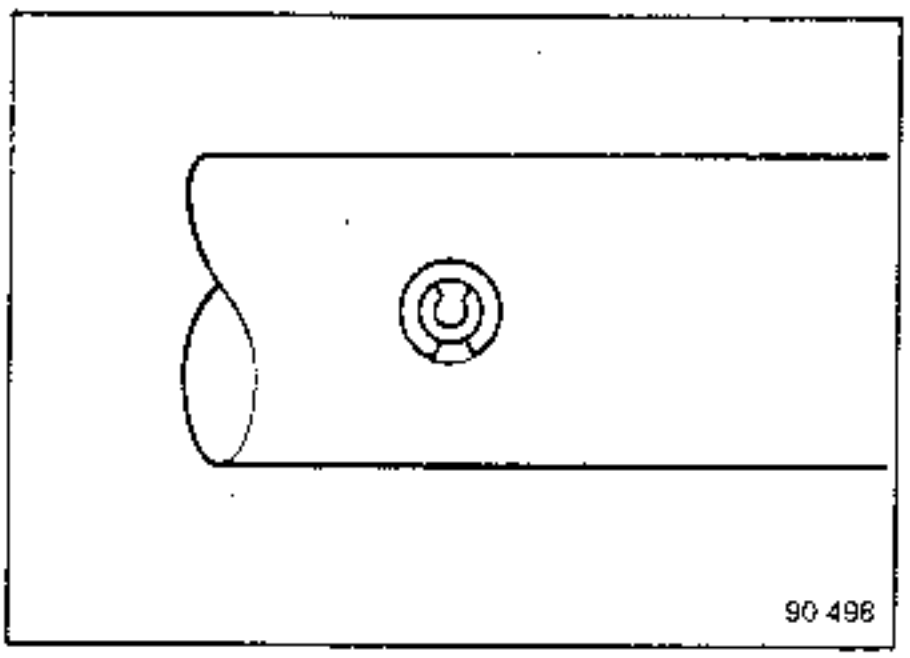
- the shaft and its gaiter.

Using tool **B.Vi.747** compress the spring and fit the half-shells.

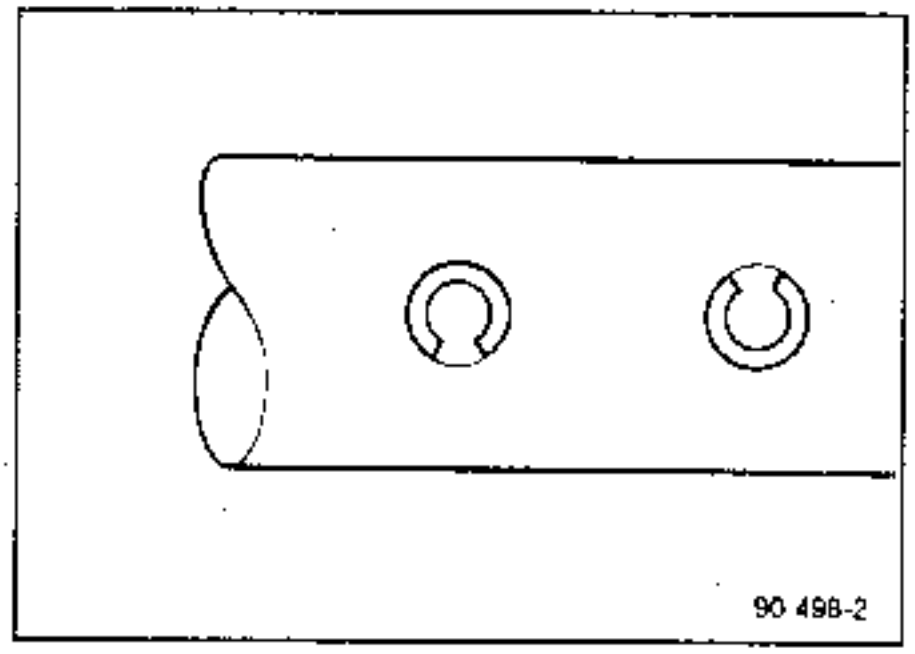
Fit the rollpin in the selector finger (using tool **B.Vi.606**).

Make sure the rollpins are fitted the correct way round.

The slots in the rollpins must be at right angles to the shaft and facing different directions.

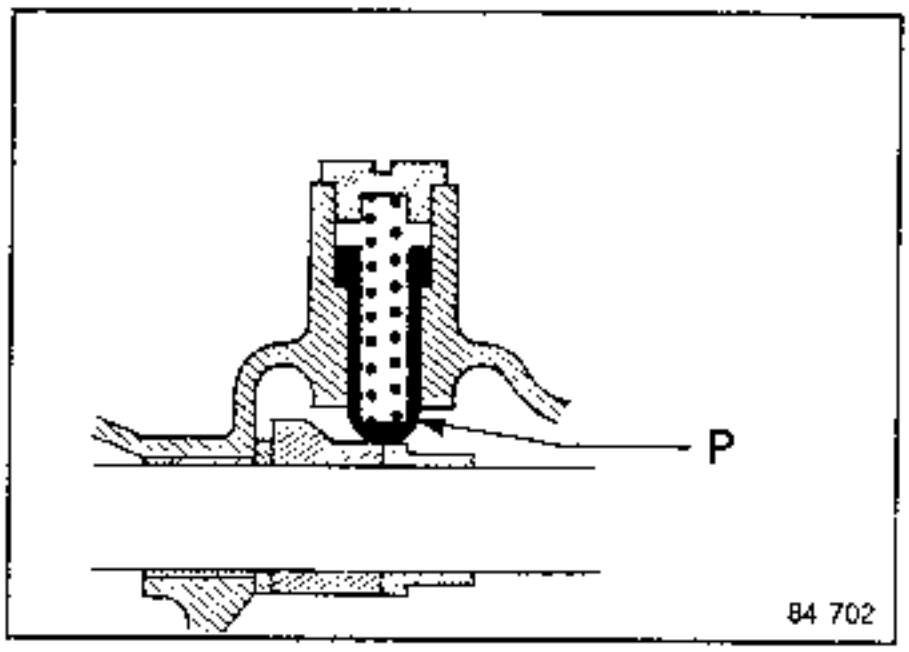



**NG5:**
The slots in the rollpins must be at right angles to the shaft and facing different directions.




**NG1 – NG3 (1st type)**

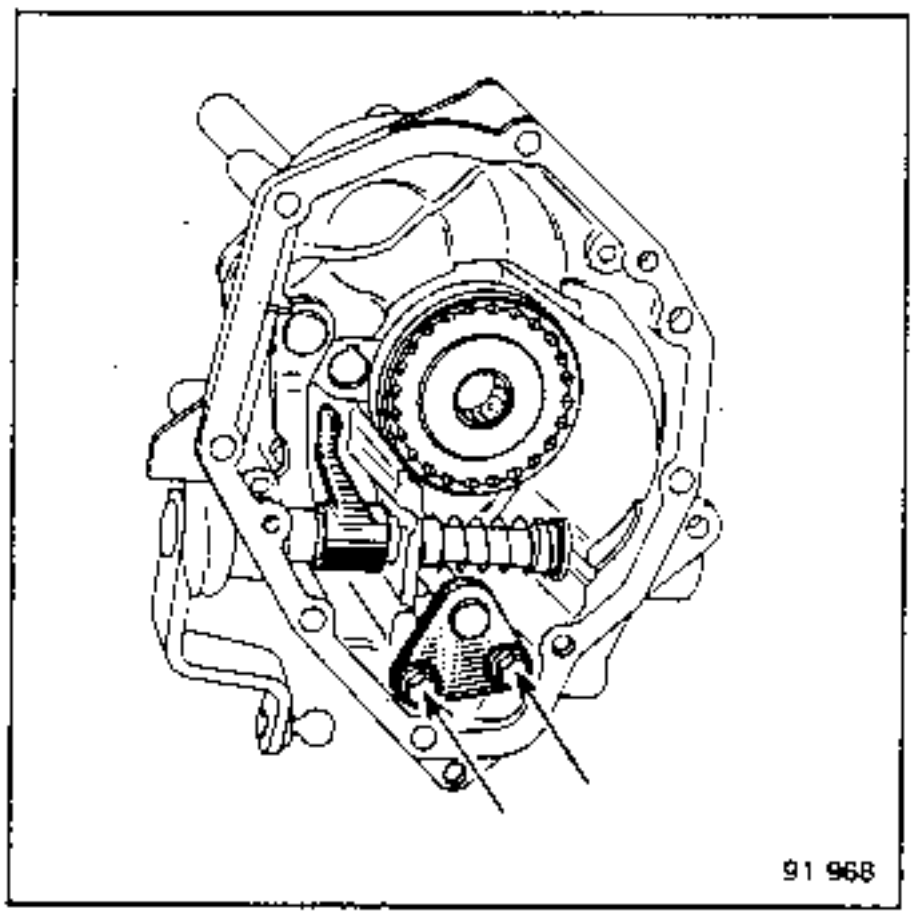
Refit the plunger and detent plunger spring for the reverse gear, with the plug coated with **CAF 4/60 THIXO.**




Check that the shaft slides properly and that there is no play.

## NG7 REAR CASING

Refit the dog clutch shaft bearing.

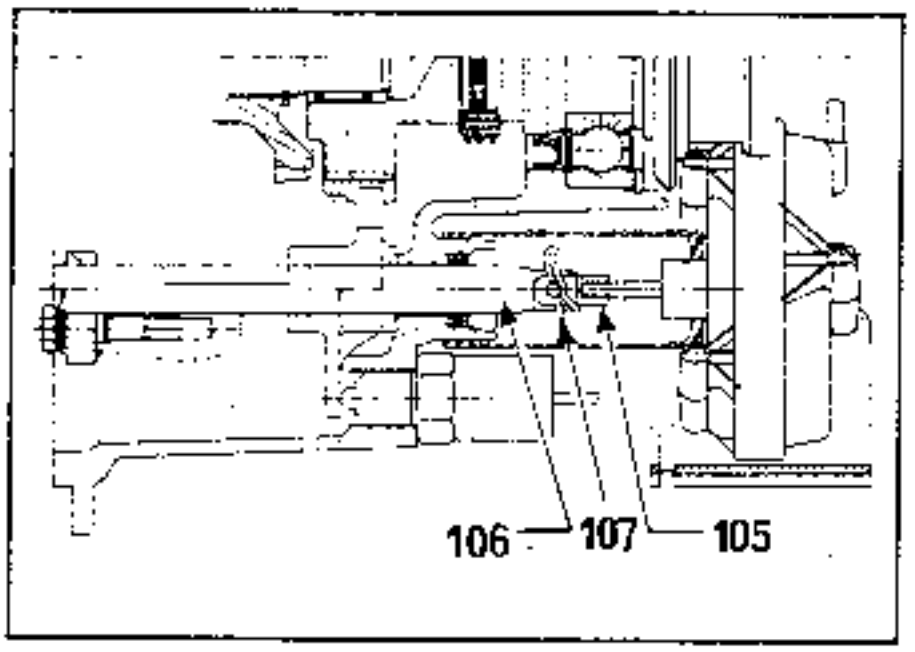



Position and secure the vacuum capsule mounting, after fitting the rear casing mounting bolt.

Fit the vacuum capsule.

Place clevis **(105)** for the control rod on the dog clutch shaft.

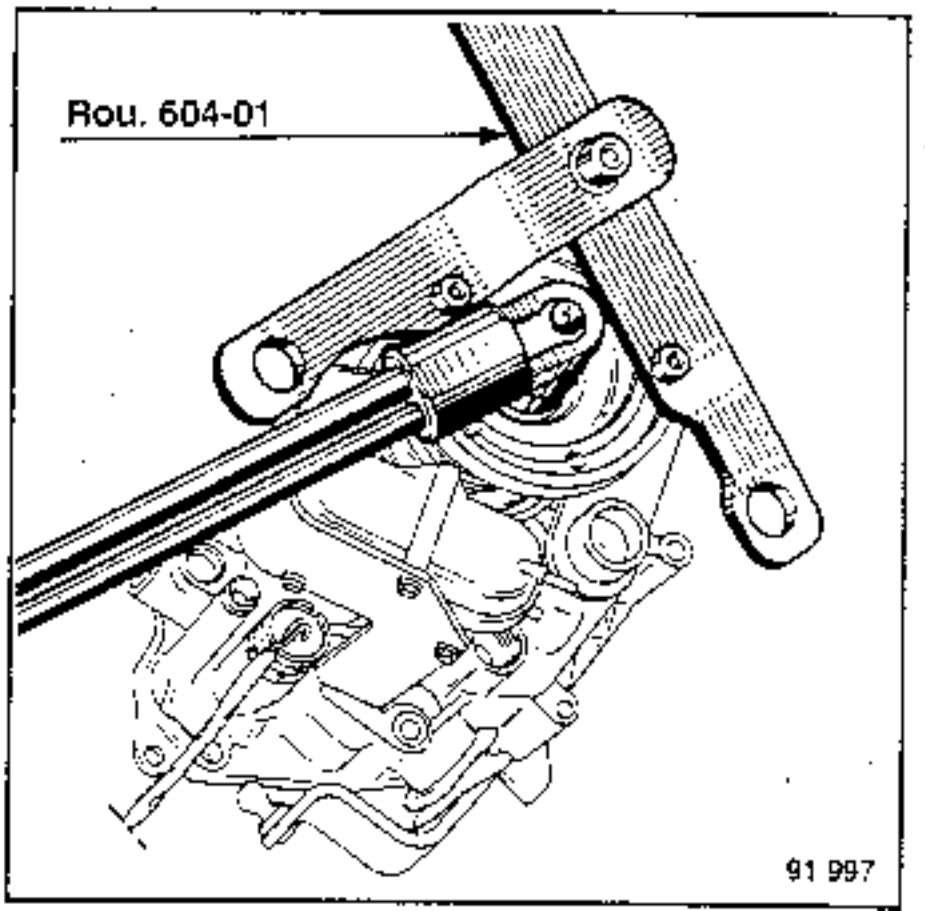
Fit in place shaft **(106)**, pin **(107)** and the protector.




Check that the fork-shaft-slide gear assembly slides freely.

