

MANUAL TRANSMISSION

SECTION MT

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MT

REMOVAL AND INSTALLATION

Removal

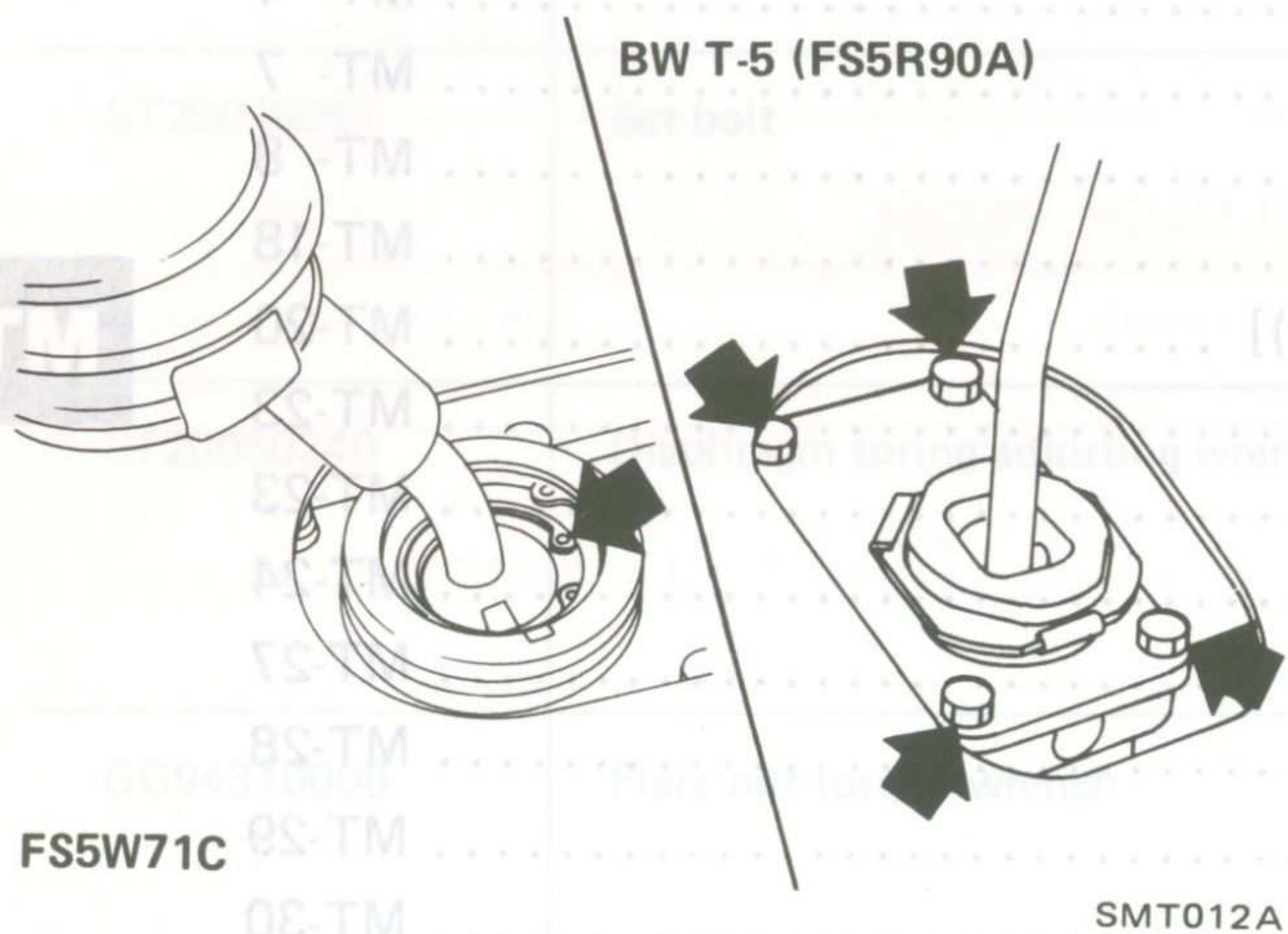
- Remove exhaust front tube, catalytic converter and exhaust manifold connecting tube. Refer to EM section.
- Remove propeller shaft. Refer to PD section.

Insert plug into rear oil seal after removing propeller shaft.

- Support engine by placing a jack under oil pan.

CAUTION:

- Be careful not to damage spline, sleeve yoke and rear oil seal, when removing propeller shaft.
- Do not place jack under the oil pan drain plug.
- Remove shift lever.

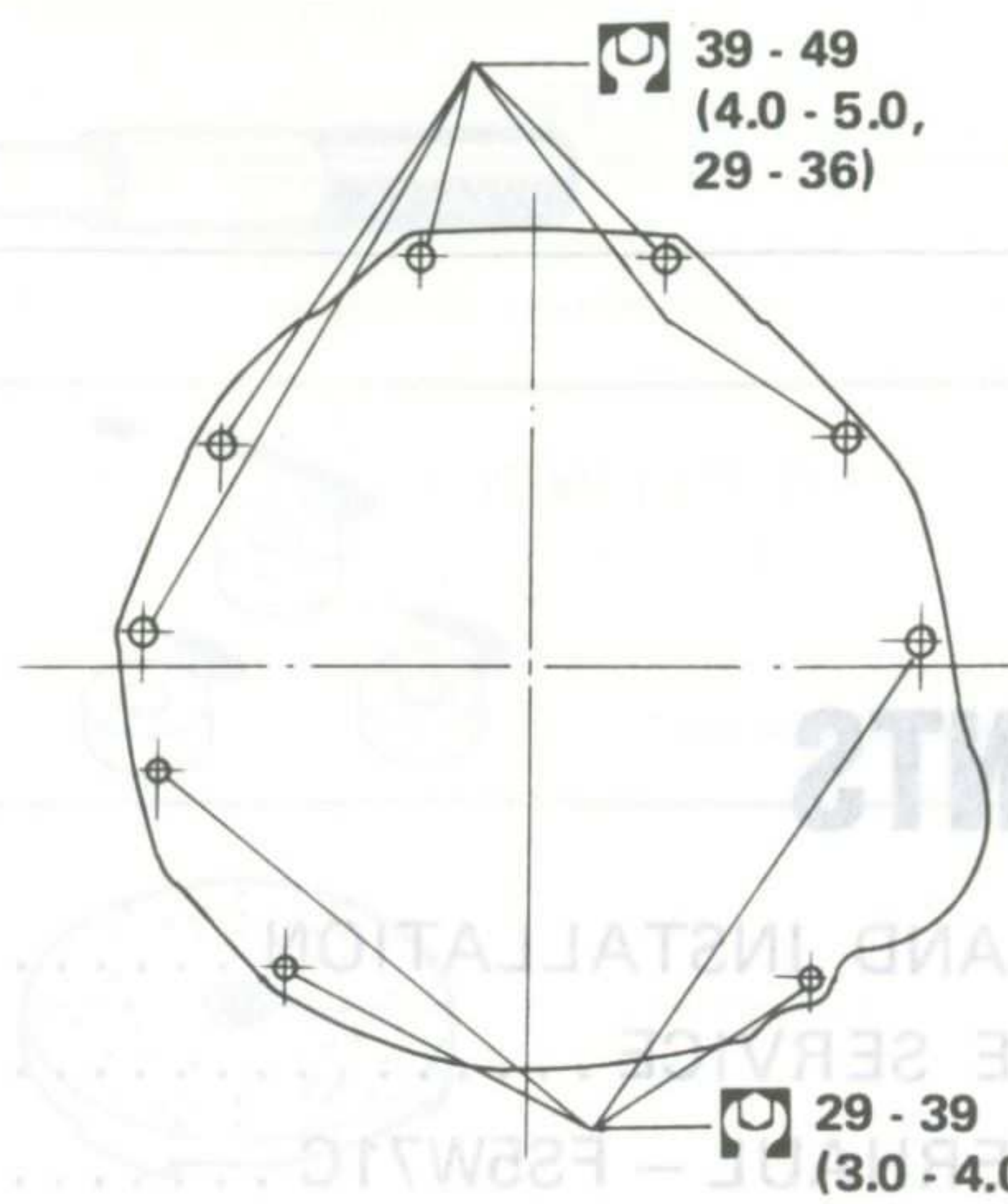


WARNING:

Support Manual Transmission, while removing it.

Installation

- Tighten bolts securing transmission to engine. These bolts have different lengths.



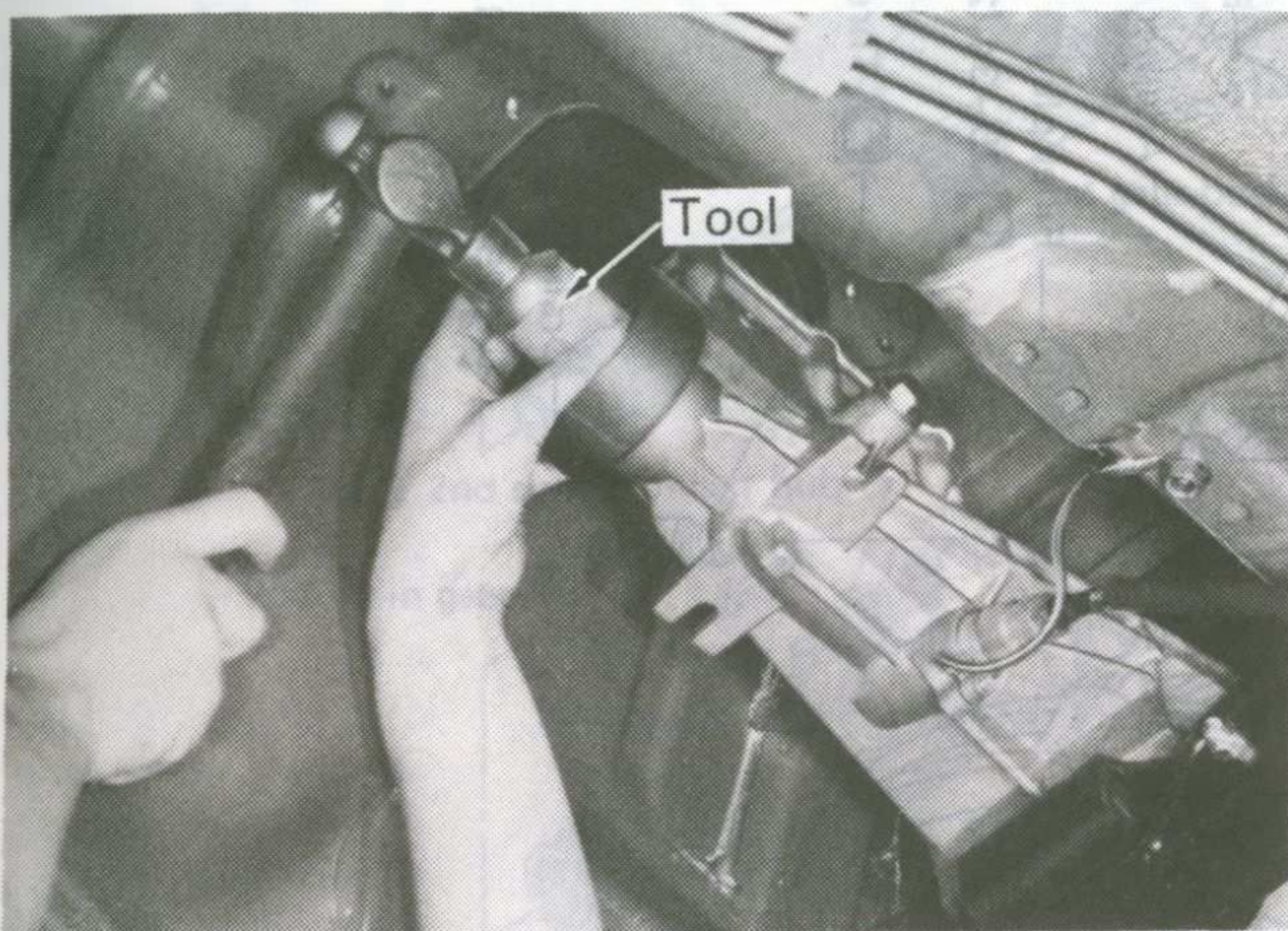
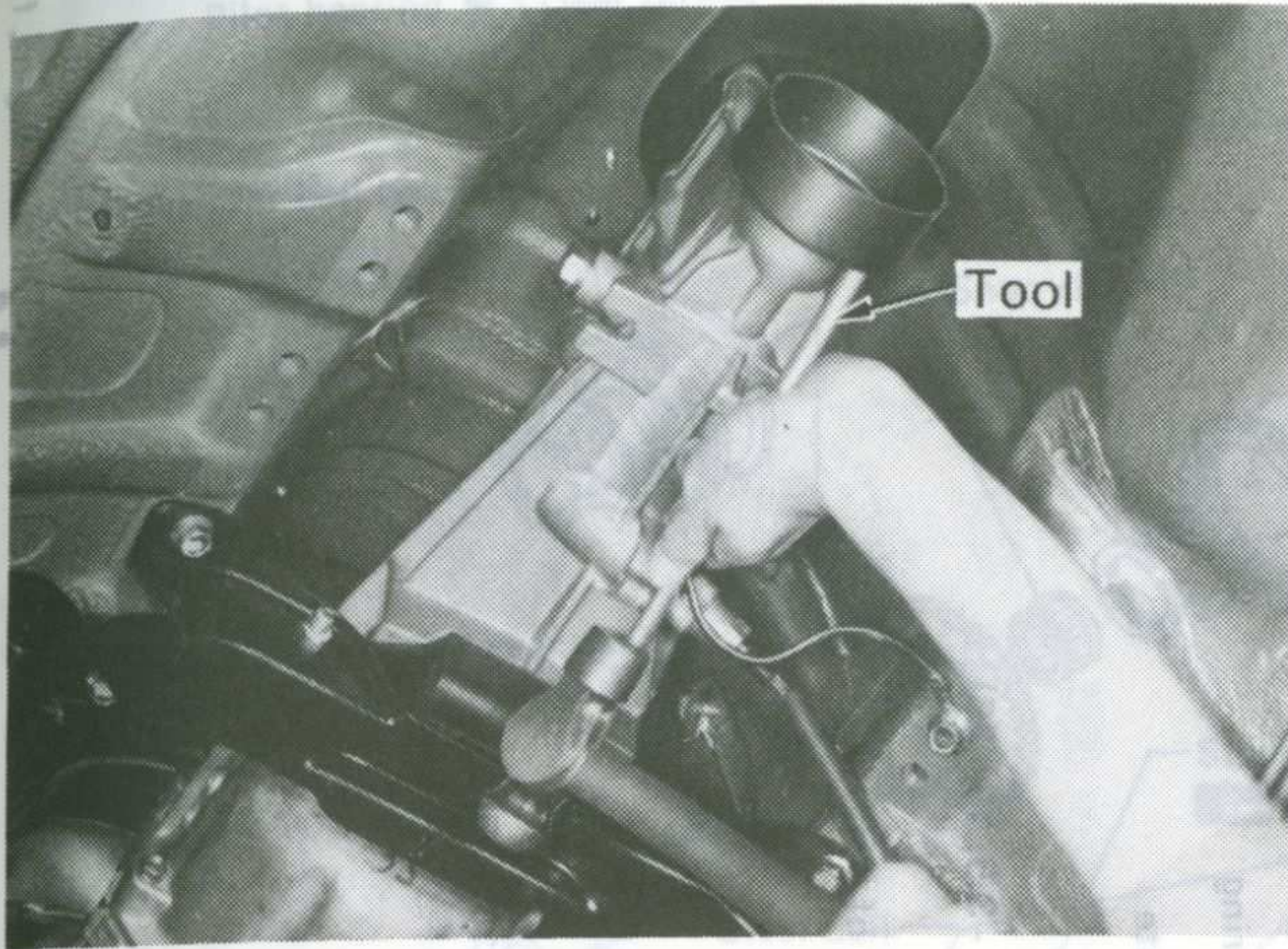
: N·m (kg-m, ft-lb)

SMT978

- Fill transmission with recommended gear oil.

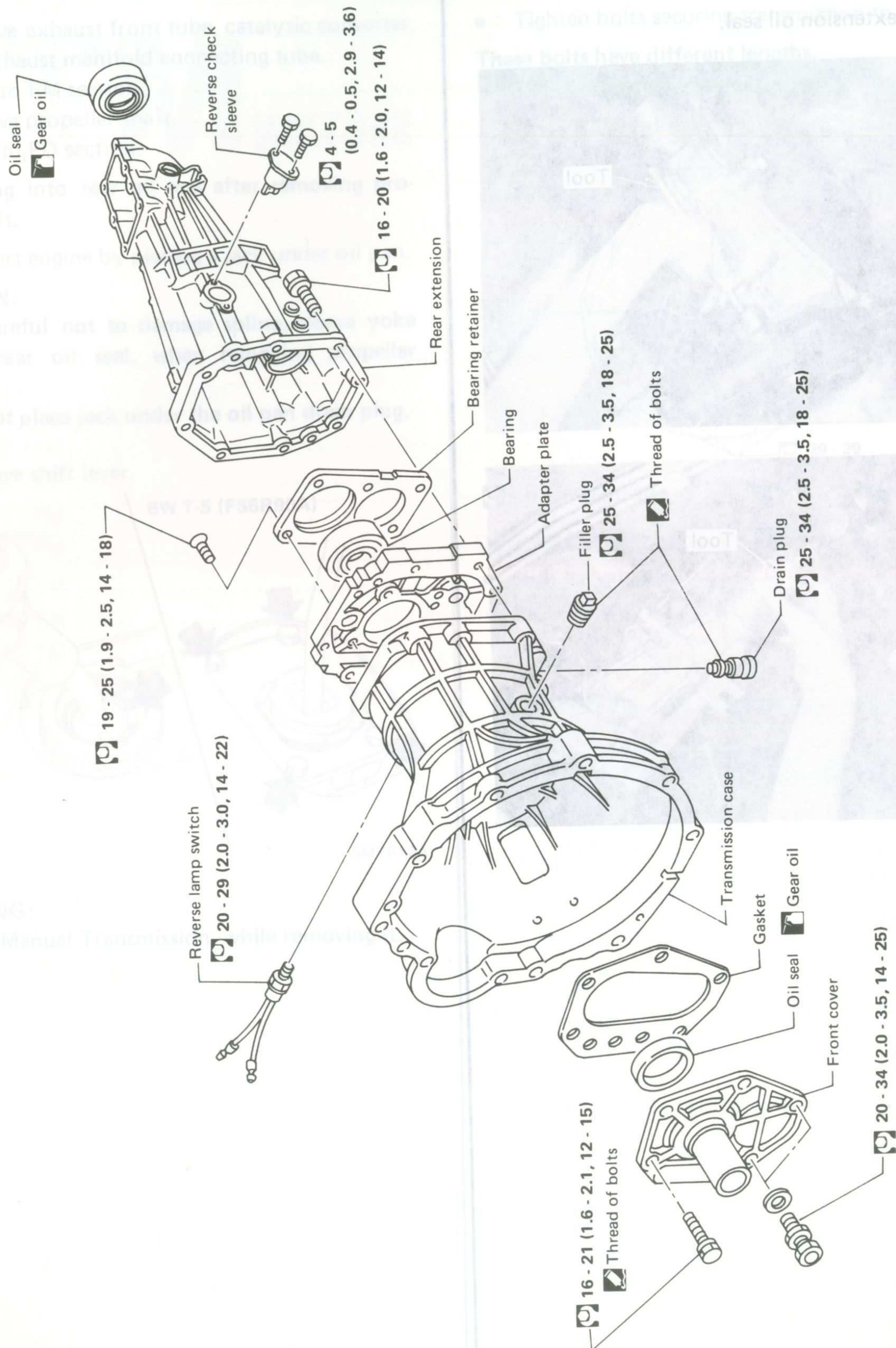
ON-VEHICLE SERVICE

- Rear extension oil seal.



MAJOR OVERHAUL—FS5W71C

Case Components

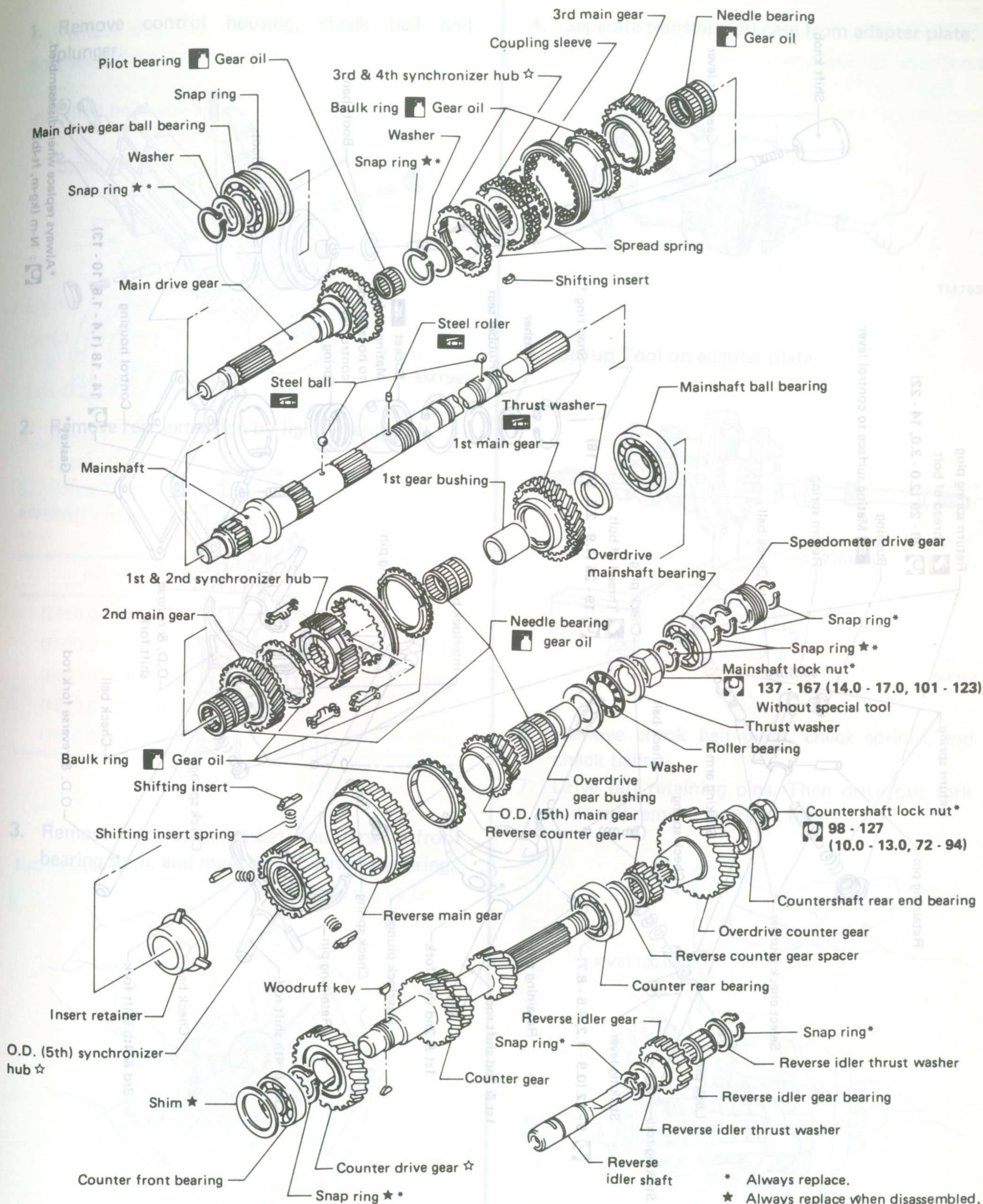


□ : N-m (kg-m, ft-lb)

SMT979

MAJOR OVERHAUL—FS5W71C

Gear Components



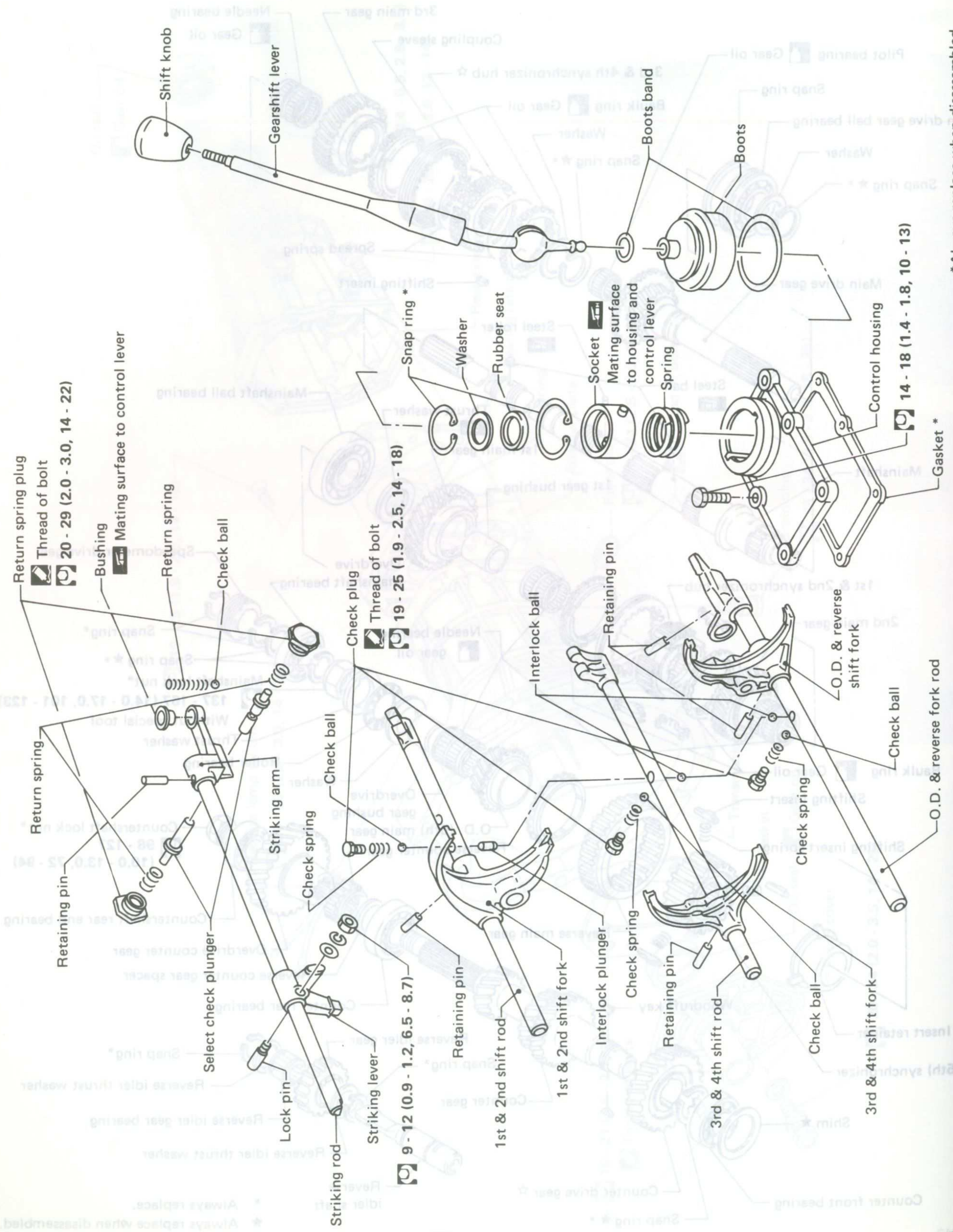
* Always replace.
★ Always replace when disassembled.
☆ Pay attention to its direction.

□ : N-m (kg-m, ft-lb)

SMT178A

MAJOR OVERHAUL—FS5W71C

Shift Control Components

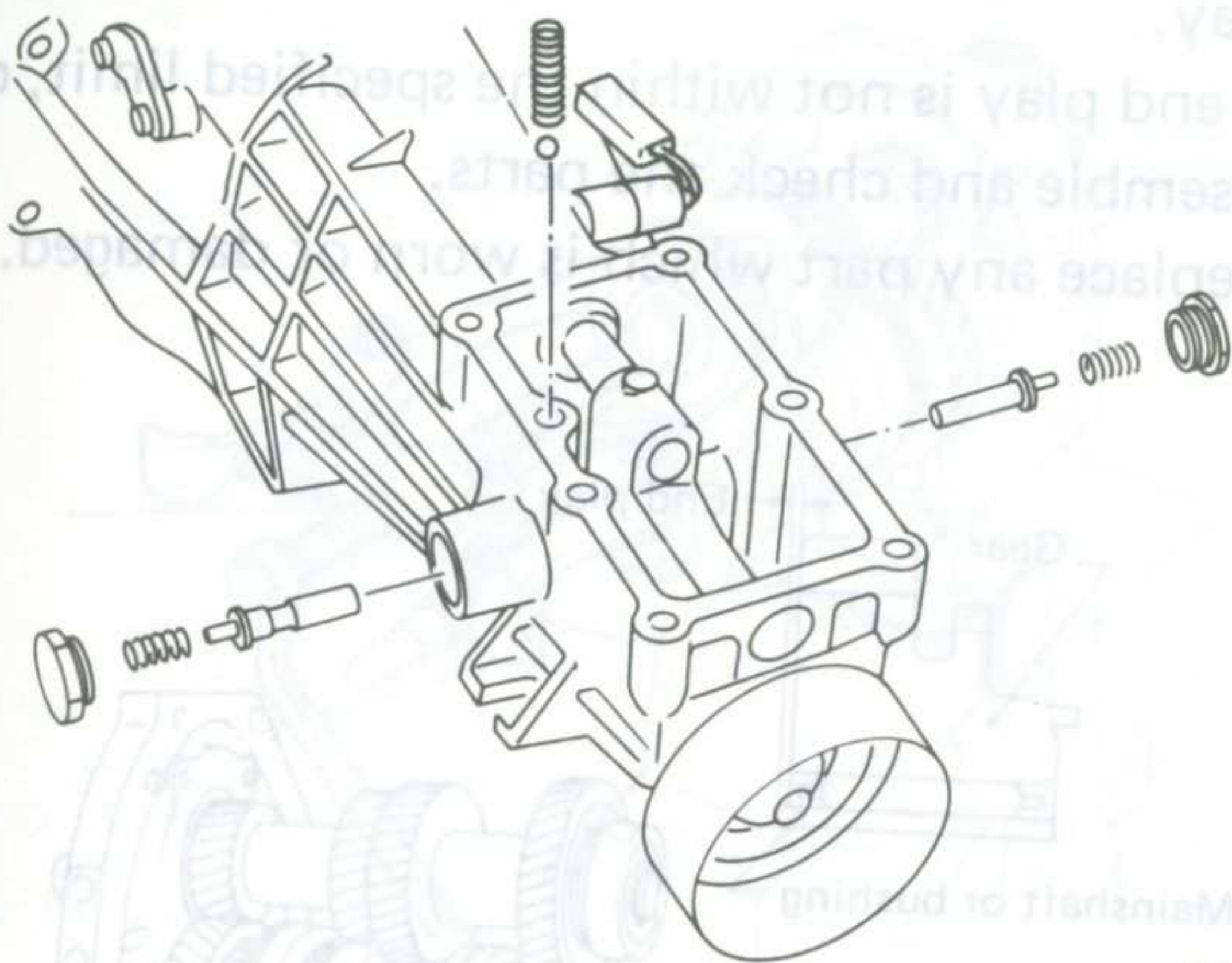


* Always replace when disassembled.
 [Symbol]: N-m (kg-m, ft-lb)