Refit:
- the dog switch;

- the flange: the new mounting bolt (greased) must be torque tightened to **7 to 8 daNm.**



## CLUTCH CASING

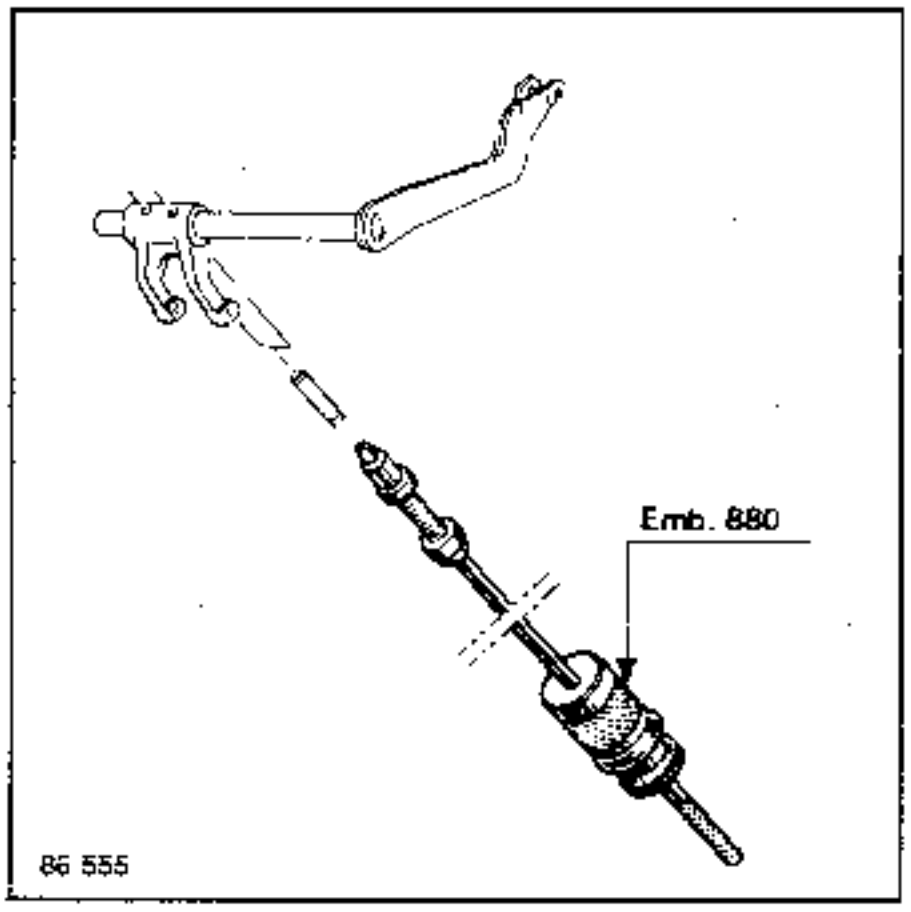
### Replacing the clutch fork

**1) For "push type" clutch**

**1st type**

**Removal:**

Take the rollpins out of the fork using tool **Emb.880.**

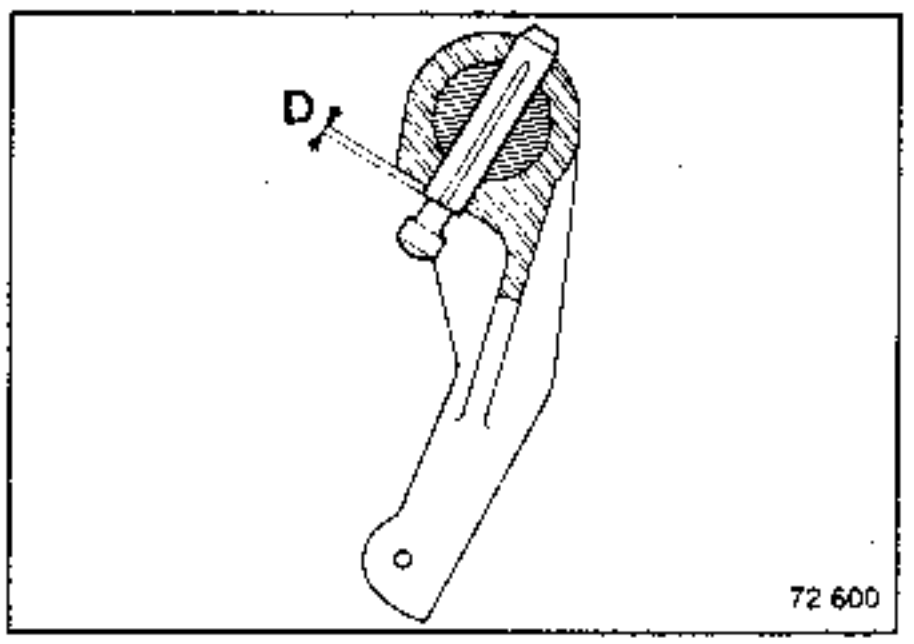



**Refitting:**

**Special point**

Grease the fork shaft with **No.** 20 grease.

Fit the rollpins: make sure protrusion D in relation to the fork is 1 **mm.**



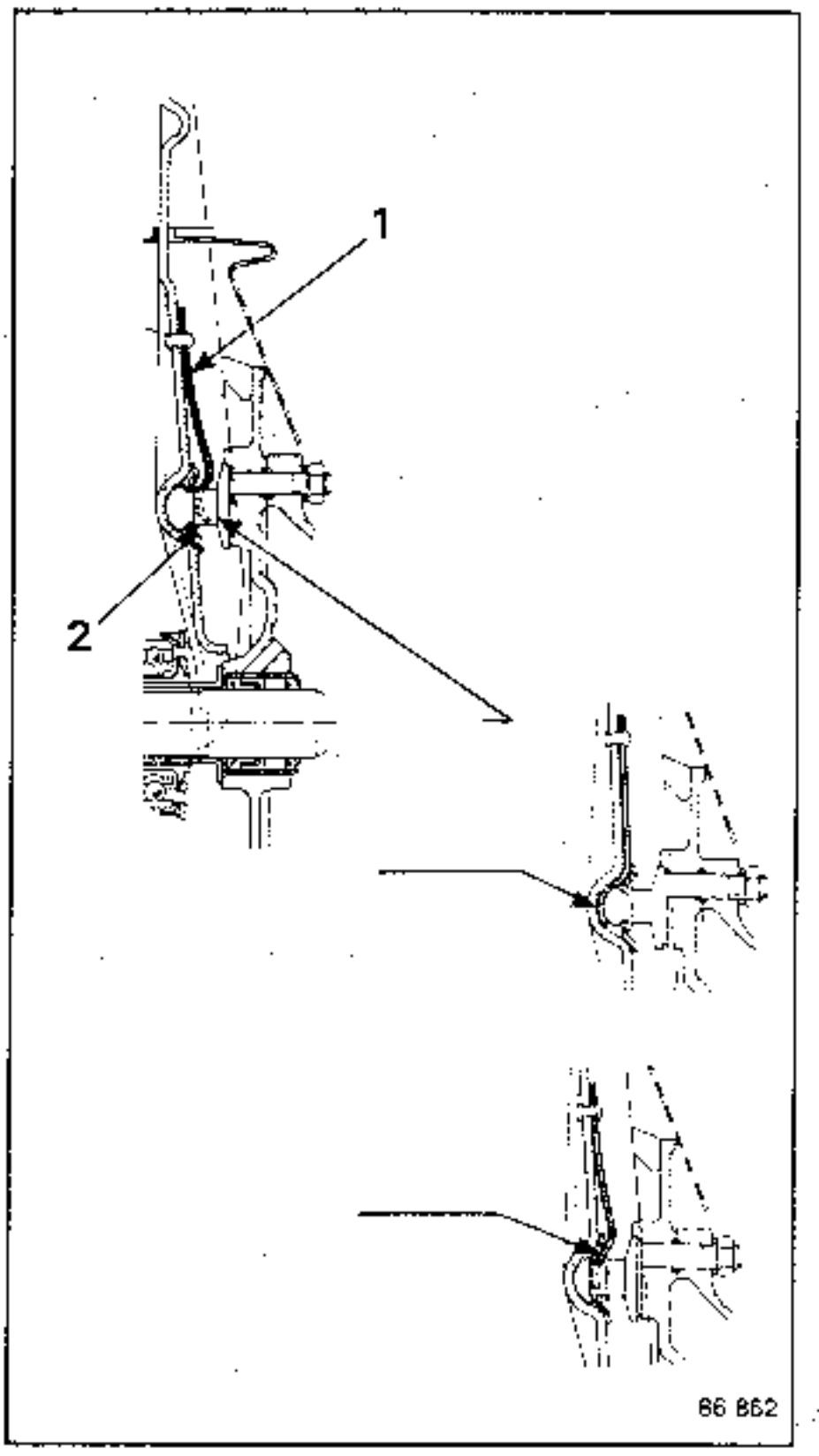

**2nd type**

**Removal:**
Remove the thrust pad.

Disengage the fork from the pivot and take it out through the interior of the casing.

**Refitting:**
Grease the fork pivot with **No.** 20 grease.

Fit the fork in place, with spring **(1)** behind cup **(2).**




Ensure that it operates correctly.

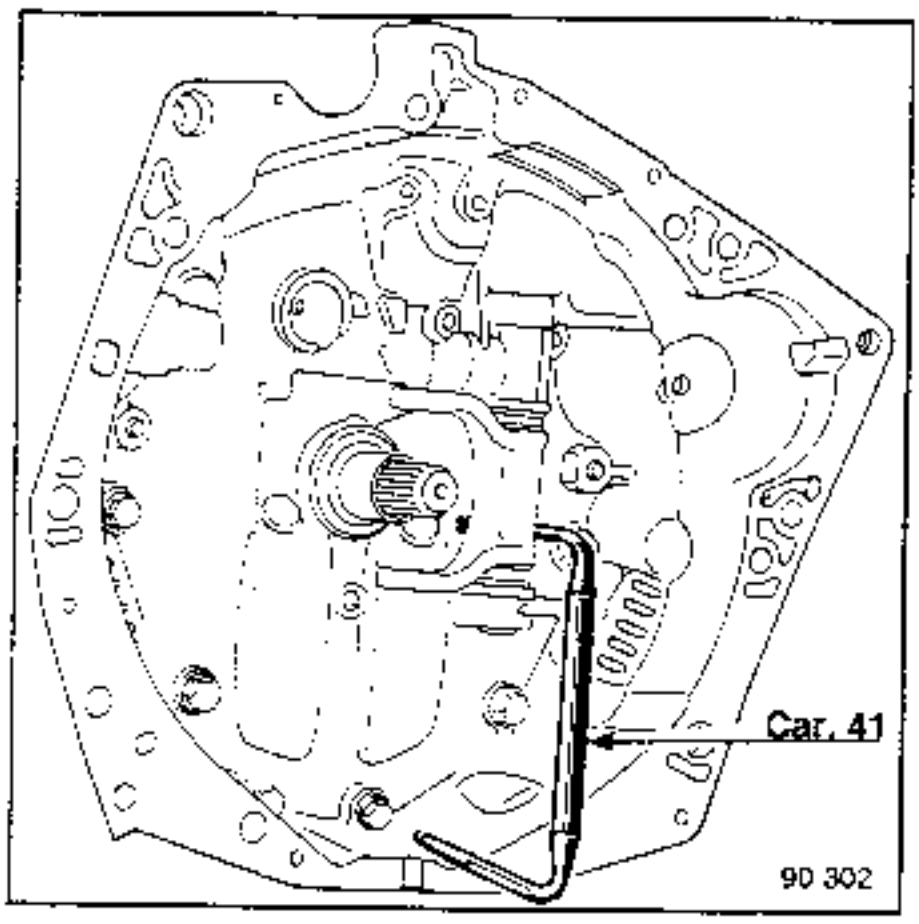
## CLUTCH CASING

### Replacing the clutch fork (contd)

### 2) For the "pull" type of clutch

### Removal

Knock out the rollpins holding the fork using tool **B.Vi. 606** until the rollpins are half-way out, then use tool **Car.41.**



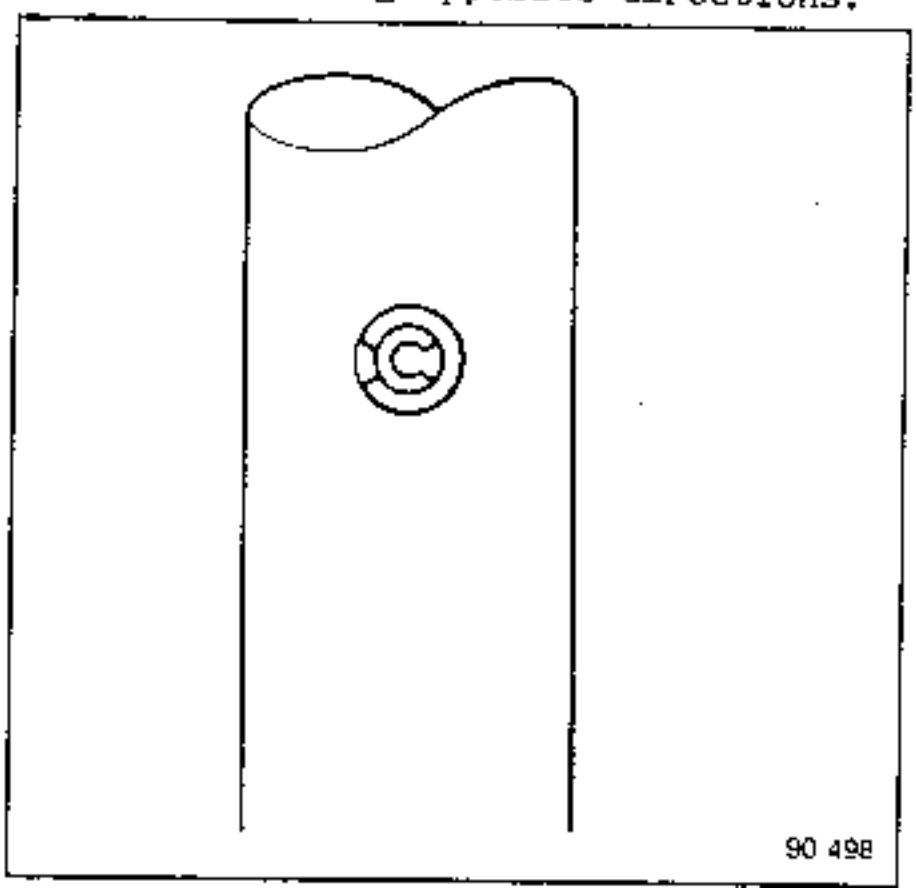

### Refitting

Lightly grease the fork shaft with **Mobil x 57030 No. 20** grease.

Engage the shaft (fitted with the sealing rubber), fit the fork and two plastic spacers. Make sure the fork is fitted the correct way round, with the boss facing the insids of the clutch casing.

Align the holes in the fork with those in the shaft and fit the rollpins.

Make sure the rollpins are fitted with their slots at right angles to the fork shaft and facing opposite directions.

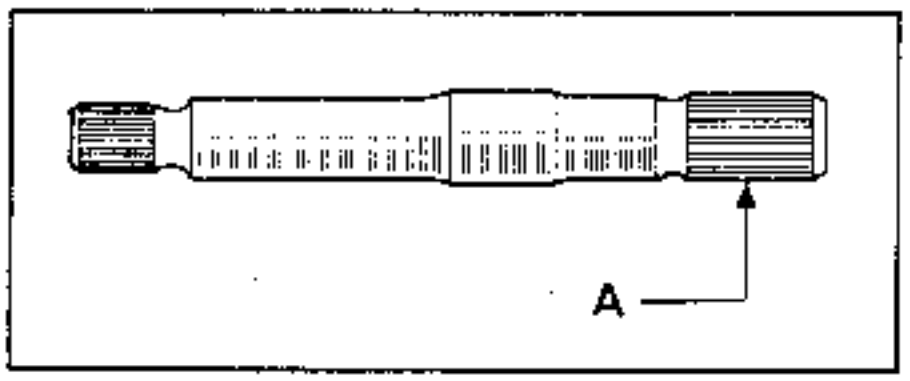


## CLUTCH CASING

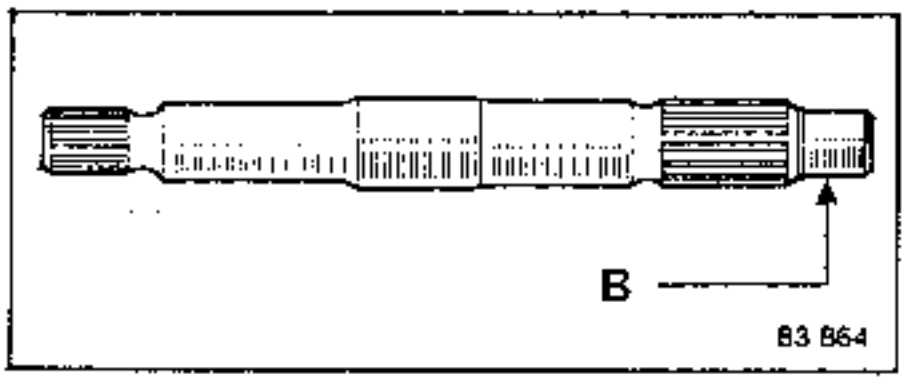
### Centring the clutch shaft

In service exchange, gearboxes with a short shaft **(A)** or a long shaft **(B)** can both be supplied:

- gearbox **with** a spigot bearing in the clutch casing: short clutch shaft **(A)**;



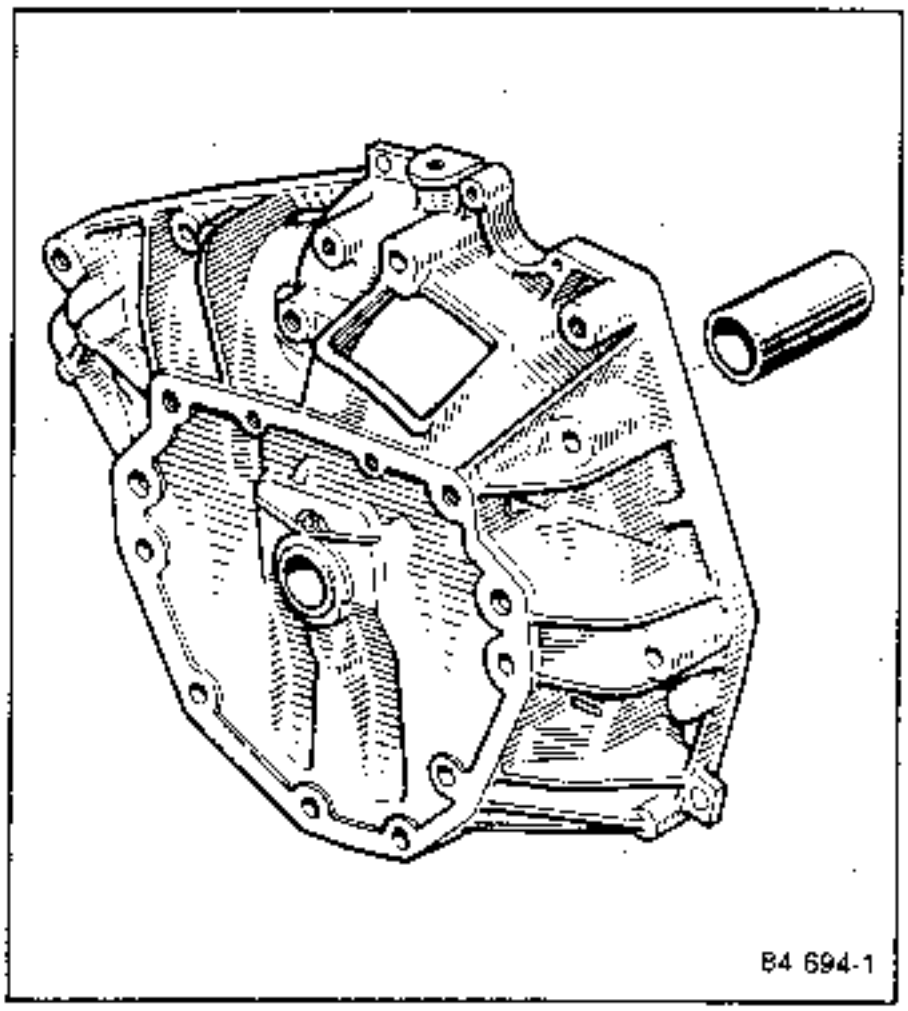

- gearbox **without** a spigot bearing in the clutch casing: long clutch shaft **(B)**.




If the gearbox has a long shaft **(B)**, a bearing must be fitted in the crankshaft. If the flywheel does not have a lock plate, bond the bearing on the crankshaft using **Loctite FRENBLOC.**

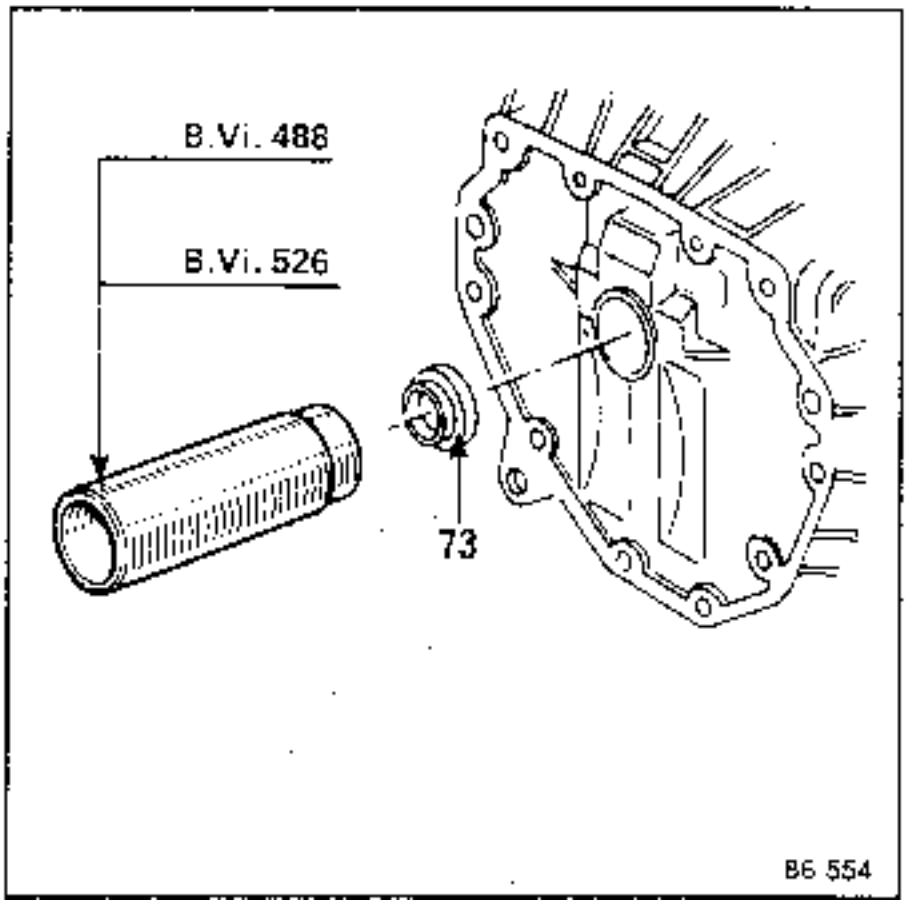
If the gearbox has a short shaft, the bearing on the crankshaft must be removed.

### 1) Clutch shaft without a spigot bearing




Seal **73** is refitted using tool:

- **B.Vi. 488** for cast-iron engines;
- **B.Vi. 526** for aluminium engines.



## CLUTCH CASING

### 2) Clutch casing with spigot bearing (guide tube)

The lip-seal and clutch shaft spigot bearing are integral with the thrust pad guide tube.

Lubrication is by means of an aperture leading into the clutch casing bore.

**Removal**

Take the guide tube out on the press.

When a guide tube has been removed on the press it cannot be re-used.

**Removal**

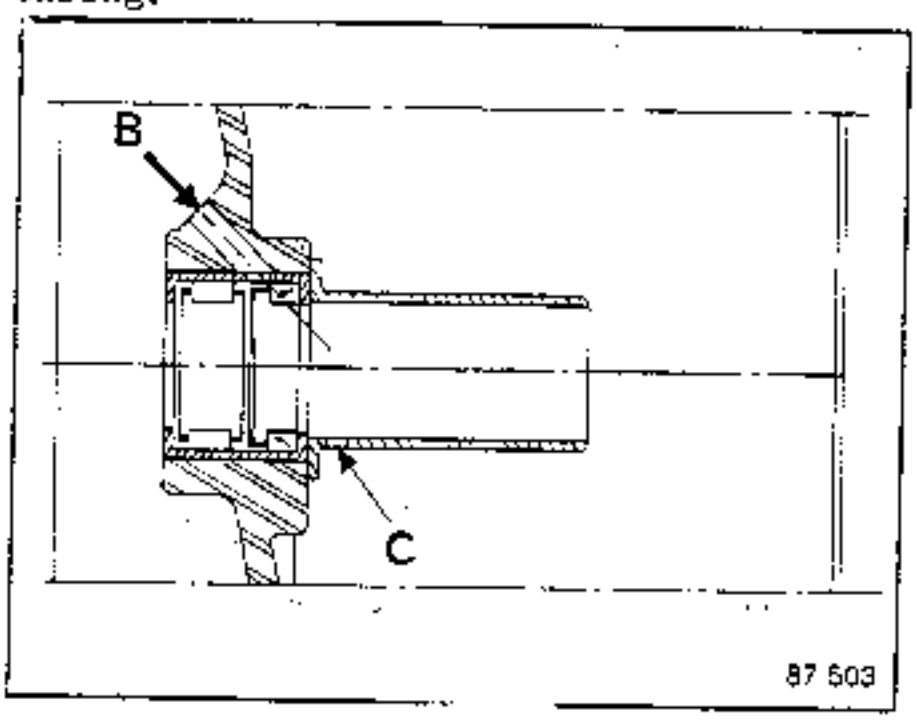
Put a thin coating of **No.** 20 grease on the walls of the bore.

Fit O-ring **(T)** on the guide tube.

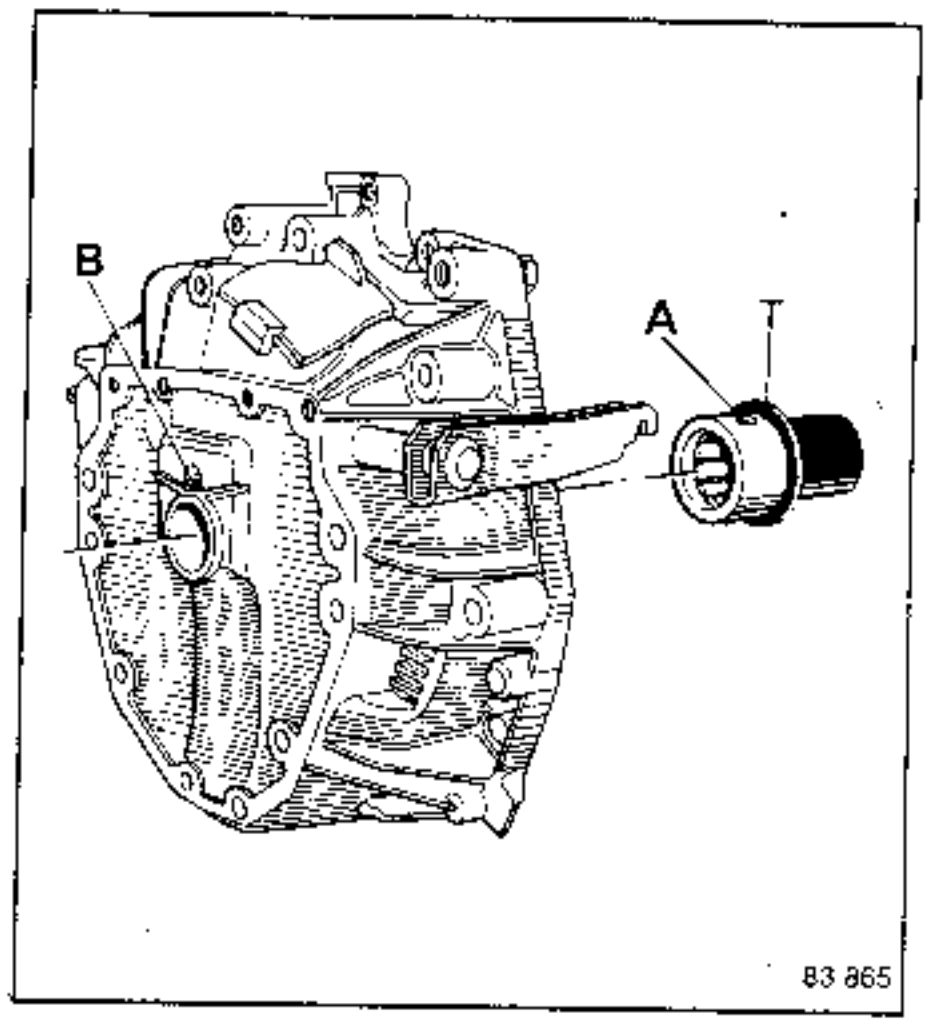
Offer up the guide tube to the clutch casing and align the bearing lubricating hole in the guide tube opposite the hole in the clutch casing.

Insert the guide tube on the press until it is completely fitted.

Check that lubricating hole **(A)** in the bearing is opposite hole **(B)** in the clutch casing.




Aperture **(C)** in the guide tube must face the bottom of the casing.




Lubricate the seal before fitting the shaft.

**NOTE:** The lip seal and bearing are in direct contact with the clutch shaft. If they are fitted incorrectly the clutch shaft will have to be replaced.

## ASSEMBLING THE CASINGS

| TIGHTENING TORQUES (in daNm) | |
|---|---|
| Primary shaft nut | 13 |
| Secondary shaft nut | 15 |
| 8 mm Ø casing bolts | 2.5 & 3 |
| Rear casing bolts | 1.6 to 2 |
| Threaded plugs | 2.5 |
| Switch | 2.5 |
| Locking plug | 1.7 |
| Drain and topping up plugs | 2.4 |
| Clutch casing bolts 8 mm Ø | 2.5 |
| 10 mm Ø | 4 |
| Pivot mounting nut | 1.6 |
| Differential lock nut lock plate bolt | 2.4 |

**CONSUMABLES**

**Loctite "518":**
- Casing joint faces

**CAF 4/60 THIXO:**
- Threaded plugs
- Switch threads

**No. 20 grease part no. 77 01 032 832:**
- Clutch thrust pad guide
- Clutch fork pivot
- Clutch shaft splines
- Sunwheel splines
- Clutch fork pads

**Gearbox oil:**
- Lip seals

**Perfect Seal "LOWAC":**
- Rear and clutch casing paper seals

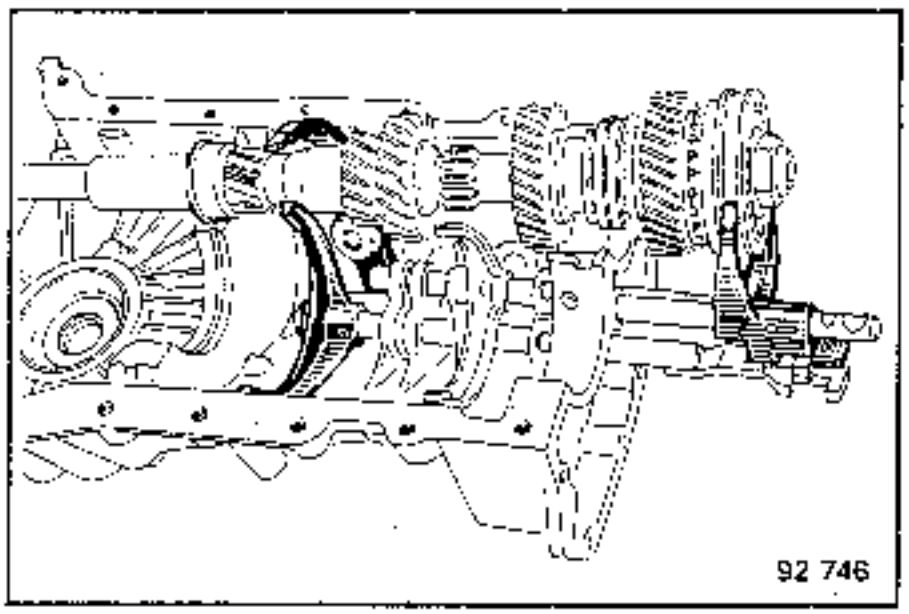
**Loctite FRENBLOC:**
- Primary and secondary shaft nuts

Ensure that the casing vent-to-atmosphere is not blocked.

Place the 1st/2nd, 3rd/4th and 5th speed forks (except for the NG5 gearbox) in neutral.

Push the reverse gear lever finger towards the 1st speed drive gear.

**Fit in place:**
- the primary shaft;

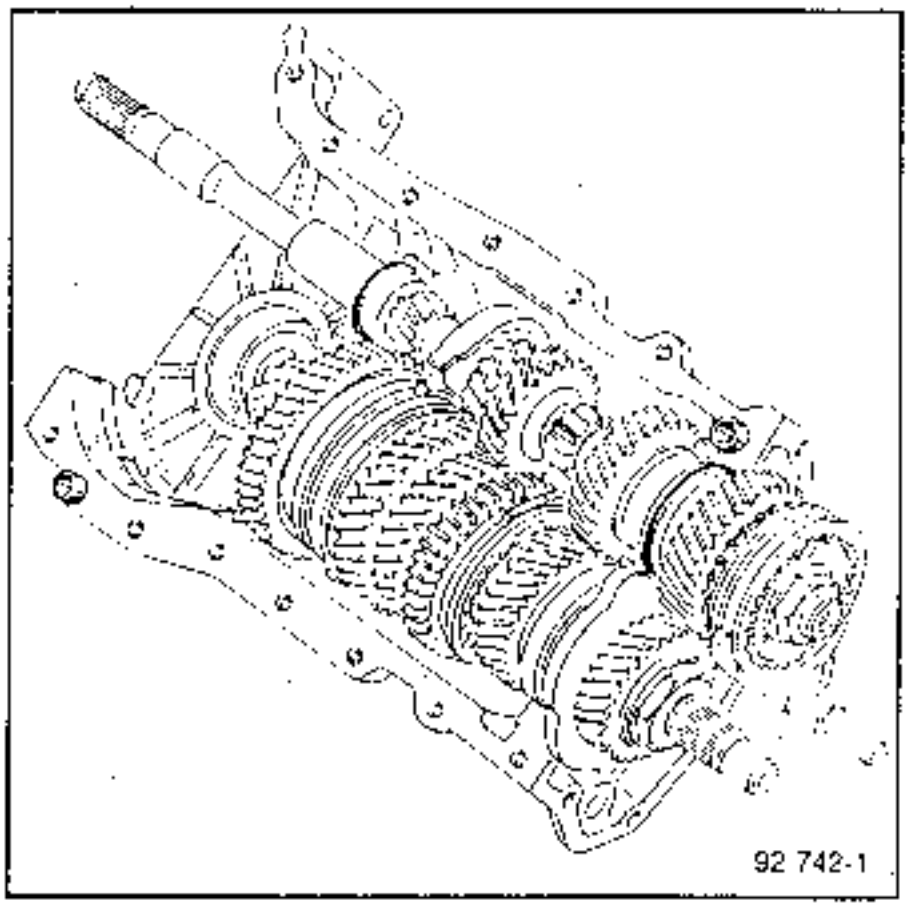



- the secondary shaft.