SMT148A

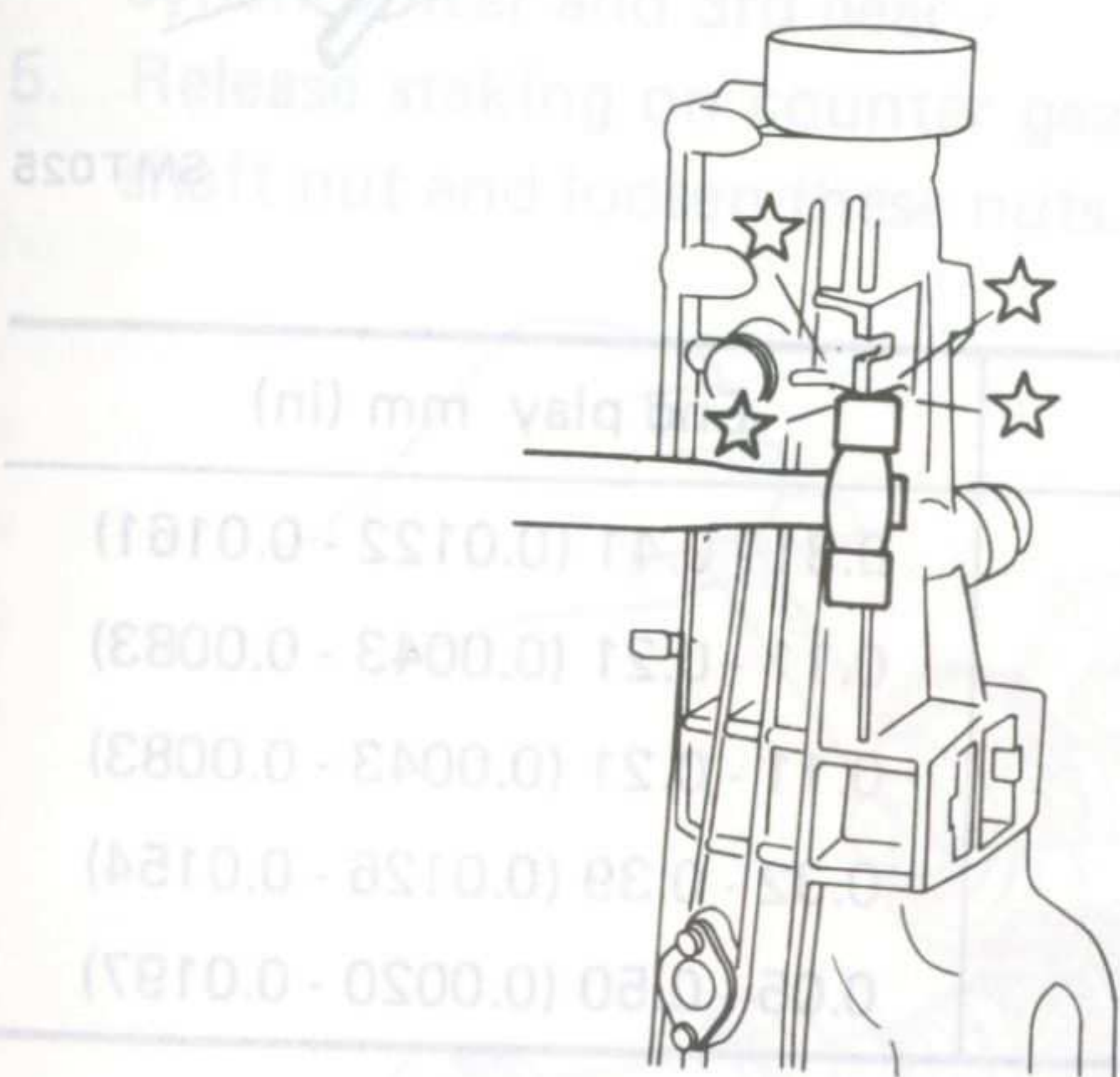
DISASSEMBLY—FS5W71C

1. Remove control housing, check ball and plunger.



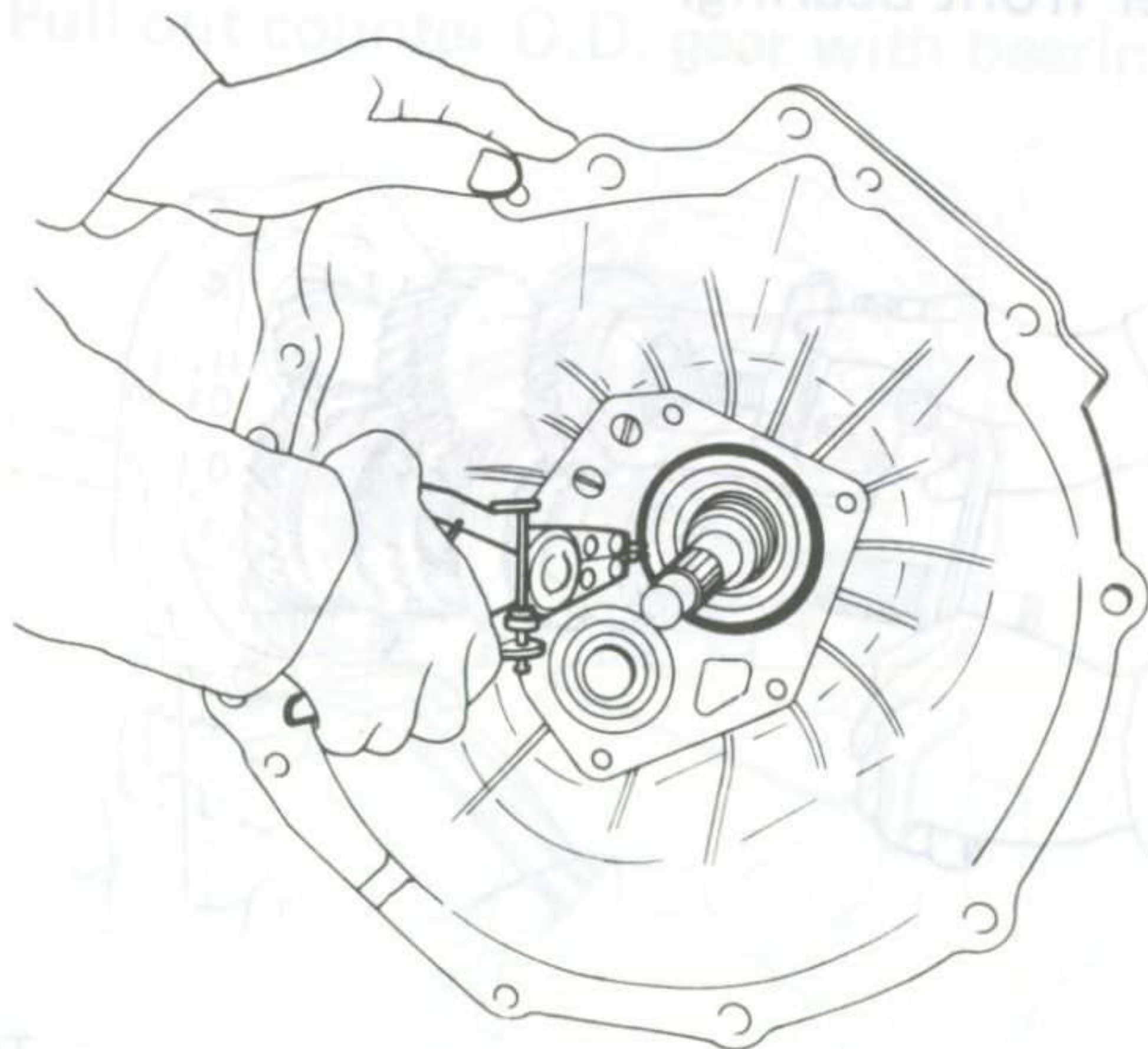
SMT982

2. Remove rear extension by lightly tapping it.



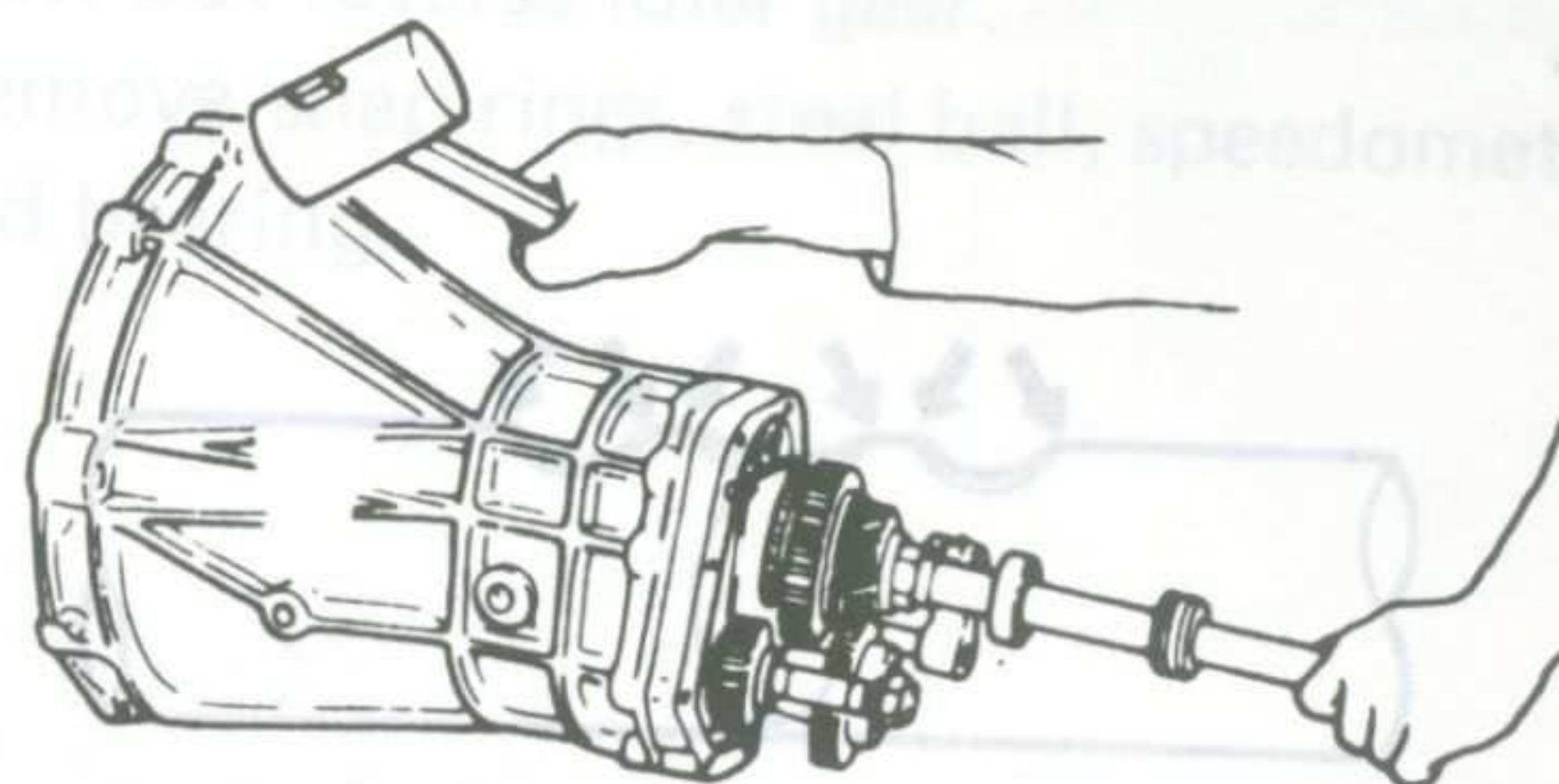
SMT983

3. Remove front cover, gasket, countershaft front bearing shim, and main drive bearing snap ring.



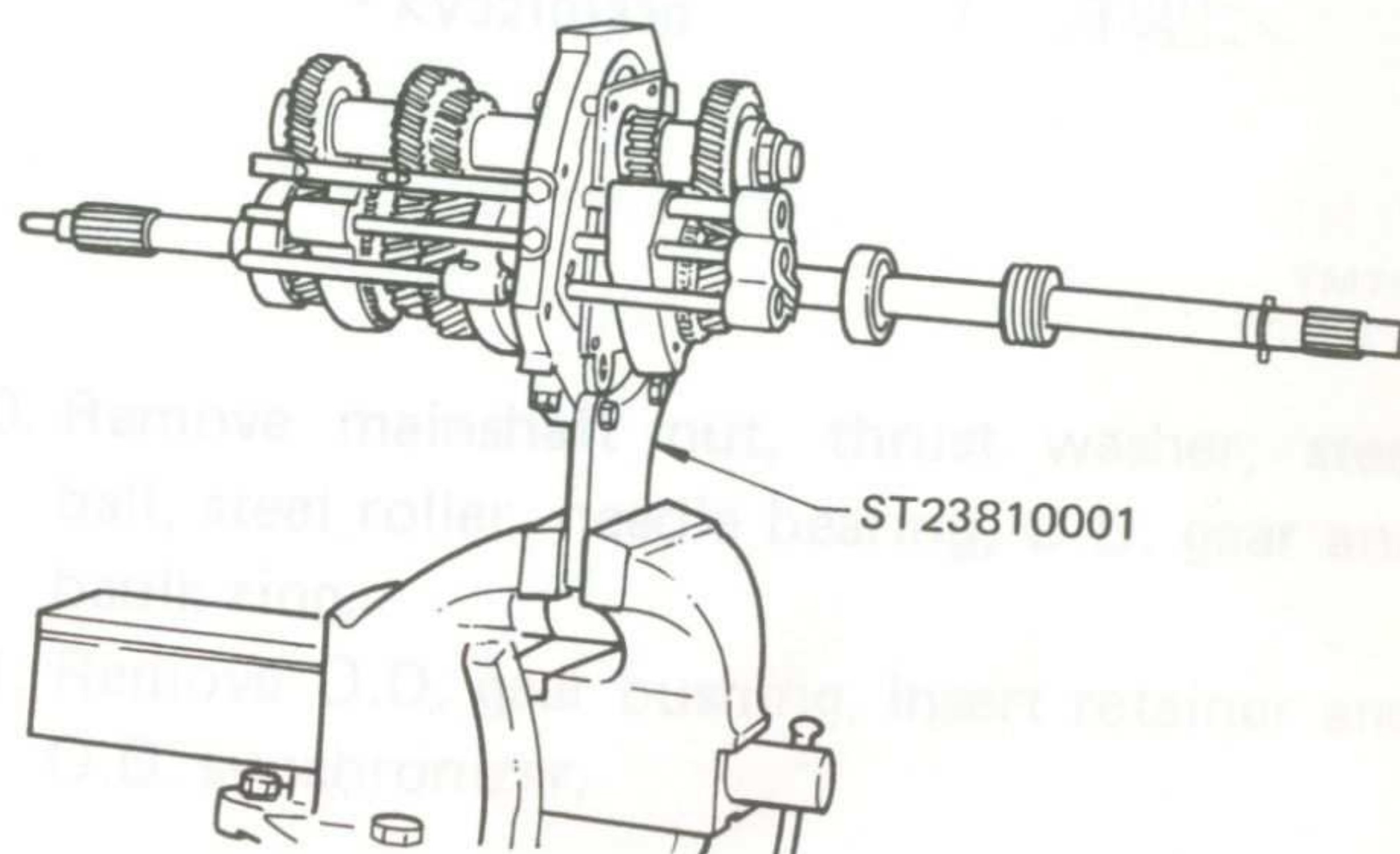
SMT011

4. Separate transmission case from adapter plate.



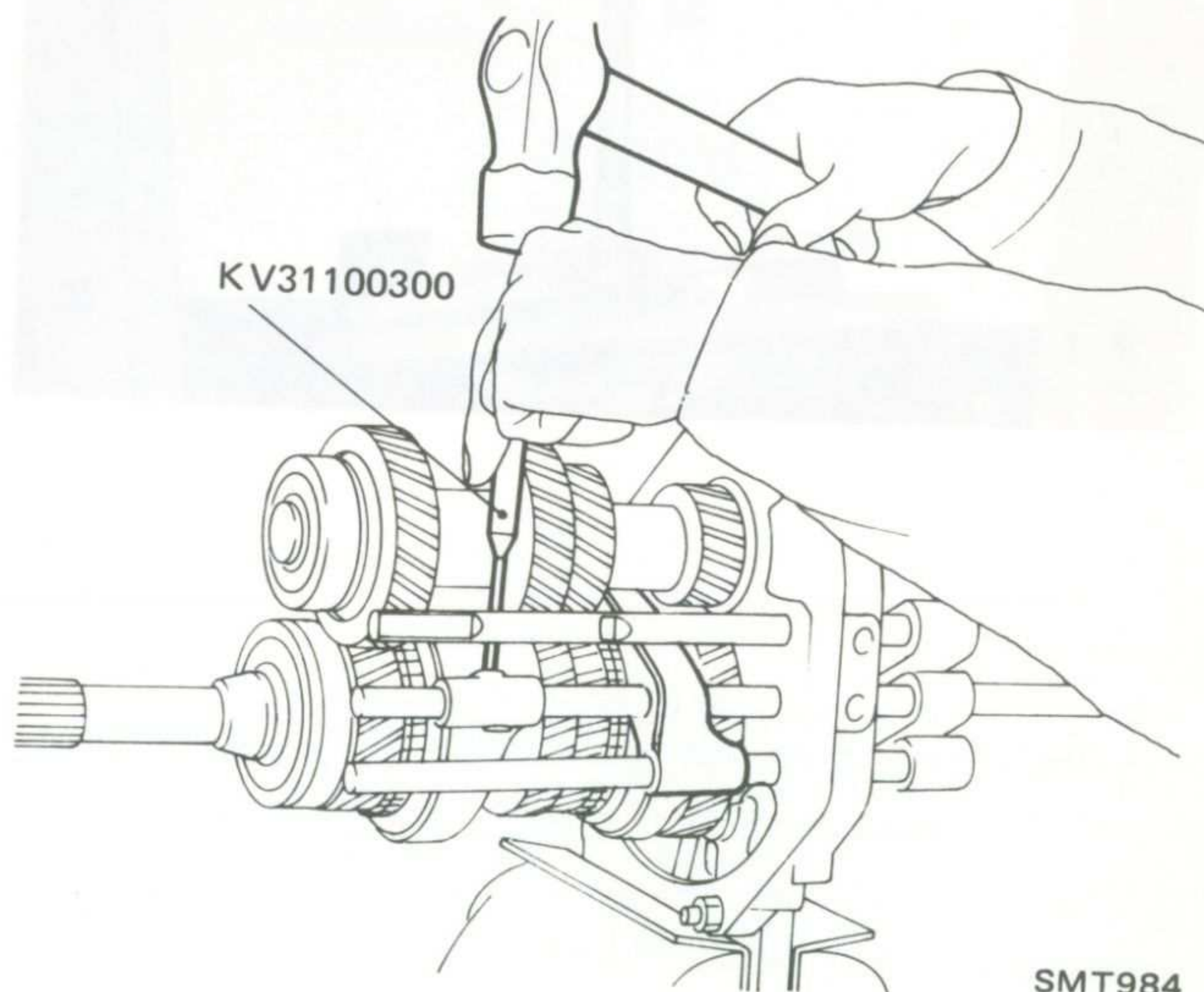
TM753

5. Set up Tool on adapter plate.



TM754

6. Remove check ball plugs, check springs, and check balls.
7. Drive out retaining pins. Then drive out fork rods and remove interlock balls.



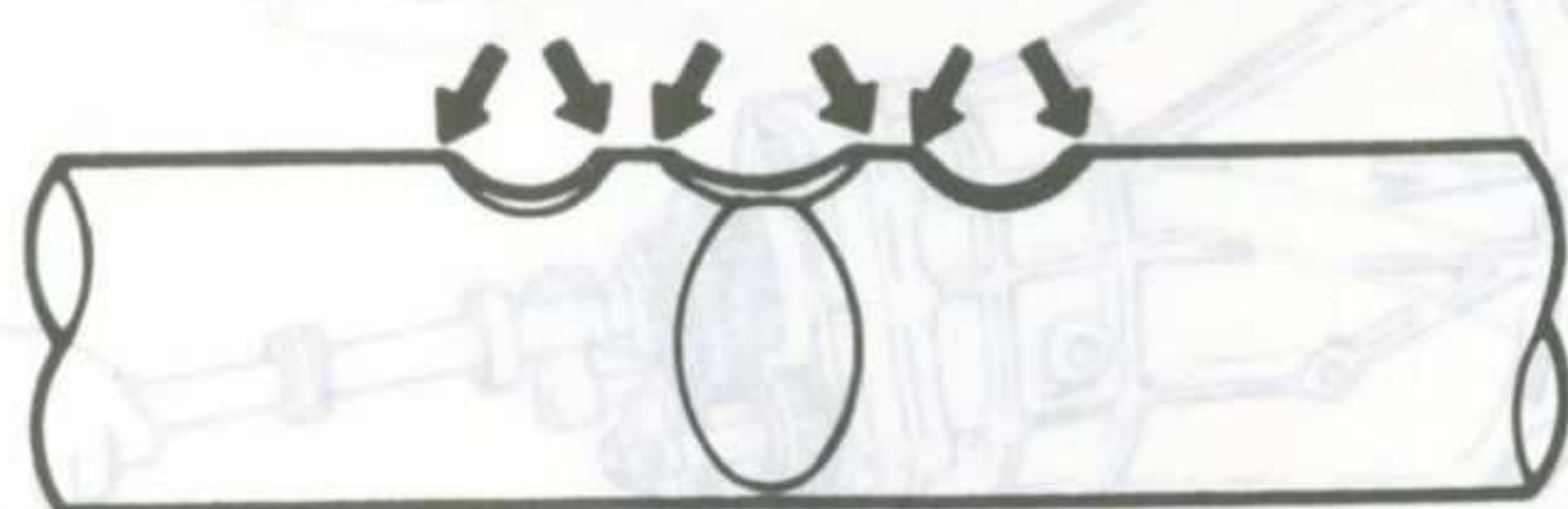
SMT984

REPAIR FOR COMPONENT PARTS—FS5W71C

Forks and Fork Rods

INSPECTION

- Check for wear, scratches, projection or damage.

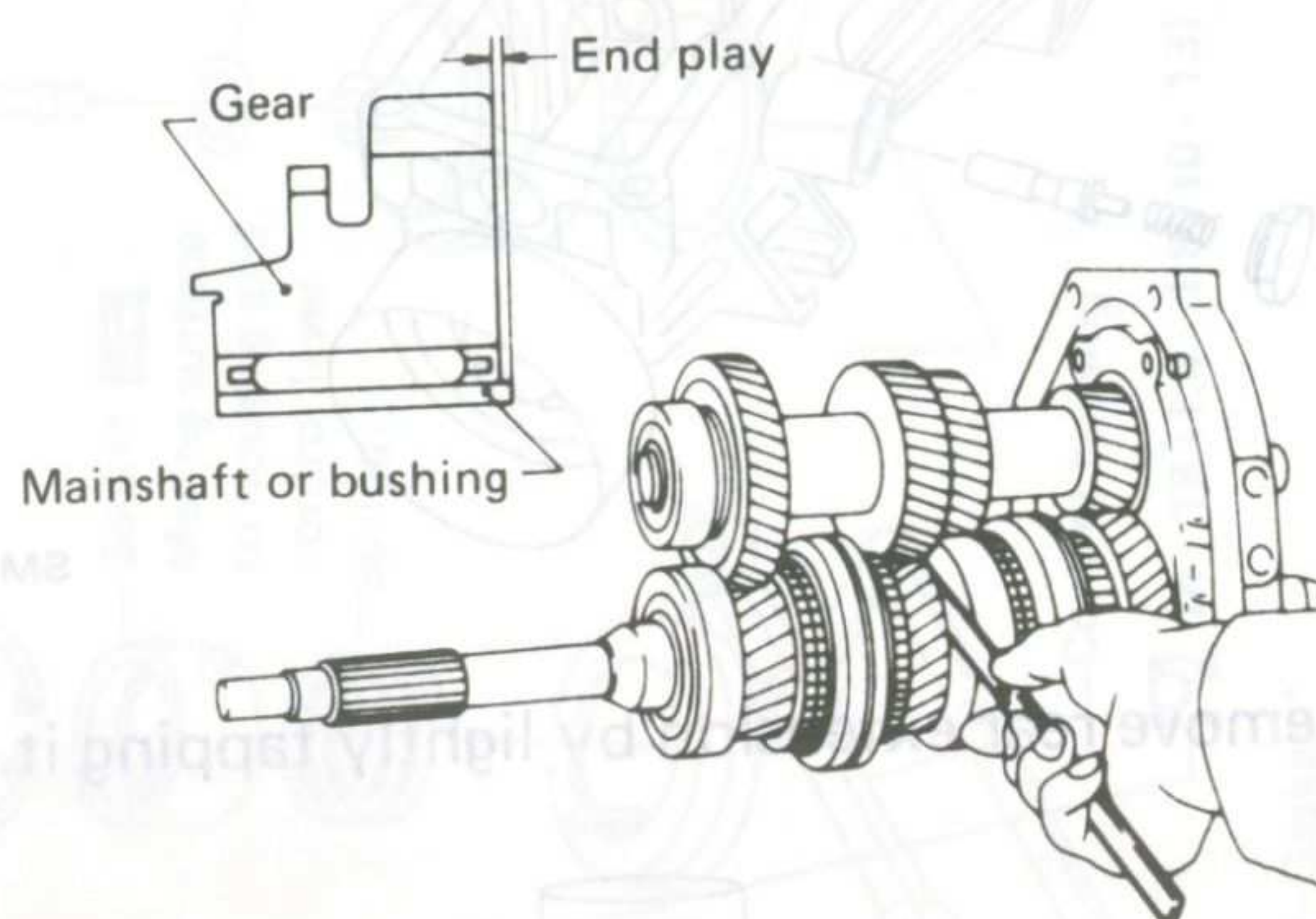


SMT137

Gears and Shafts

DISASSEMBLY

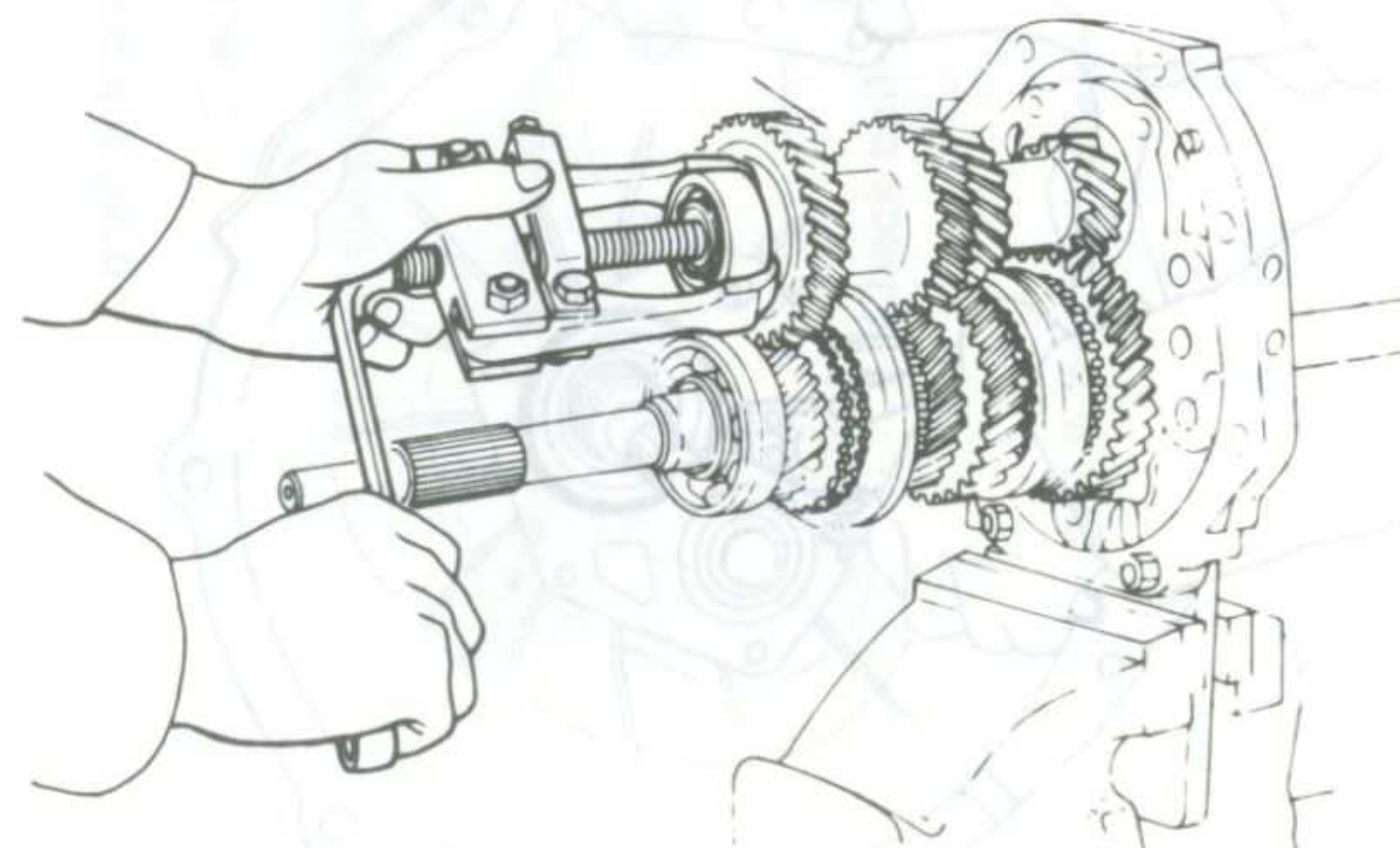
1. Before disassembly, measure each gear end play.
- If end play is not within the specified limit, disassemble and check the parts.
 - Replace any part which is worn or damaged.



SMT025

Gear	End play mm (in)
1st	0.31 - 0.41 (0.0122 - 0.0161)
2nd	0.11 - 0.21 (0.0043 - 0.0083)
3rd	0.11 - 0.21 (0.0043 - 0.0083)
O.D.	0.32 - 0.39 (0.0126 - 0.0154)
Reverse idler	0.05 - 0.50 (0.0020 - 0.0197)

2. Mesh 2nd and reverse gear, then draw out counter front bearing.

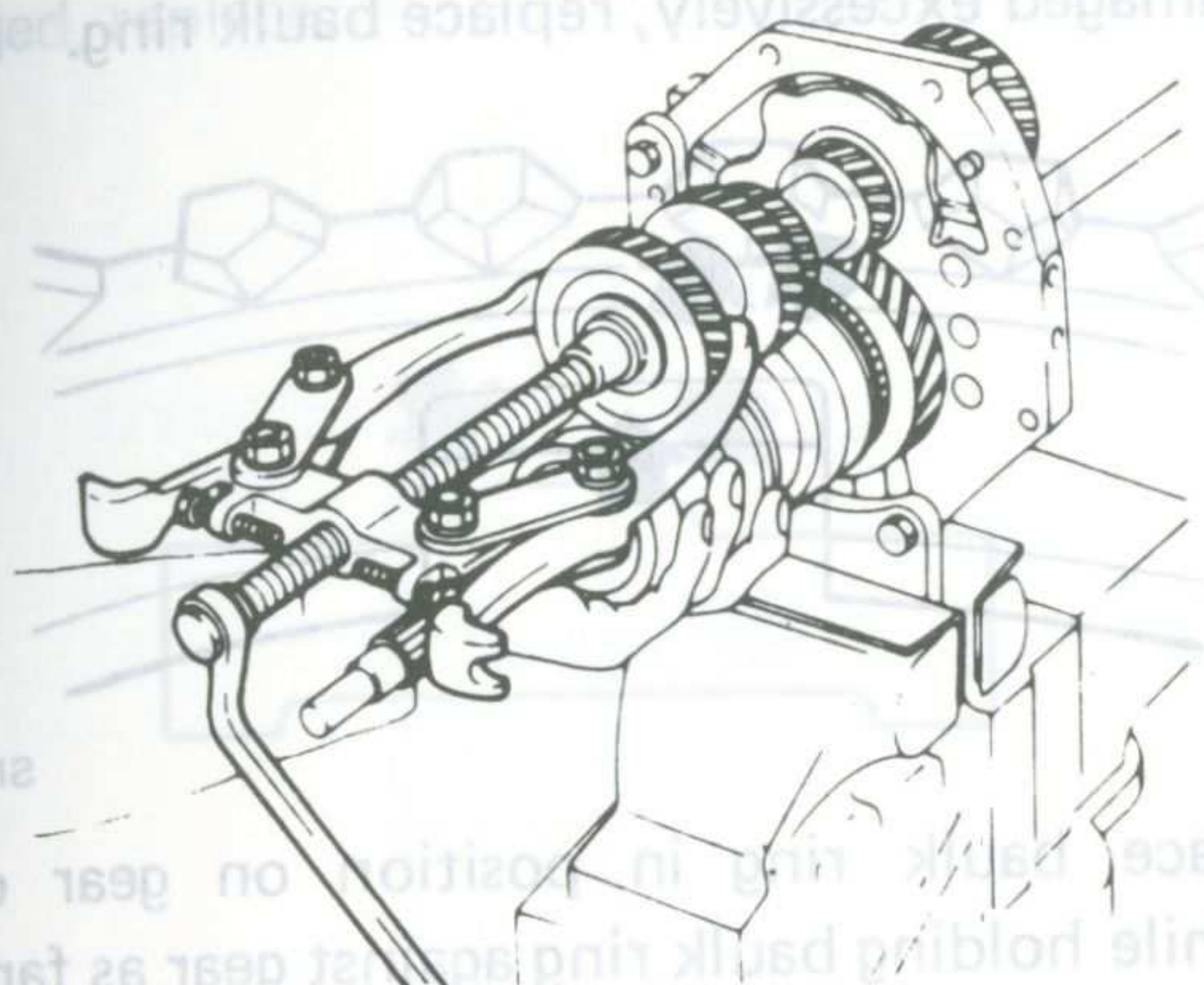


TM398

REPAIR FOR COMPONENT PARTS—FS5W71C

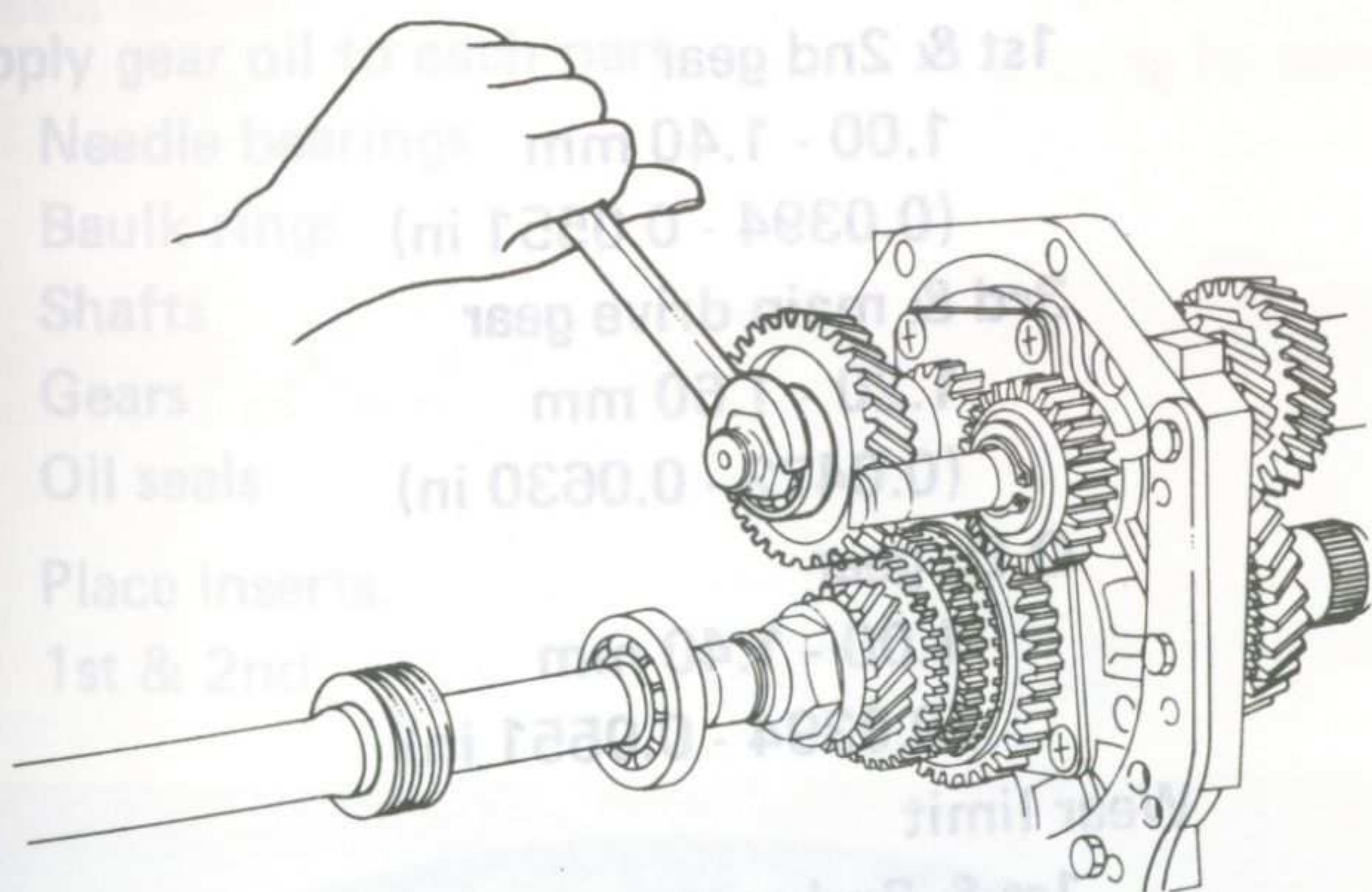
Gears and Shafts (Cont'd)

3. Remove snap ring and draw out counter drive gear with main drive gear.



SMT023

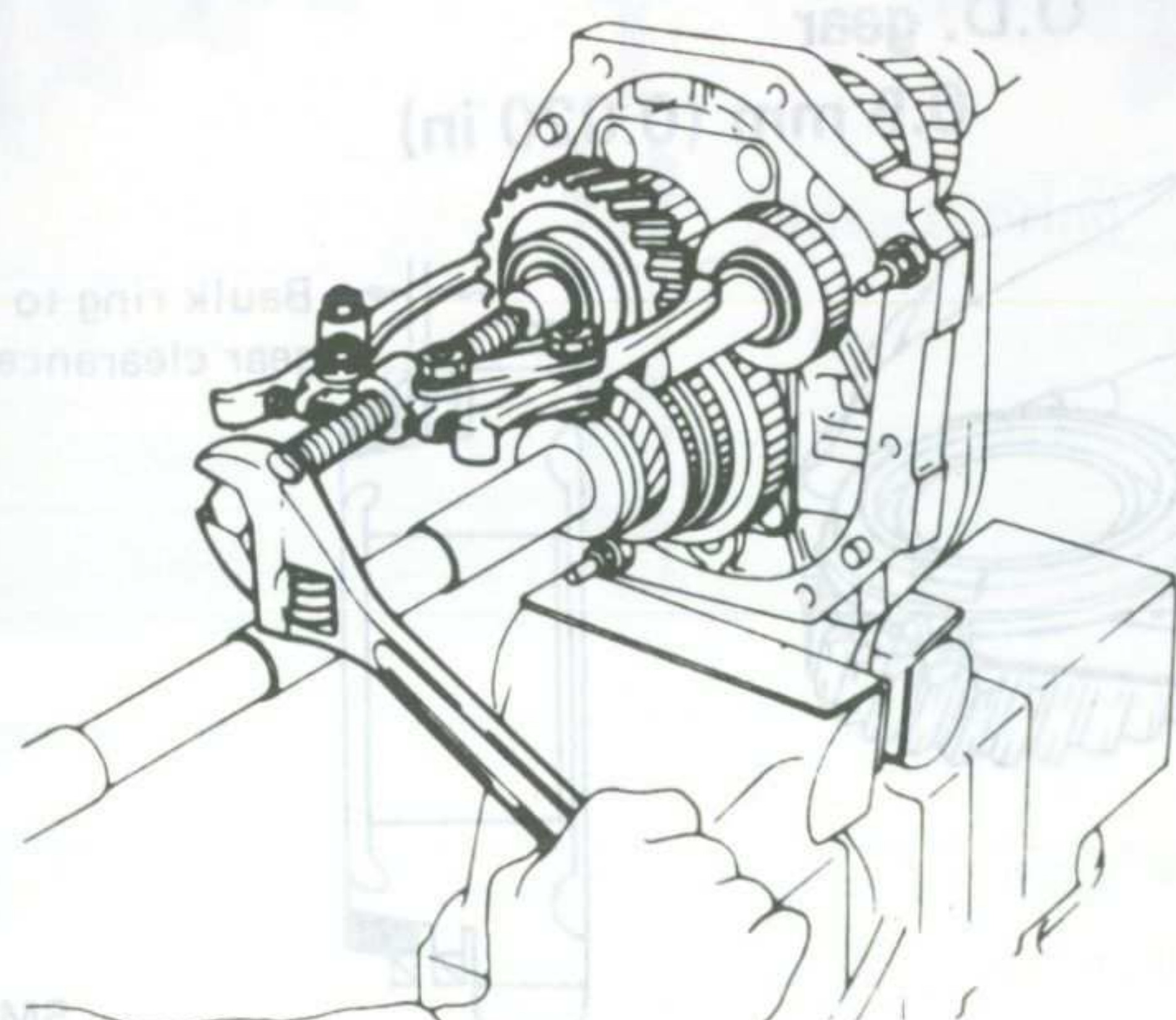
4. Remove snap ring and draw out 3rd & 4th synchronizer and 3rd gear.
5. Release staking on counter gear nut and mainshaft nut and loosen these nuts.



TM757

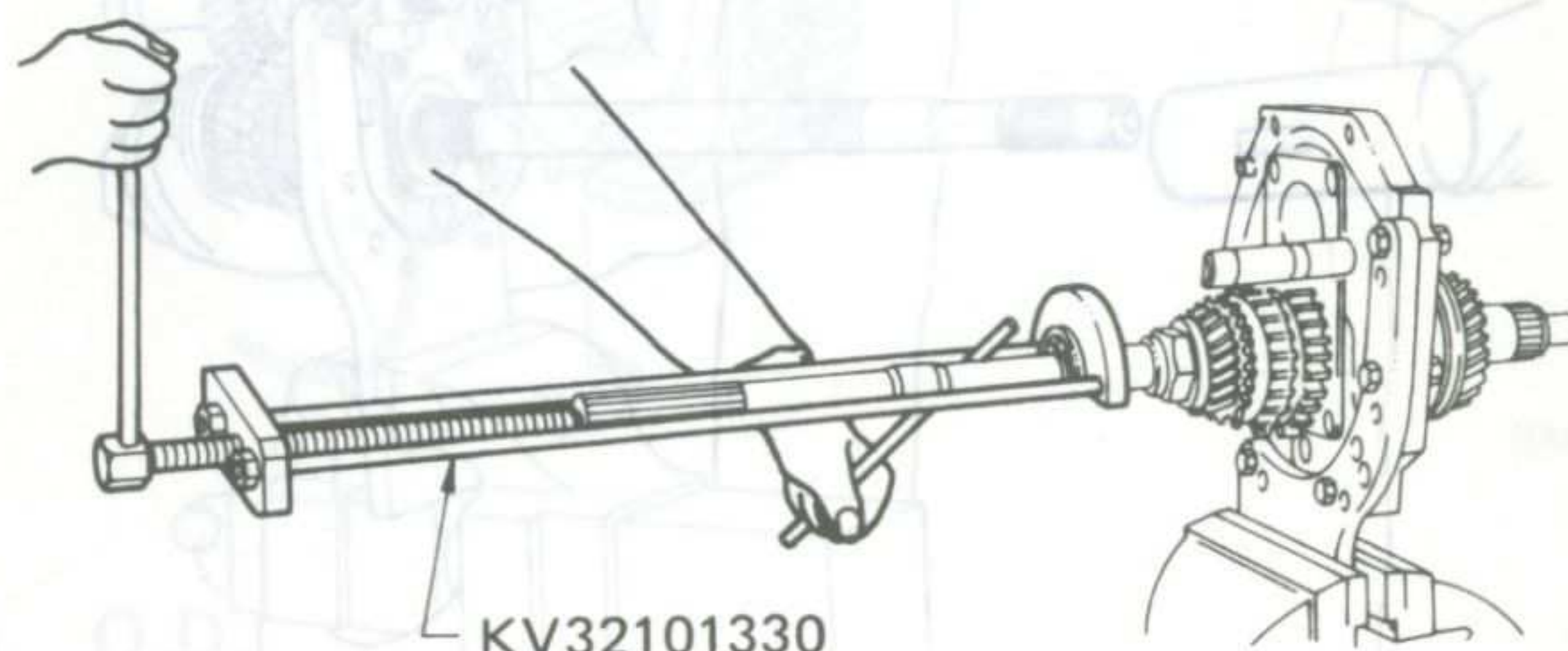
Mainshaft nut: Left-hand thread

6. Pull out counter O.D. gear with bearing.



SMT042

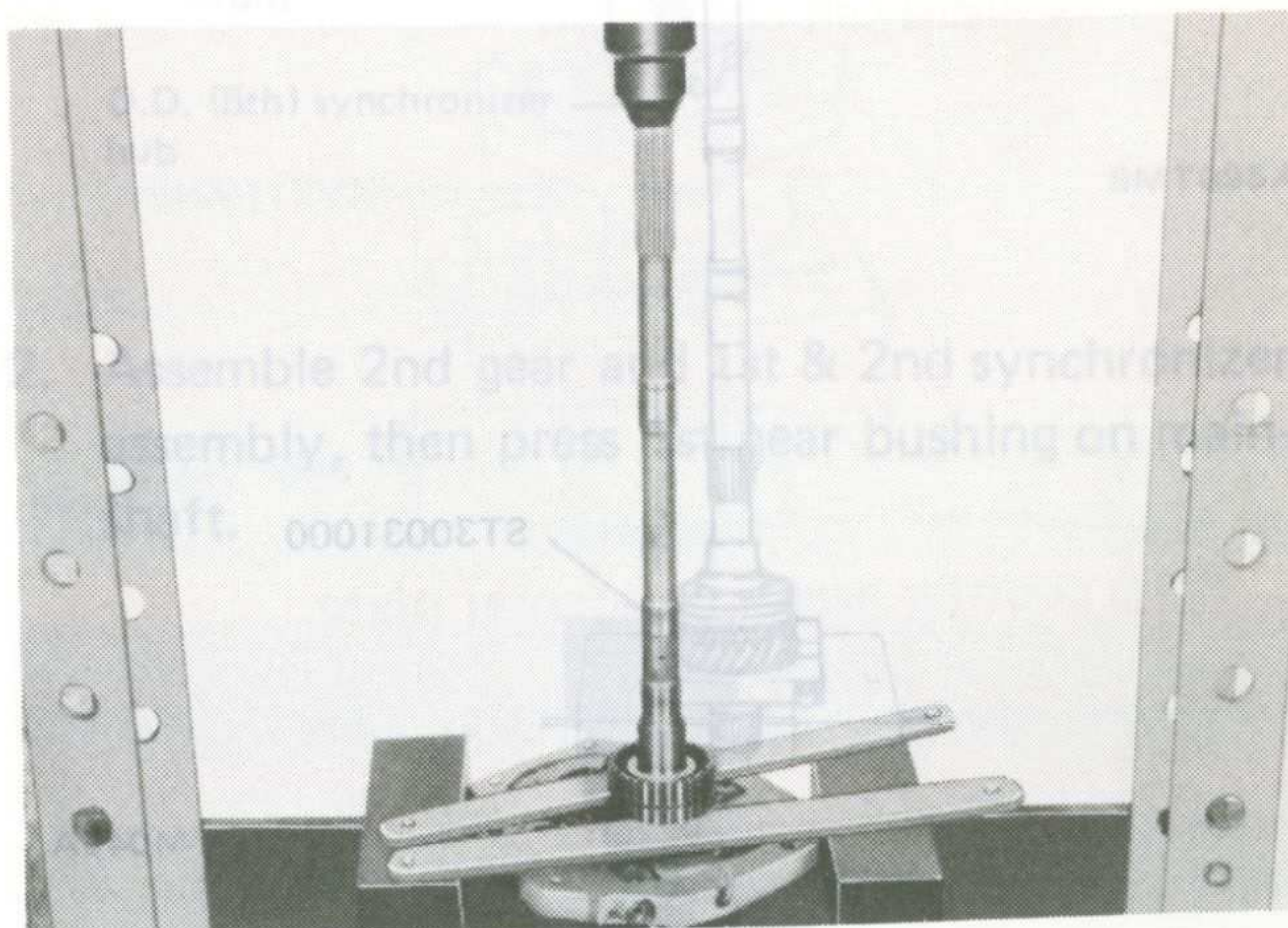
7. Draw out reverse counter gear and spacer.
8. Remove snap ring from reverse idler shaft, and draw out reverse idler gear.
9. Remove snap rings, steel ball, speedometer gear and bearing.