Place the reverse gear shaft back in neutral.

Make sure that the following are in the correct position:

- the two locating pins;
- the magnet;
- the bearing snap rings in the casing grooves.

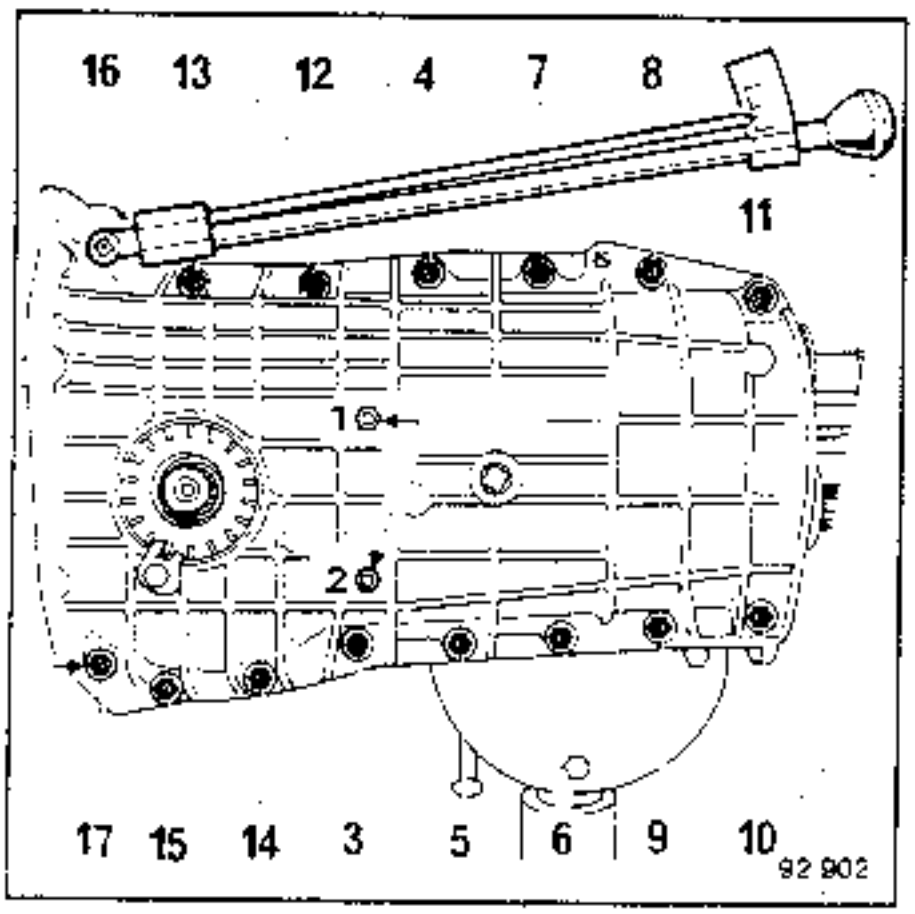


## ASSEMBLING THE CASINGS

On the lefthand casing:

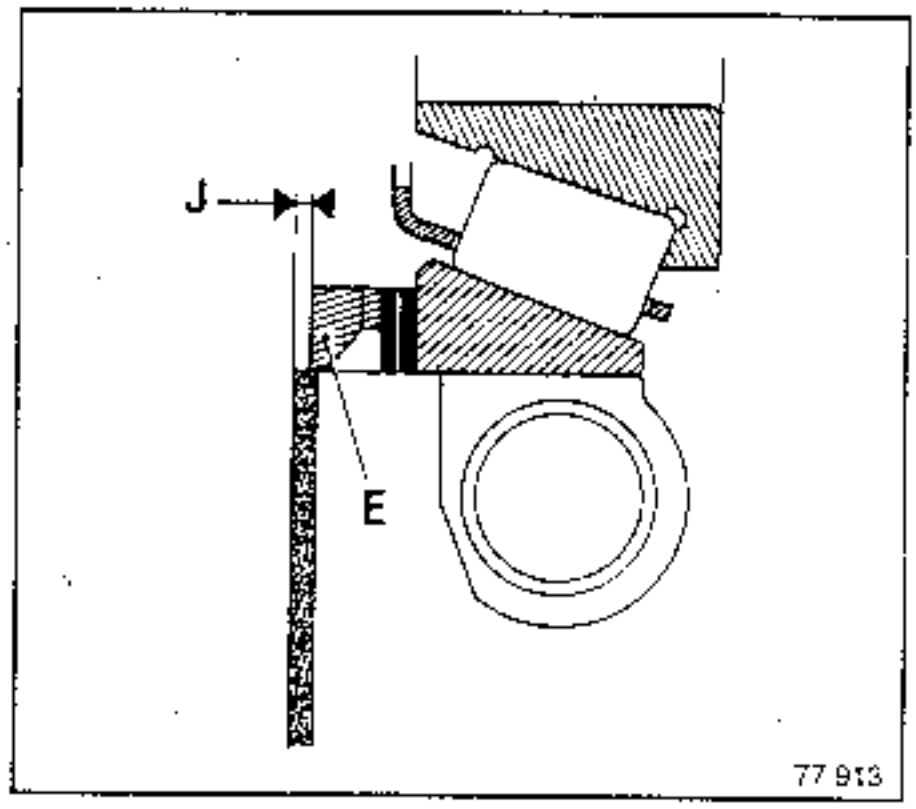
- Place the reverse gear shaft in neutral.
- Coat the casing joint faces with **Loctite 518.**
- Fit protector **B.Vi.813** on the lefthand sunwheel
- Assemble the casings, taking care to position the reverse swivel lever and bearings correctly.

Torque tighten the casing mounting bolts in the order shown and to the recommended torque.




## NG0 - NG2: Adjusting the primary shaft bearing pre-load

Fit the shims removed on dismantling and spacer **(E)**.



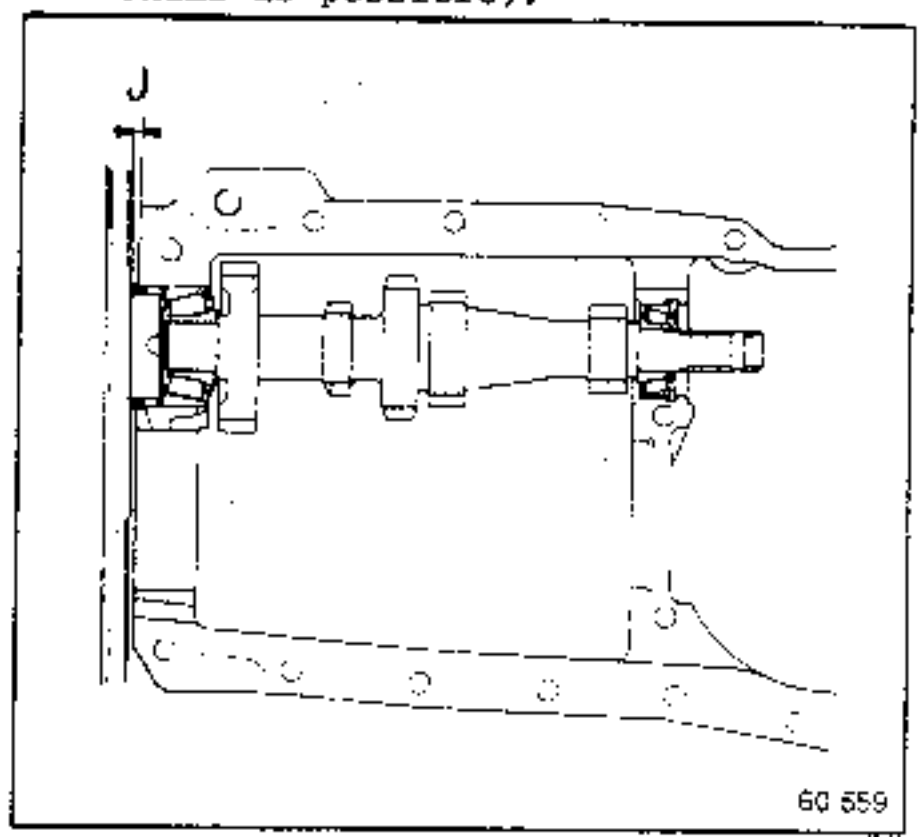

Using a piece of tubing, lightly tap spacer **(E)** to fit the bearings.

Fit the paper gasket to the rear casing.

Measure clearance **(J)** between the spacer and the outer face of the gasket:

**J = 0.02 to 0.12 mm.**

If the distance is not correct, increase or decrease the shim thickness (use as few shims as possible).

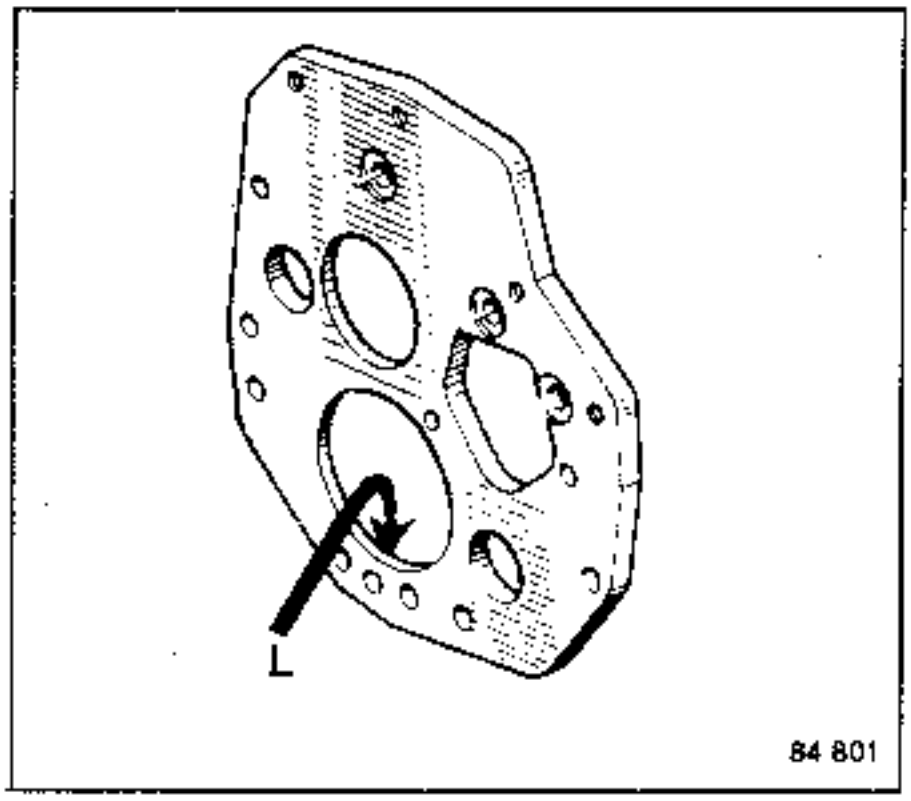


## ASSEMBLING THE CASINGS

**NG5:**

Fit:
- the paper gasket for the spacer plate coated with **Perfect Seal;**
- the spacer plate, centring rebate **(L)** on the secondary shaft bearing.

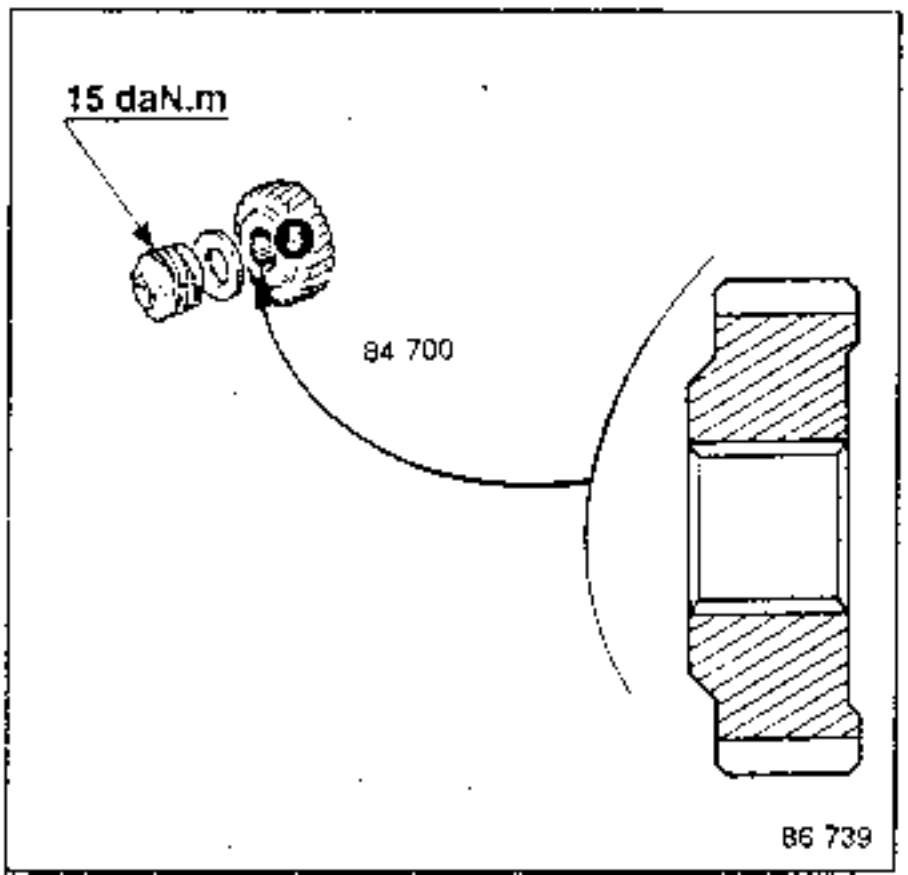
Tighten the bolts holding the plate.




Make sure the fixed gear is fitted the correct way round.

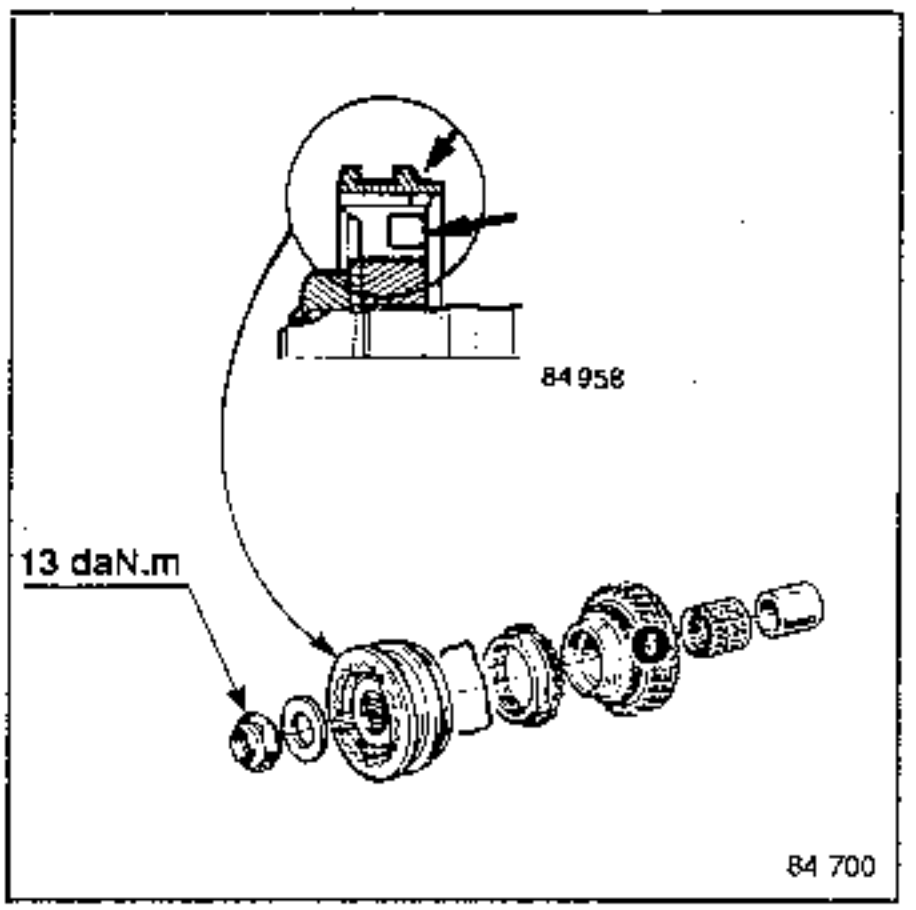
**On the secondary shaft:**

Make sure the fixed gear is fitted the correct way round and bond it with **Loctite FRENBLOC.**




**On the primary shaft:**

Bond the hub with **Loctite FRENBLOC** and make sure the assembly is fitted the correct way round.




Place the bosses on the synchro rings in the notches on the hub.

Put back the 5th speed synchro/hub/slide gear/fork assembly.

Select 1st and 5th gears.

Put three drops of **Loctite FRENBLOC** on the threads of the new nuts, torque tighten and lock them:

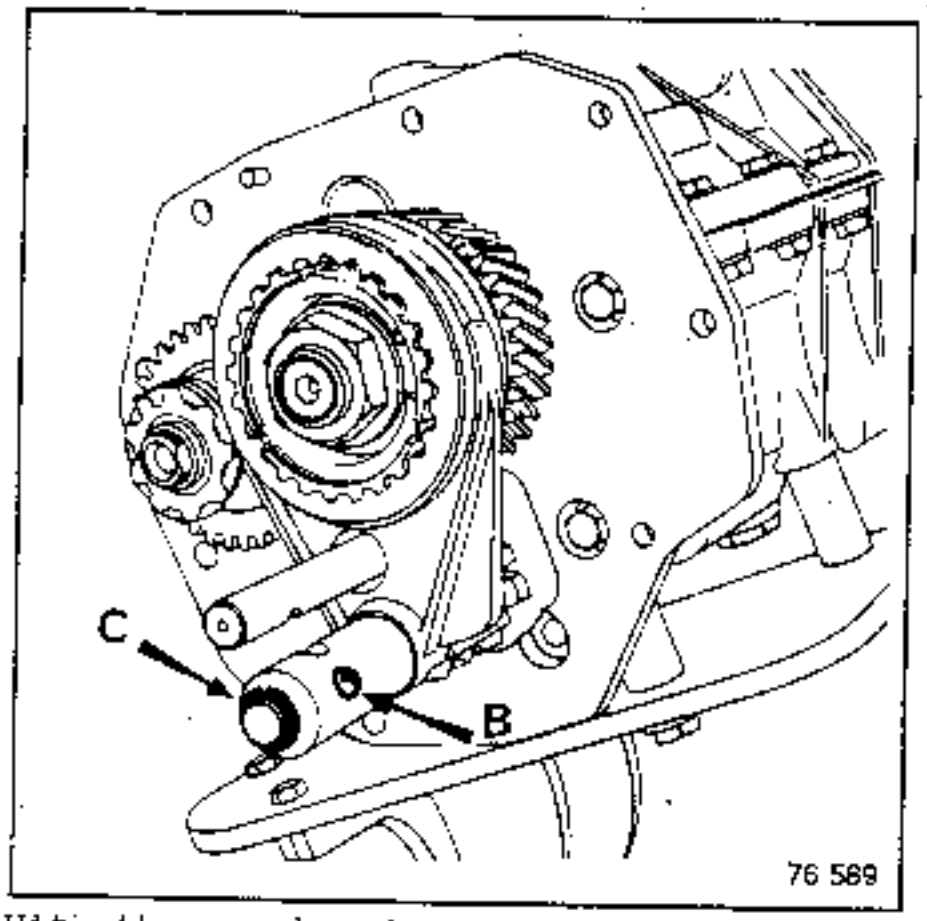
- primary shaft : **13 daNm**
- secondary shaft : **15 daNm**

Return to neutral and check that all gears can be engaged.

## ASSEMBLING THE CASINGS

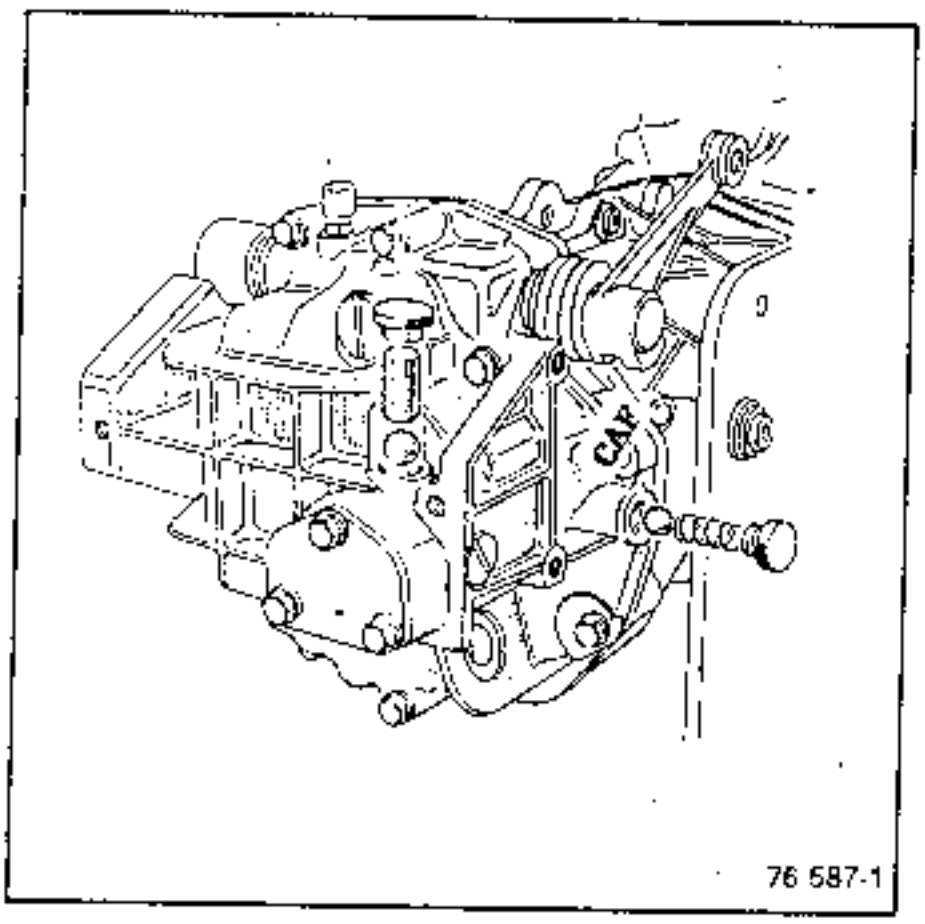
**NG5:**

Fit locking ball **(B)** and circlip **(C)**.




With the gearbox in neutral, fit:

- the rear casing with its paper gasket coated with **Perfect seal;**
- the 5th speed locking ball and spring;
- the 3rd/4th and 5th speed locking ball and plunger;
- the plugs, having coated their threads with **CAF 4/60 THIXO.**

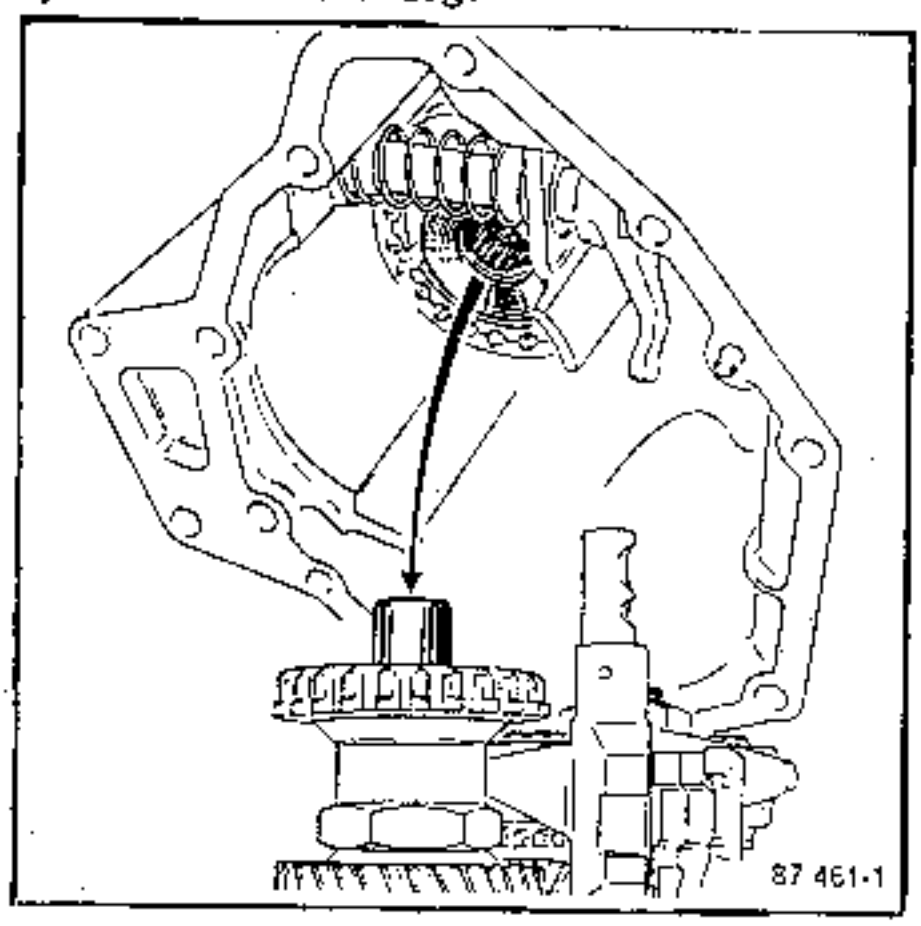



**NG 5-speed gearbox - All types except NG5**

**Select 4th gear.**

Fit the paper gasket, coated with **Perfect Seal,** on the rear casing (except on the NG7 where it is fitted dry).

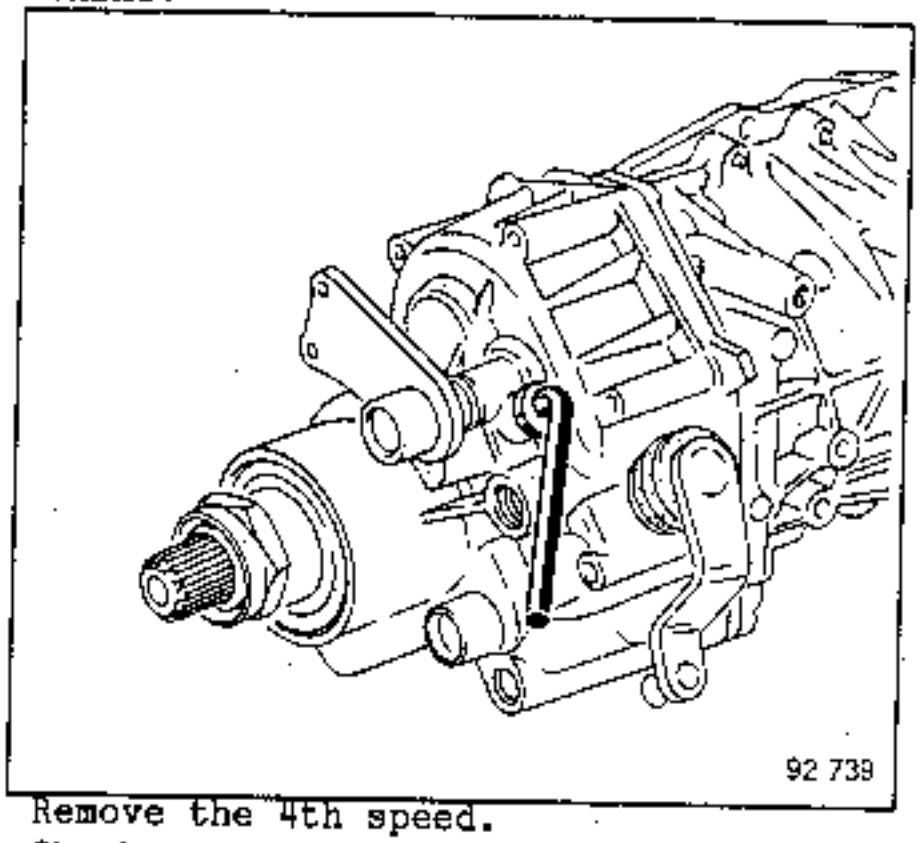
Select 4th gear and position the casing, with the selector finger in the 3rd/4th speed fork shaft dog.




Position the spacer plate so that it locates in its housing in the casing and close the rear casing.

Torque tighten the bolts.

Refit the 5th speed locking ball, after coating the plug threads with **CAF 4/60 THIXO.**



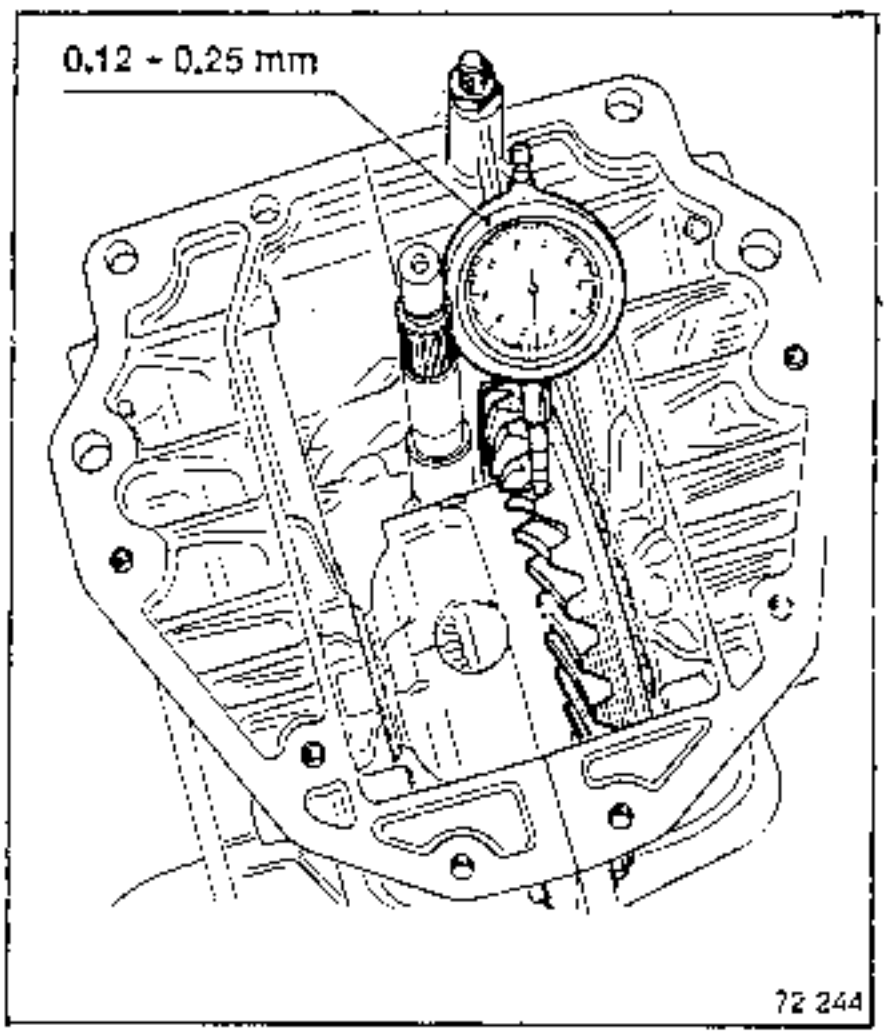

Remove the 4th speed.