KV32101330

TM760

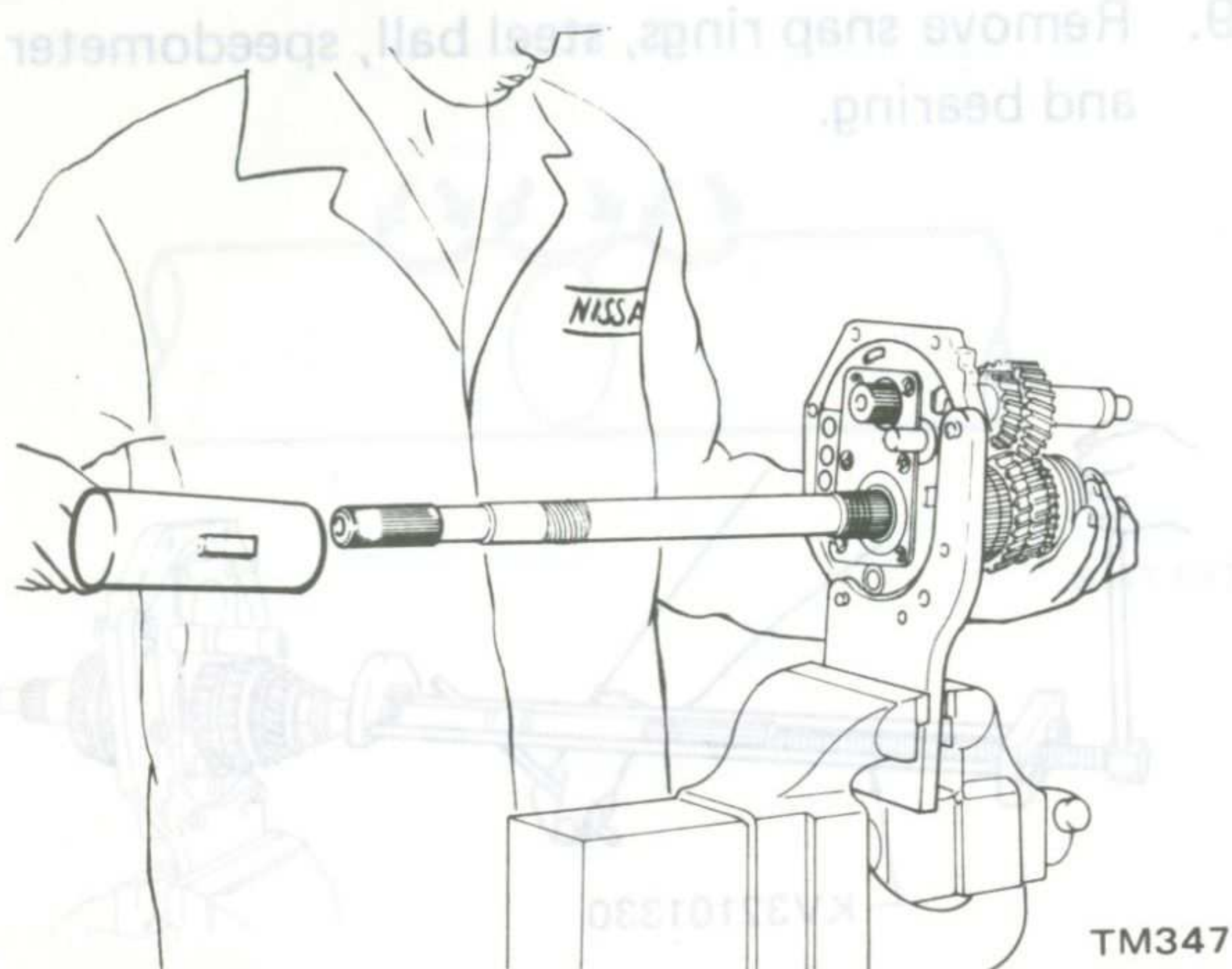
10. Remove mainshaft nut, thrust washer, steel ball, steel roller, needle bearing, O.D. gear and baulk ring.
11. Remove O.D. gear bushing, insert retainer and O.D. synchronizer.



REPAIR FOR COMPONENT PARTS—FS5W71C

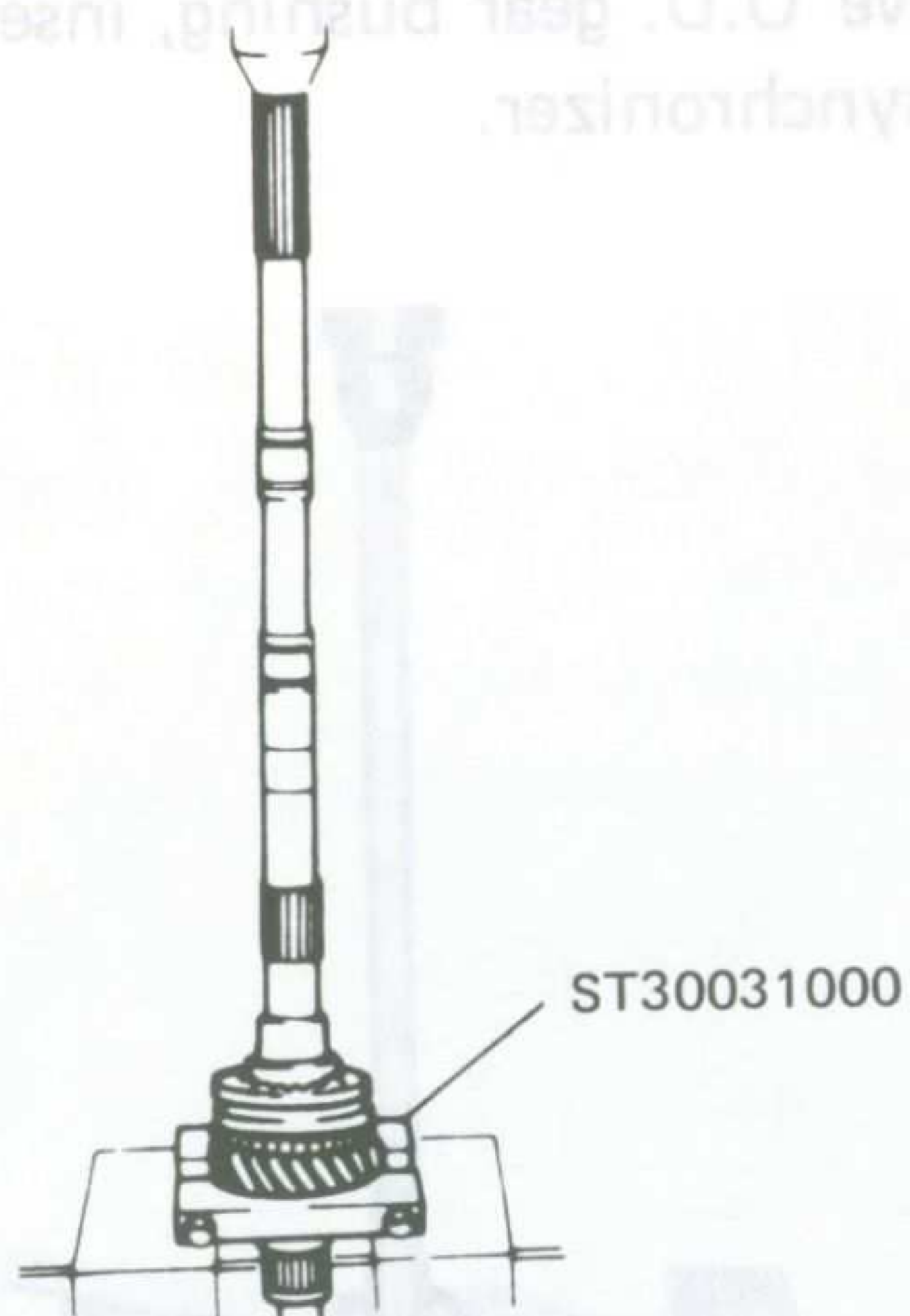
Gears and Shafts (Cont'd)

12. Draw out mainshaft assembly together with counter gear, by tapping rear end of mainshaft and counter gear.



13. Remove thrust washer, steel ball, and 1st gear.
Be careful not to lose steel ball.

14. Press out 1st gear mainshaft bushing together with 2nd gear.

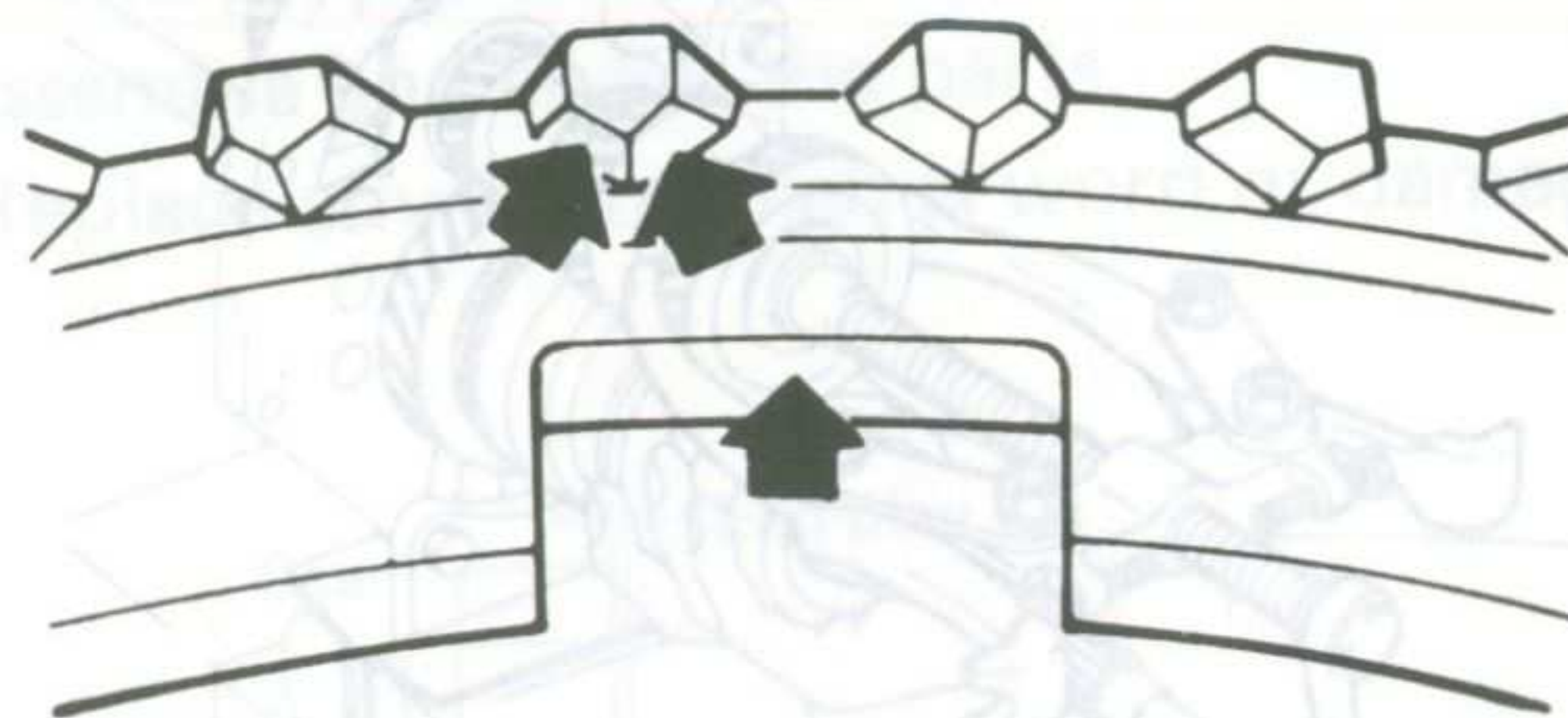


INSPECTION

- Check all gears for excessive wear, chips and cracks; replace as required.
- Check shaft for bending, cracks and wear; if necessary, replace.

Baulk rings

- If found to be deformed, cracked or otherwise damaged excessively, replace baulk ring.



- Place baulk ring in position on gear cone. While holding baulk ring against gear as far as it will go, measure gap between baulk ring and gear.

If the clearance is smaller than the wear limit, replace baulk ring.

Baulk ring to gear clearance:

Standard

1st & 2nd gear

1.00 - 1.40 mm
(0.0394 - 0.0551 in)

3rd & main drive gear

1.20 - 1.60 mm
(0.0472 - 0.0630 in)

O.D. gear

1.00 - 1.40 mm
(0.0394 - 0.0551 in)

Wear limit

1st & 2nd gear

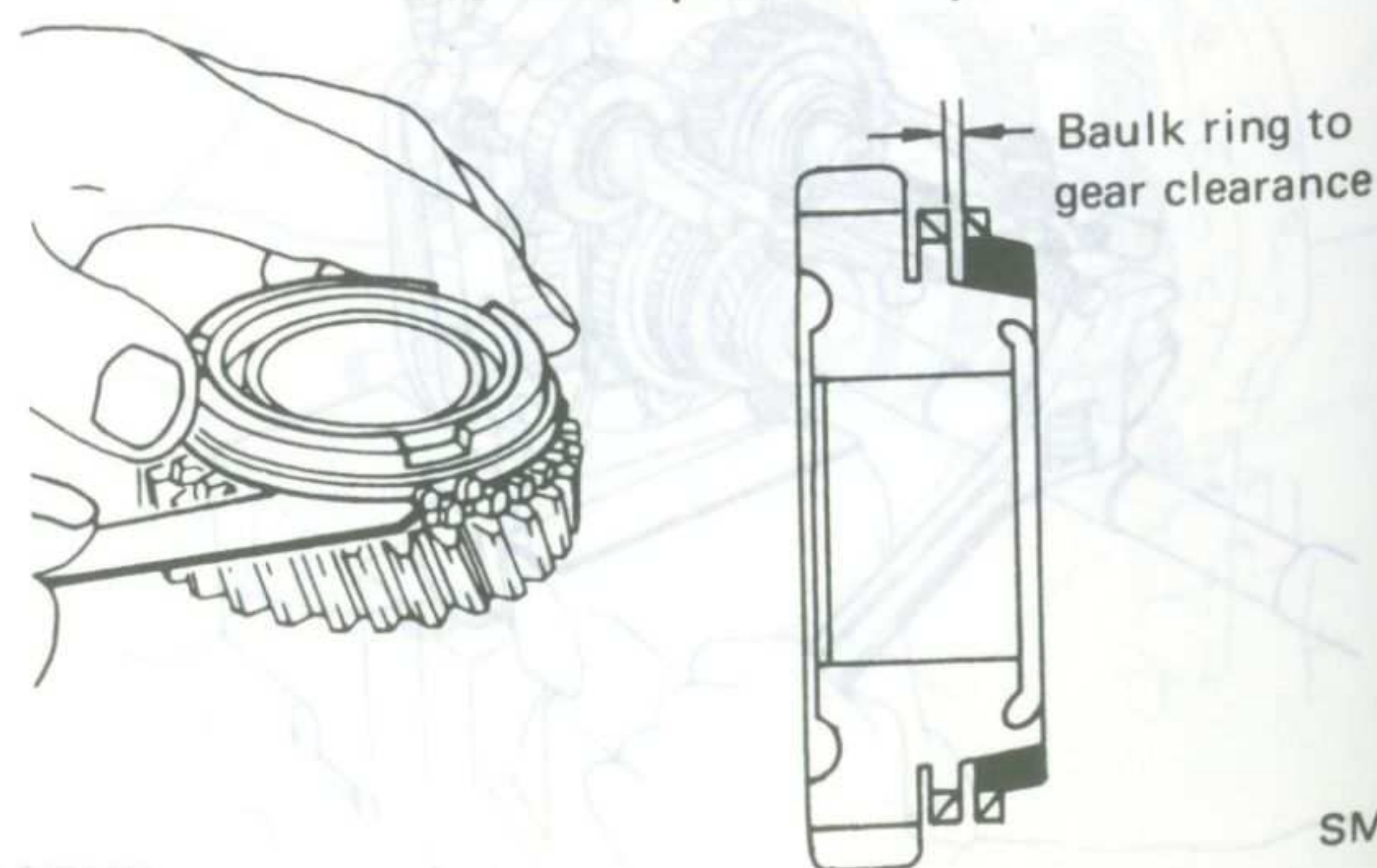
0.5 mm (0.020 in)

3rd & main drive gear

0.8 mm (0.031 in)

O.D. gear

0.5 mm (0.020 in)

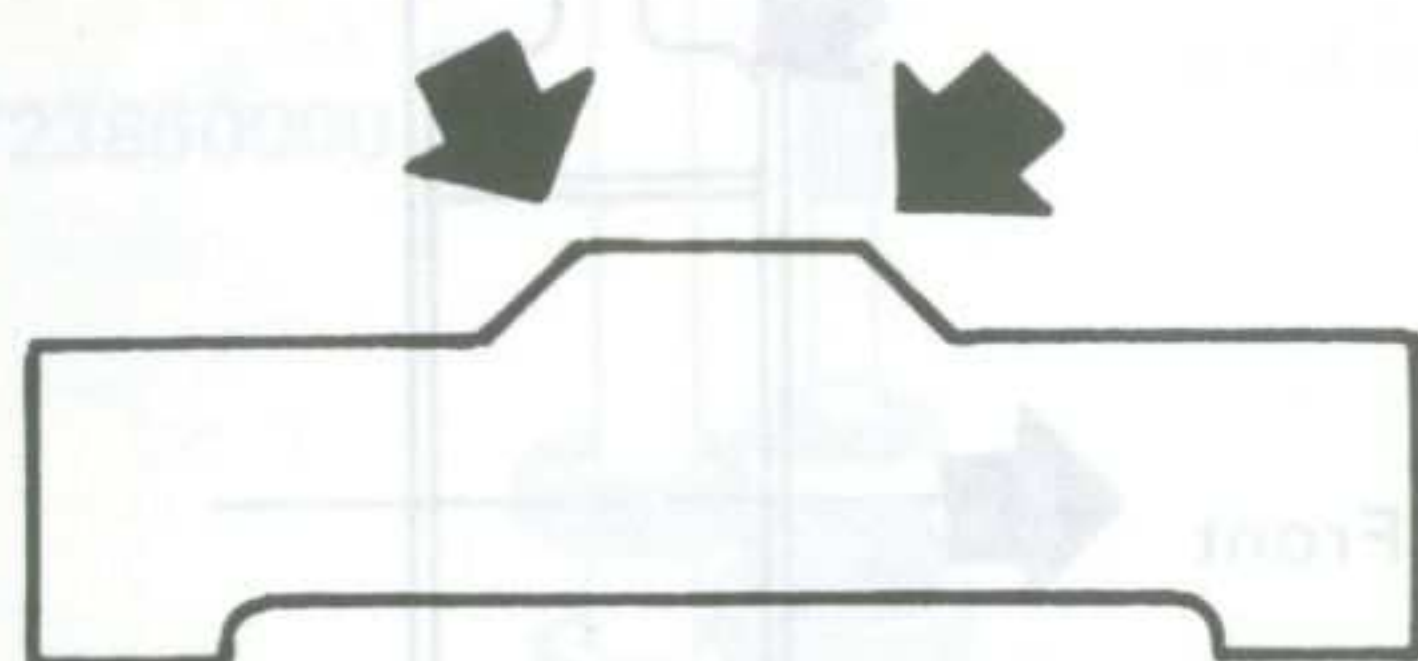


REPAIR FOR COMPONENT PARTS—FS5W71C

Gears and Shafts (Cont'd)

Shifting inserts and springs

If worn excessively, worn unevenly, deformed, or damaged, replace.



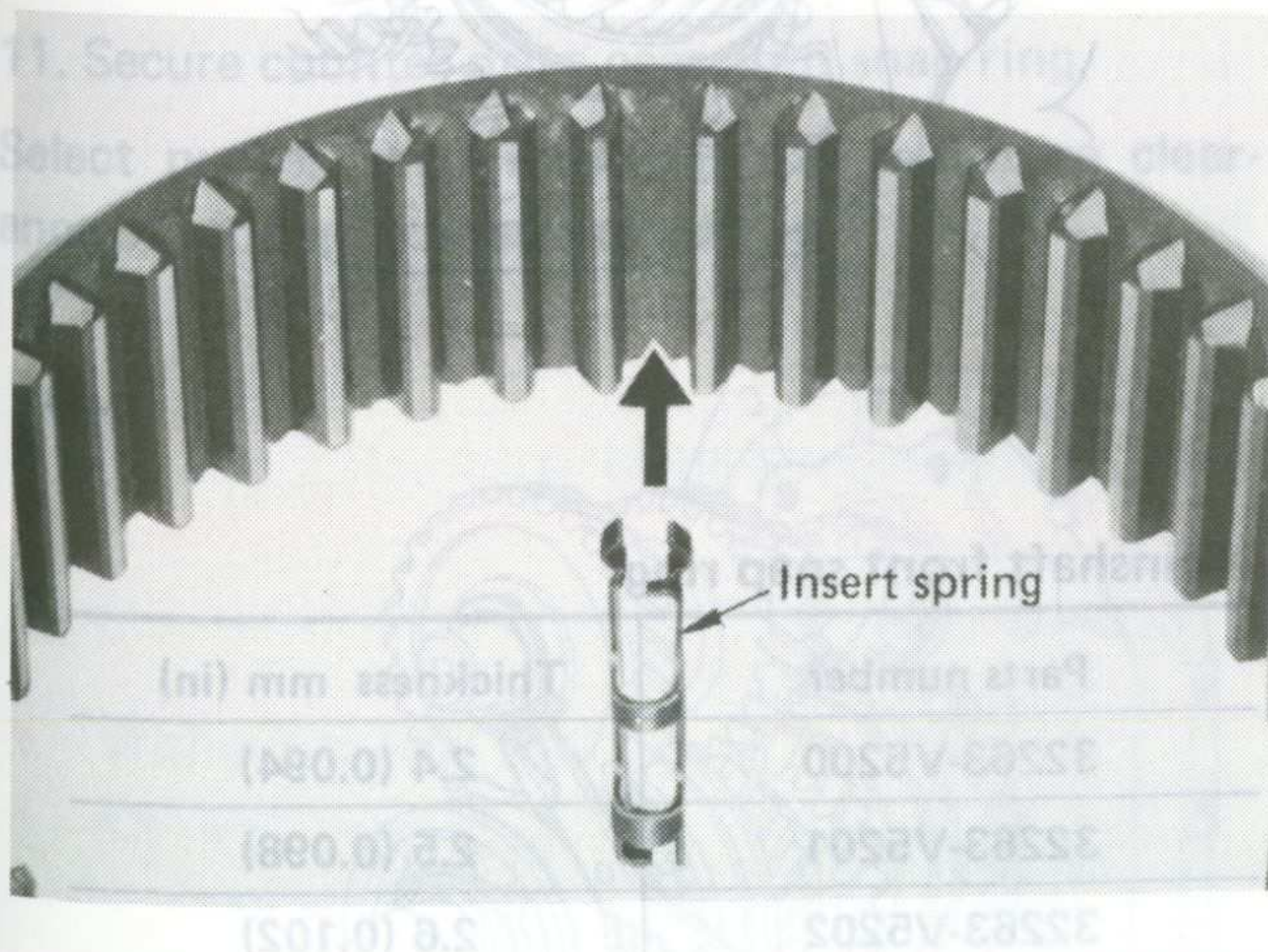
SMT064

ASSEMBLY

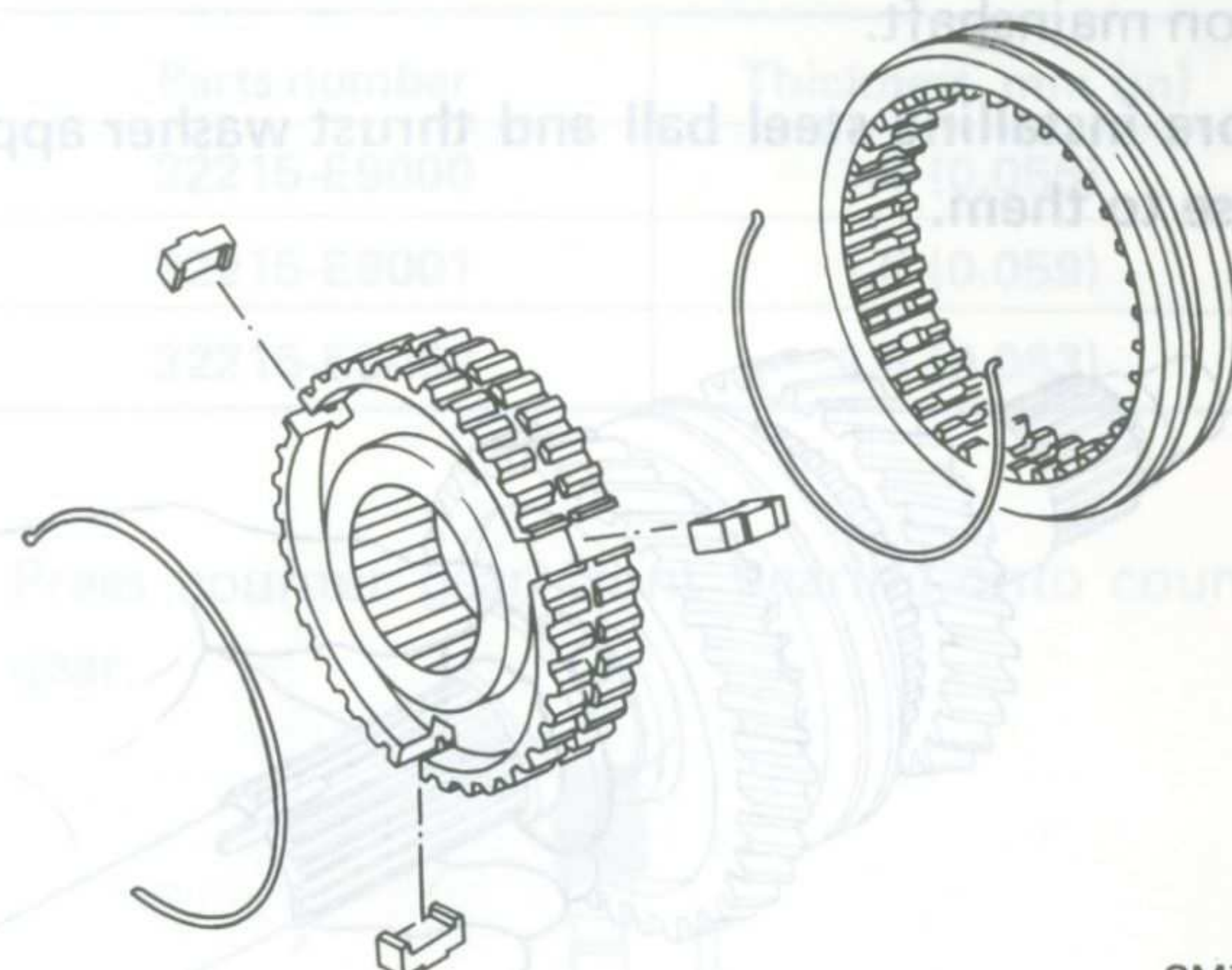
Note:

Apply gear oil to each part.

- Needle bearings
 - Baulk rings
 - Shafts
 - Gears
 - Oil seals
1. Place inserts.
 - 1st & 2nd

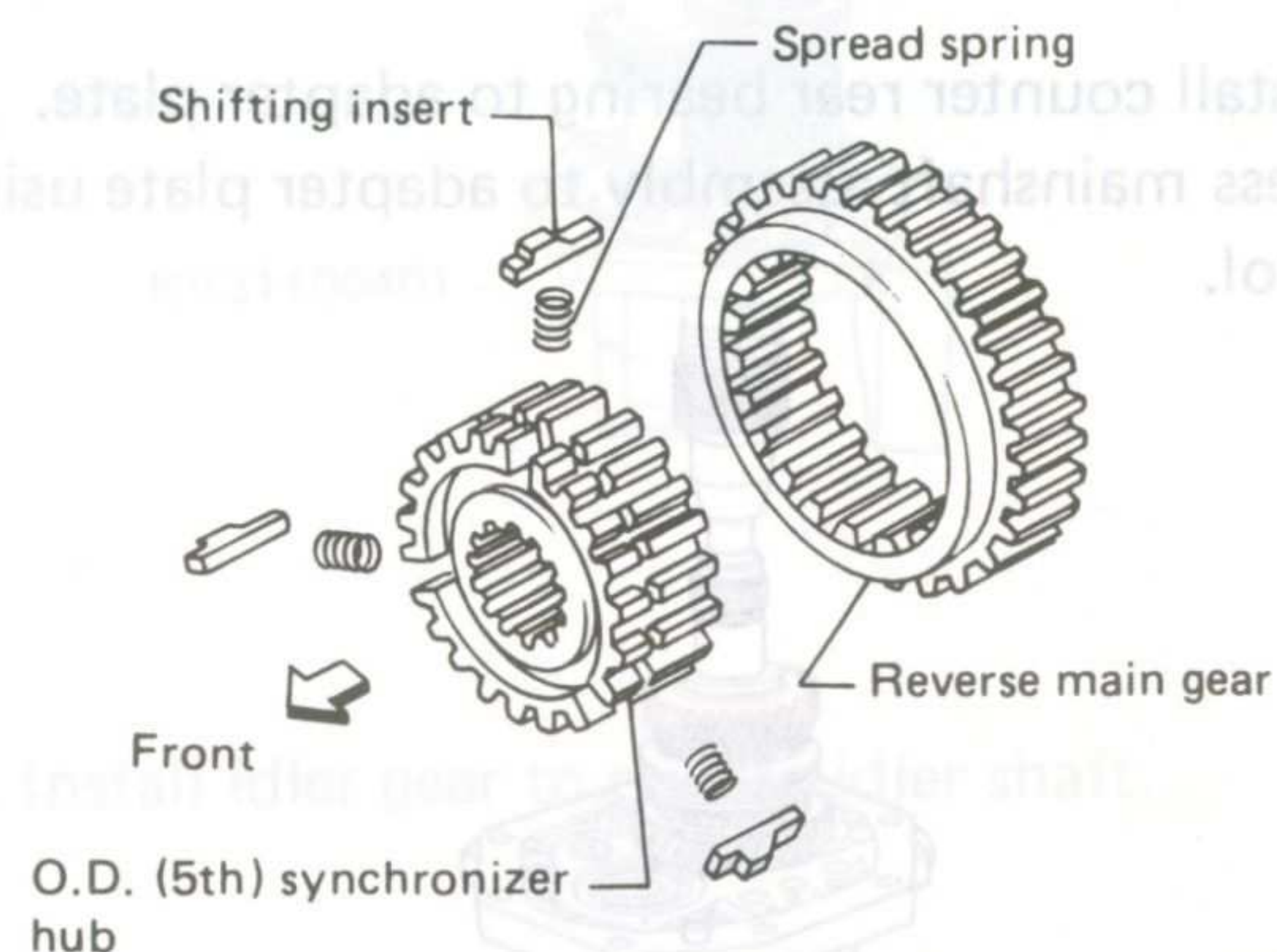


- 3rd & 4th



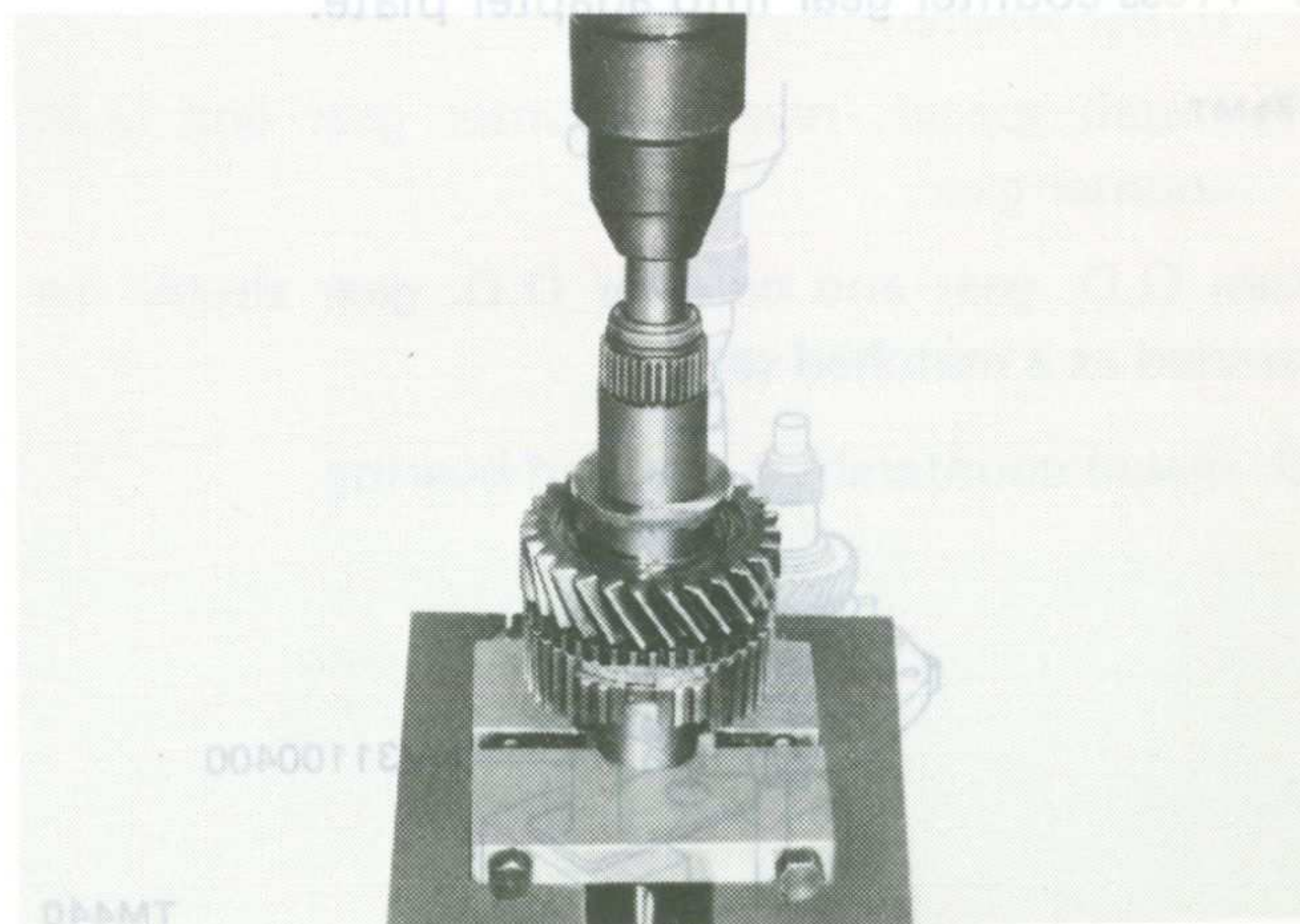
SMT994

- O.D.