Check that all the gears can be selected.

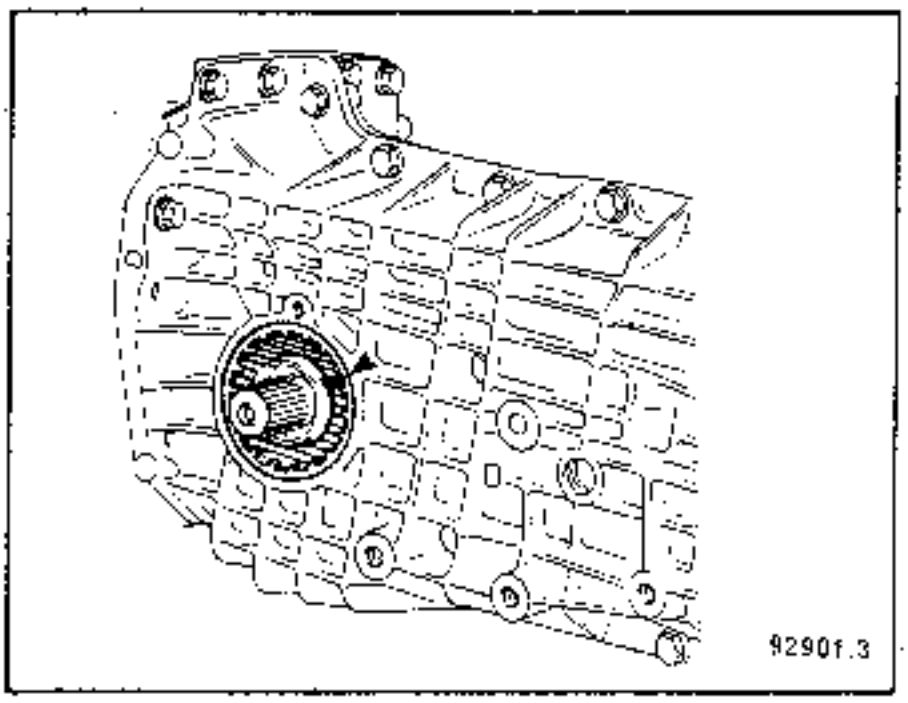
## ASSEMBLING THE CASINGS

**Check the backlash (at three points 120° apart)**

- Secure a clock gauge on the casing, with the probe at right angles to the side of a tooth on the crown wheel, as near to the outer edge as possible.
- Check the backlash: it should be between **0.12 and 0.25 mm.**
  If the backlash is excessive, unscrew the nut at the casing end and tighten the screw at the crown wheel end by the same amount and vice versa if the backlash is too small.




When the backlash has been adjusted, make a new mark on the nut.



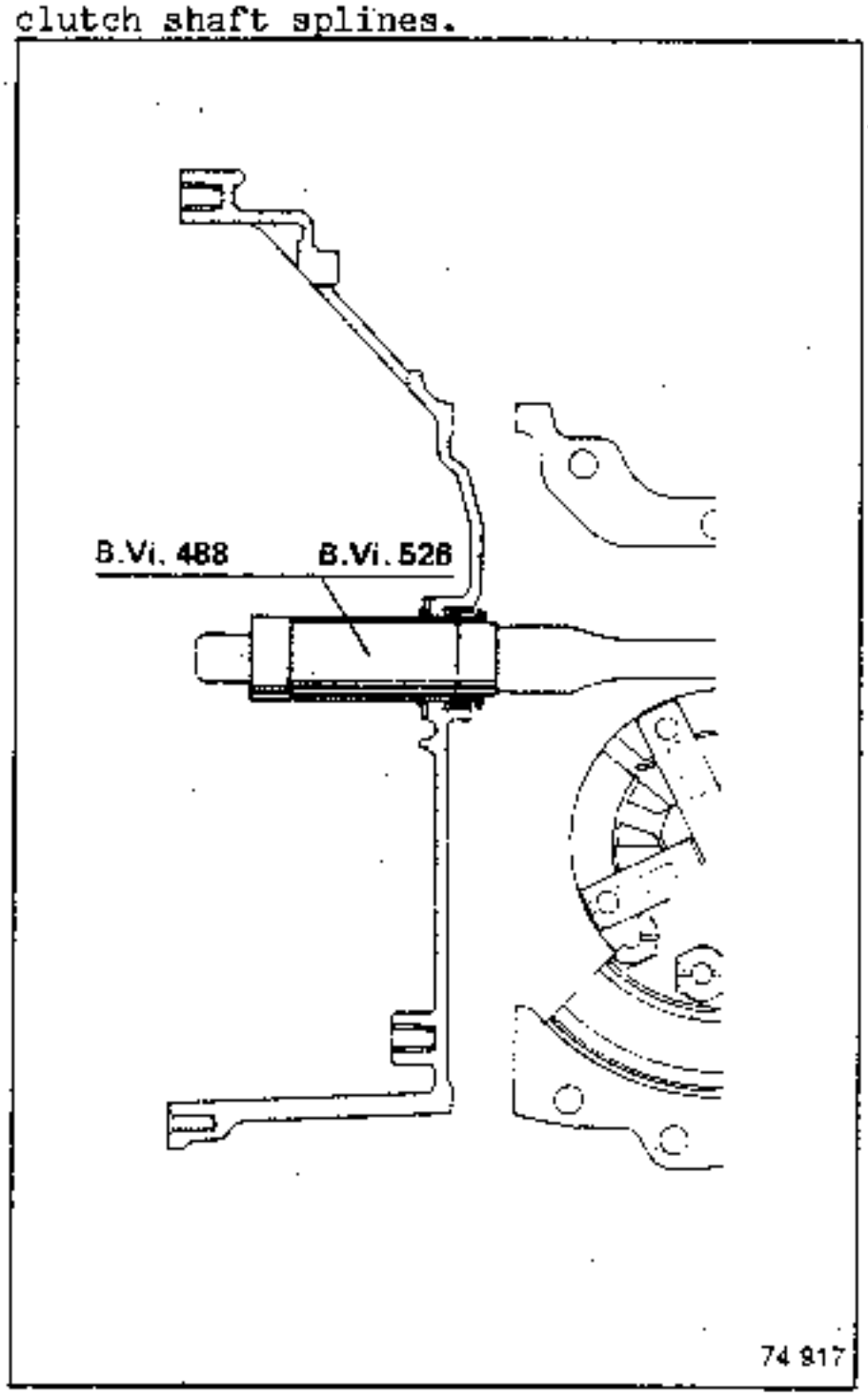

Before assembling the clutch casing:

- check that the locating pins are fitted;
- coat the paper gasket with **Perfect Seal.**

**Long clutch shaft:**

Fit the clutch casing, using tooling **B.Vi.526** for aluminium engines or **B.Vi.488** for cast-iron engines.

These tools are designed to protect the lip seal when it is passed over the clutch shaft splines.




**Short clutch shaft:**

Place adhesive tape over the shaft splines so as not to damage the lip seal.

Assemble the casings and torque tighten the bolts.

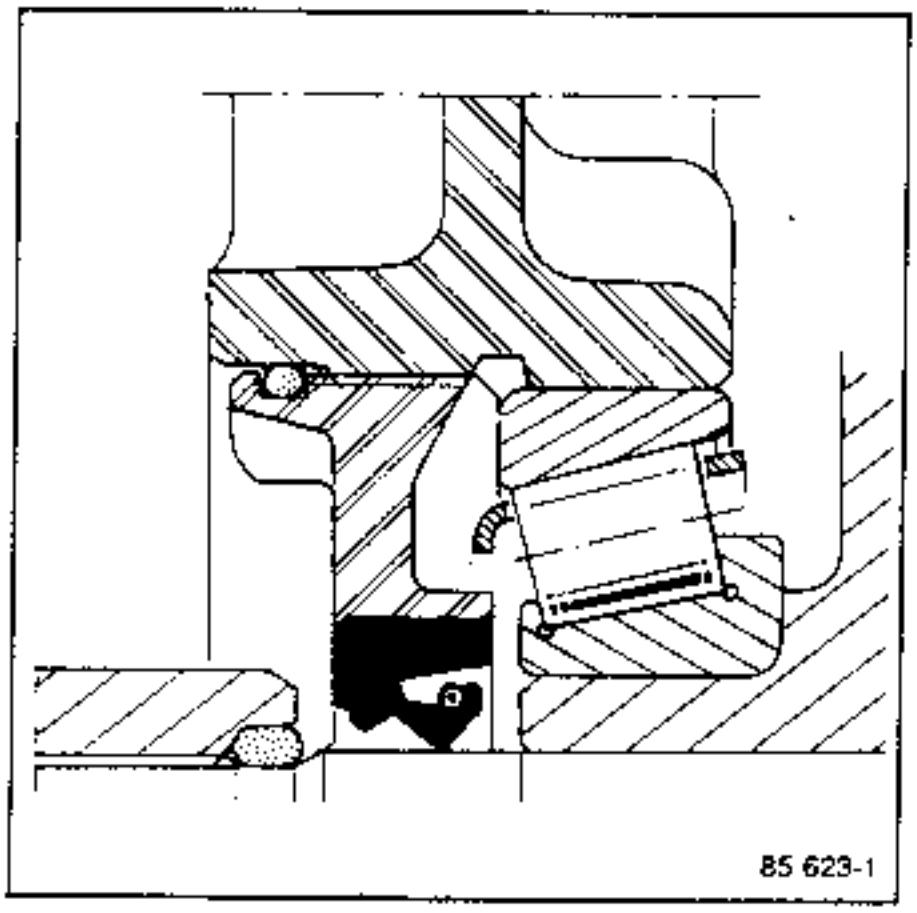
## ASSEMBLING THE CASINGS

### Reassembling the seals on the differential nuts

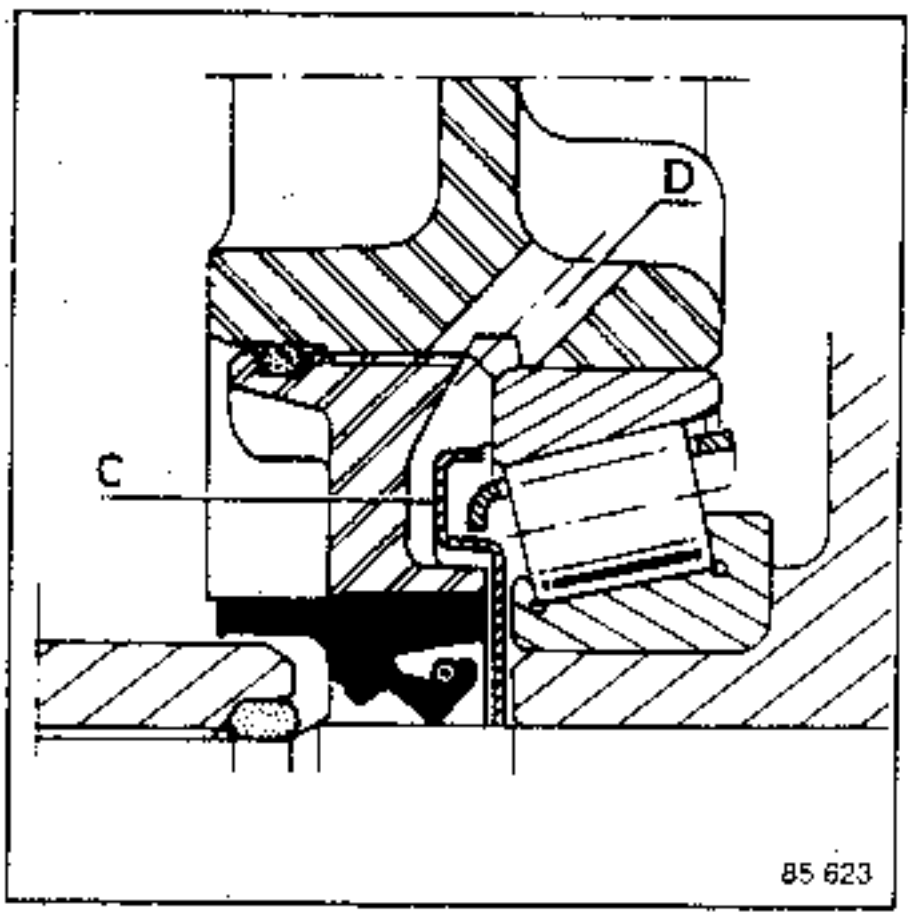
Remove a differential nut from the casing, counting the number of turns.

**ATTENTION:** There are two types of seal:

**1st type**




**2nd type**




**Special feature of the 2nd type:**

- An oil deflector **(C)** has been added to the differential nut fitted to casings having an additional duct **(D)**.

- The lip seal is of the front bush-type.

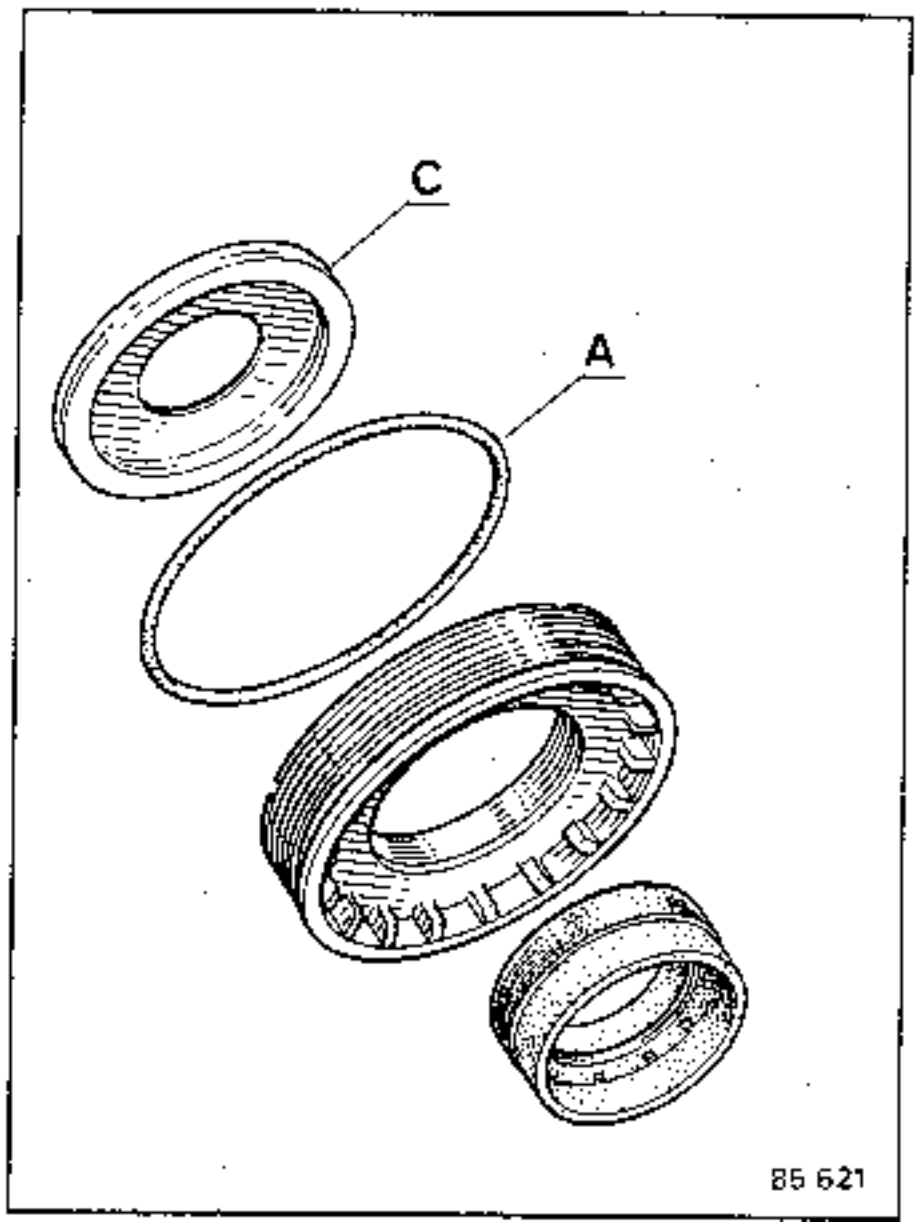
In service exchange the Parts Department supplies only:

- lip seals of the front bush-type;

- nuts with deflector **(C)**.

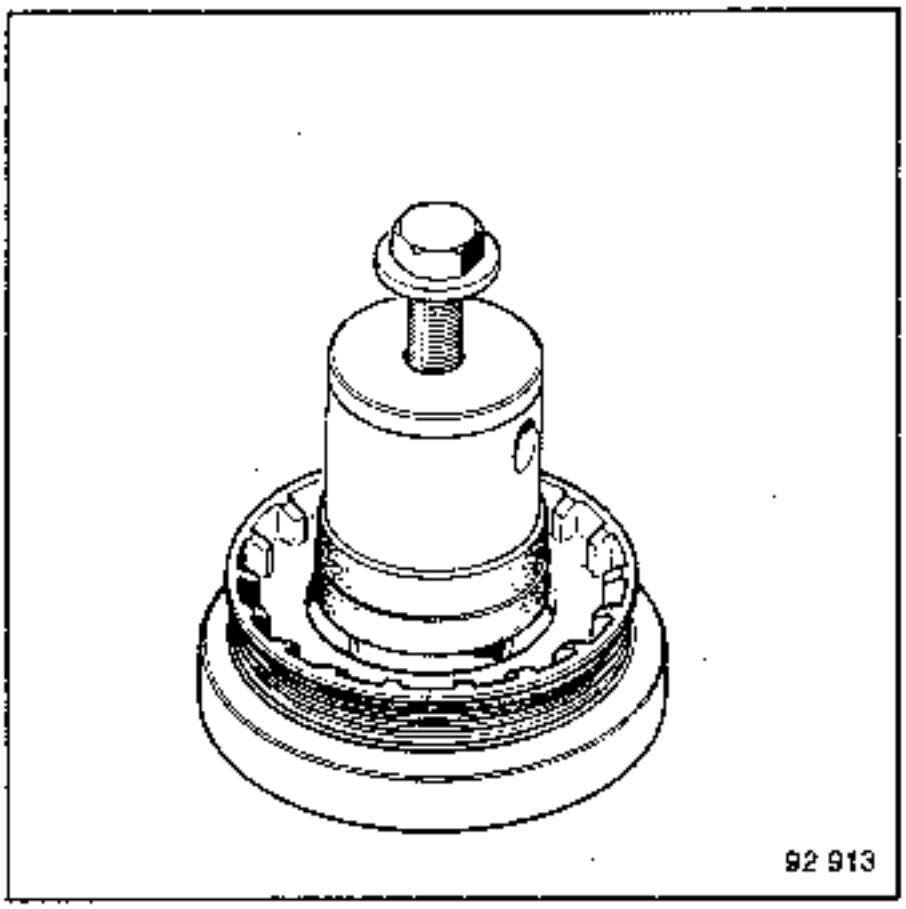
**IMPORTANT**
**Under no circumstances must deflect (C) be fitted to a manual gearbox with a casing which does not have oil way (D) since the lip seal is not lubricated.**

**Assembly:**
On the differential nut place O-ring **(A)** and fit deflector **(C)**, if necessary.

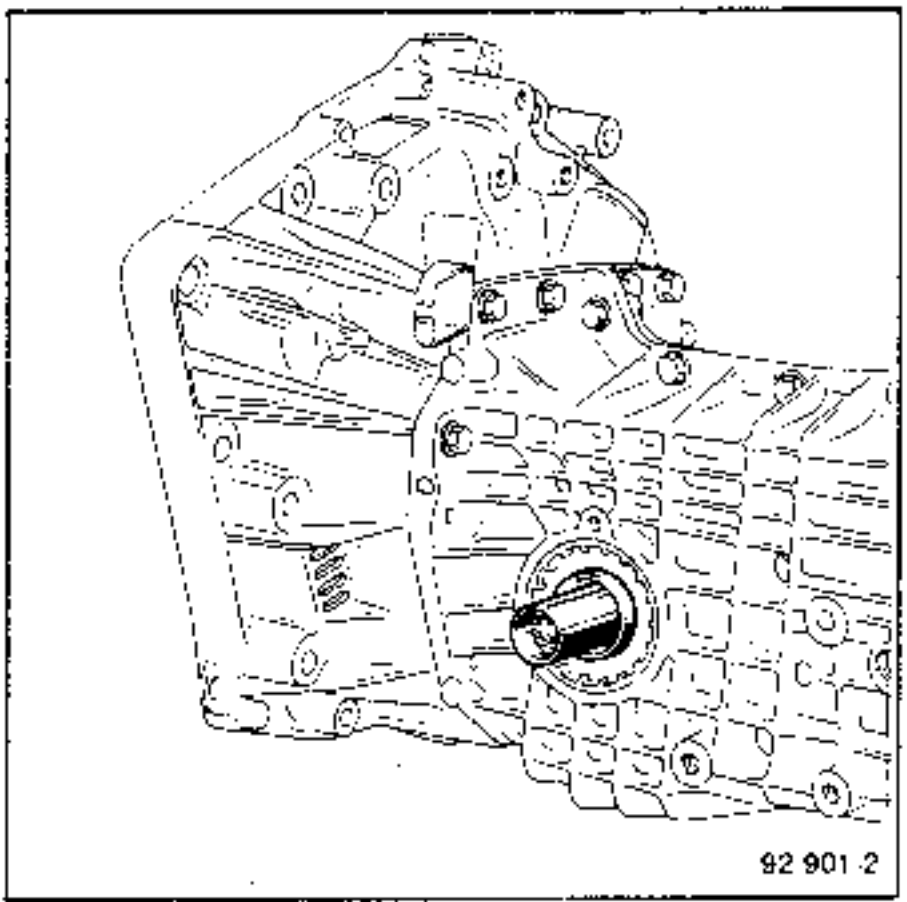


## ASSEMBLING THE CASINGS

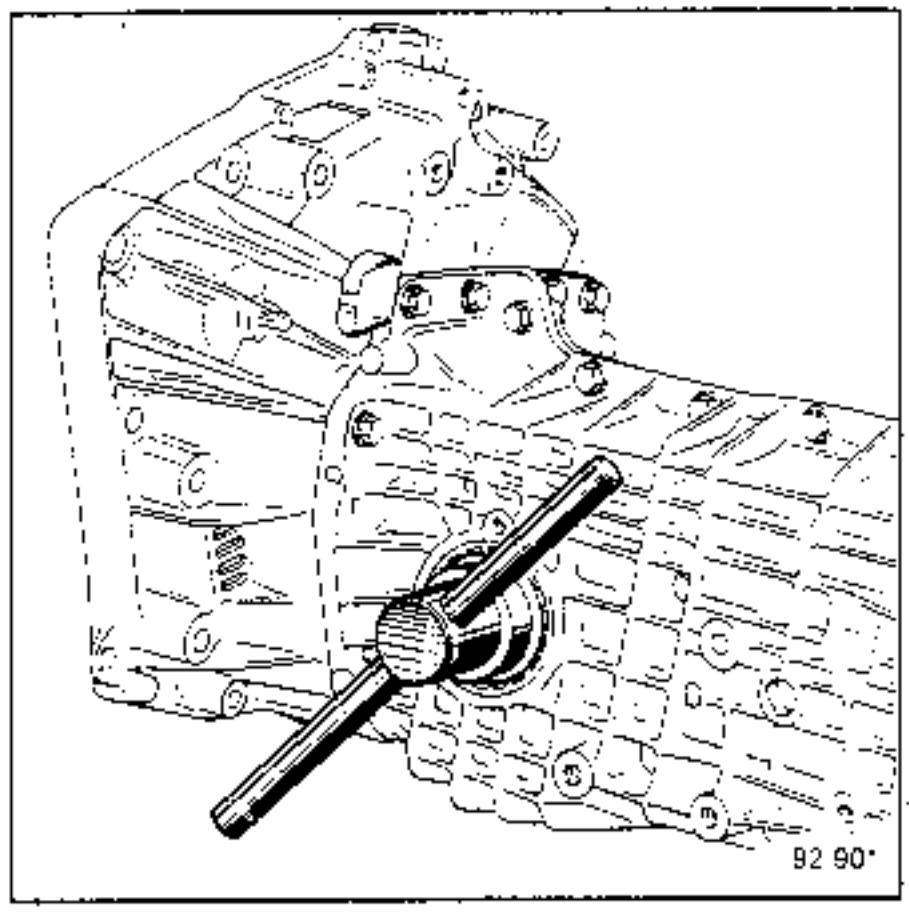
The (greased) oil seal is fitted using tool **B.Vi.1154** which determines the correct position of the seal.


92 913

Fit tool **B.Vi. 813** on the sunwheel splines.


92 901-2

Using tool **B.Vi.807-01,** retighten the differential nut until it is aligned with the mark on the casing.


92 90

Lock the nut using the lock plate.

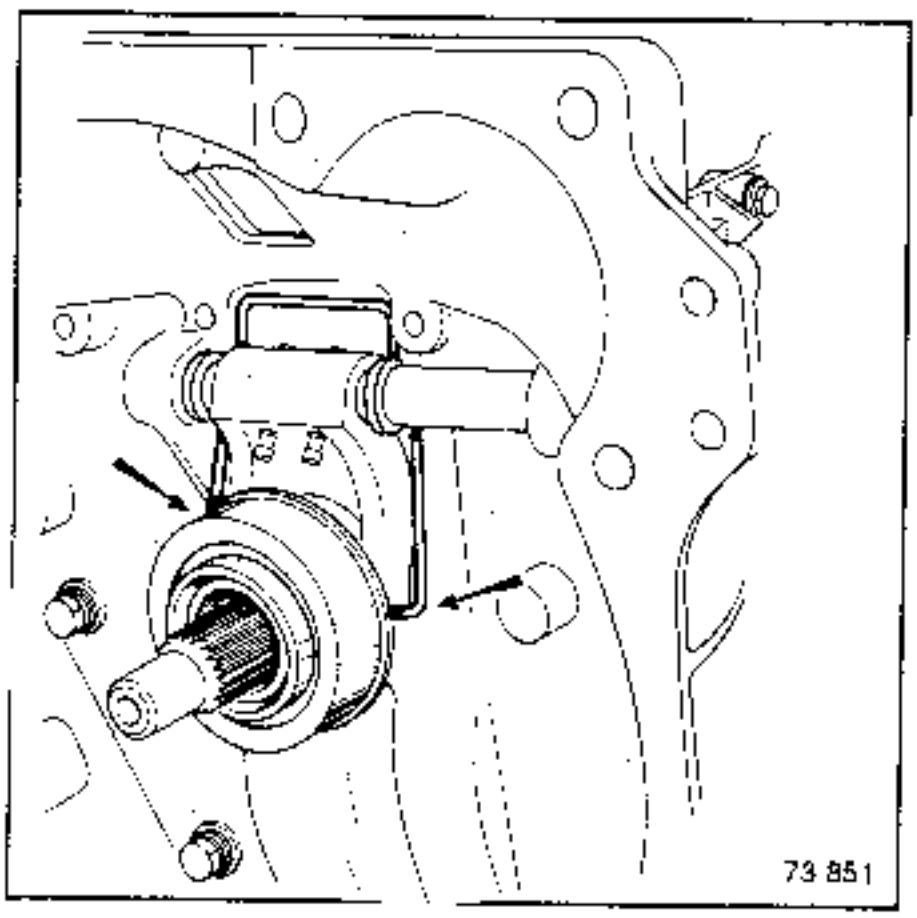
## ASSEMBLING THE CASINGS

Lubricate the guide tube, pads and fork pivot using **No. 20** grease.

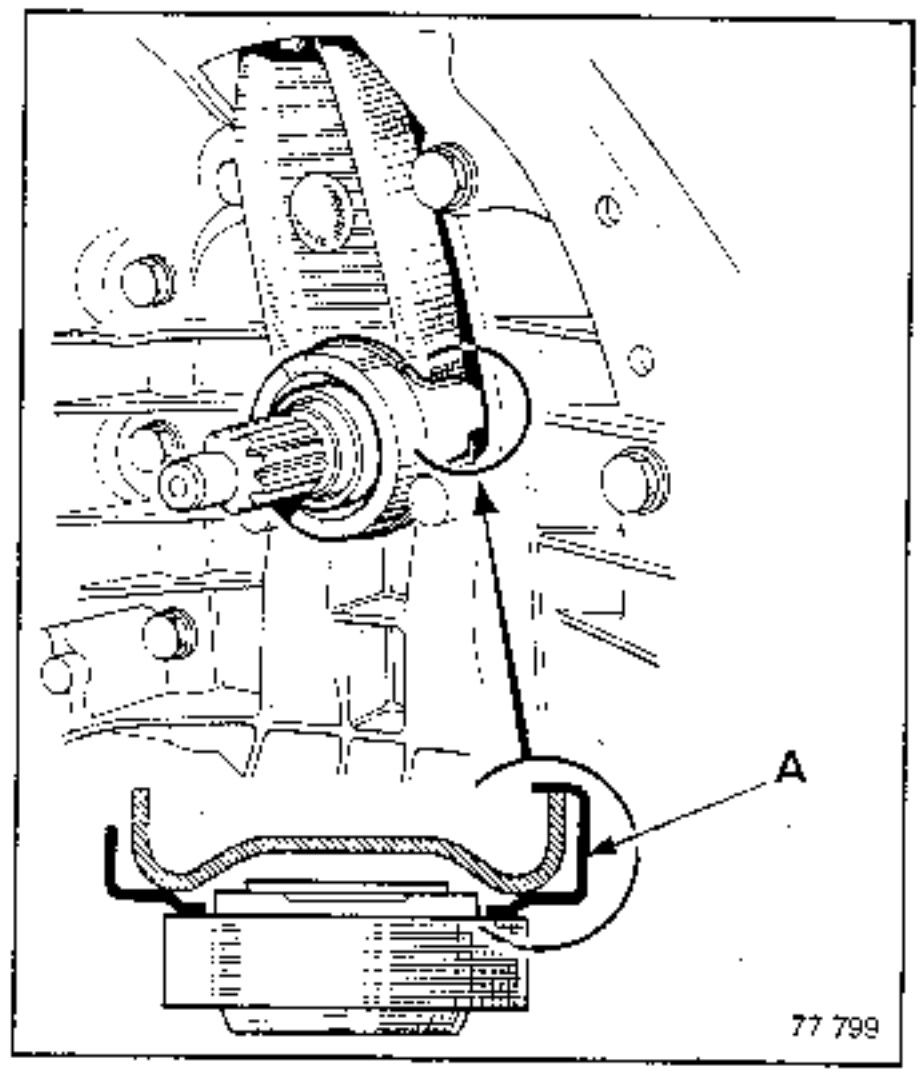
**"Push" type clutch**

Fit the thrust pad.

Fit in place the spring, engaging its ends in the holes in the thrust pad mounting and those in the fork.