SMT095A

2. Assemble 2nd gear and 1st & 2nd synchronizer assembly, then press 1st gear bushing on mainshaft.

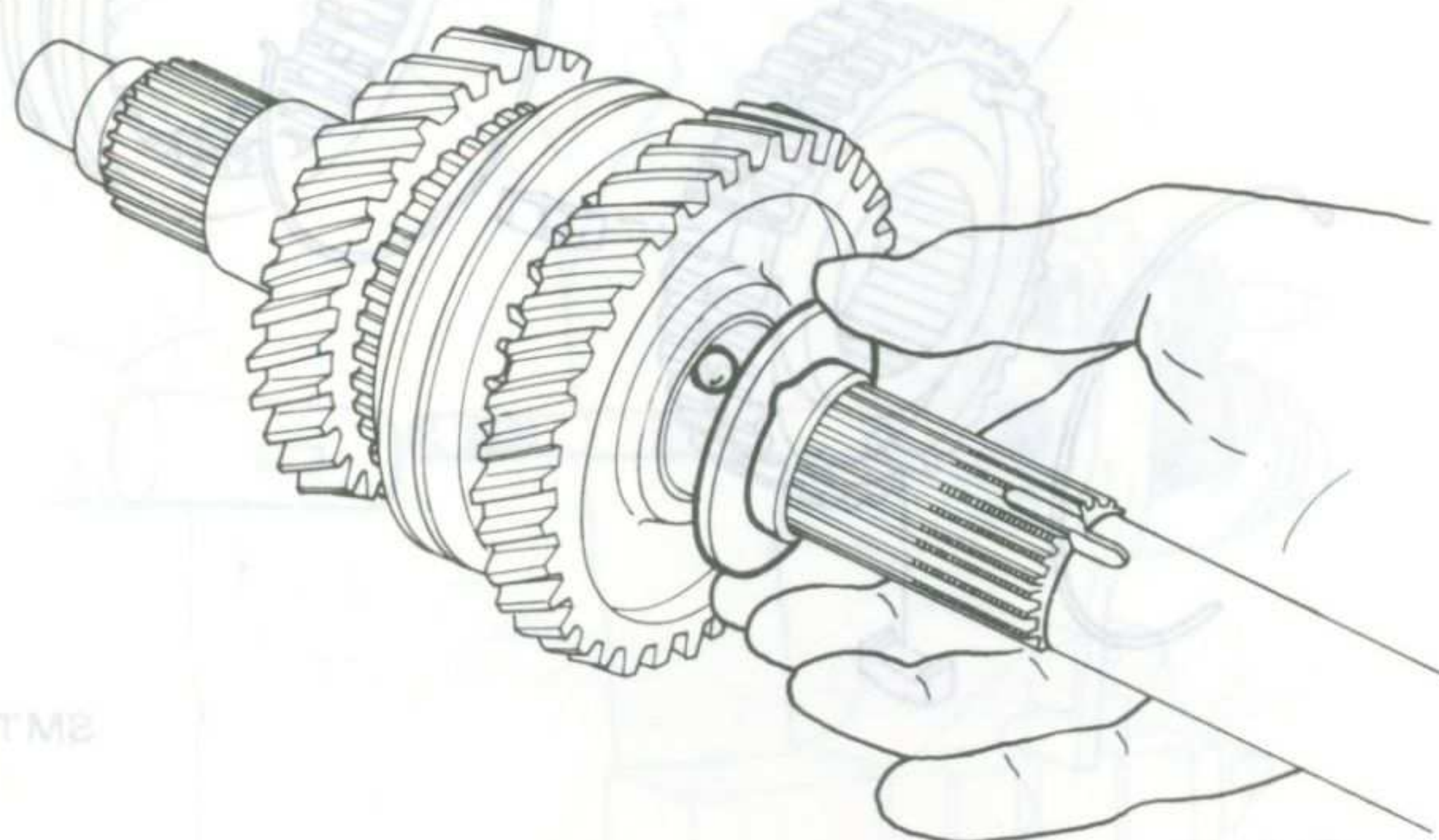


REPAIR FOR COMPONENT PARTS—FS5W71C

Gears and Shafts (Cont'd)

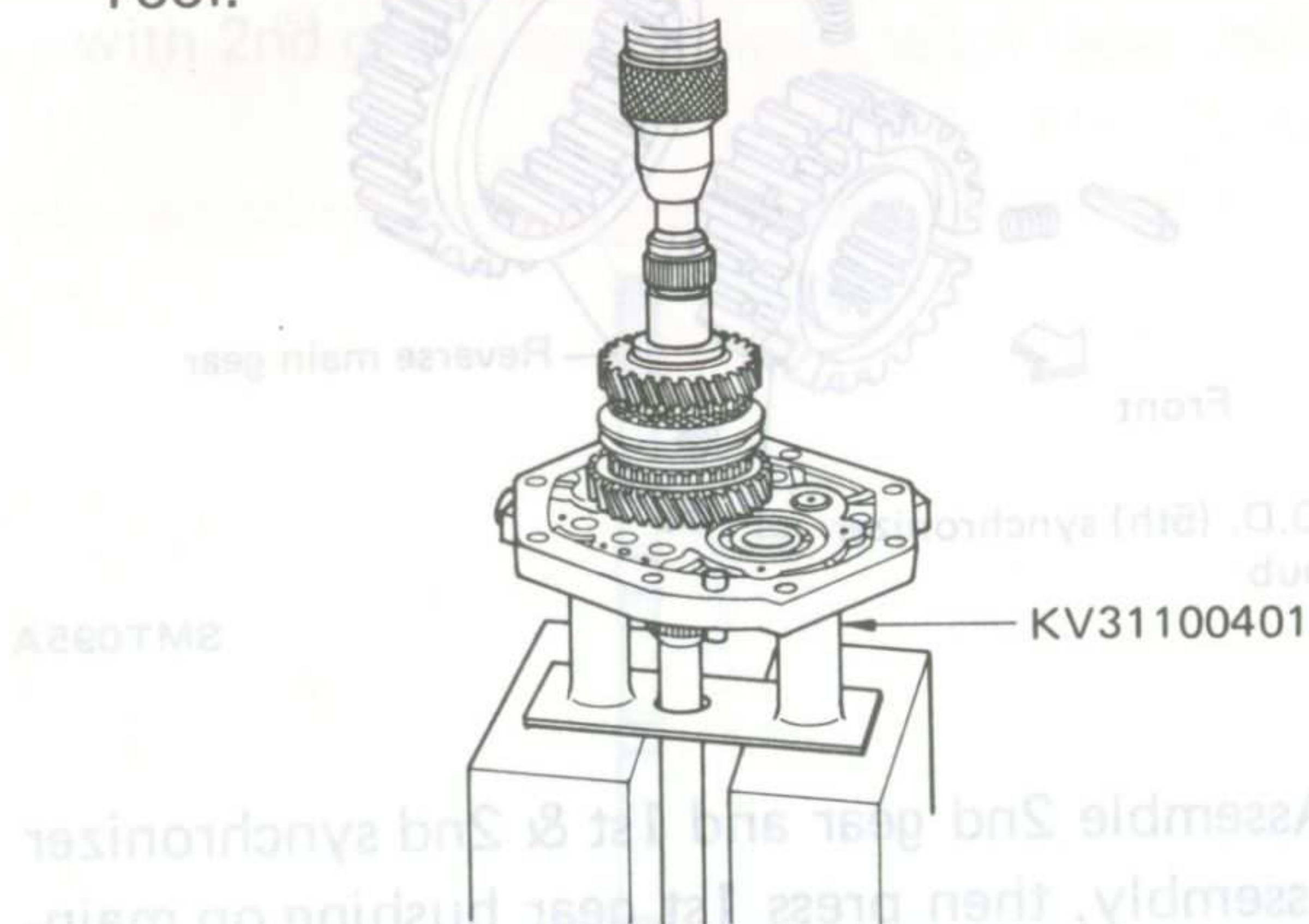
3. Assemble 1st gear, steel ball, and thrust washer on mainshaft.

Before installing steel ball and thrust washer apply grease to them.



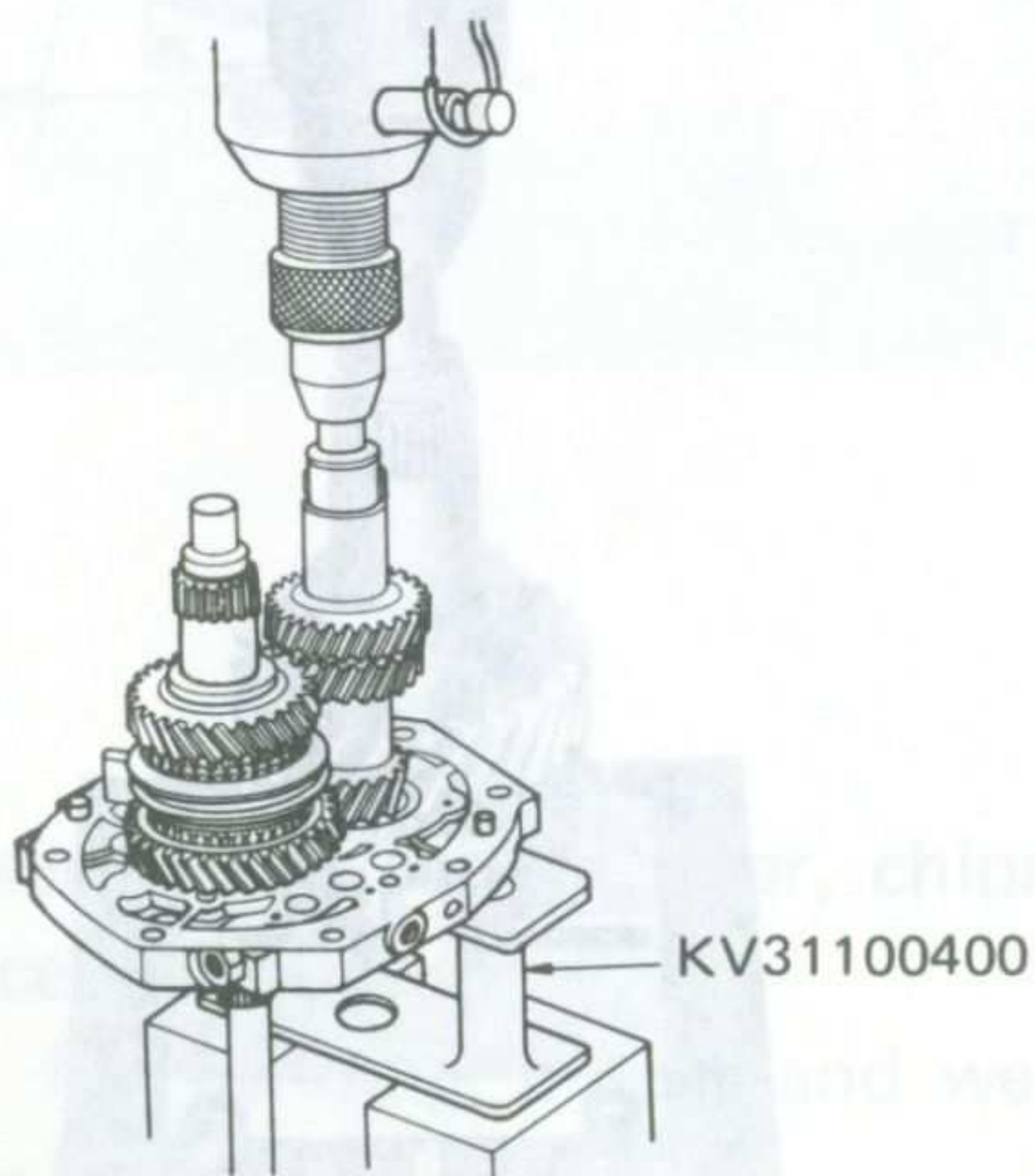
TM358

4. Install counter rear bearing to adapter plate.
5. Press mainshaft assembly to adapter plate using Tool.



TM439

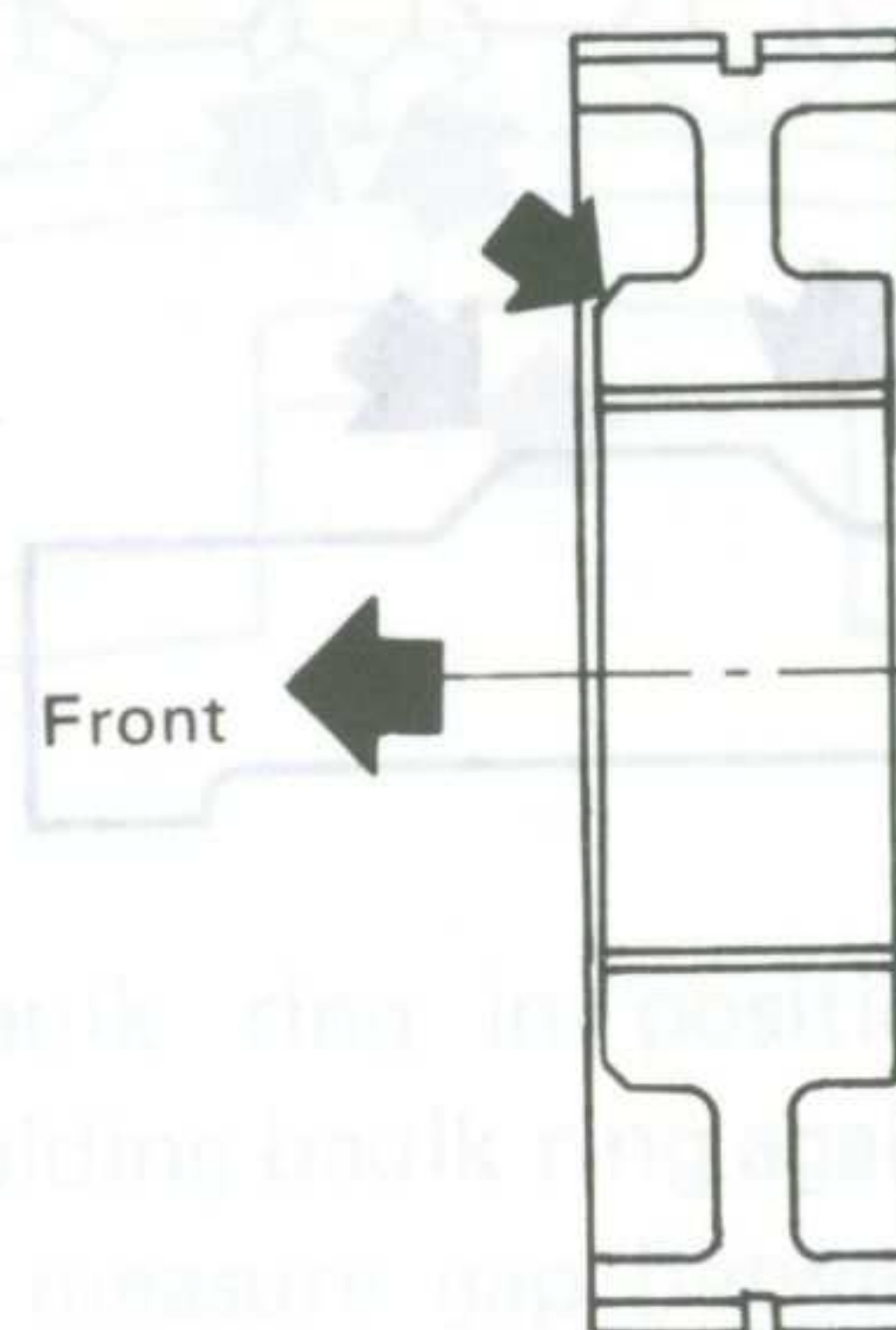
6. Press counter gear into adapter plate.



TM440

7. Install 3rd main gear, and 3rd & 4th synchronizer assembly.

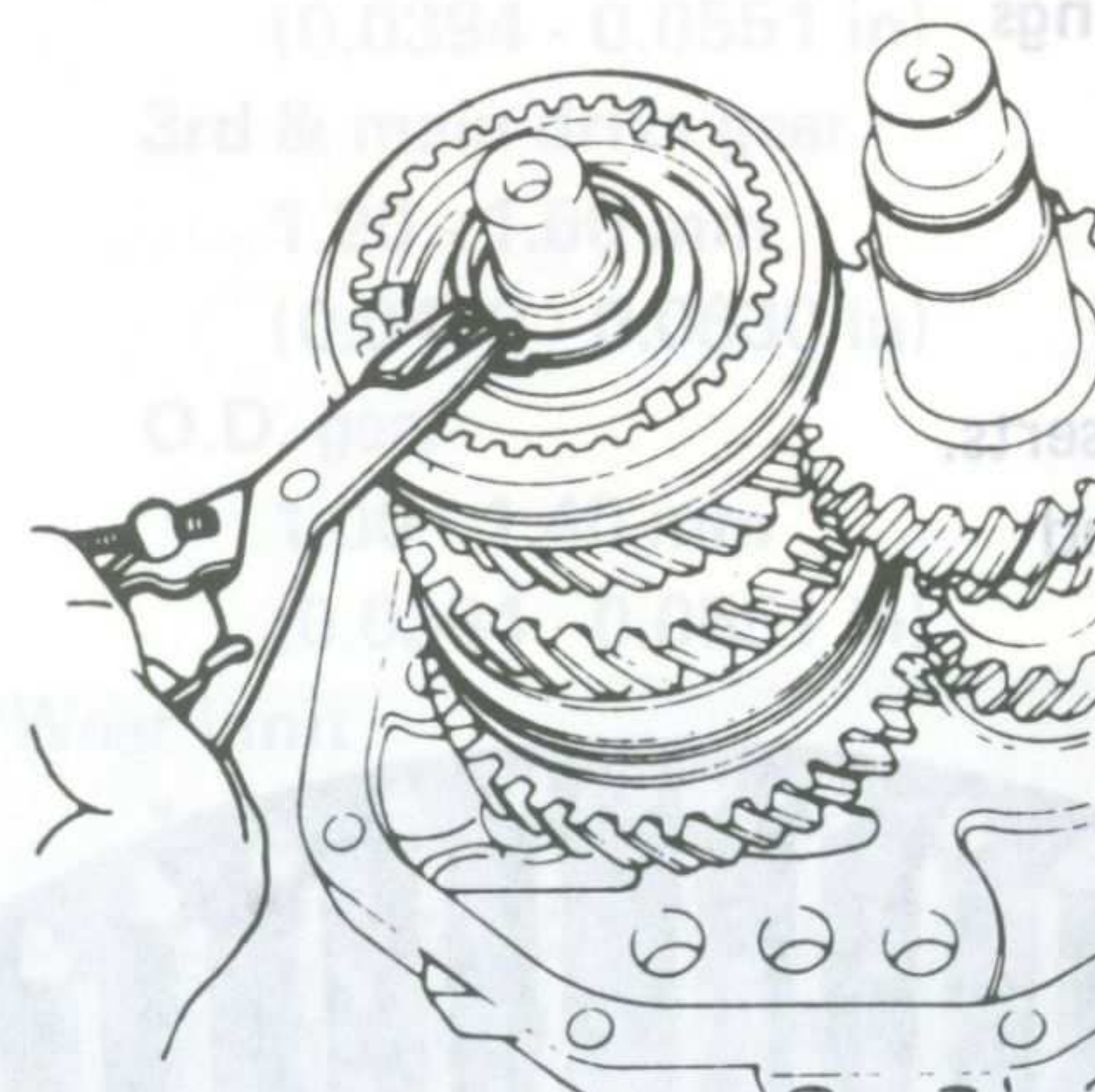
Pay attention to direction of synchronizer.



SMT008A

8. Install thrust washer on mainshaft and secure it with mainshaft front snap ring.

Select proper snap ring that will minimize clearance of groove in mainshaft.



TM441

Mainshaft front snap ring:

Parts number	Thickness mm (in)
32263-V5200	2.4 (0.094)
32263-V5201	2.5 (0.098)
32263-V5202	2.6 (0.102)

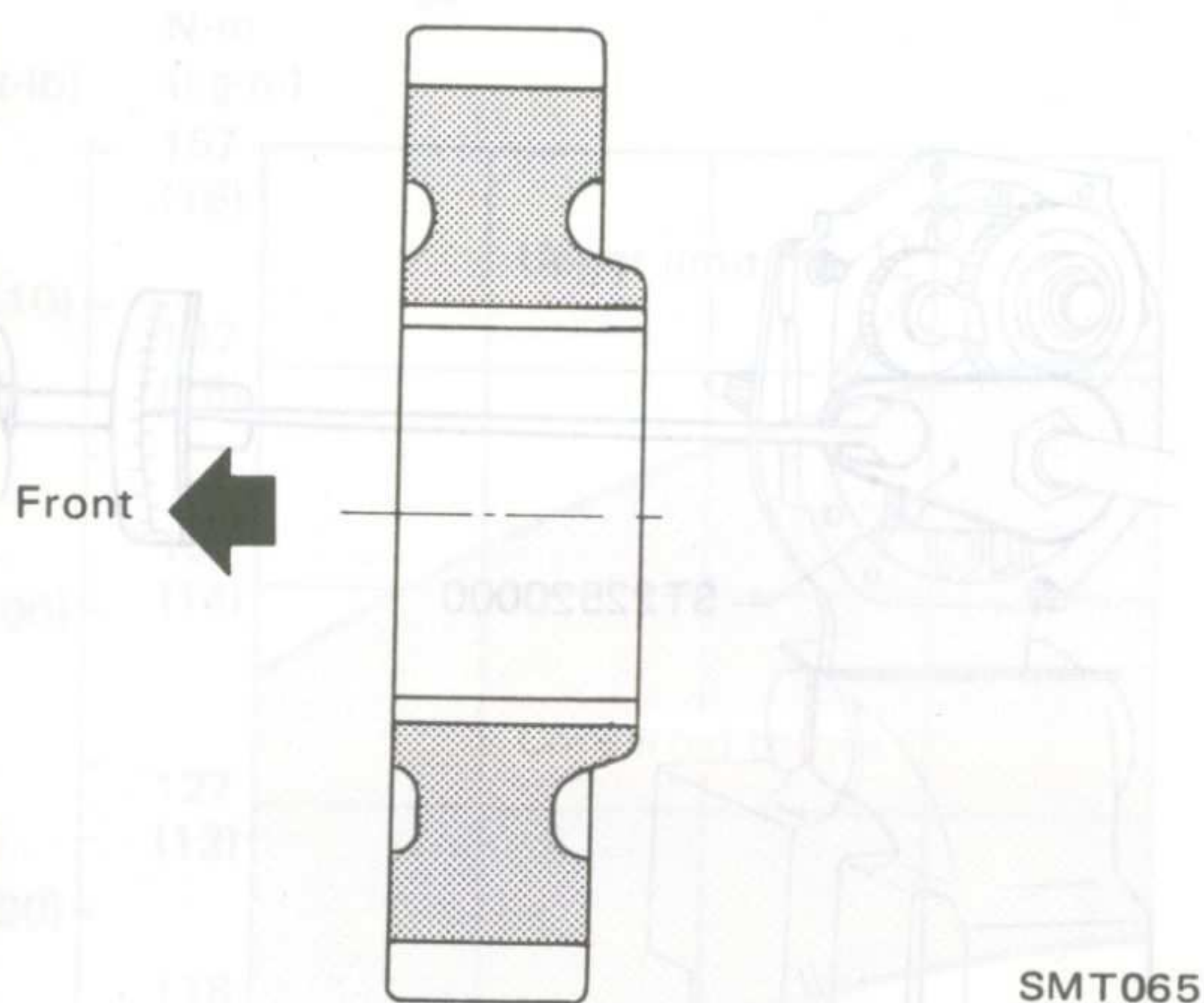
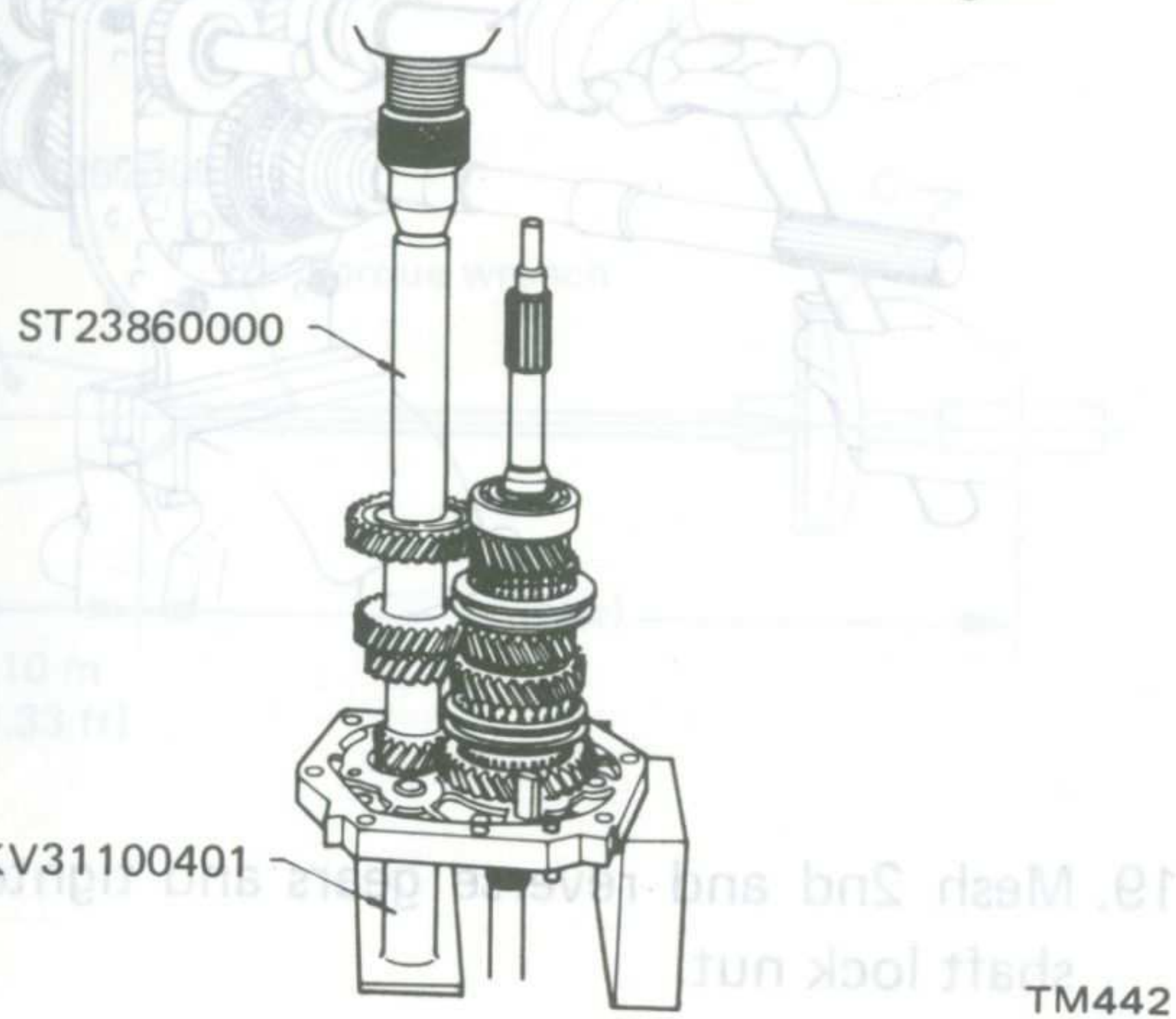
9. Apply gear oil to mainshaft pilot bearing and install it on mainshaft.

REPAIR FOR COMPONENT PARTS—FS5W71C

Gears and Shafts (Cont'd)

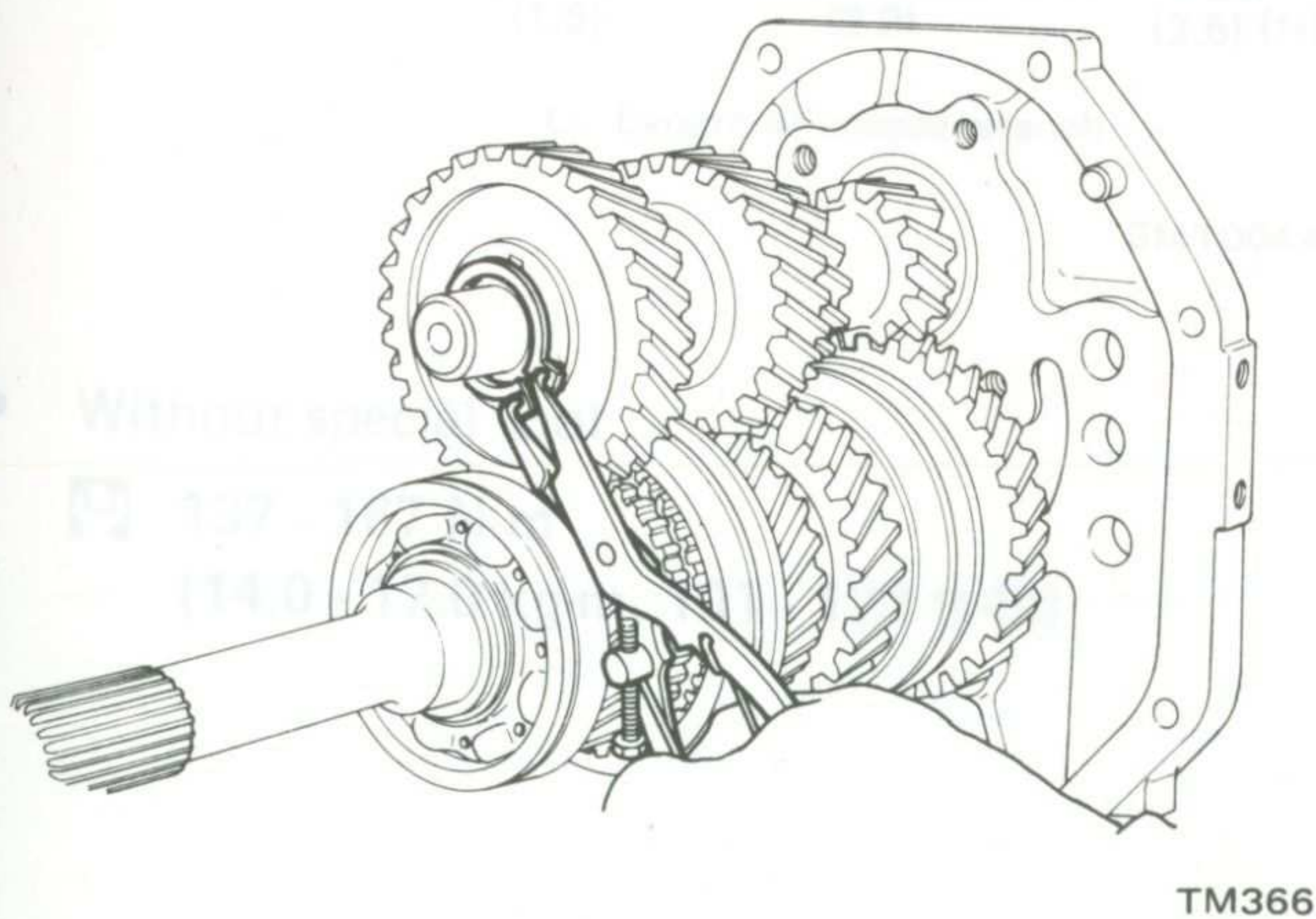
10. Press counter drive gear with main drive gear using Tool.

Pay attention to direction of counter front gear.



11. Secure counter drive gear with snap ring.

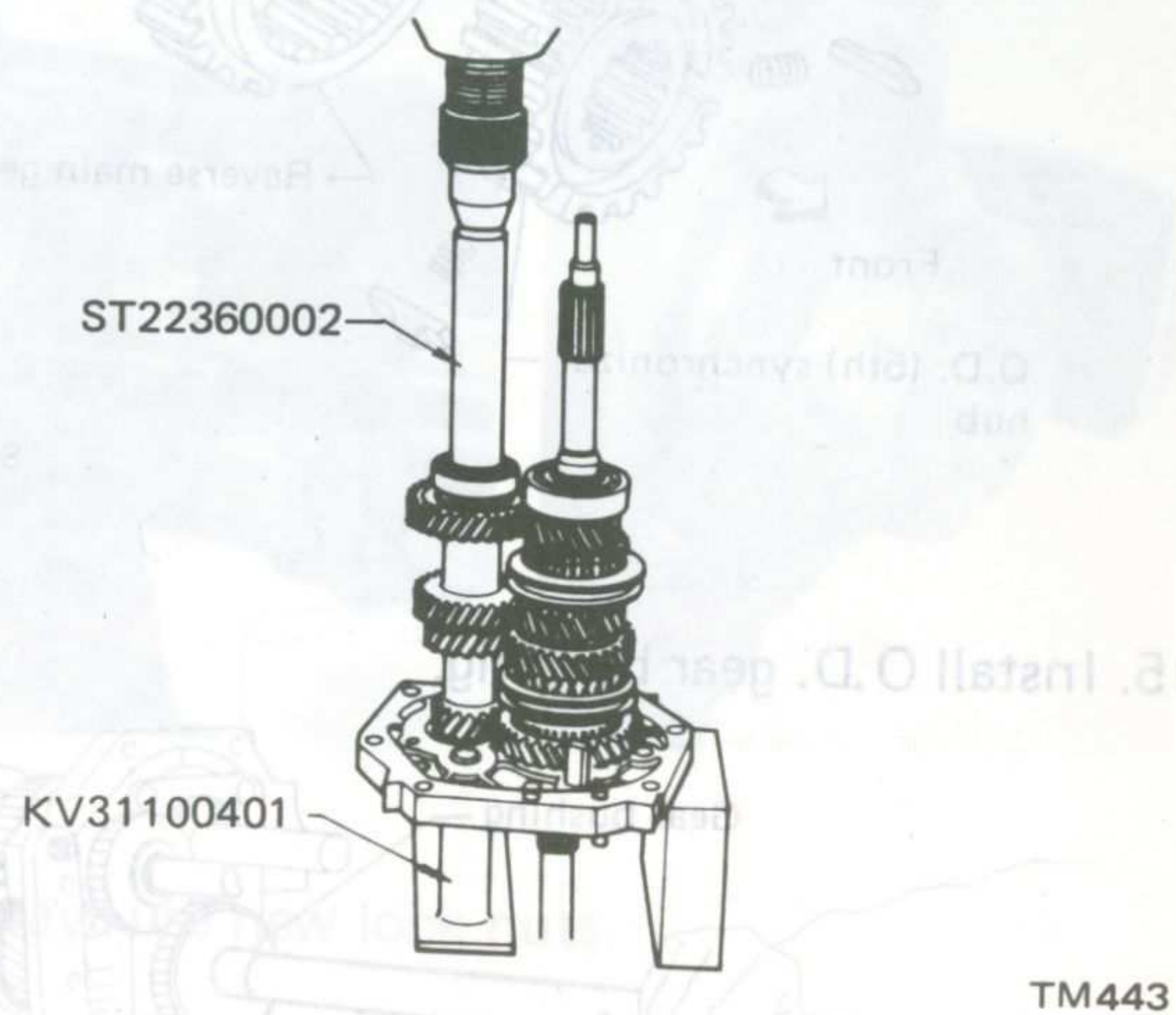
Select proper snap ring that will minimize clearance of groove in countershaft.



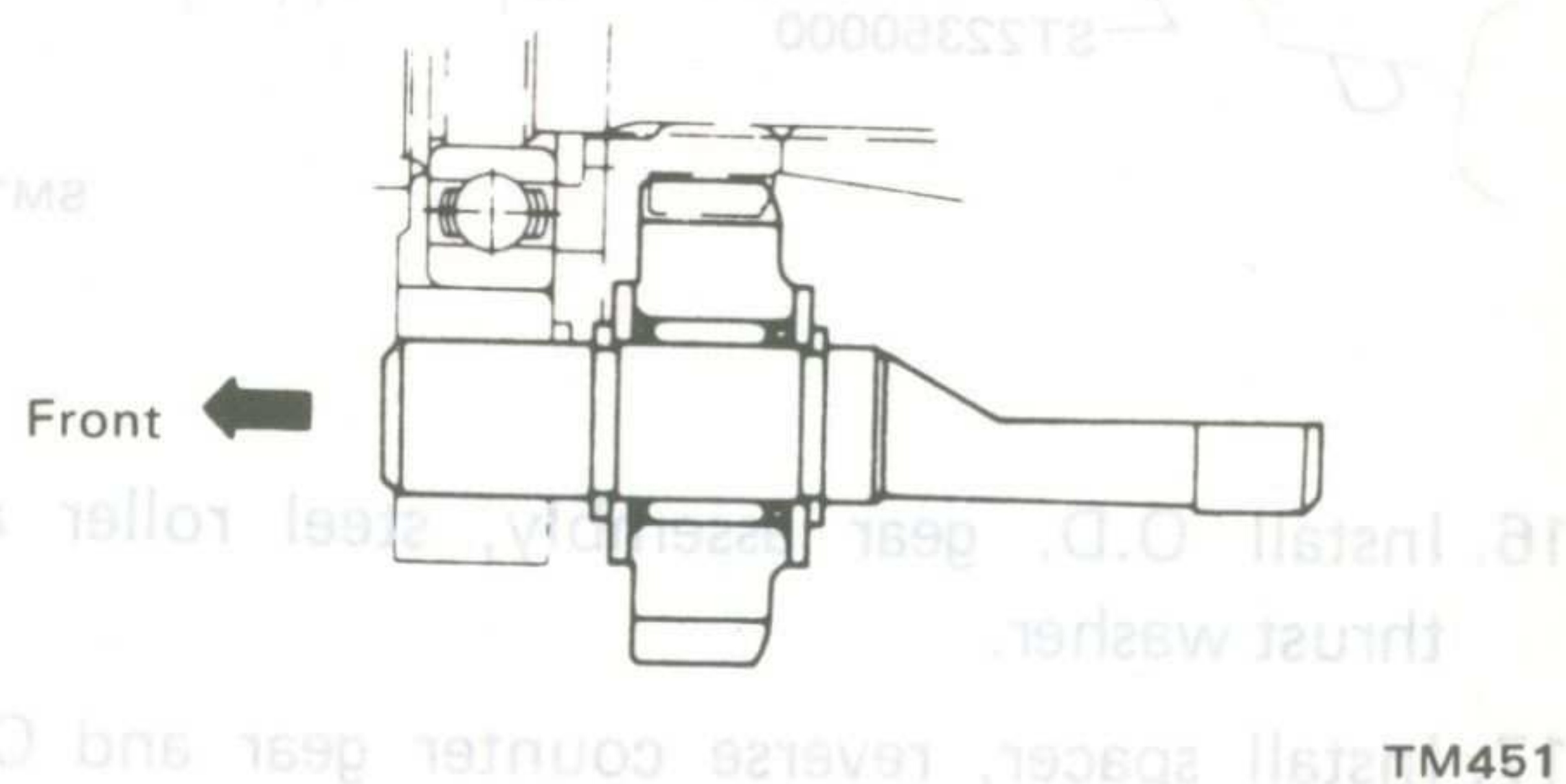
Counter drive gear snap ring:

Parts number	Thickness mm (in)
32215-E9000	1.4 (0.055)
32215-E9001	1.5 (0.059)
32215-E9002	1.6 (0.063)

12. Press counter gear front bearing onto counter gear.



13. Install idler gear to reverse idler shaft.

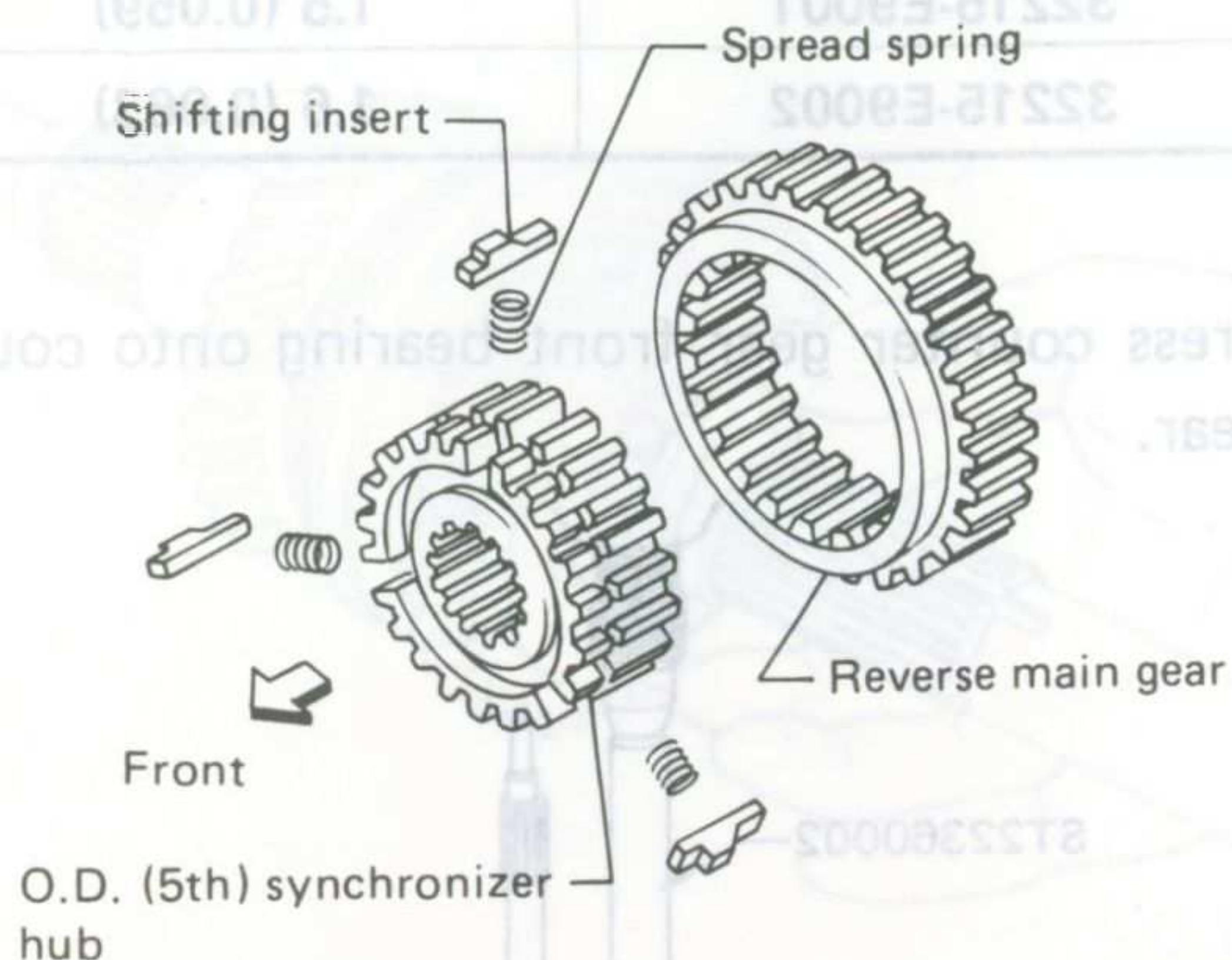


REPAIR FOR COMPONENT PARTS—FS5W71C

Gears and Shafts (Cont'd)

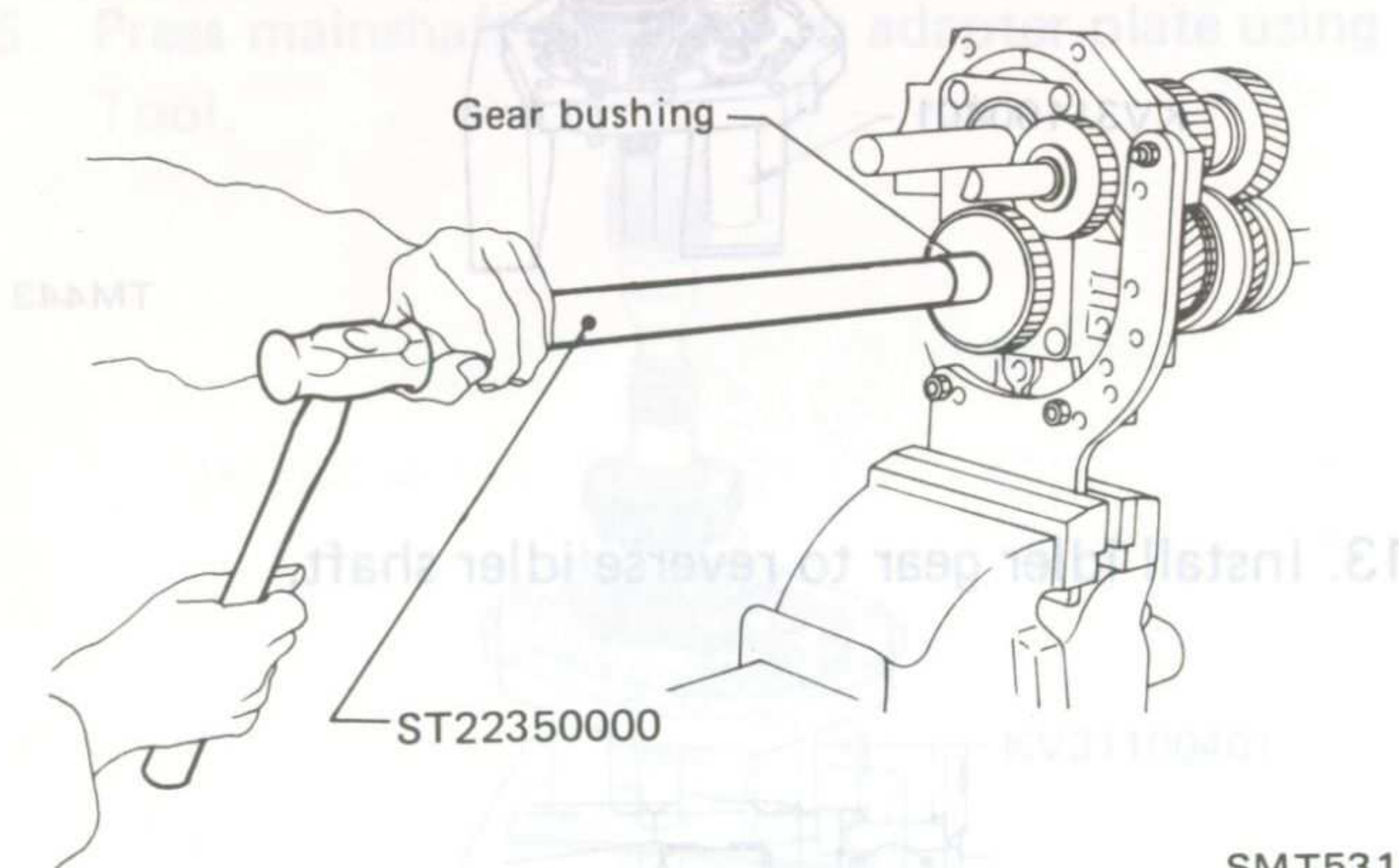
14. Install insert retainer and O.D. synchronizer to mainshaft.

Pay attention to direction of hub.



SMT095A

15. Install O.D. gear bushing.



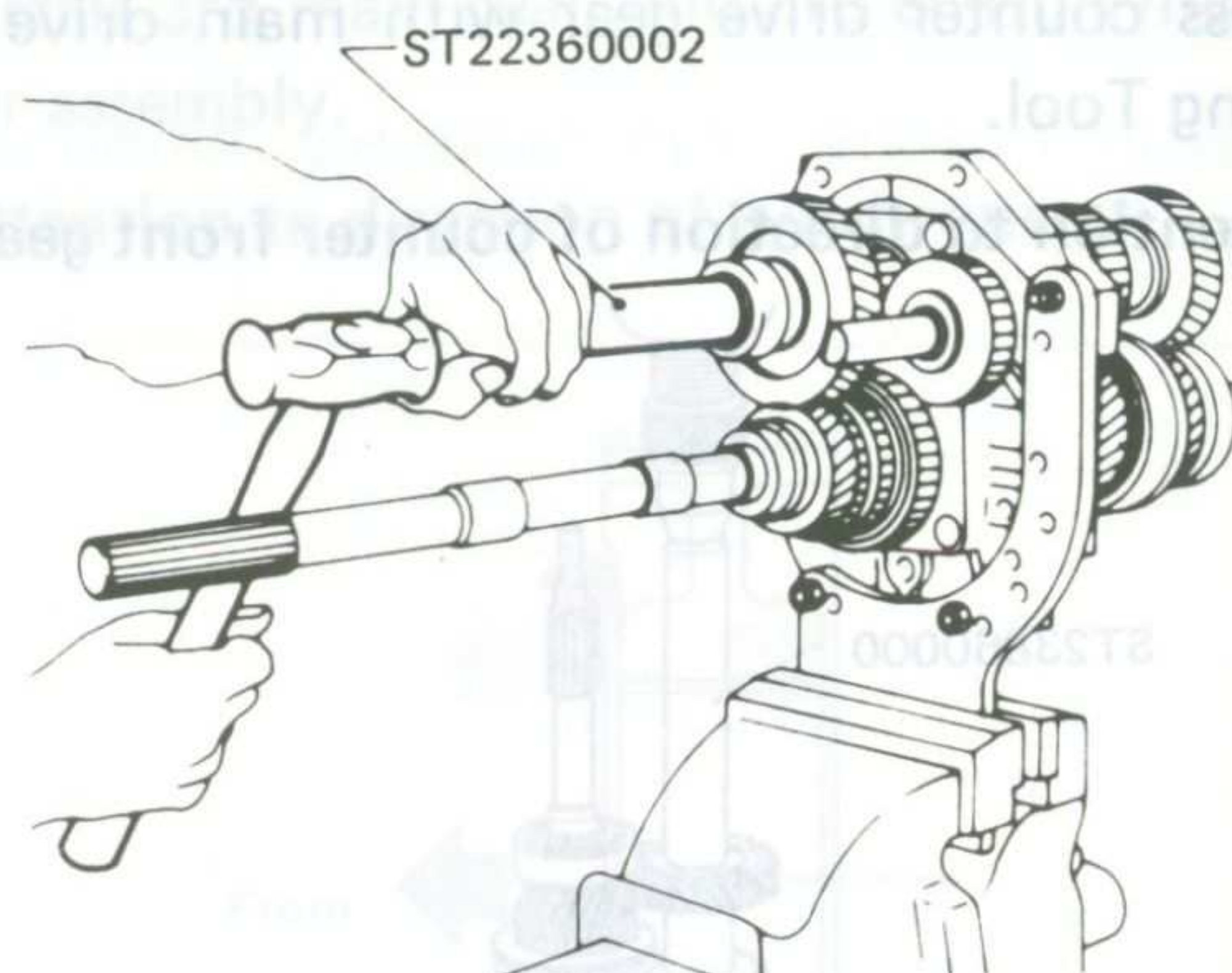
SMT531

16. Install O.D. gear assembly, steel roller and thrust washer.

17. Install spacer, reverse counter gear and O.D. counter gear.

Main O.D. gear and counter O.D. gear should be handled as a matched set.

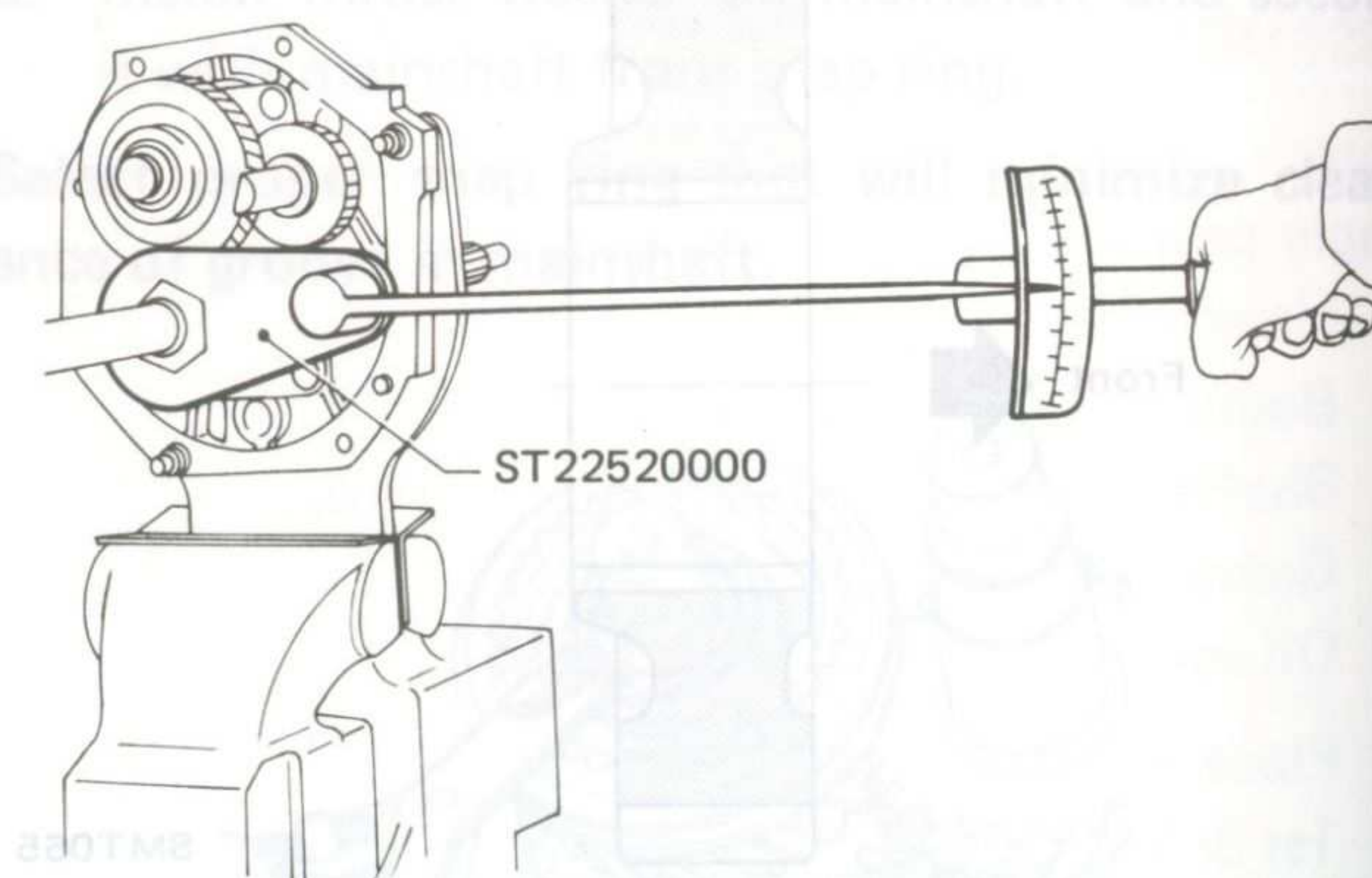
18. Install countershaft rear end bearing.



SMT043

19. Mesh 2nd and reverse gears and tighten mainshaft lock nut.

- With special tool

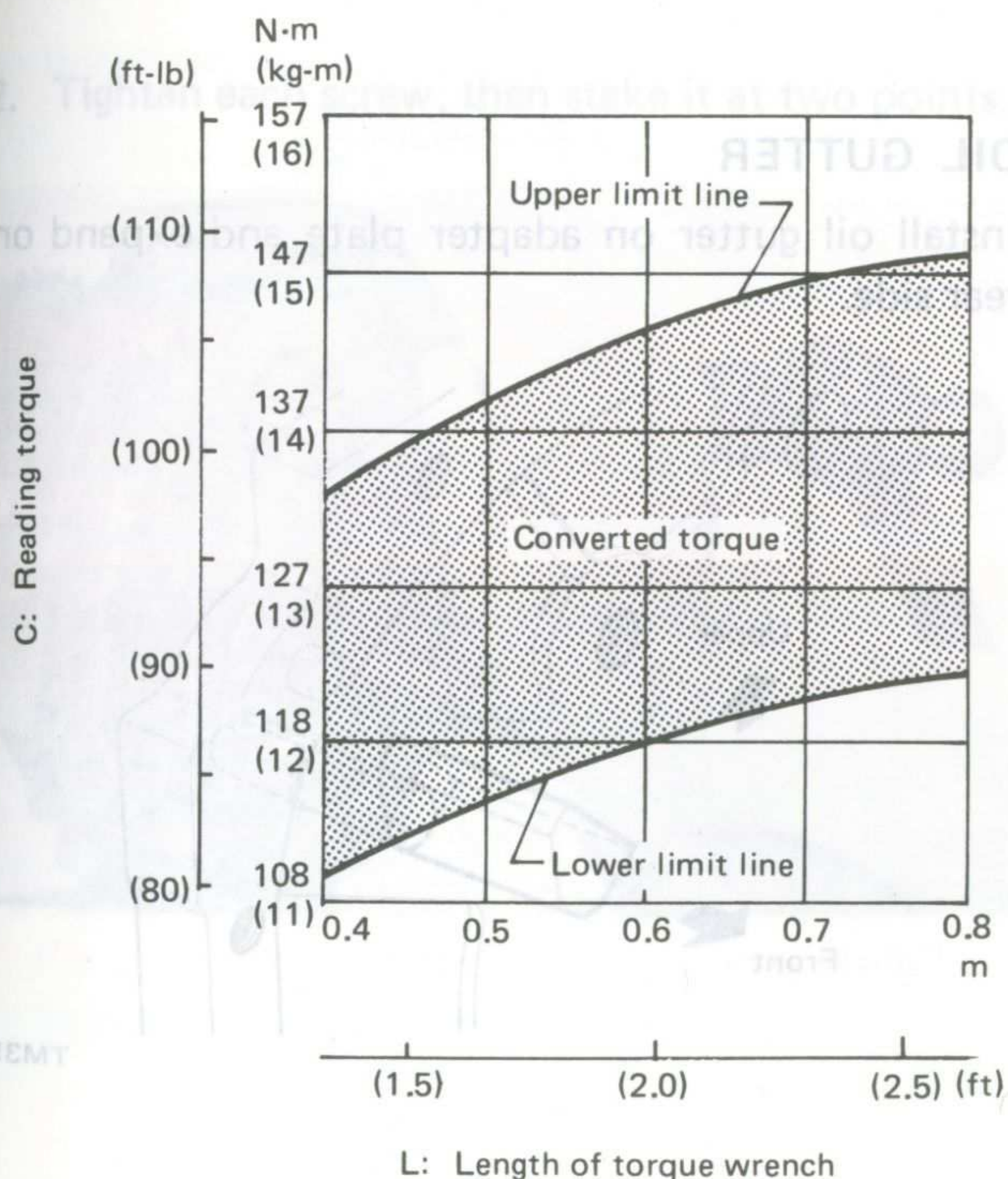
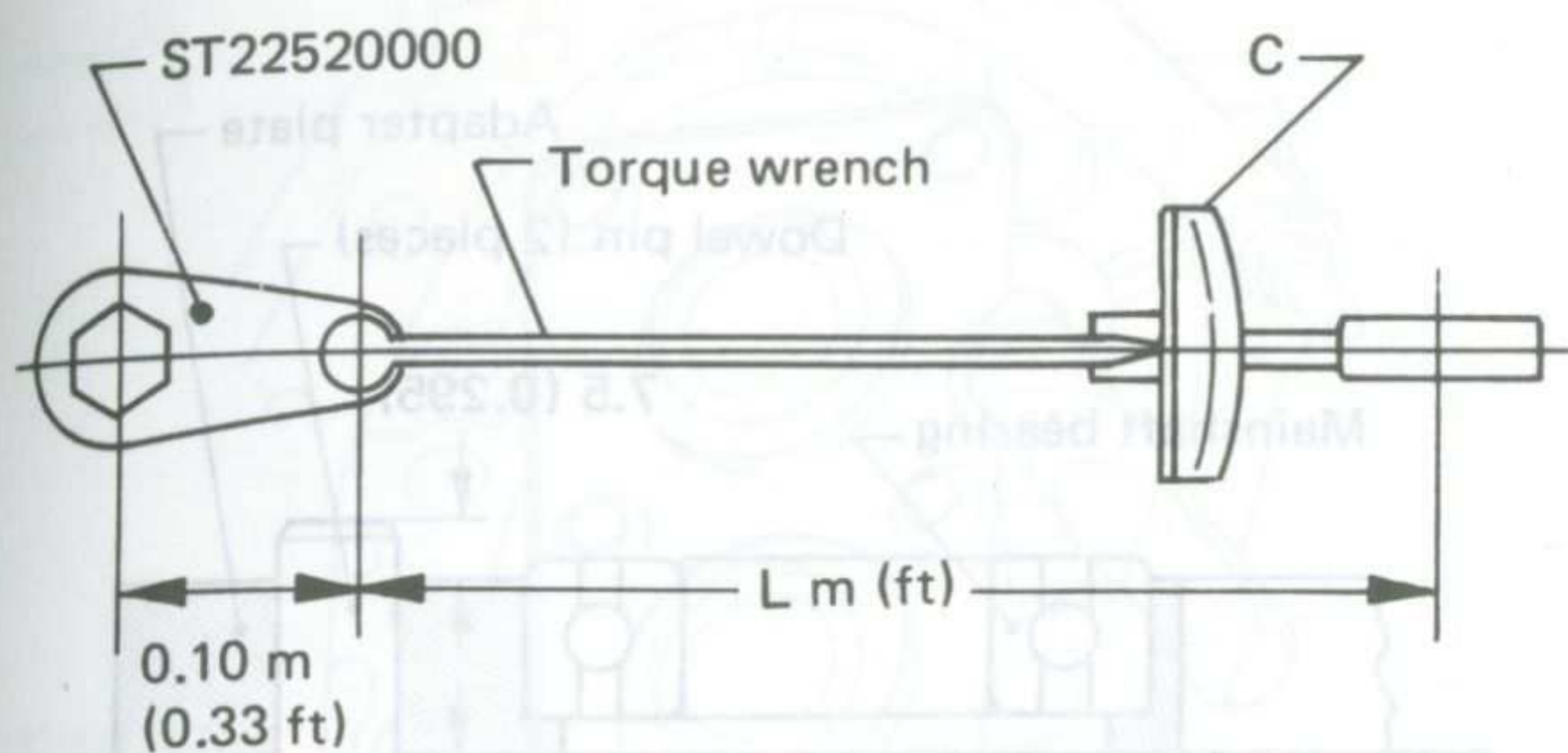


SMT003A

REPAIR FOR COMPONENT PARTS—FS5W71C

Gears and Shafts (Cont'd)

Using the following chart
(Length of torque wrench vs. setting or reading torque)



SMT004A

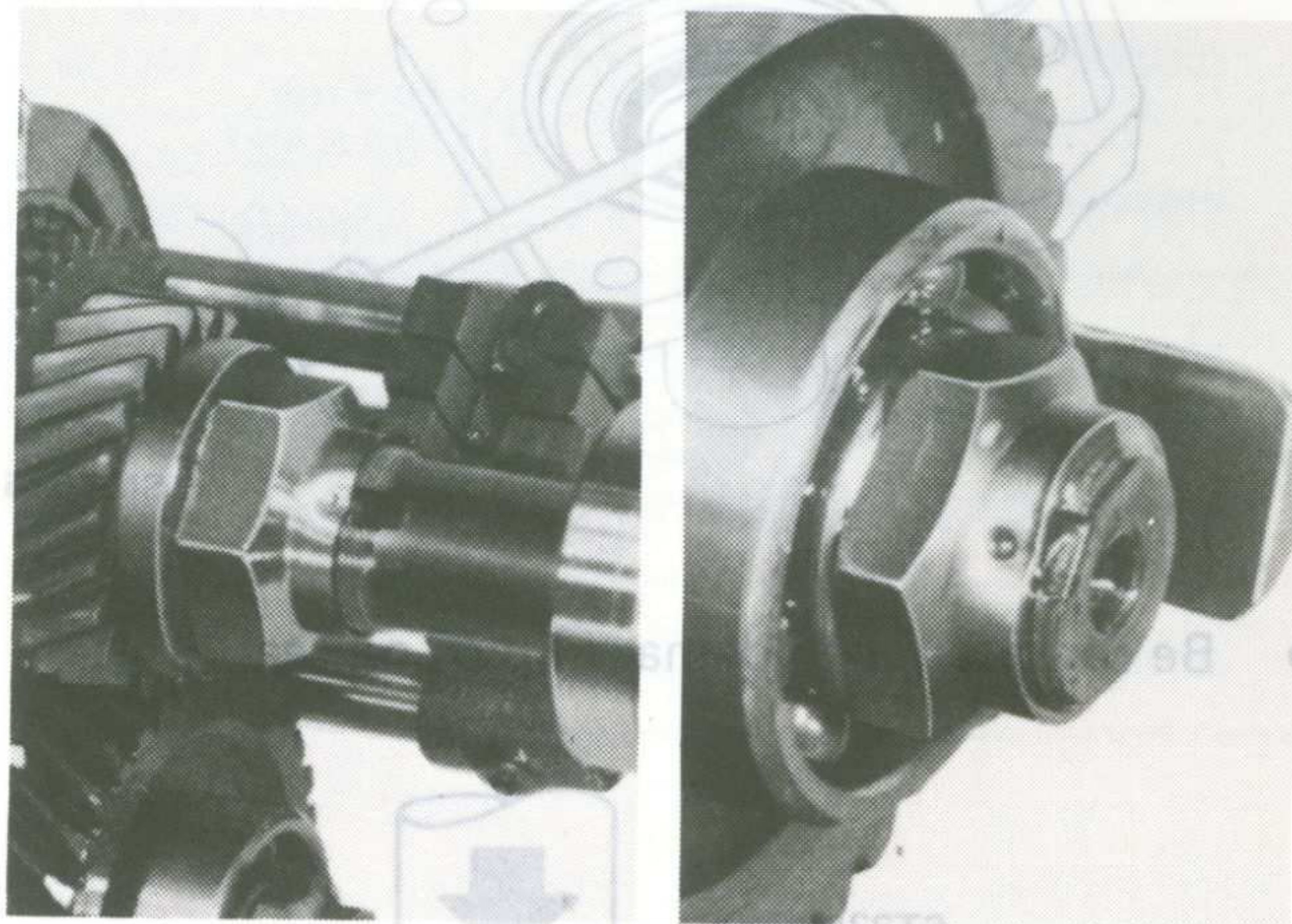
- Without special tool

137 - 167 N·m
(14.0 - 17.0 kg-m, 101 - 123 ft-lb)

20. Tighten counter gear lock nut.

: **98 - 127 N·m**
(10.0 - 13.0 kg-m, 72 - 94 ft-lb)

21. Stake mainshaft lock nut and counter gear lock nut with a punch.



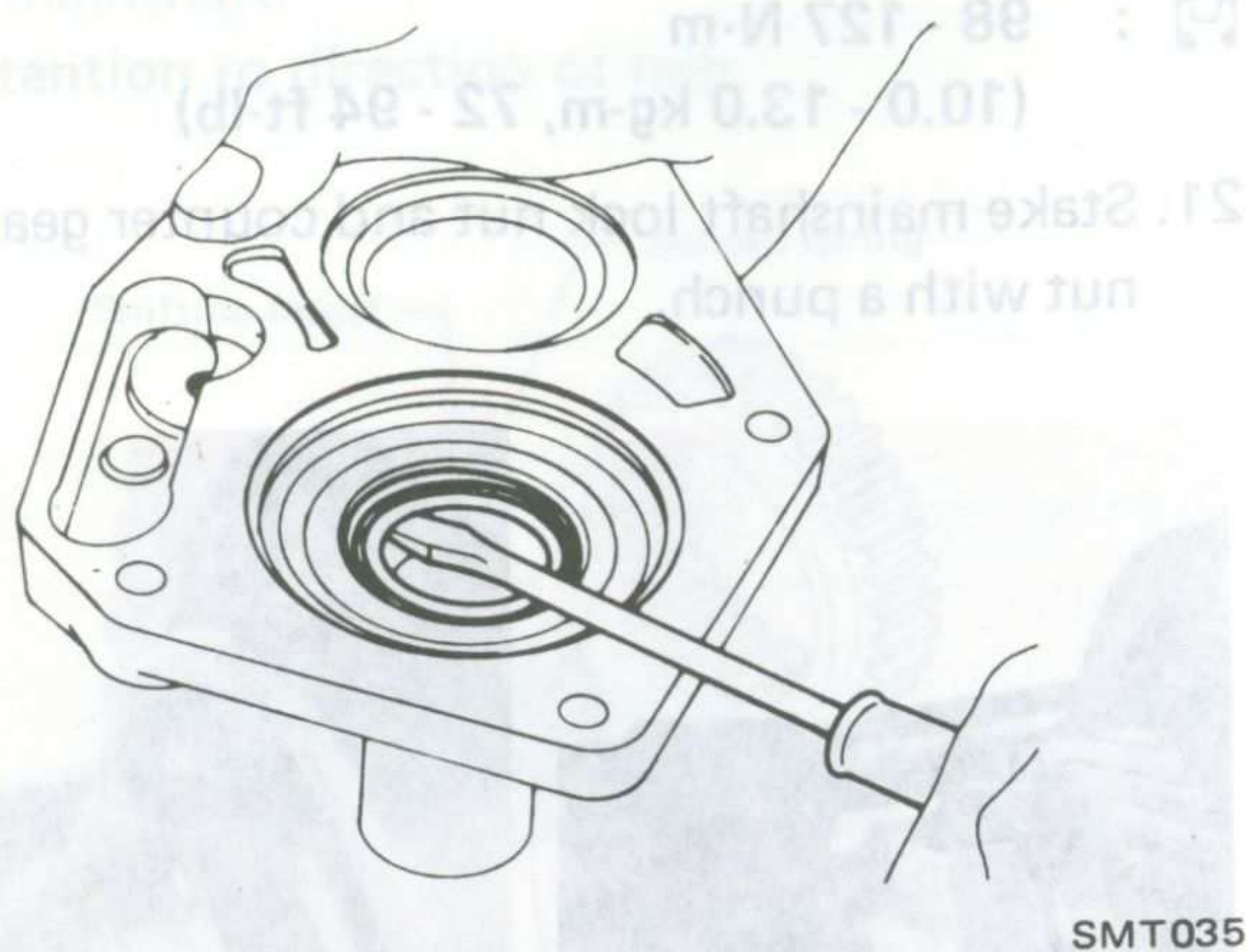
- Always use new lock nuts.

22. Measure gear end play. For the description, refer to Disassembly of Gears and Shafts.

REPAIR FOR COMPONENT PARTS—FS5W71C

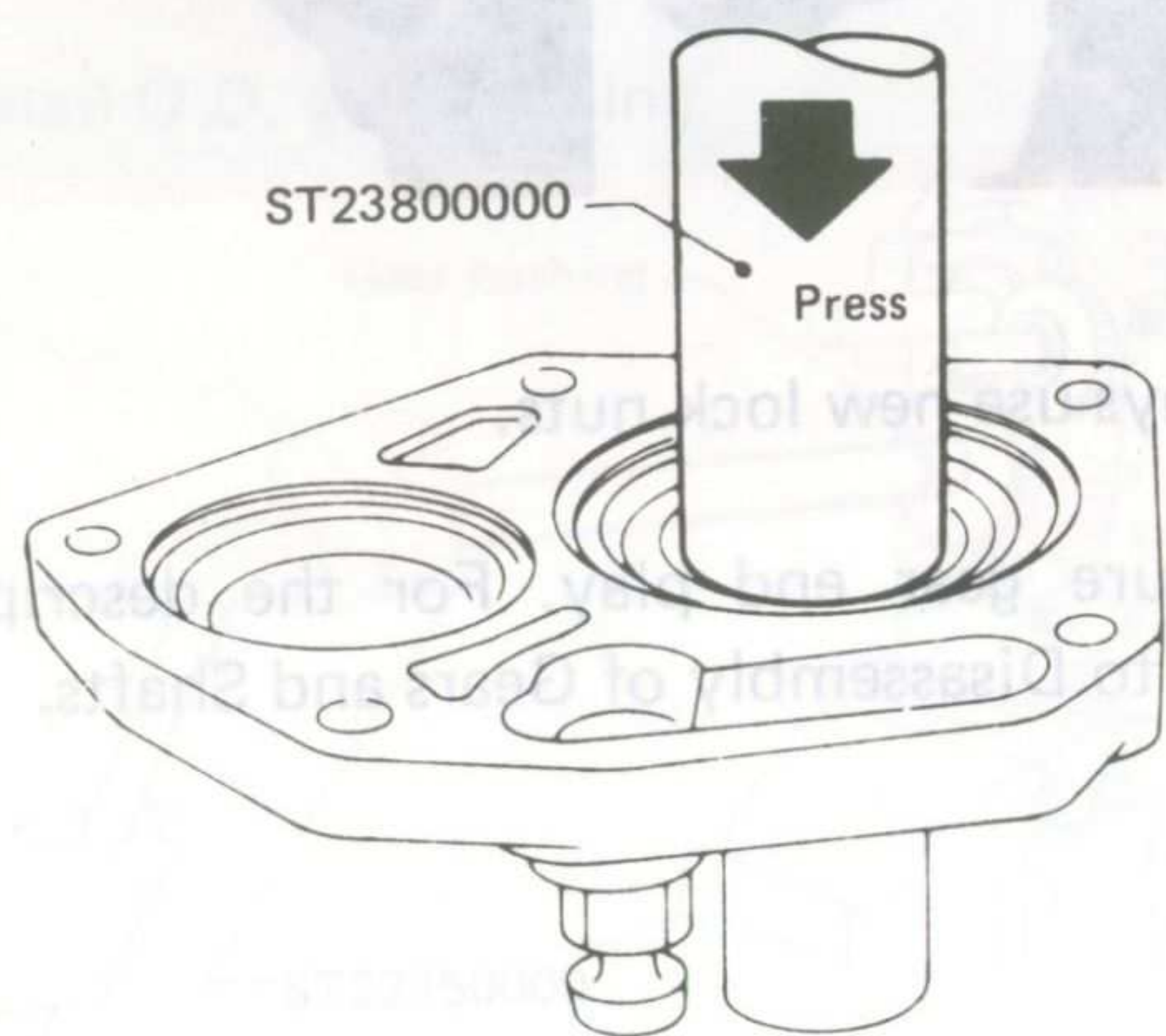
Oil Seals

FRONT COVER OIL SEAL



SMT035

- Be careful not to damage lip of oil seal.

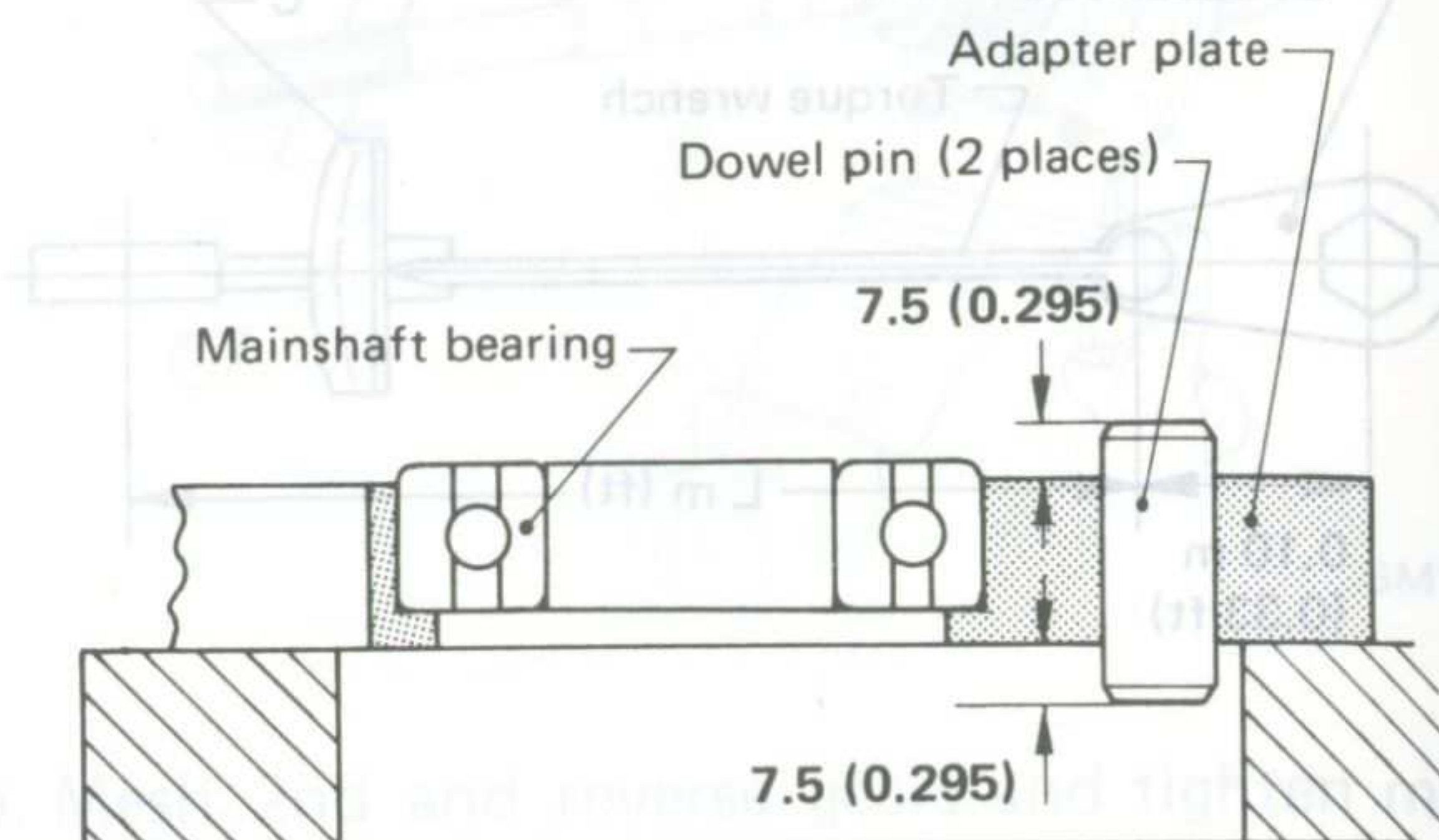


SMT036

Adapter Plate

- When replacing adapter plate parts, use the following procedures.

DOWEL PIN

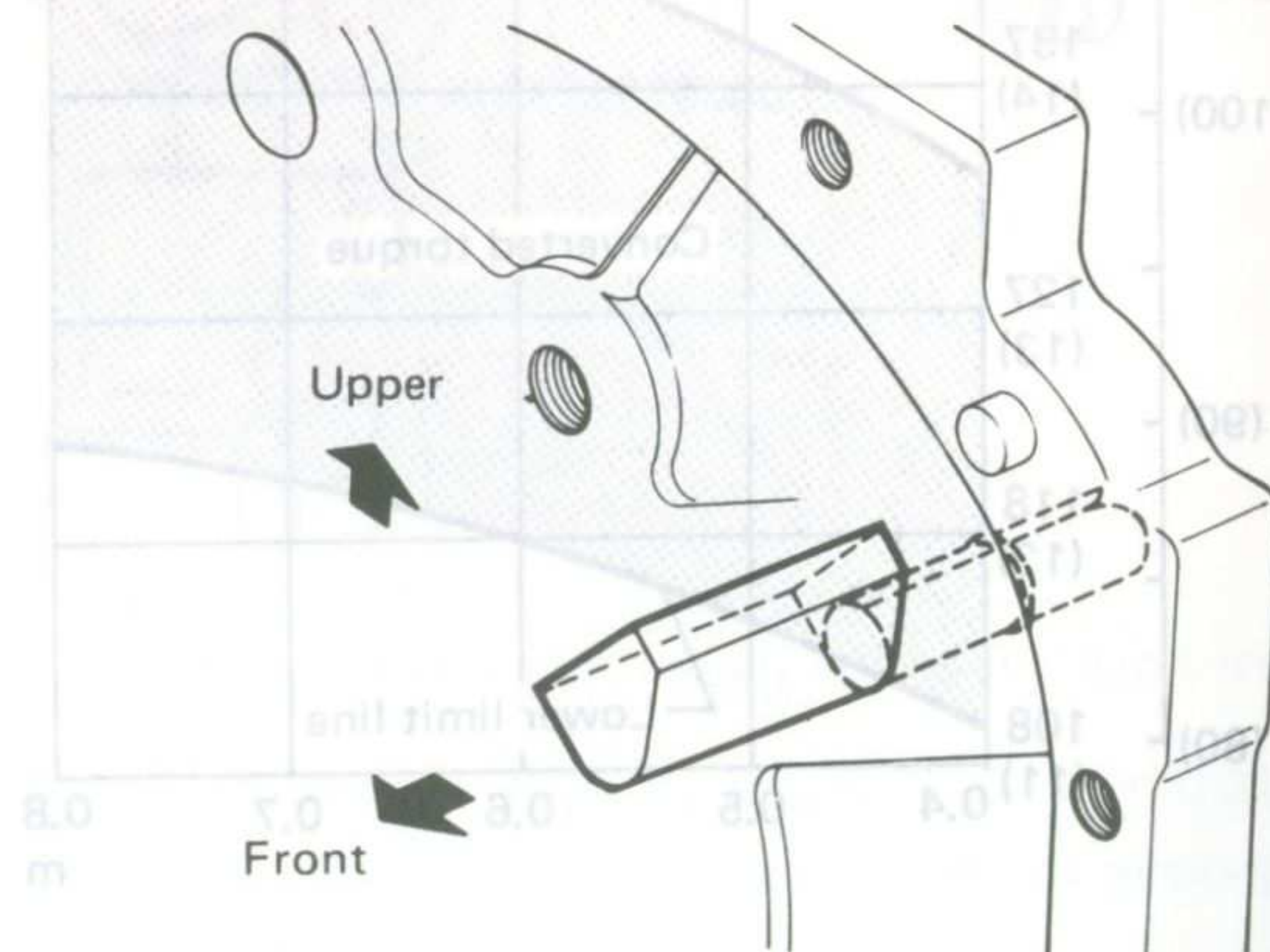


Unit: mm (in)

SMT027

OIL GUTTER

Install oil gutter on adapter plate and expand on rear side.