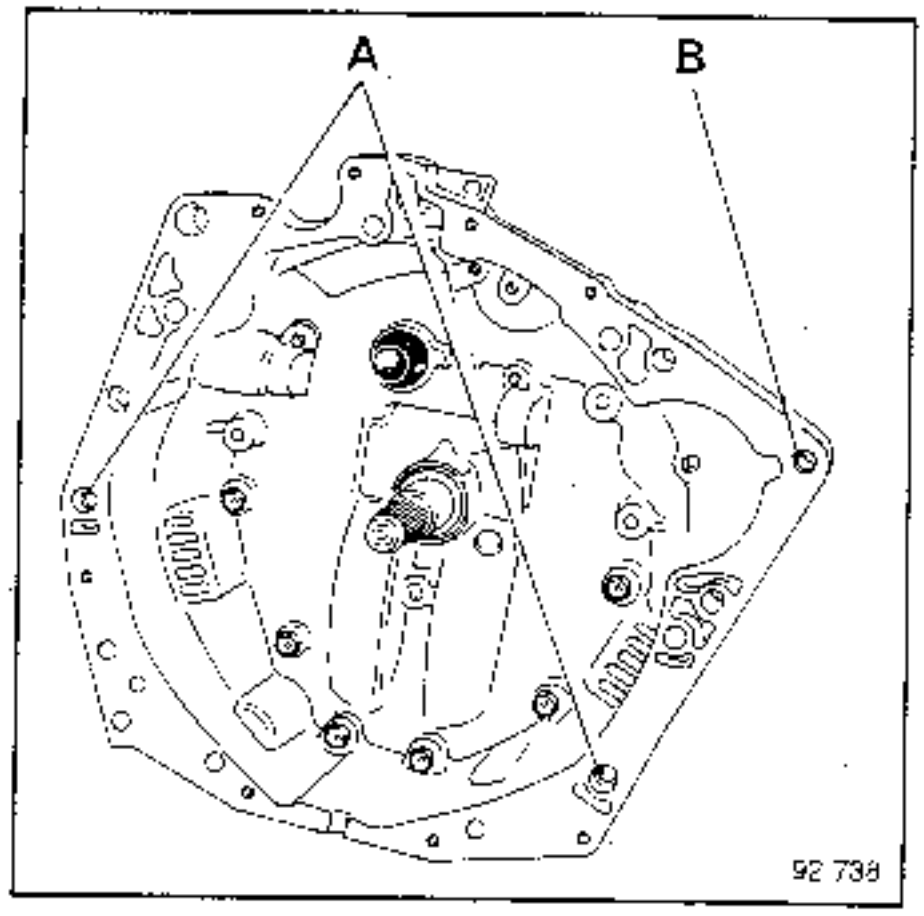



Tilt the fork and fit the new thrust pad, with notch **(A)** in the fork.



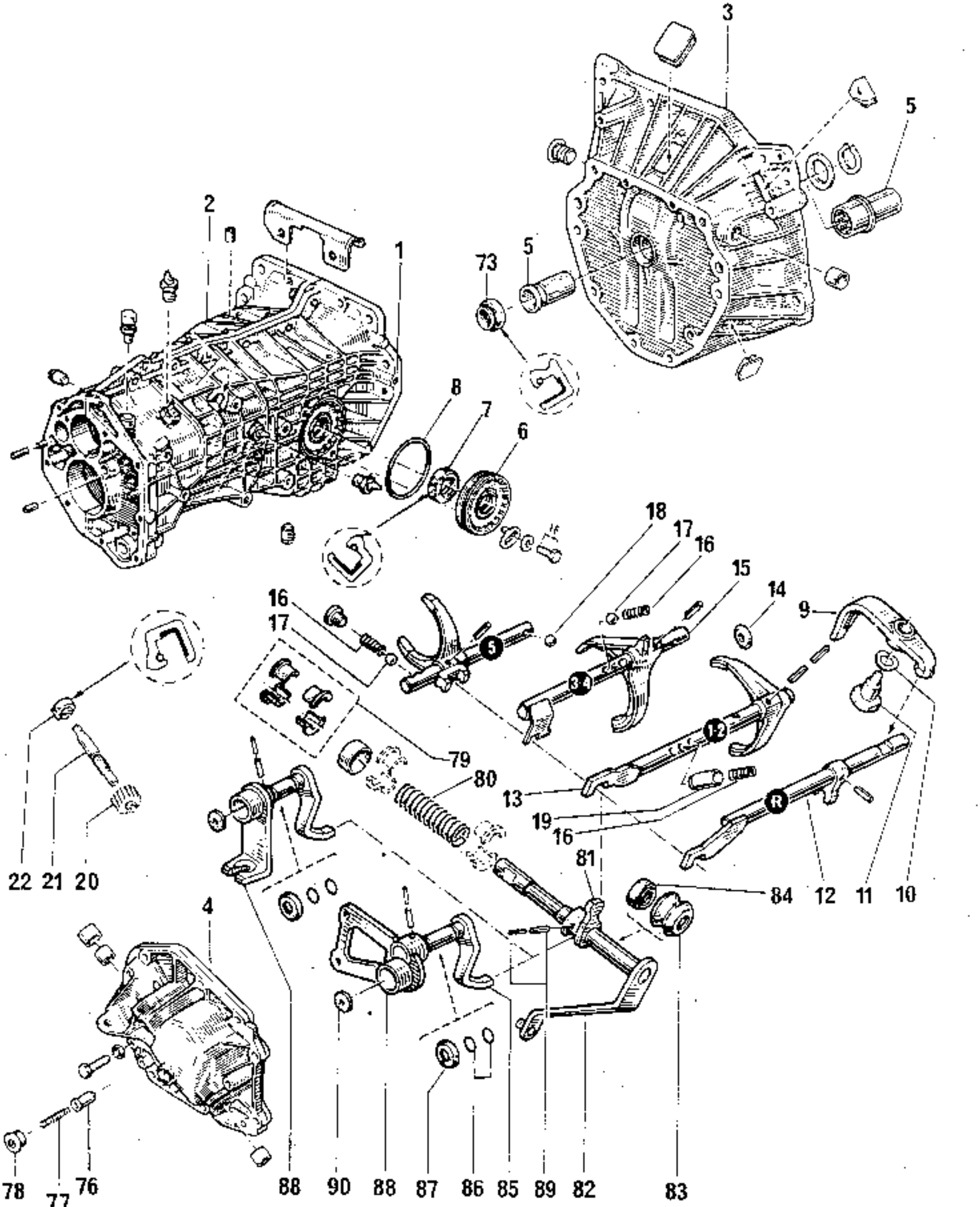

Remove the gearbox from its stand.

Before refitting the gearbox to the vehicle, fit the locating pins at **(A)** and **(B)** on the clutch casing.

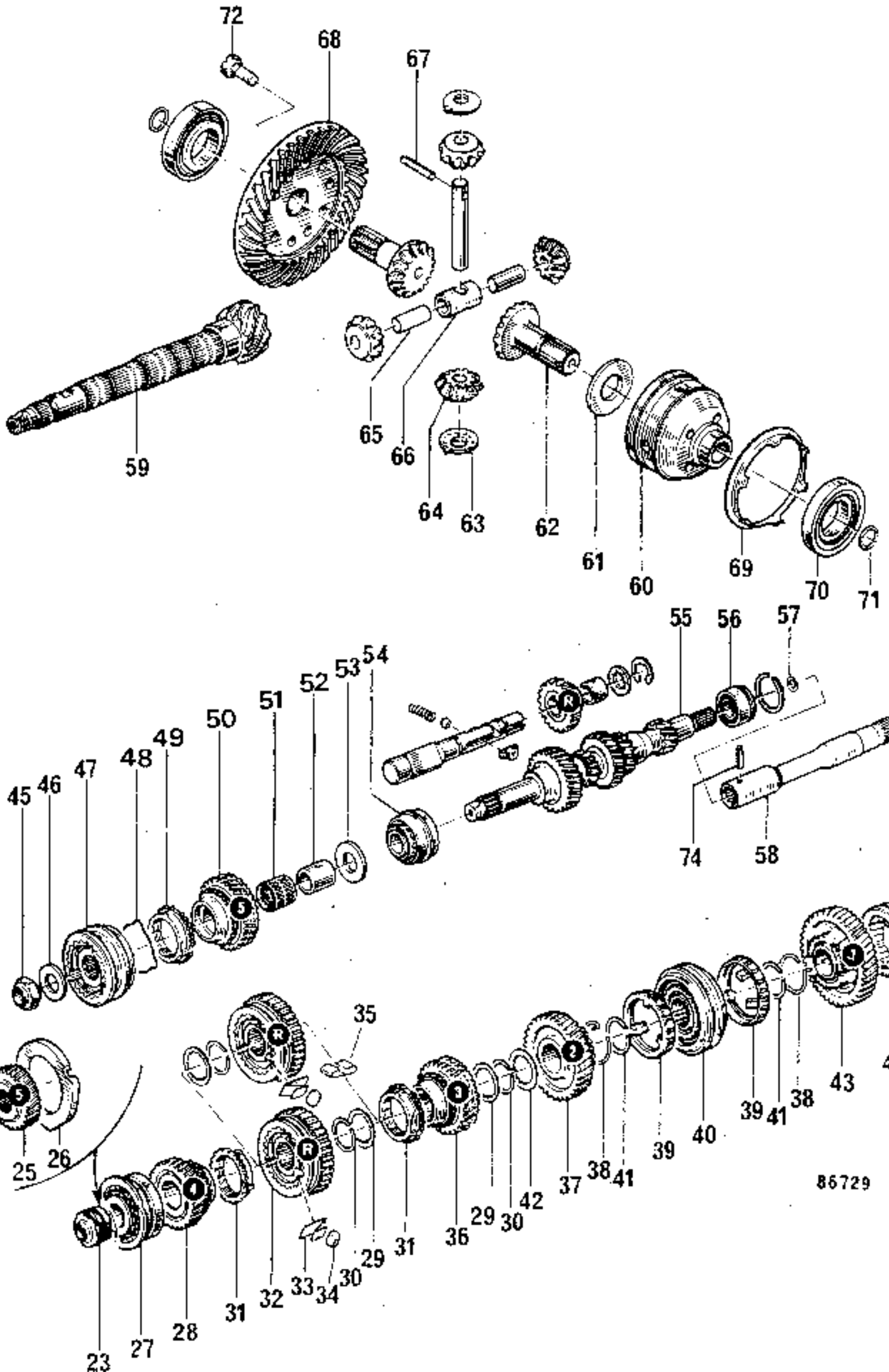


1 : Righthand half-casing
2 : Lefthand half-casing
3 : Clutch casing
4 : Rear casing
5 : Guide tube
6 : Differential lock nut
7 : Lip-type seal
8 : O-ring
9 : Reverse gear lever
10 : Crinkle washer
11 : Lever bolt
12 : Reverse gear shaft
13 : 1st/2nd speed shaft and fork
14 : Interlocking disc
15 : 3rd/4th speed shaft and fork
16 : Locking spring
17 : Detent plunger ball
18 : Locking ball
19 : 1st/2nd speed locking plunger
20 : Speedometer drive gear
21 : Speedometer shaft
22 : Speedometer seal
23 : Secondary shaft nut
24 : Washer
25 : 5th speed fixed gear
26 : Spacer
27 : Set of taper roller bearings
28 : 4th speed idler gear
29 : Small diameter splined washer
30 : Small diameter snap ring
31 : Synchro ring
32 : 3rd/4th speed synchro hub/slide gear
33 : 3rd/4th speed synchro ring
34 : Synchro roller
35 : Synchro heart-shaped spring
36 : 3rd speed idler gear
37 : 2nd speed idler gear
38 : 1st/2nd speed synchro spring
39 : Synchro mobile cone
40 : 1st/2nd speed synchro hub-slide gear
41 : Large diameter snap ring
42 : Large diameter splined washer
43 : 1st speed idler gear
44 : Cylinder roller bearing
45 : Primary shaft nut
46 : Washer
47 : 5th speed slide gear hub
48 : 5th speed synchro ring spring
49 : 5th speed synchro
50 : 5th speed idler gear
51 : Needle bush
52 : Bush
53 : Thick washer
54 : Bearing with double row of balls
55 : Primary shaft
56 : Roller bearing
57 : Grower washer
58 : Clutch shaft
59 : Secondary shaft
60 : Differential unit
61 : Friction washer
62 : Sunwheel
63 : Washer
64 : Planet wheel
65 : Planet wheel small shaft
66 : Differential hub
67 : Rollpin
68 : Crown wheel
69 : Collar
70 : Bearing
71 : O-ring
72 : Crown wheel bolt
73 : Lip-type seal
74 : Rollpin
75 : Selector finger rollpin
76 : Reverse gear detent plunger
77 : Plunger spring
78 : Plug
79 : 1/2 shells
80 : Spring
81 : Selector finger
82 : Selector shaft-lever
83 : Gaiter
84 : Lip-type seal
85 : Selector lever
86 : O-rings
87 : Anti-dust washer
88 : Ball joint cover mounting lever sleeve
89 : Rollpins
90 : Rubber washer
91 : Secondary shaft nut
92 : Snap ring
93 : Drive
94 : Needle bush
95 : Slide gear
96 : Output shaft
97 : Lip-type seal
98 : Bearing
99 : Circlip
100 : Output flange
101 : Spacer
102 : Flange securing bolt
103 : Dog clutch shaft
104 : Dog clutch fork
105 : Clevis
106 : Shaft
107 : Pin
108 : Lip-type seal
109 : Protector
110 : Vacuum capsule

Casings and controls



MECHANISMS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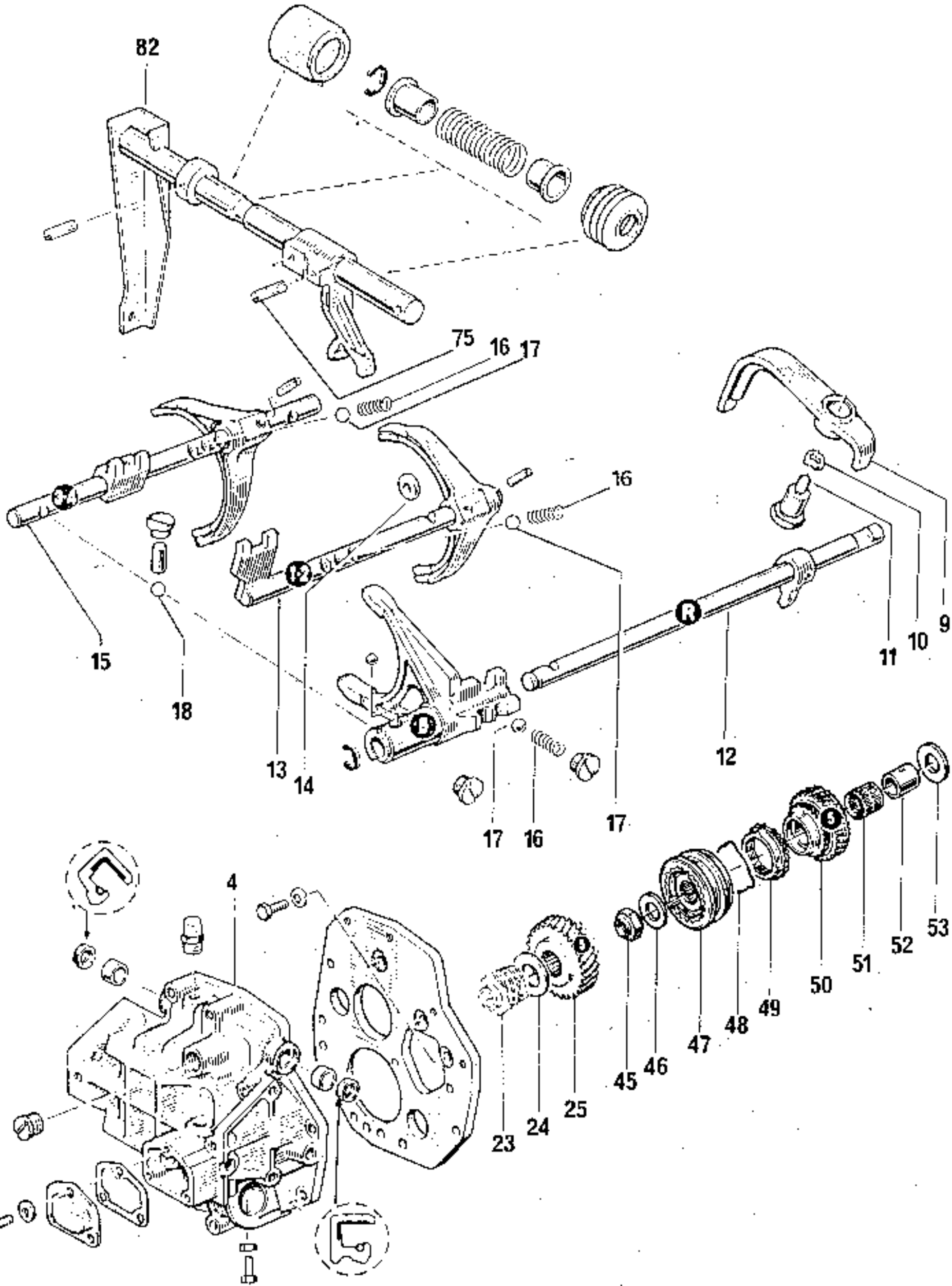
Special features of NG5 gearbox



Special features of NG7 gearbox