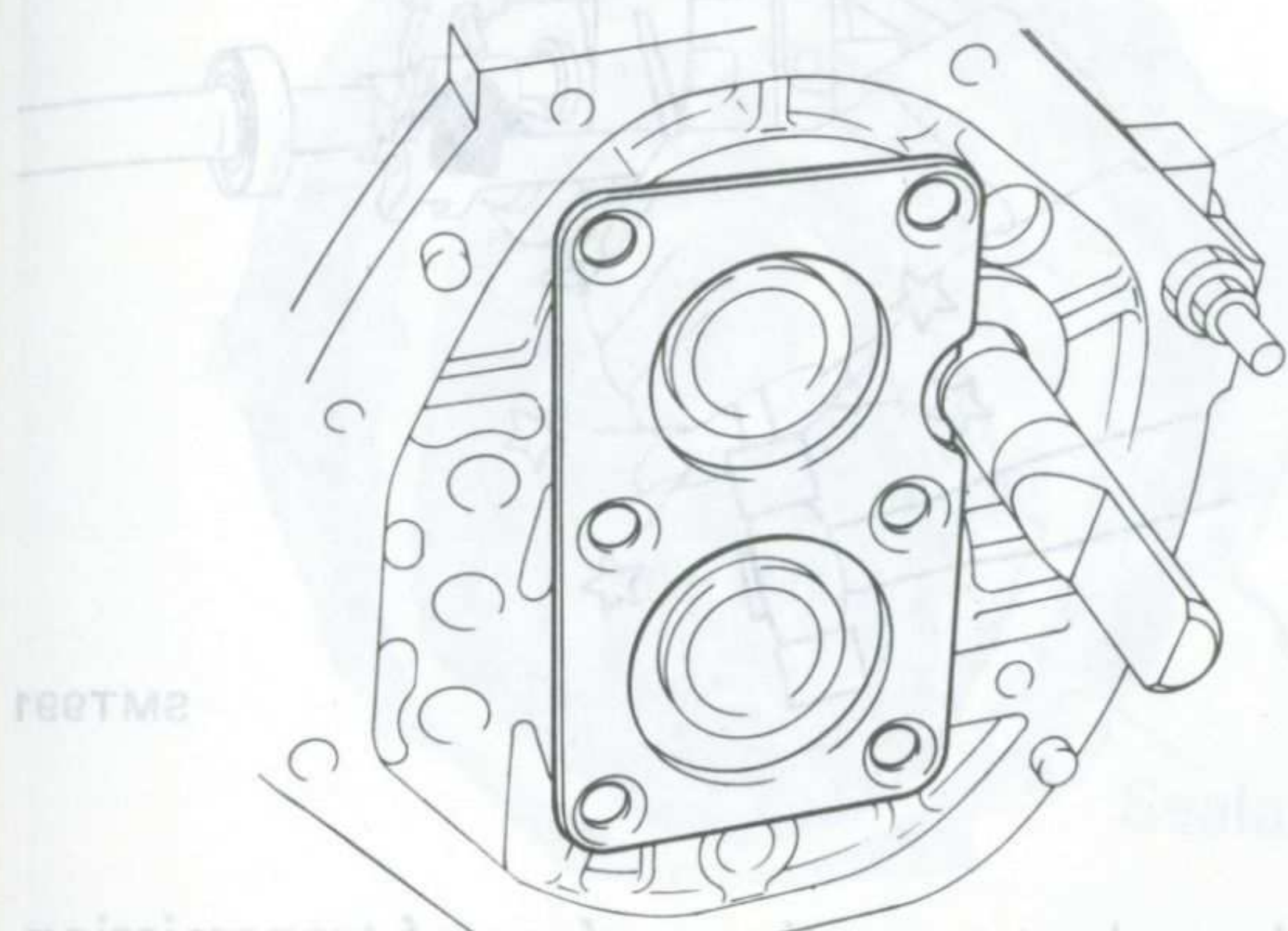
TM356

REPAIR FOR COMPONENT PARTS—FS5W71C

Adapter Plate (Cont'd)

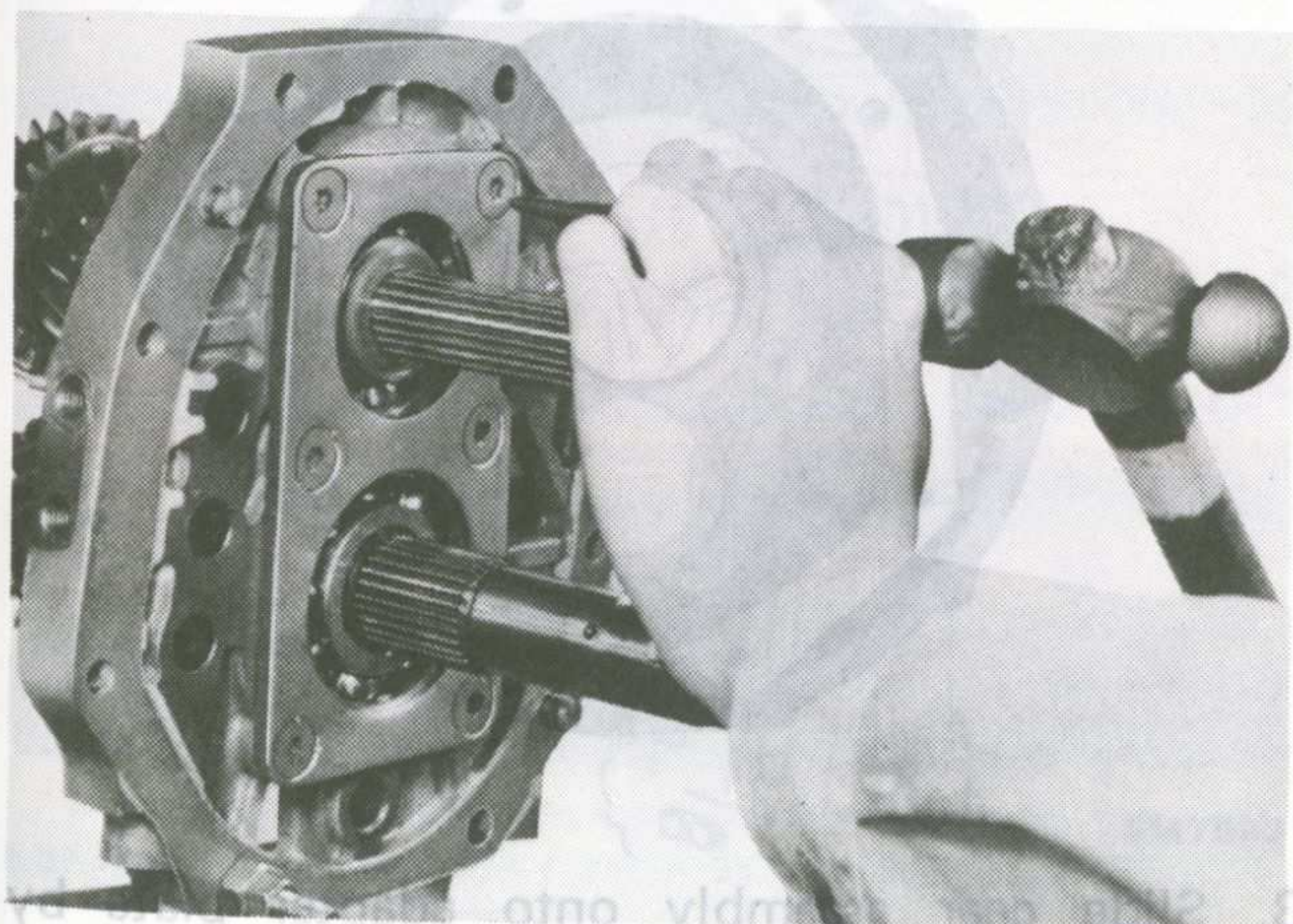
BEARING RETAINER

1. Insert reverse shaft, then install bearing retainer.

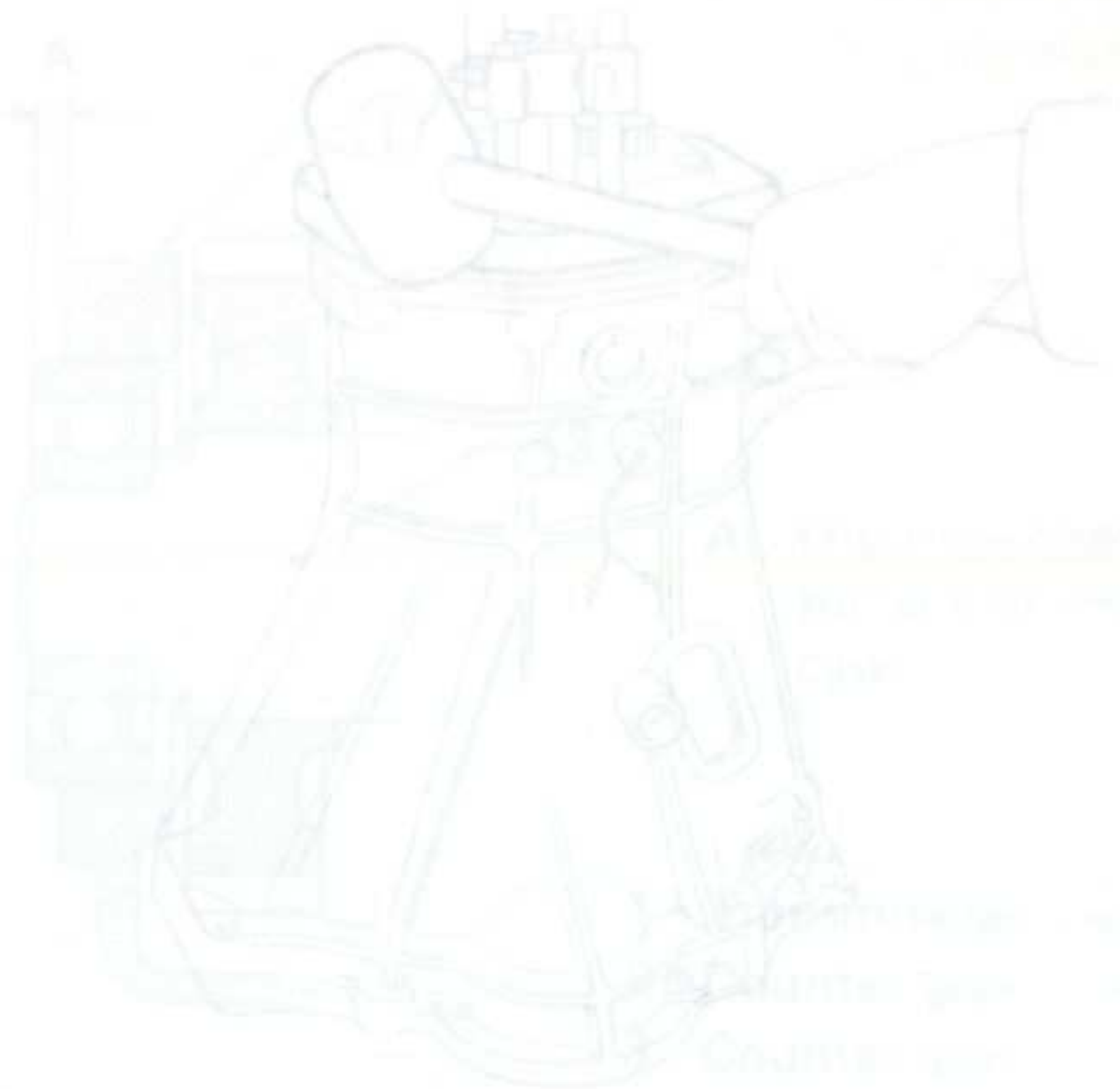


SMT028

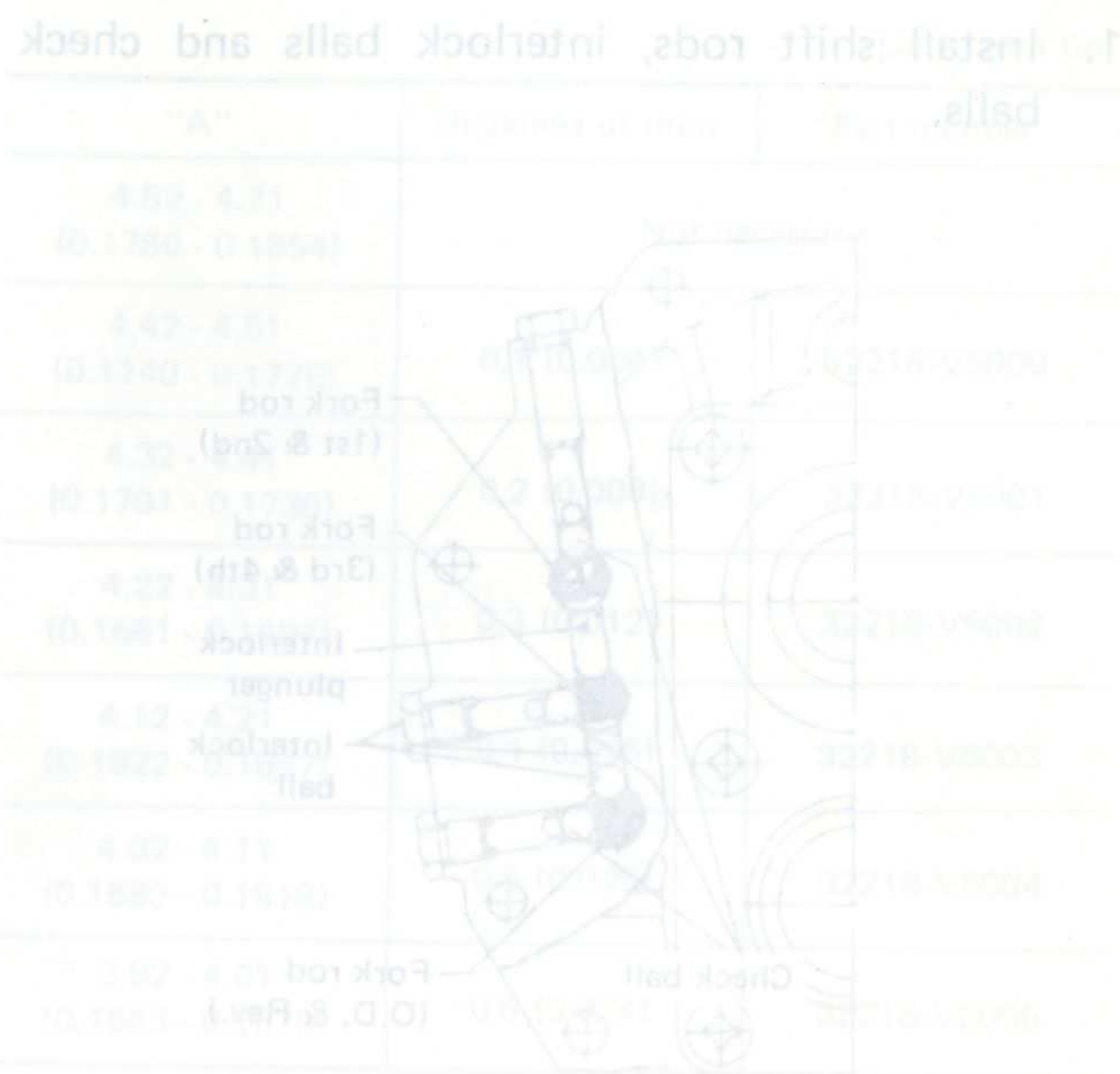
2. Tighten each screw, then stake it at two points.



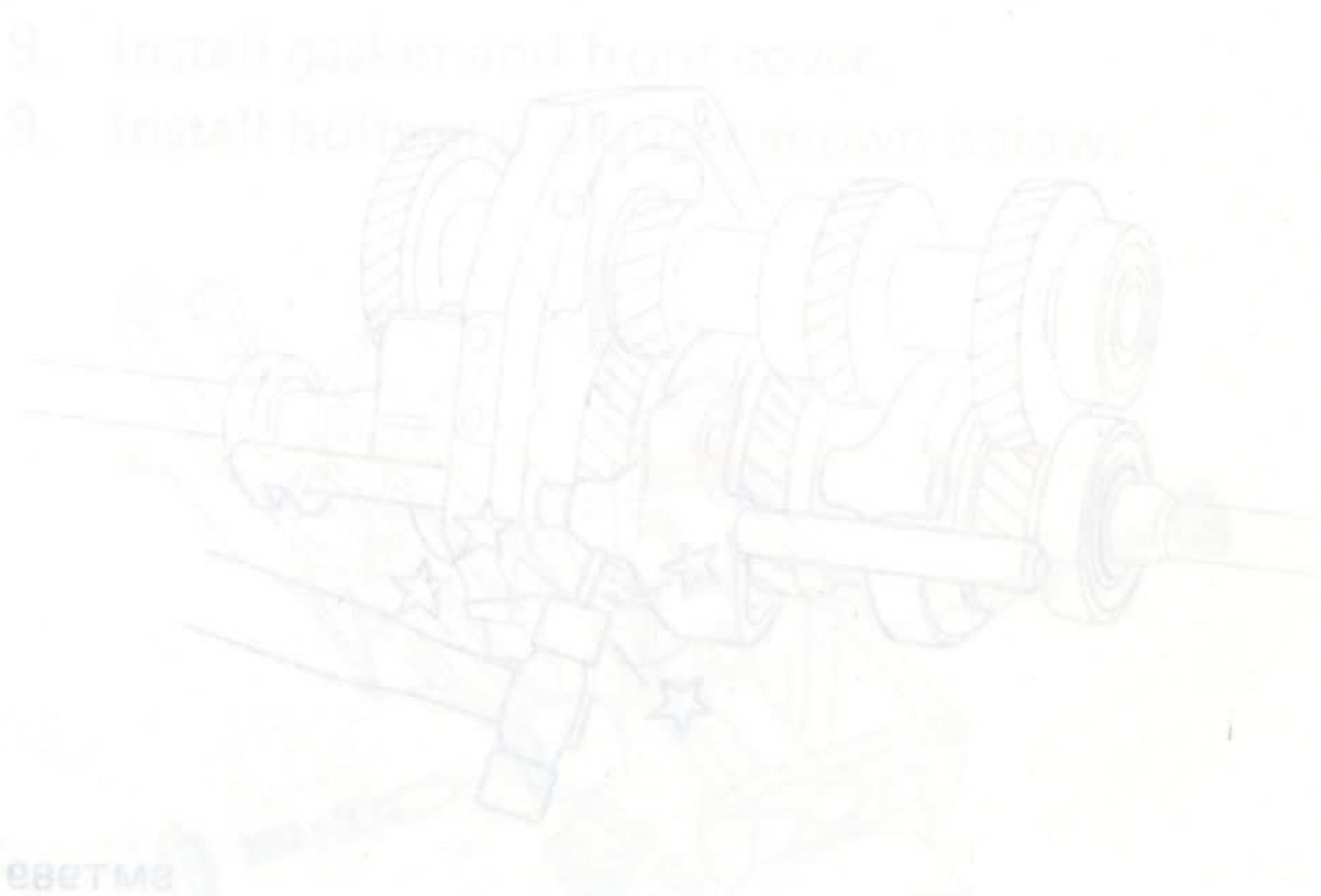
6. Fit main hammer with a soft hammer nail fit.
7. Select countershaft front bearing shim.



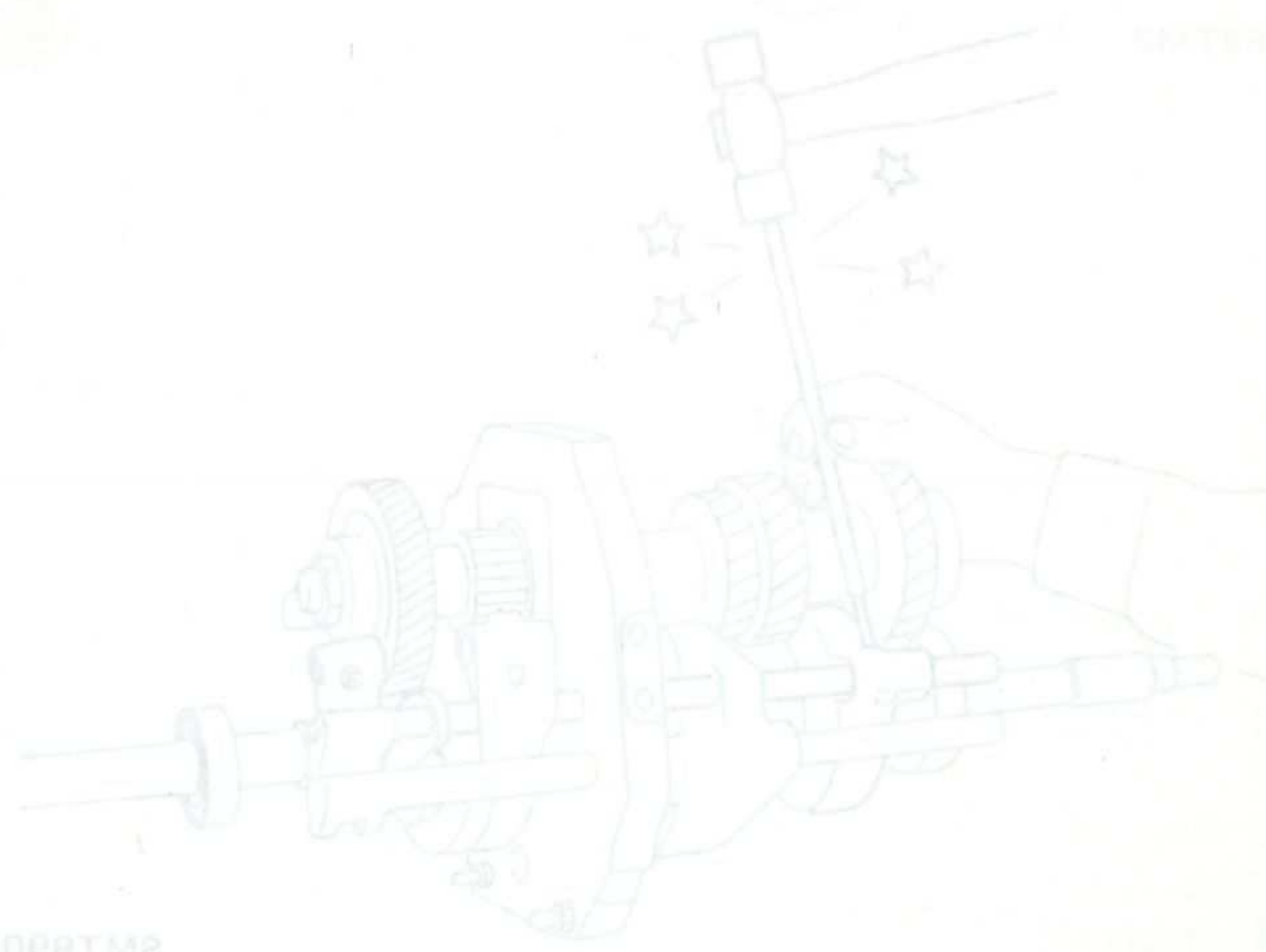
SMT013



SMT022



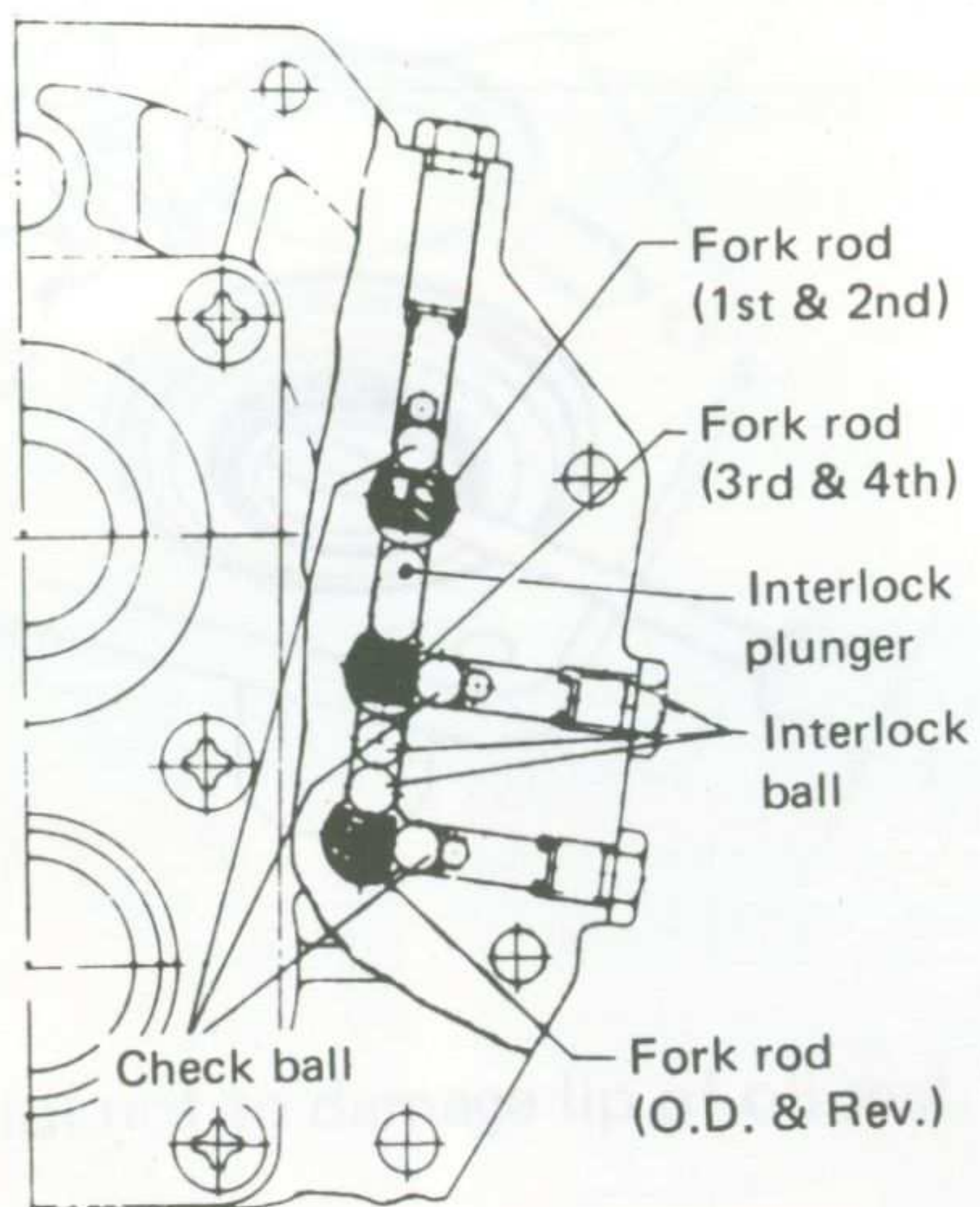
SMT023



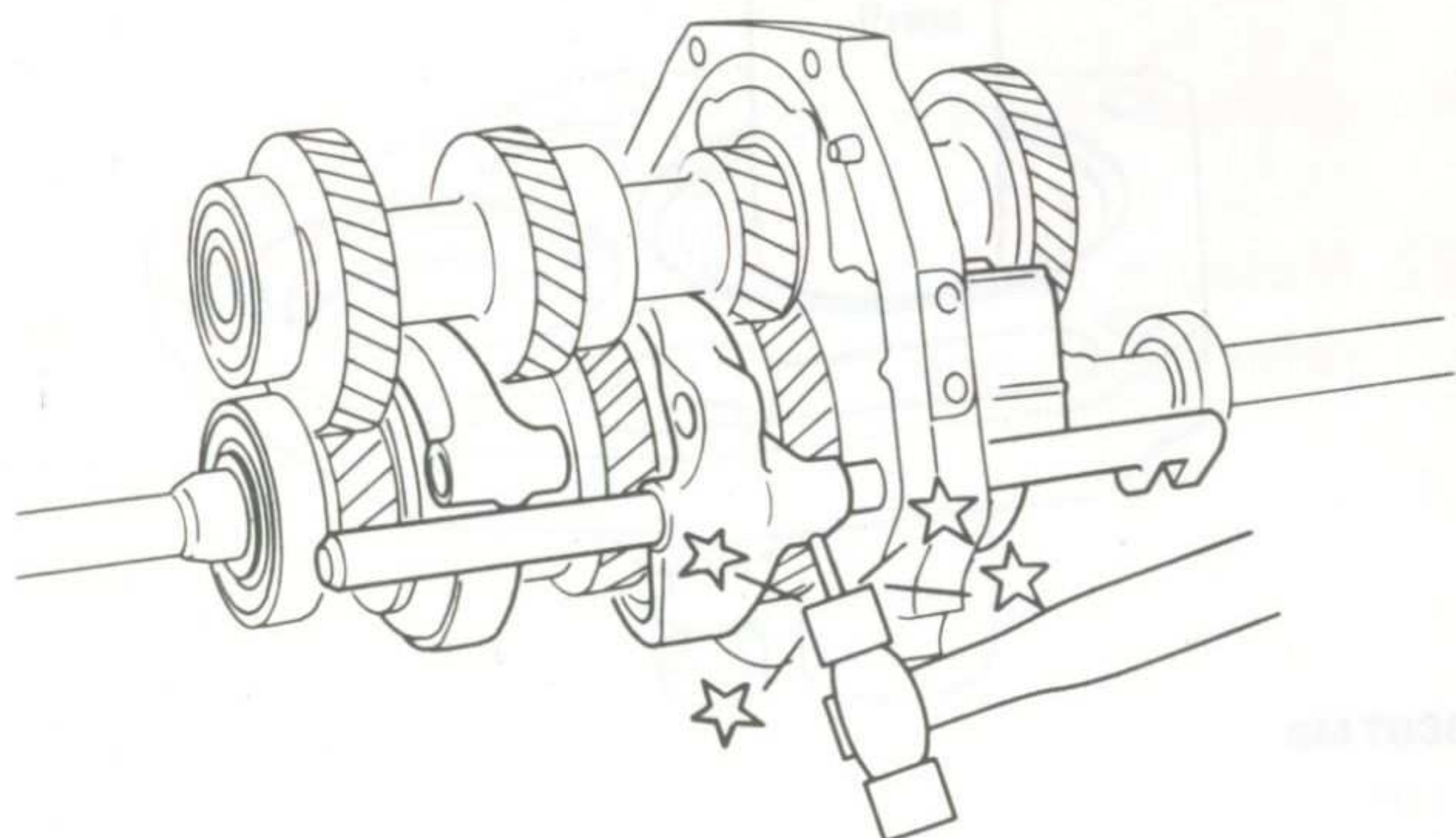
SMT020

ASSEMBLY—FS5W71C

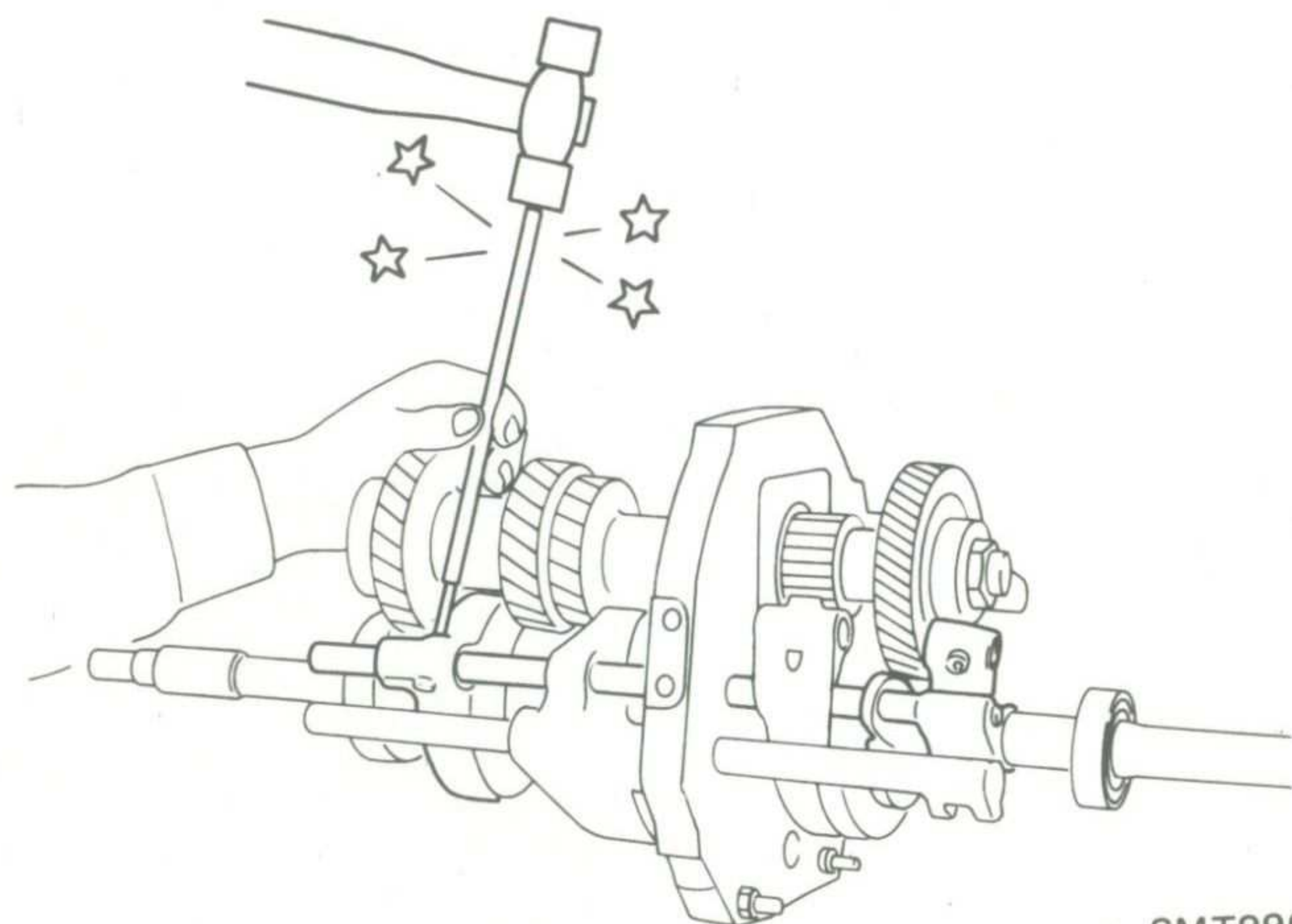
1. Install shift rods, interlock balls and check balls.



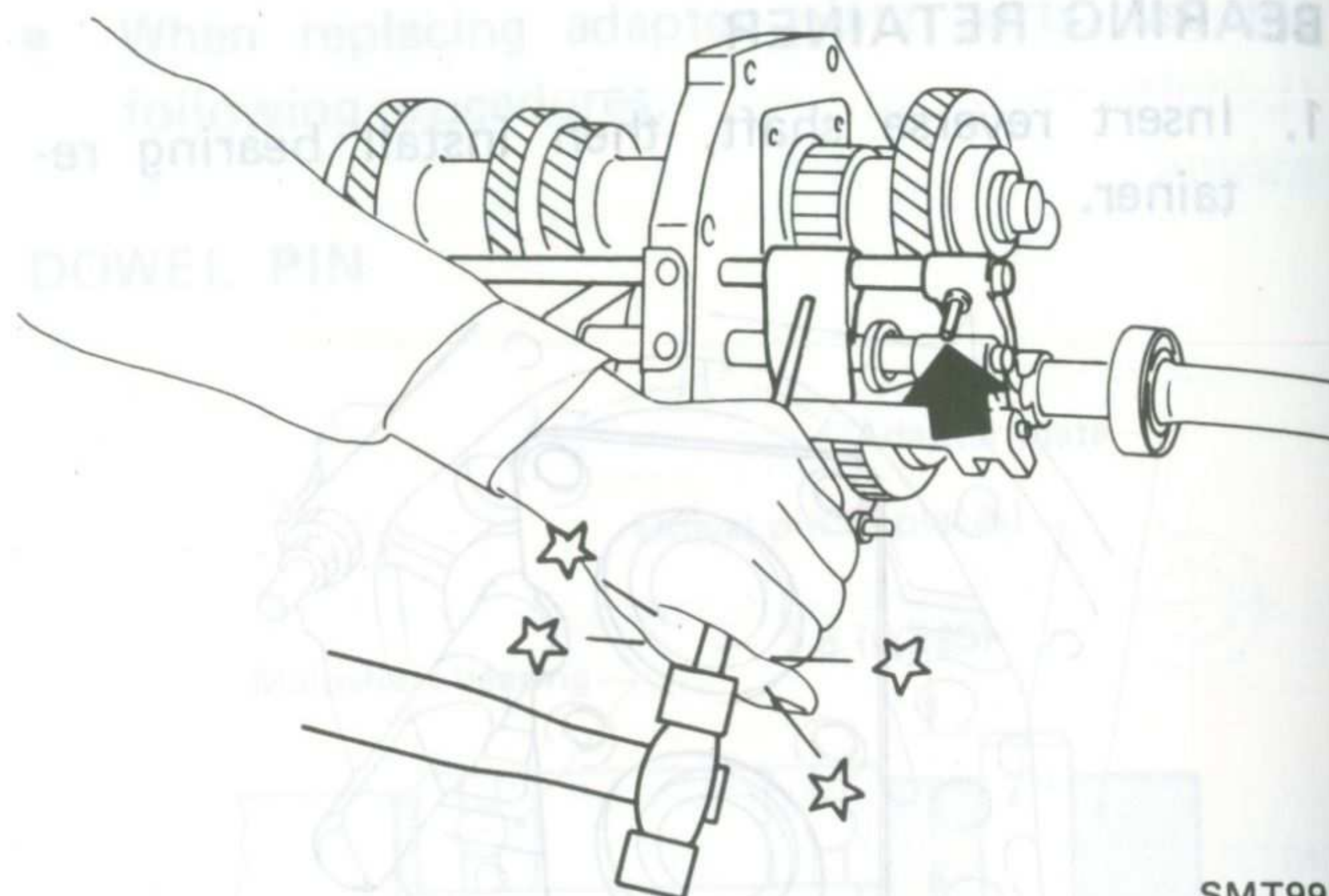
SMT992



SMT989

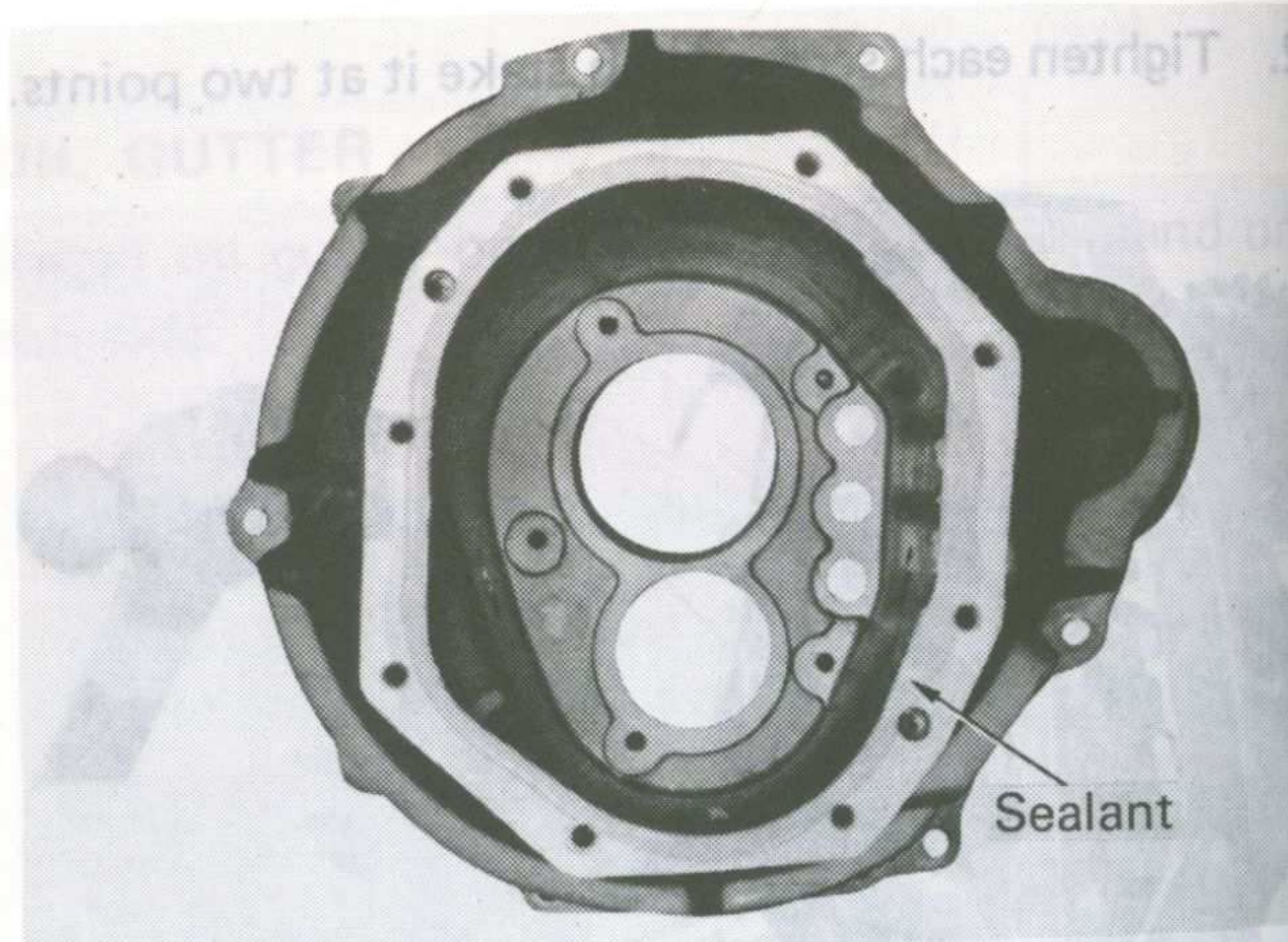


SMT990

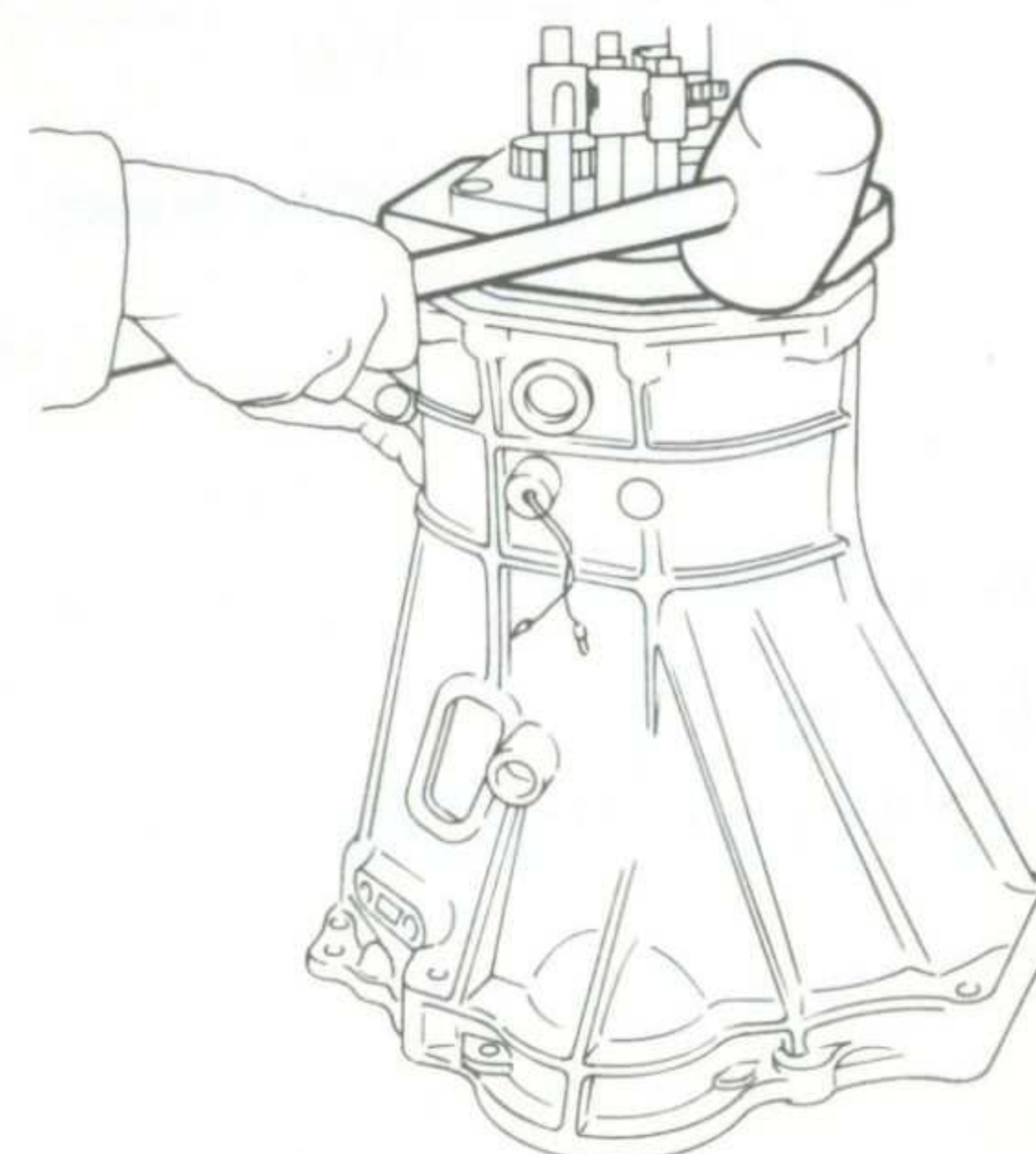


SMT991

2. Apply sealant to mating surface of transmission case.



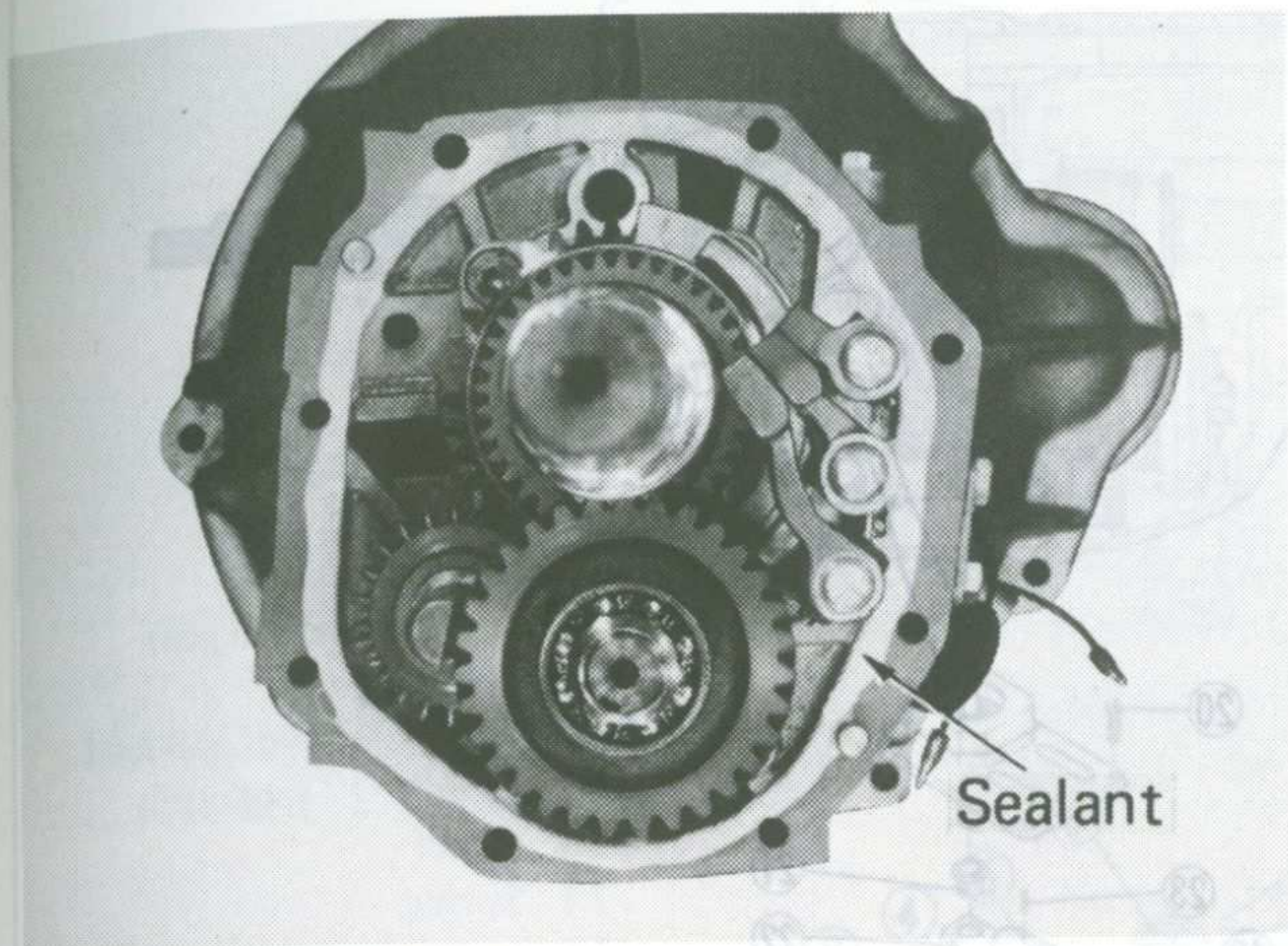
3. Slide gear assembly onto adapter plate by lightly tapping with a soft hammer.



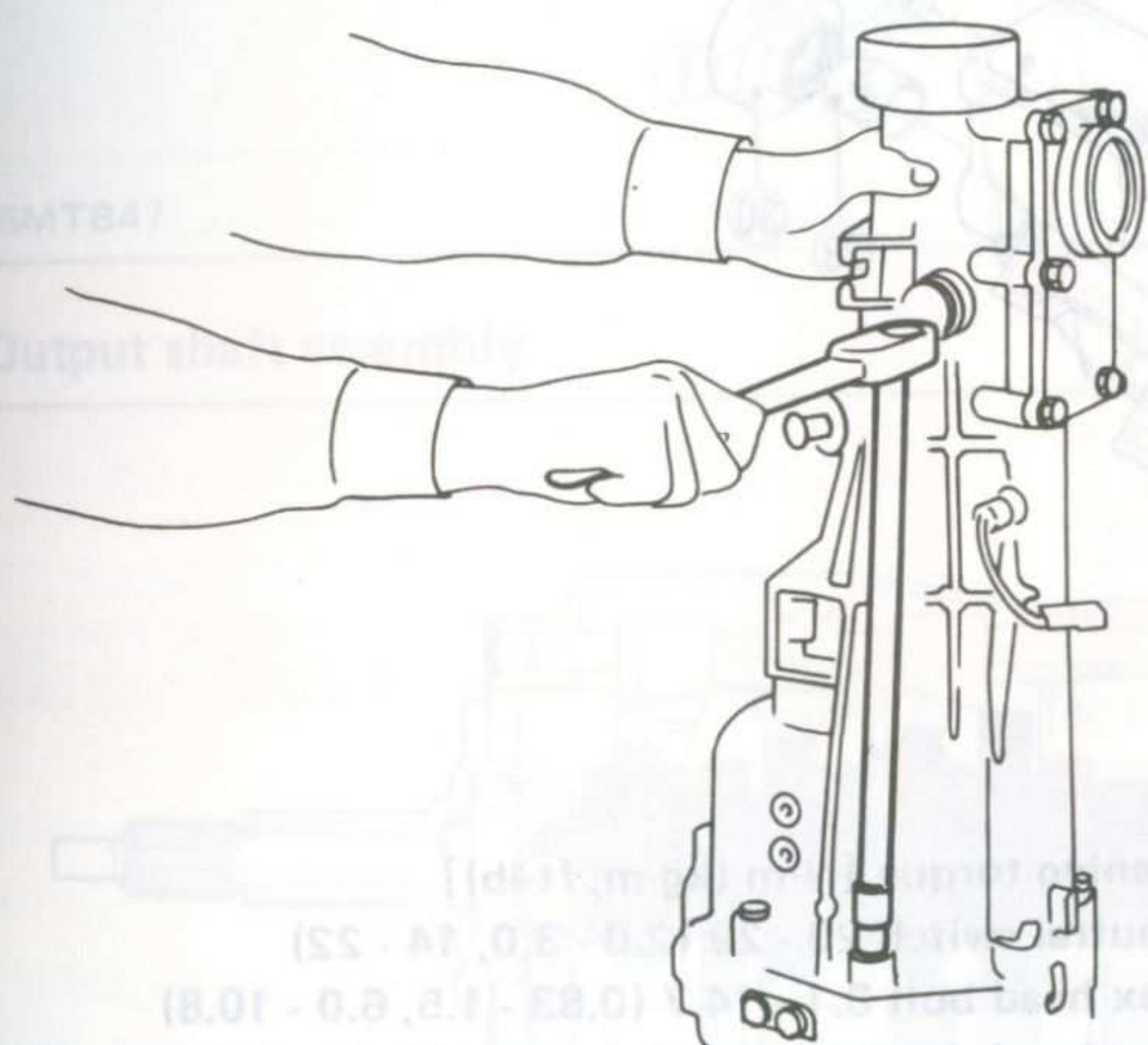
SMT013

ASSEMBLY—FS5W71C

4. Apply sealant to mating surface of adapter plate.

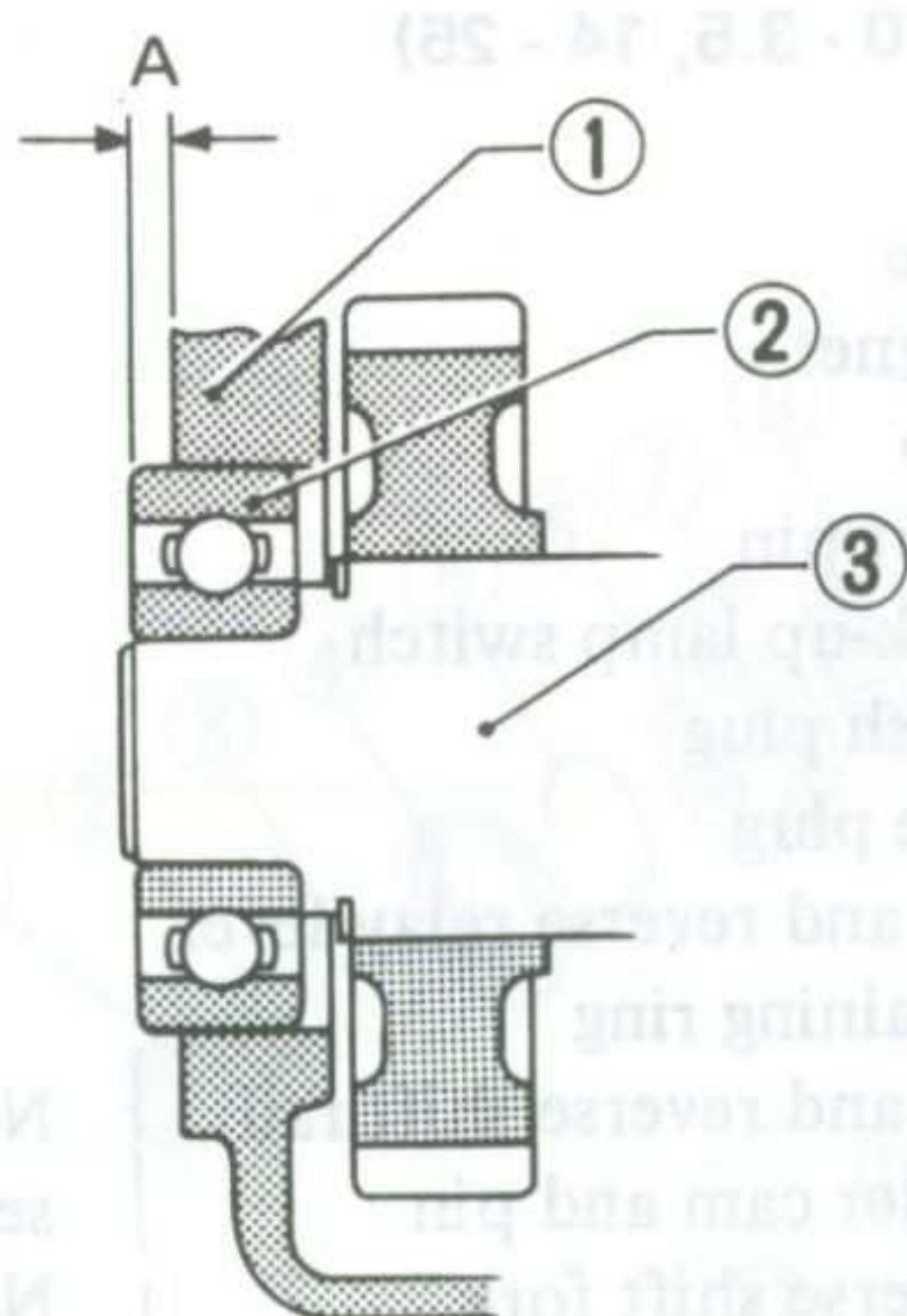


5. Install rear extension.



SMT993

6. Fit main drive bearing snap ring.
7. Select countershaft front bearing shim.



A: Distance from bearing surface to transmission case

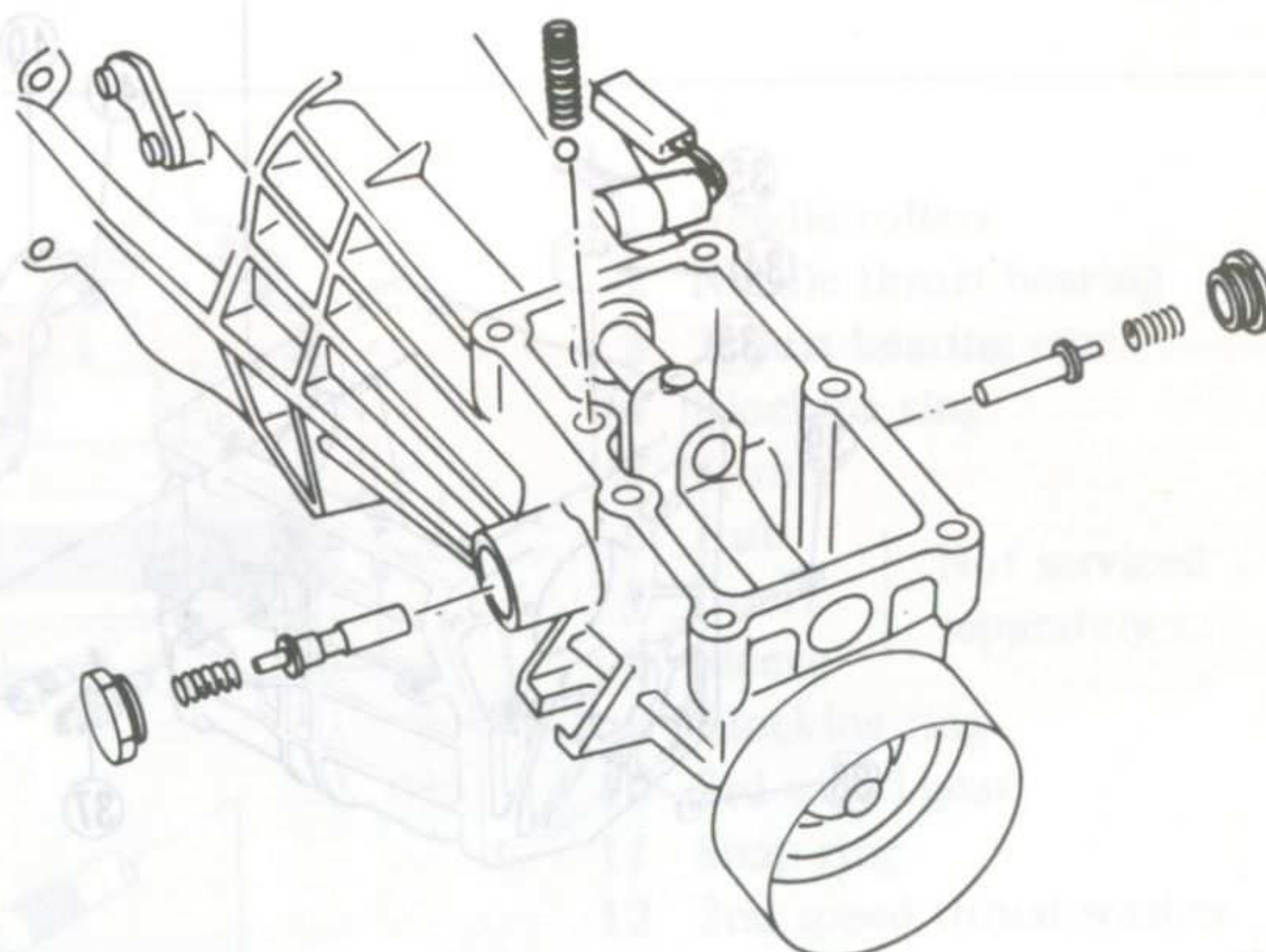
- 1 Transmission case
- 2 Counter gear front bearing
- 3 Counter gear

TM371

Unit: mm (in)

"A"	Thickness of shim	Part number
4.52 - 4.71 (0.1780 - 0.1854)	Not necessary	
4.42 - 4.51 (0.1740 - 0.1776)	0.1 (0.004)	32218-V5000
4.32 - 4.41 (0.1701 - 0.1736)	0.2 (0.008)	32218-V5001
4.22 - 4.31 (0.1661 - 0.1697)	0.3 (0.012)	32218-V5002
4.12 - 4.21 (0.1622 - 0.1657)	0.4 (0.016)	32218-V5003
4.02 - 4.11 (0.1583 - 0.1618)	0.5 (0.020)	32218-V5004
3.92 - 4.01 (0.1543 - 0.1579)	0.6 (0.024)	32218-V5005

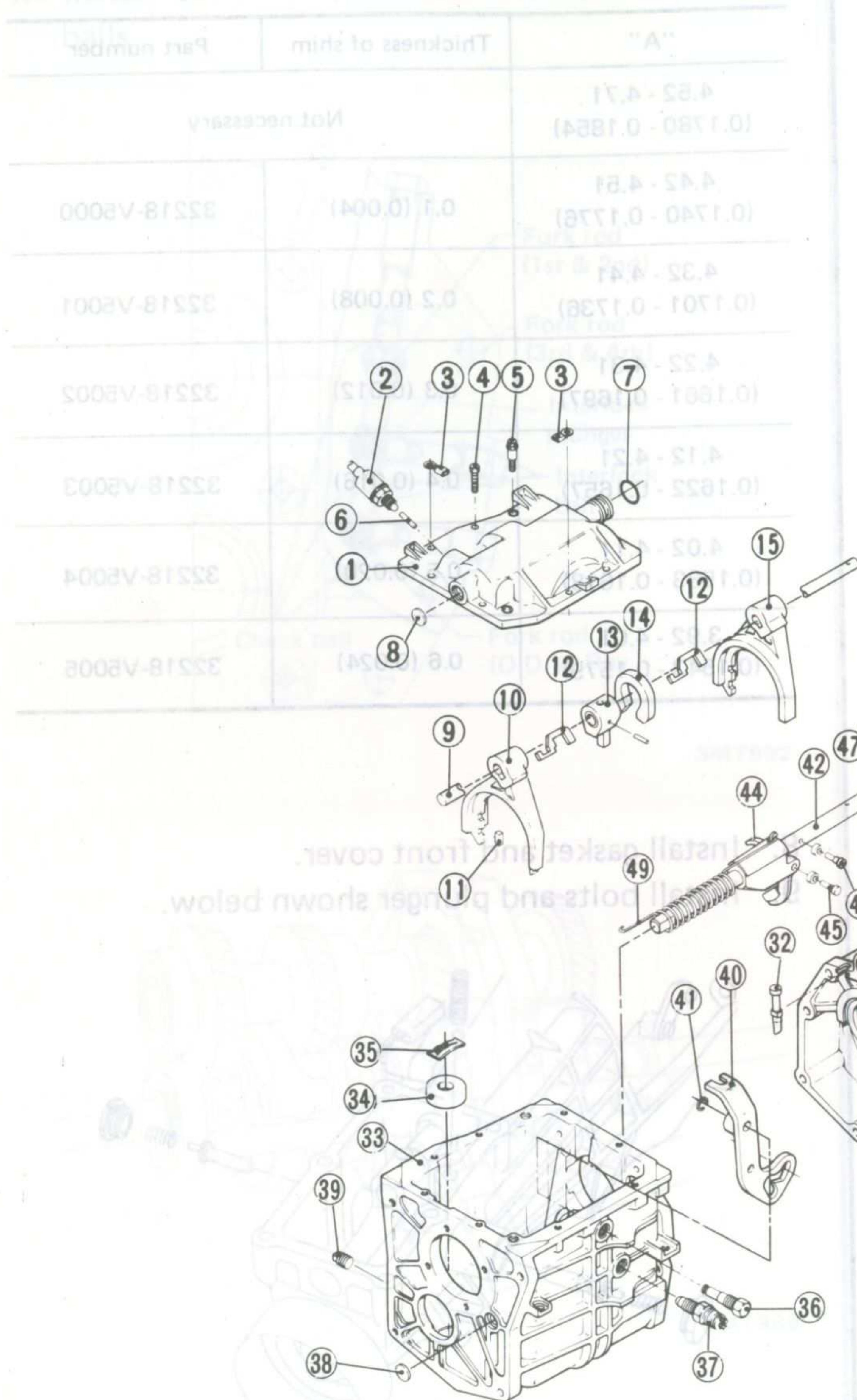
8. Install gasket and front cover.
9. Install bolts and plunger shown below.



SMT982

5-SPEED TRANSMISSION [Model : BW T-5 (FS5R90A)]

Case, shift cover, extension housing



Tightening torque [N·m (kg·m, ft·lb)]

- 2 Neutral switch 20 - 29 (2.0 - 3.0, 14 - 22)
 4 Hex head bolt 8.1 - 14.7 (0.83 - 1.5, 6.0 - 10.8)
 5 Hex head shoulder bolt 8.1 - 14.7 (0.83 - 1.5, 6.0 - 10.8)
 20 Control housing screw 15 - 27 (1.5 - 2.8, 11 - 20)
 31 Hex head flanged bolt 27 - 62 (2.8 - 6.3, 20 - 46)
 36 Pivot pin 21 - 33 (2.1 - 3.4, 15 - 25)
 37 Back-up lamp switch 17 - 24 (1.7 - 2.4, 12 - 17)
 Drain plug 20 - 34 (2.0 - 3.5, 14 - 25)

SMT846

- 1 Case cover
 2 Neutral switch
 3 Wiring clip
 4 Hex head bolt
 5 Hex head shoulder bolt
 6 Pin
 7 O-ring
 8 Welsh plug
 9 Shifter shaft
 10 3-4 shift fork
 11 Shift fork insert
 12 Selector plate
 13 Control selector arm
 14 Interlock plate
 15 1-2 shift fork
 16 Boot retainer

- 17 Boot
 18 Boot retainer
 19 Control lever/housing assembly
 20 Control housing screw
 21 Damper sleeve
 22 Offset lever
 23 Spring-pin
 24 Detent spring
 25 Ball
 26 Extension housing
 27 Detent & guide plate
 28 Bushing
 29 Cup plug
 30 Oil seal
 31 Hex head flanged bolt
 32 Breather

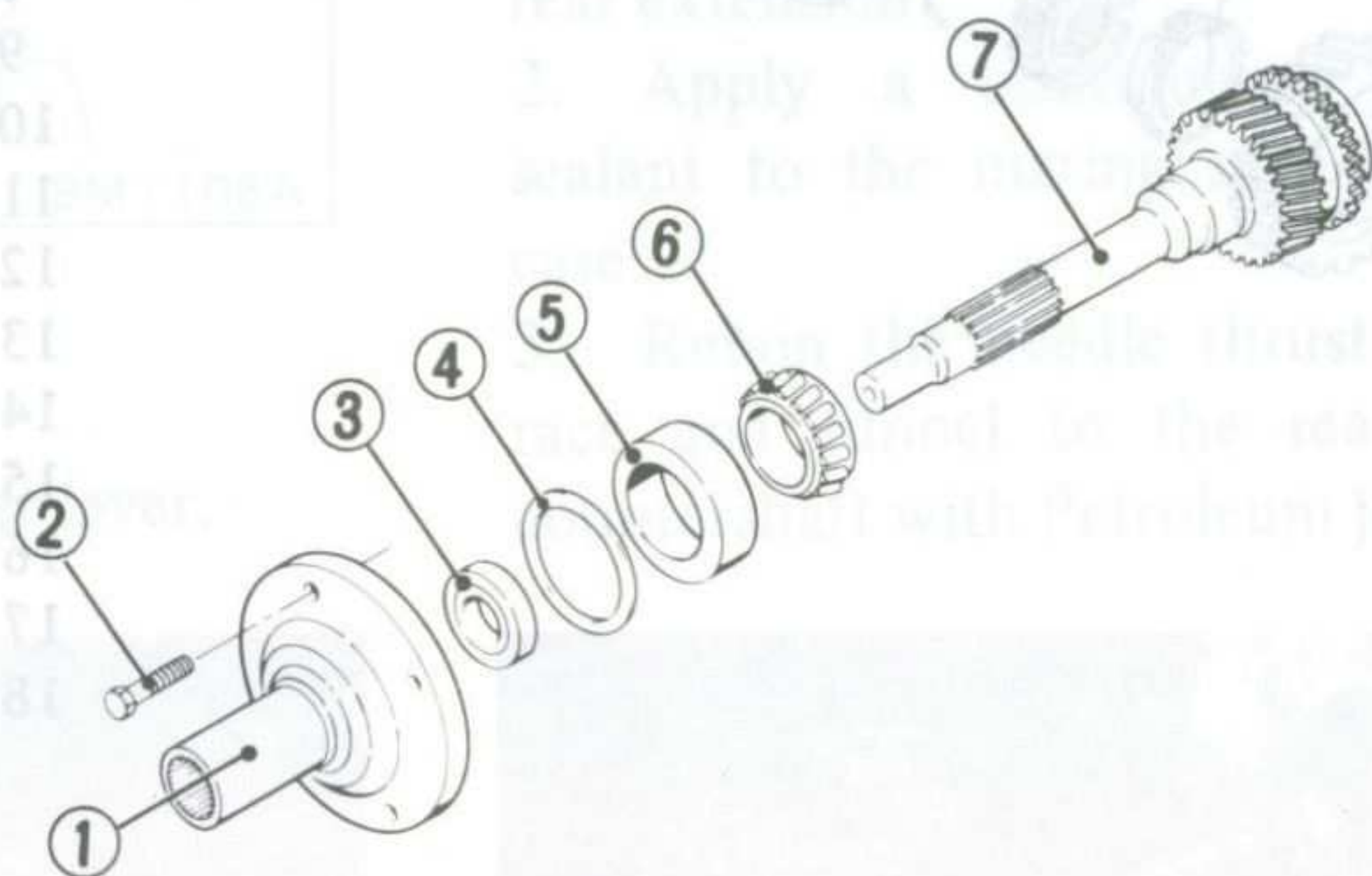
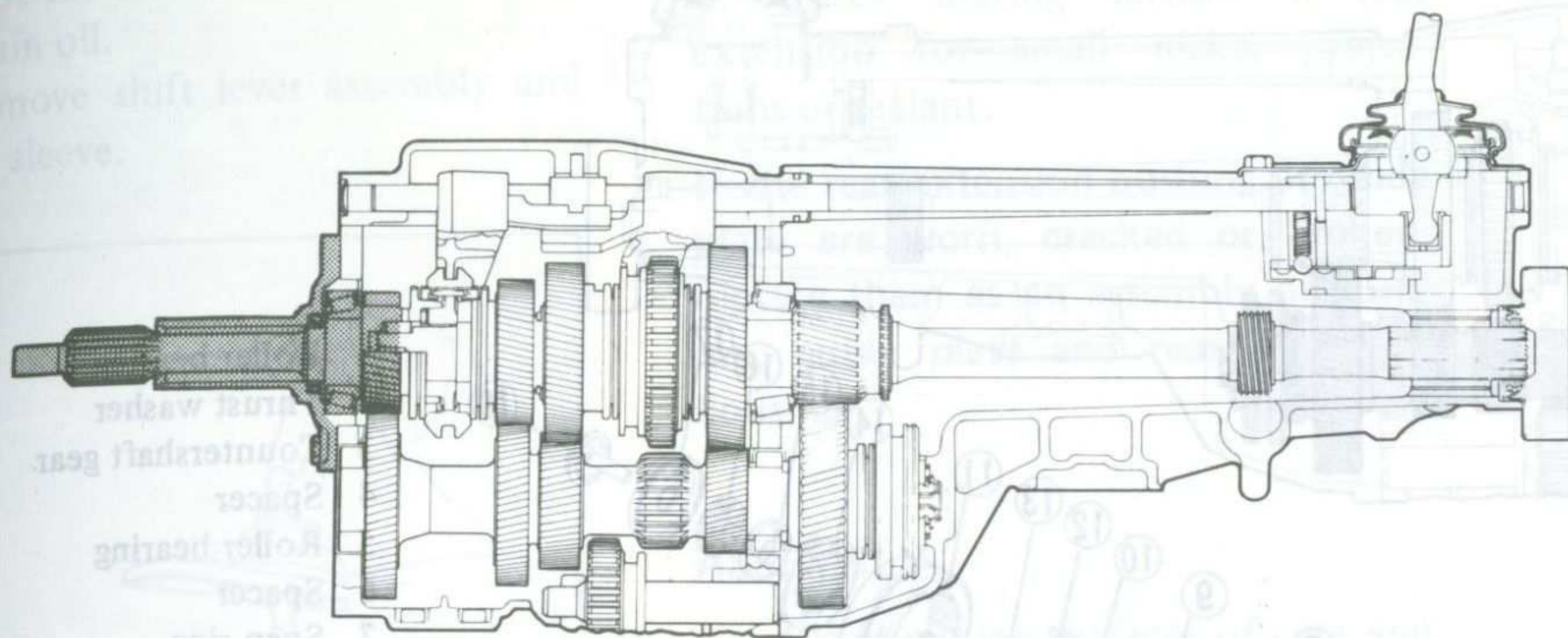
Not serviced
separately

- 33 Case
 34 Magnet
 35 Clip
 36 Pivot pin
 37 Back-up lamp switch
 38 Welsh plug
 39 Pipe plug
 40 5th and reverse relay lever
 41 Retaining ring
 42 5th and reverse shift rail
 43 Roller cam and pin
 44 Reverse shift fork
 45 Roller cam and pin
 46 5th gear shift fork
 47 Insert
 48 Spring-pin
 49 Spring

Not serviced
separately
Not serviced
separately

5-SPEED TRANSMISSION [Model: BW T-5 (FS5R90A)]

Input shaft assembly

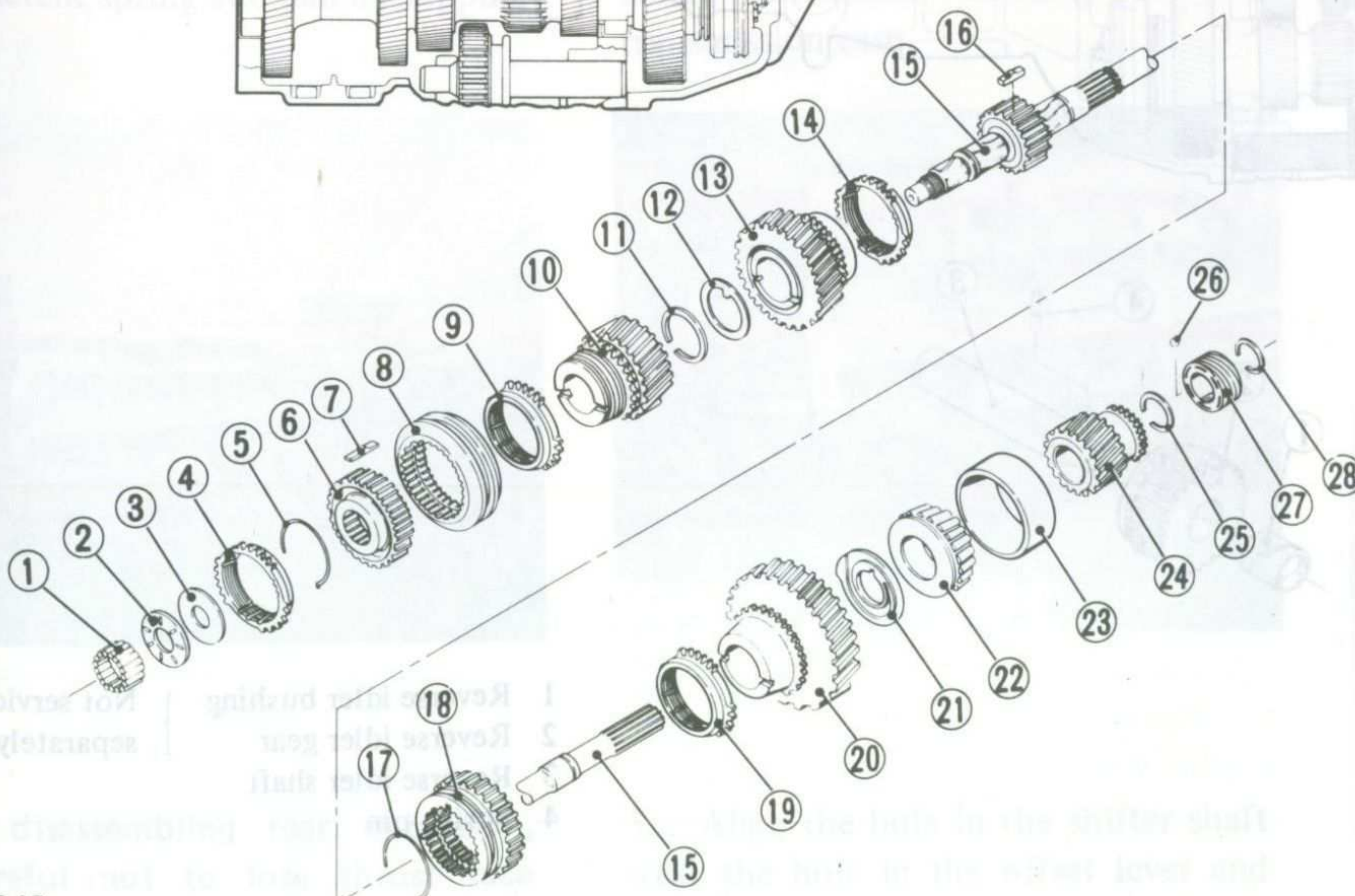
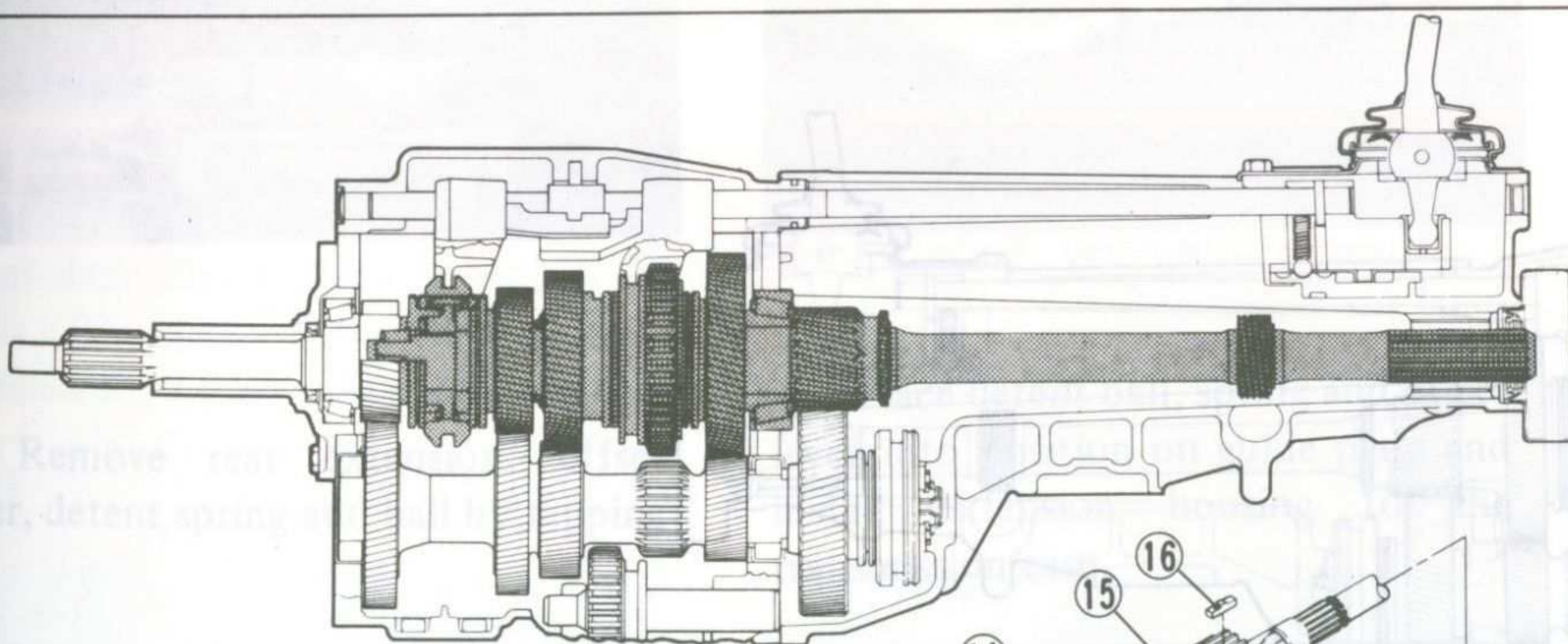


- 1 Input shaft bearing retainer
- 2 Hex head bolt
- 3 Seal
- 4 Shim
- 5 Bearing cup
- 6 Bearing cone
- 7 Input shaft (main drive gear)

SMT847

T : 2 (Hex head bolt) 15 - 27 N·m (1.5 - 2.8 kg-m, 11 - 20 ft-lb)

Output shaft assembly

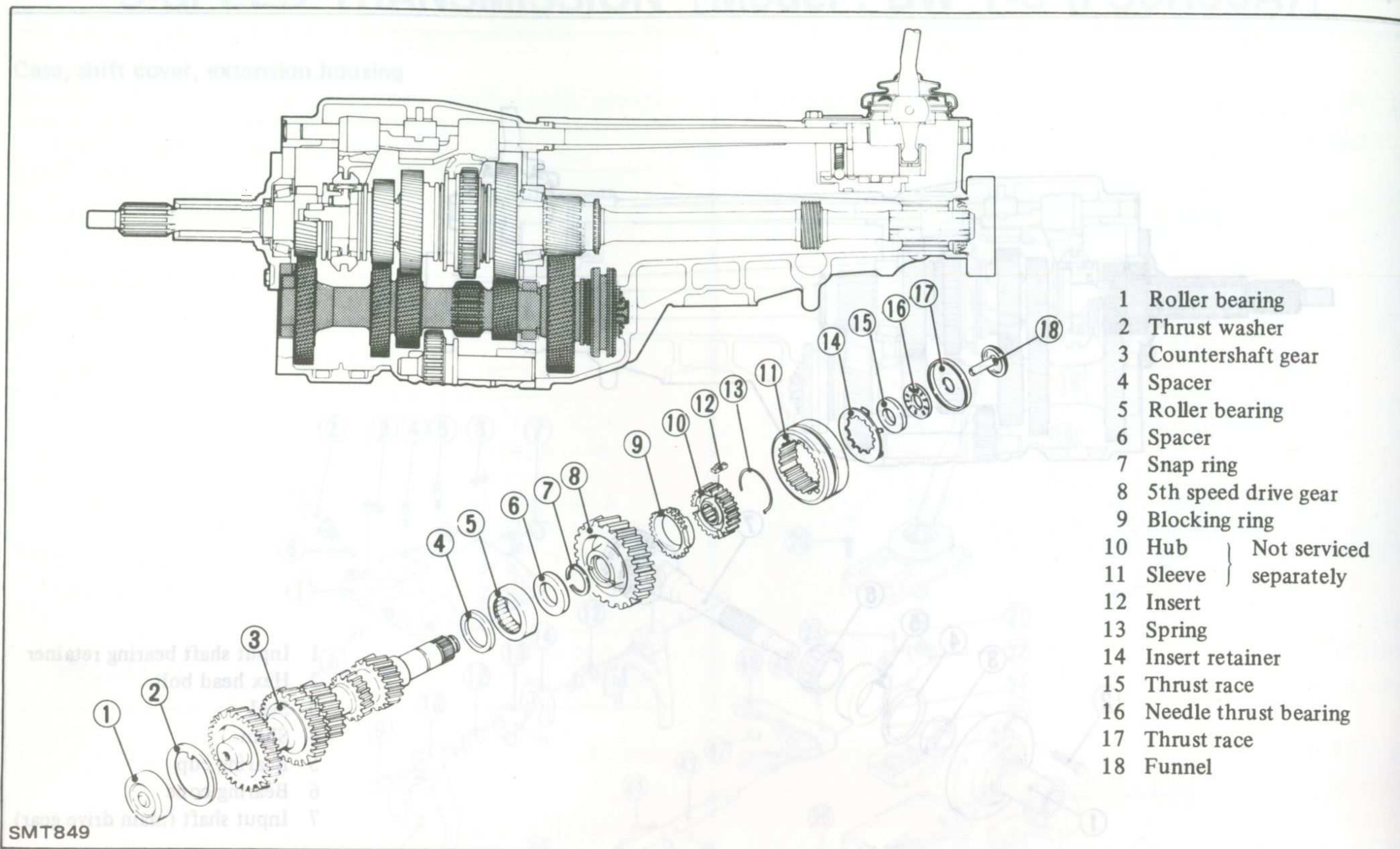


- 1 Needle rollers
- 2 Needle thrust bearing
- 3 Thrust bearing race
- 4 Blocking ring
- 5 Spring
- 6 Hub
- 7 Insert
- 8 Sleeve
- 9 Blocking ring
- 10 3rd speed gear
- 11 Snap ring
- 12 2nd speed thrust washer
- 13 2nd speed gear
- 14 Blocking ring
- 15 Output shaft and hub assembly
- 16 Insert
- 17 Spring
- 18 Reverse sliding gear
- 19 Blocking ring
- 20 1st speed gear
- 21 Thrust washer
- 22 Bearing cone
- 23 Bearing cup
- 24 5th speed driven gear
- 25 Snap ring
- 26 Ball
- 27 Speedometer gear
- 28 Snap ring

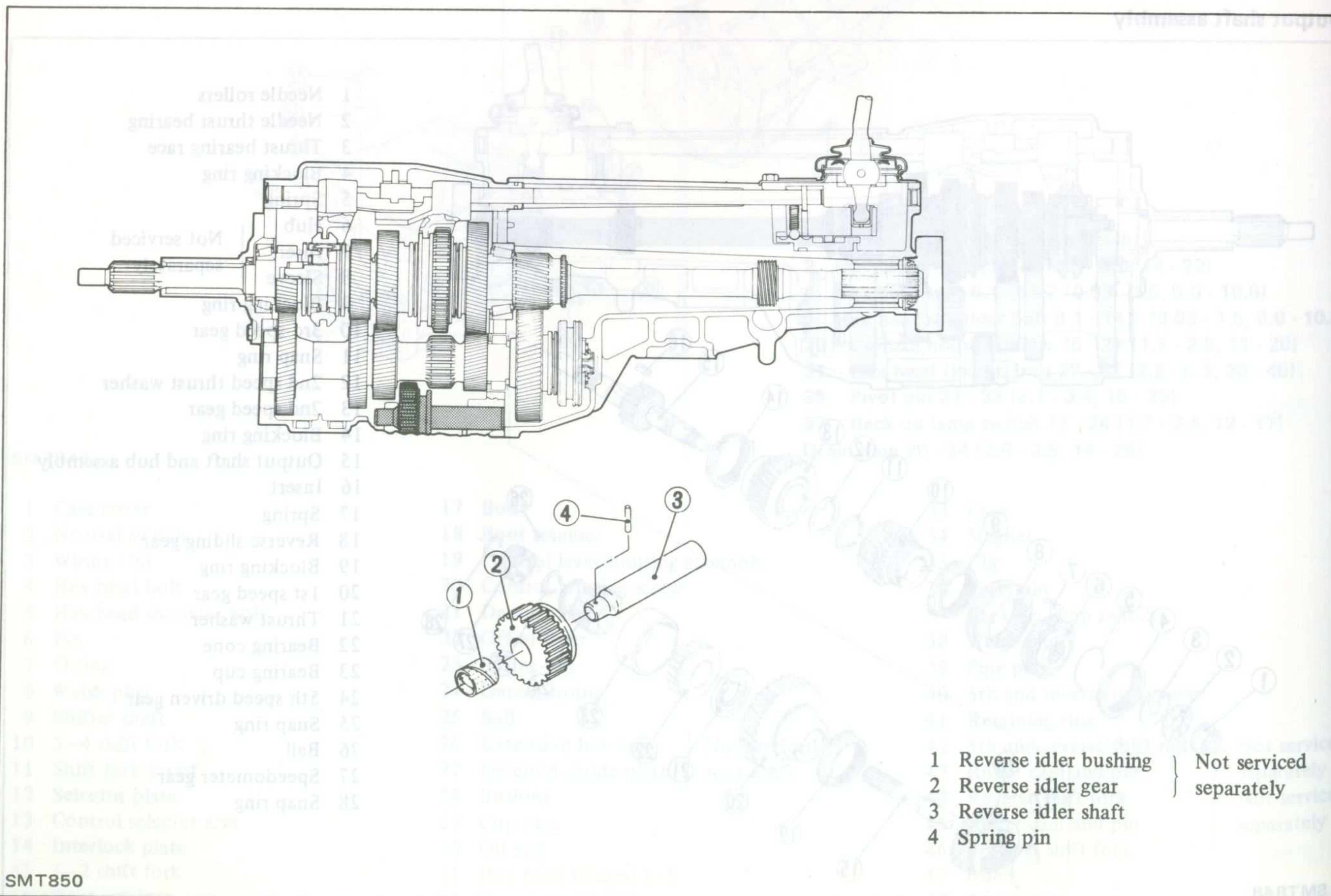
SMT848

SMT850

Countershaft assembly

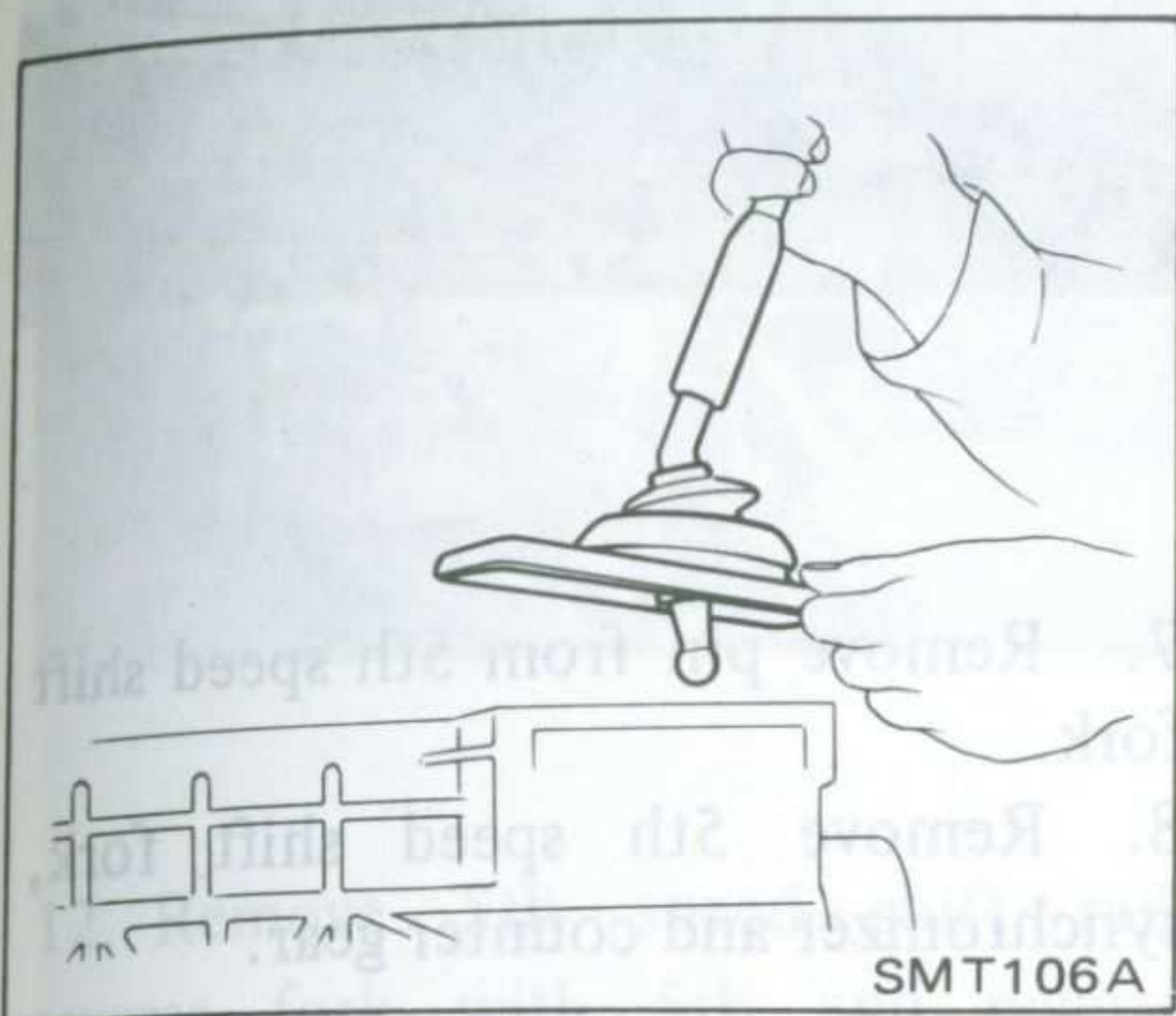


Reverse idler assembly



REAR EXTENSION DISASSEMBLY

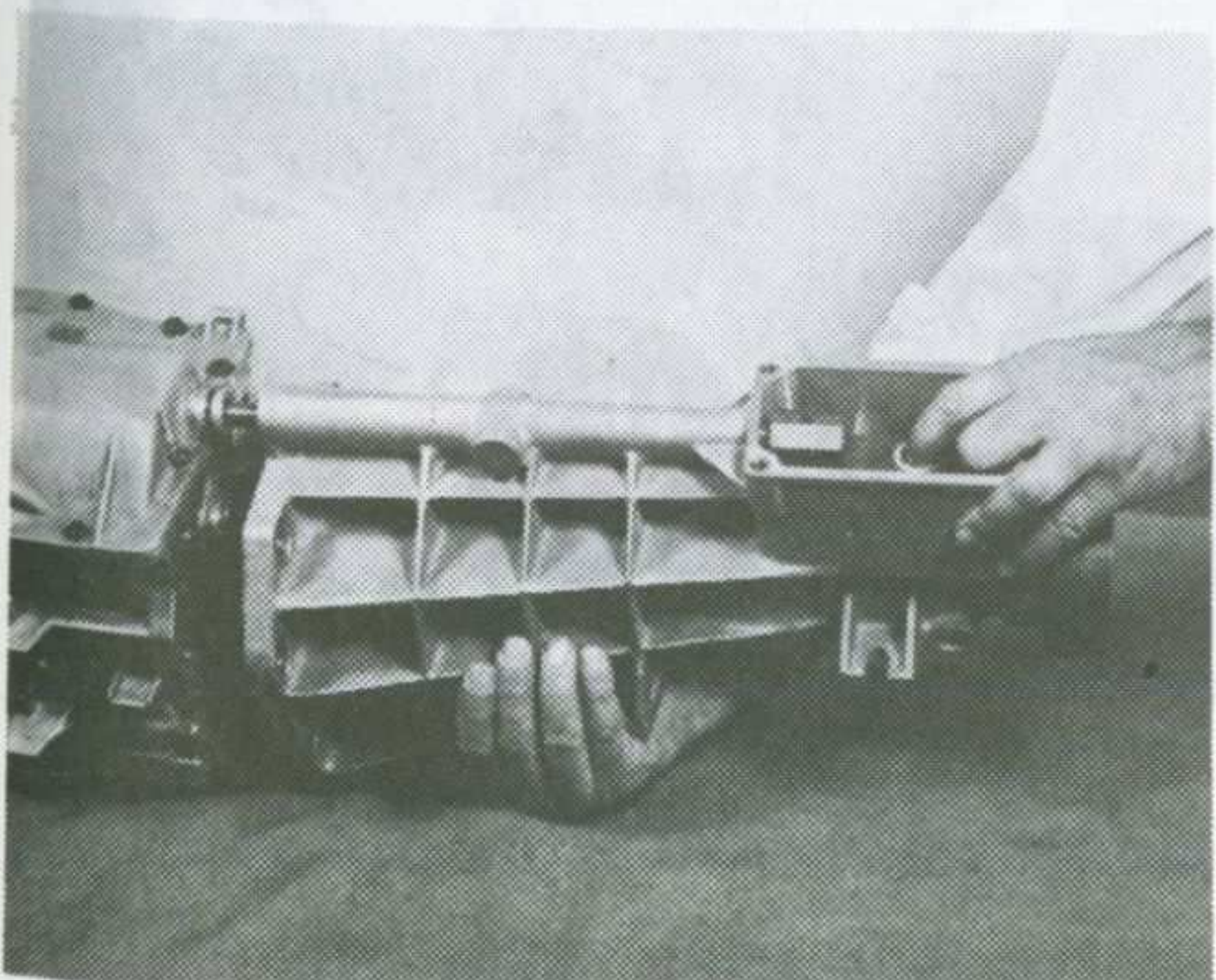
1. Wipe off dirt and grease.
2. Drain oil.
3. Remove shift lever assembly and damper sleeve.



4. Remove pin from offset lever.



5. Remove rear extension, offset lever, detent spring and ball by tapping it.



When disassembling rear extension, be careful not to lose thrust race and funnel.

INSPECTION

1. Clean with solvent and check for cracks.
2. Check mating surface of rear extension for small nicks, projections or sealant.

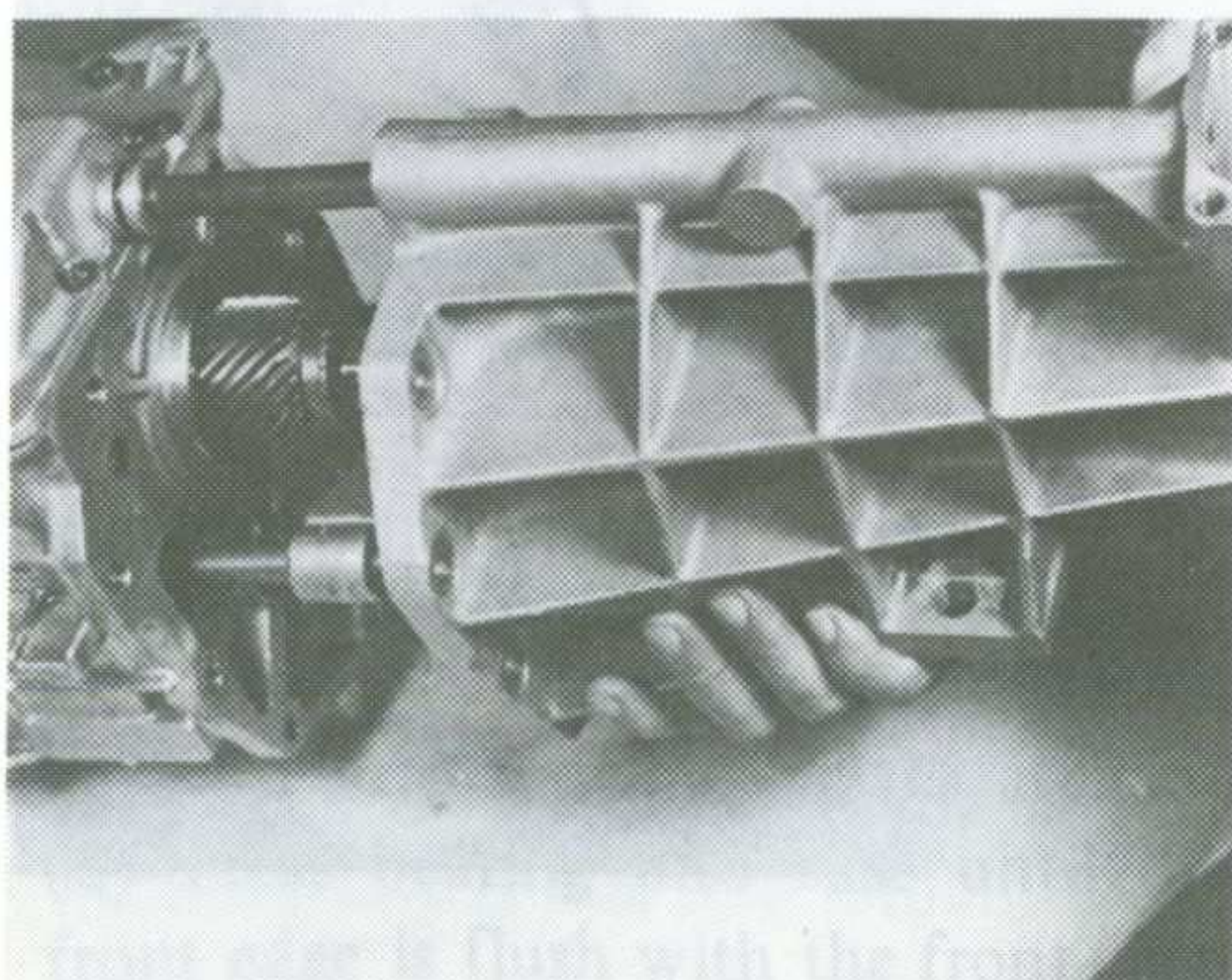
If the rear extension bushing or guide plate are worn, cracked or broken, replace them as an assembly of bushing, guide plate and rear extension housing.

ASSEMBLY

1. Clean mating surfaces of case and rear extension.
2. Apply a continuous bead of sealant to the mating surface of the case.
3. Retain the needle thrust bearing, race and funnel to the rear of the countershaft with Petroleum jelly.



4. Place detent ball, spring and offset lever into position on guide plate and install extension housing to the transmission case.



5. Align the hole in the shifter shaft with the hole in the offset lever and install the retaining pin.

6. Install rear extension bolts to transmission case.

T : 27 - 62 N·m
(2.8 - 6.3 kg-m,
20 - 46 ft-lb)

7. Apply a continuous bead of sealant to shift cover opening of rear extension.

8. Assemble damper sleeve into offset lever and install shift lever.

T : 20 - 34 N·m
(2.0 - 3.5 kg-m,
14 - 25 ft-lb)

9. Make sure that gears operate smoothly.

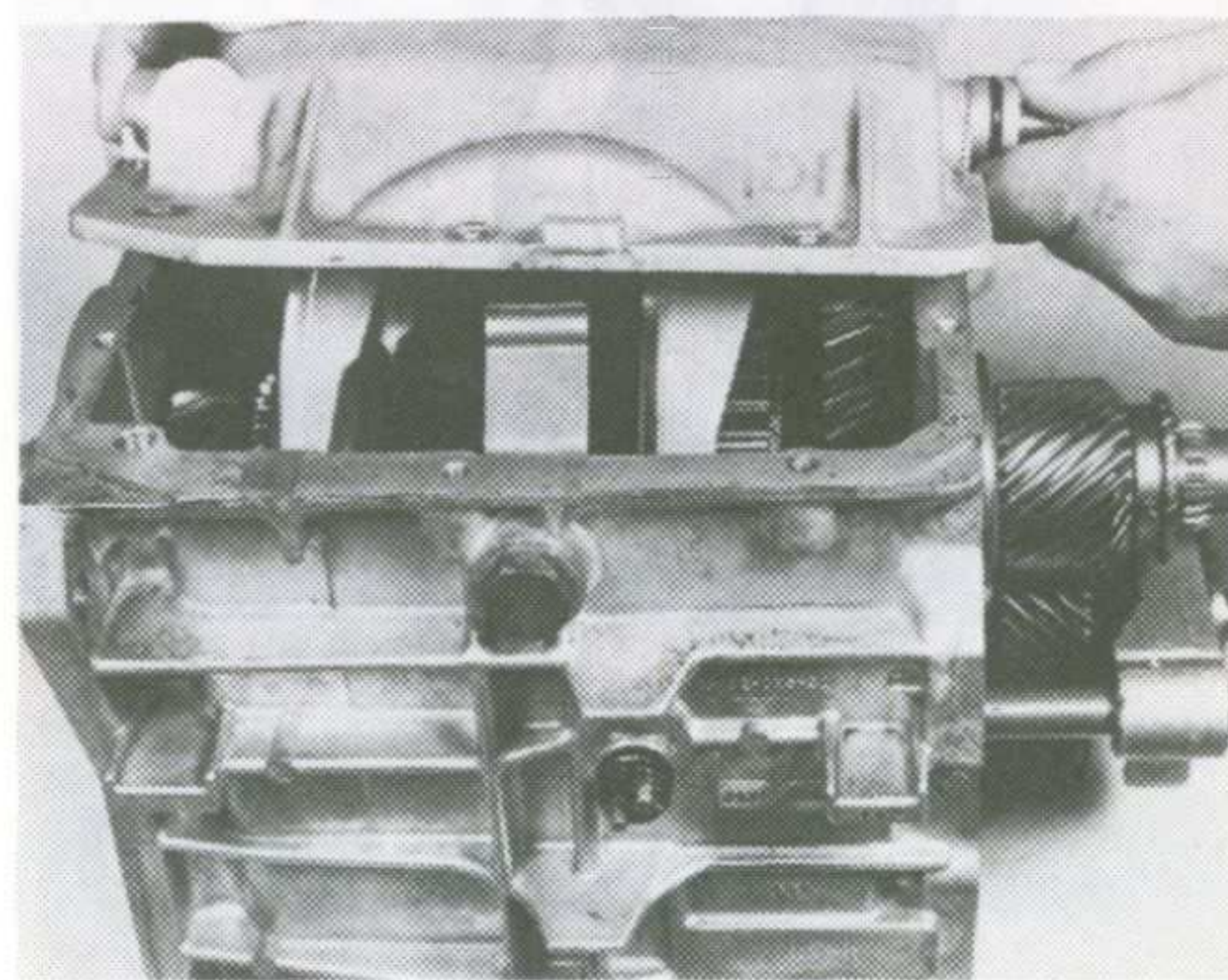
10. Apply sealant to thread and install drain plug.

T : 20 - 34 N·m
(2.0 - 3.5 kg-m,
14 - 25 ft-lb)

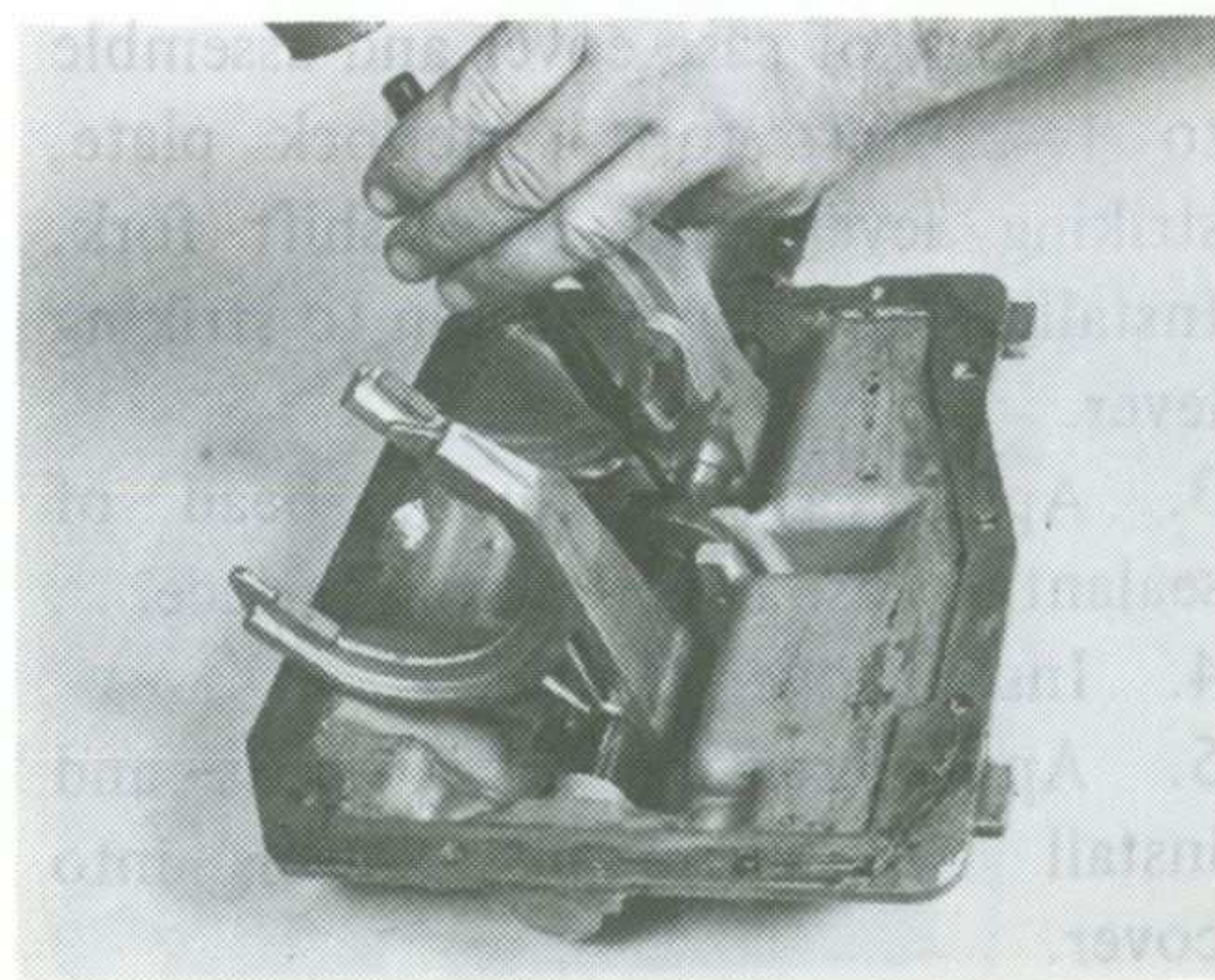
CASE COVER

DISASSEMBLY

1. Remove rear extension. Refer to rear extension for disassembly.
2. Remove cover bolts and cover by tapping it with driver. Slide cover to right side of case and lift.



3. Pull shifter shaft to rear and remove striking lever to shifter shaft roll pin.

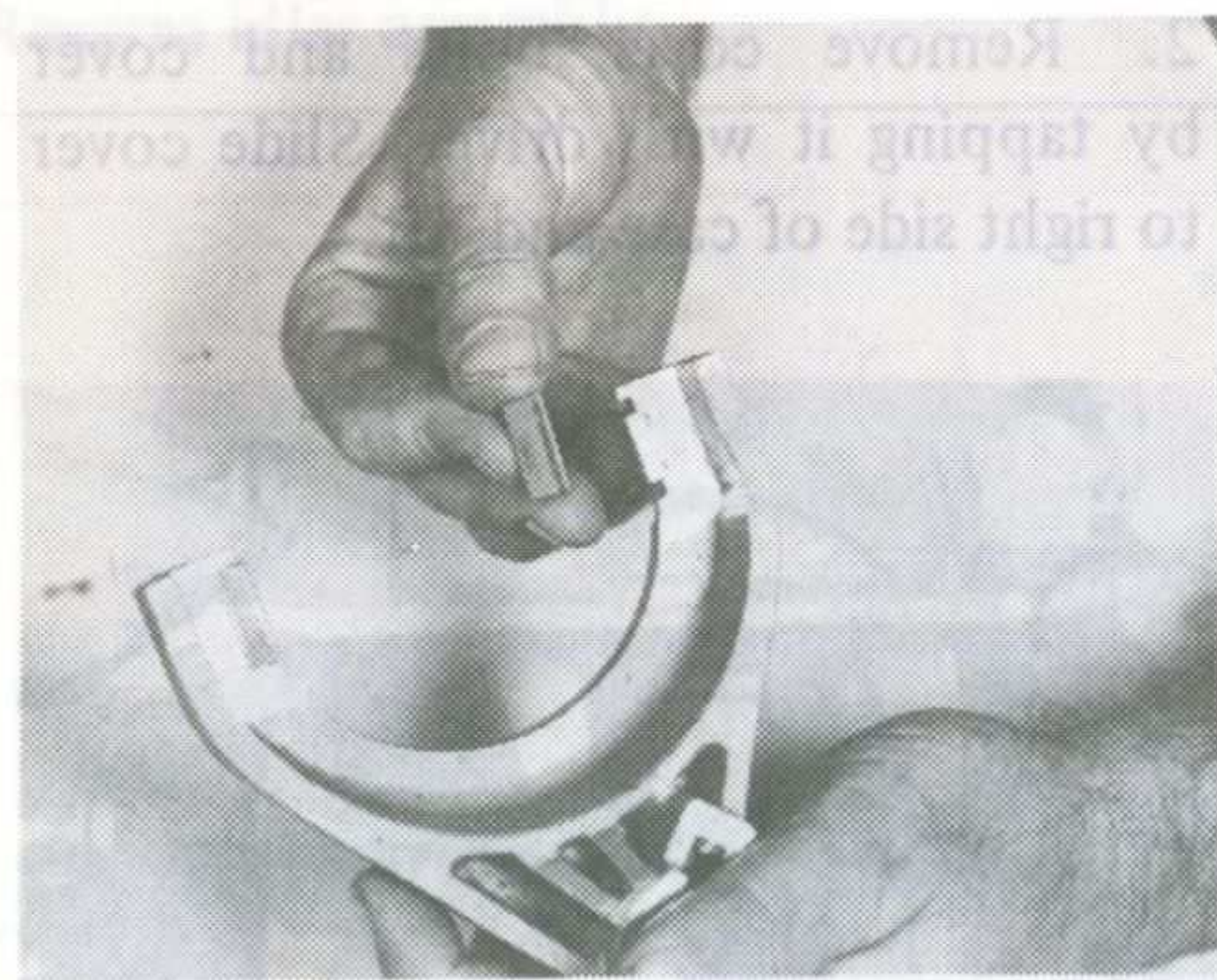


4. Remove shifter shaft through rear of case cover.
5. Slide selector plates from shift fork assemblies.



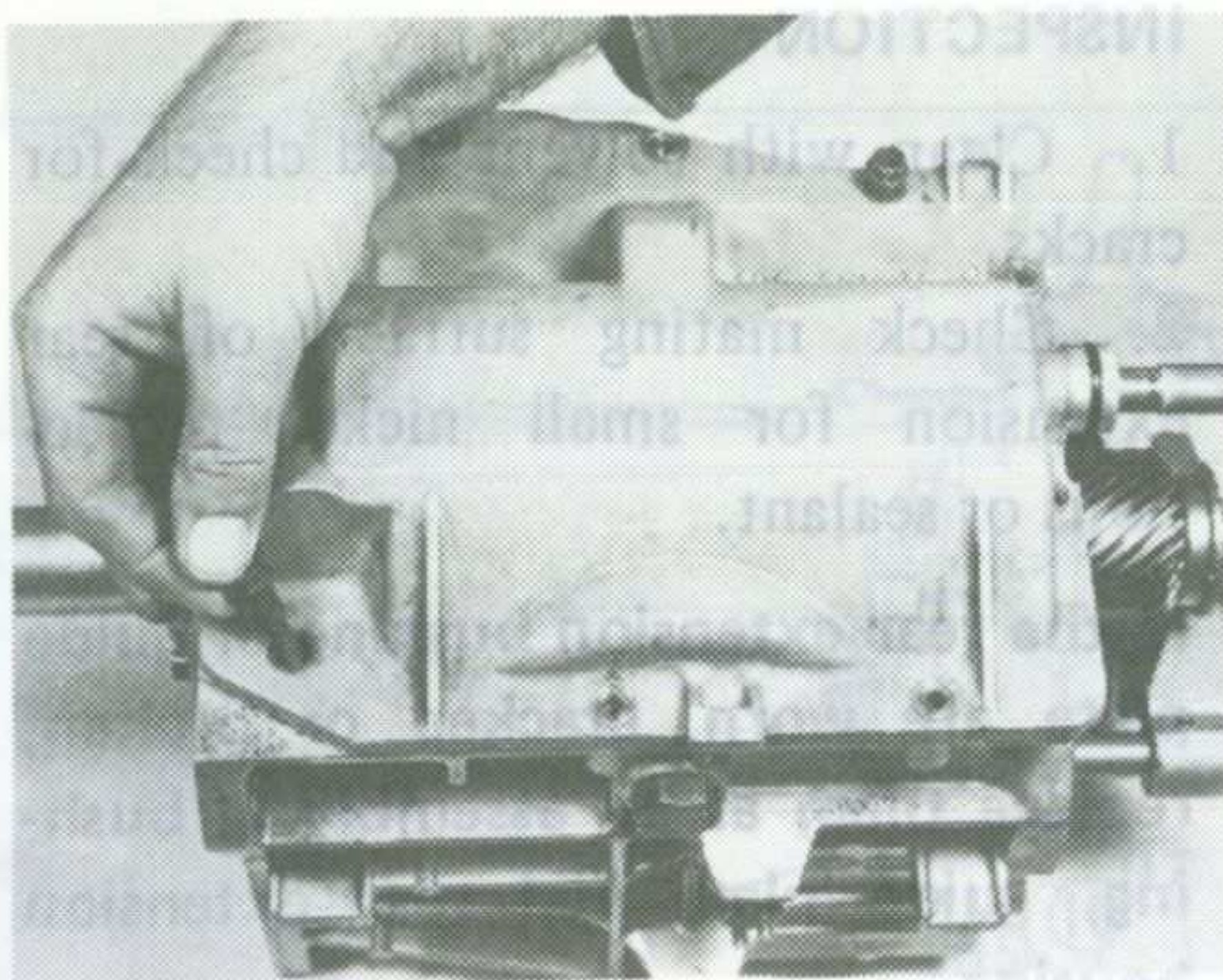
INSPECTION

1. Clean with solvent and check for wear, scratches, projections, damage, breakage or other faulty conditions. Replace any part which is worn or damaged.
2. Inspect shift fork inserts for wear or damage. Replace if necessary.



ASSEMBLY

1. Assemble selector plates to shift fork assemblies.
2. Install shifter shaft through opening in rear of case cover and assemble to 1-2 shift fork, interlock plate, striking lever and 3-4 shift fork. Install shifter shaft roll pin to striking lever.
3. Apply a continuous bead of sealant to case cover mating surface.
4. Install cover to case.
5. Apply sealant to threads and install two alignment dowels into cover.



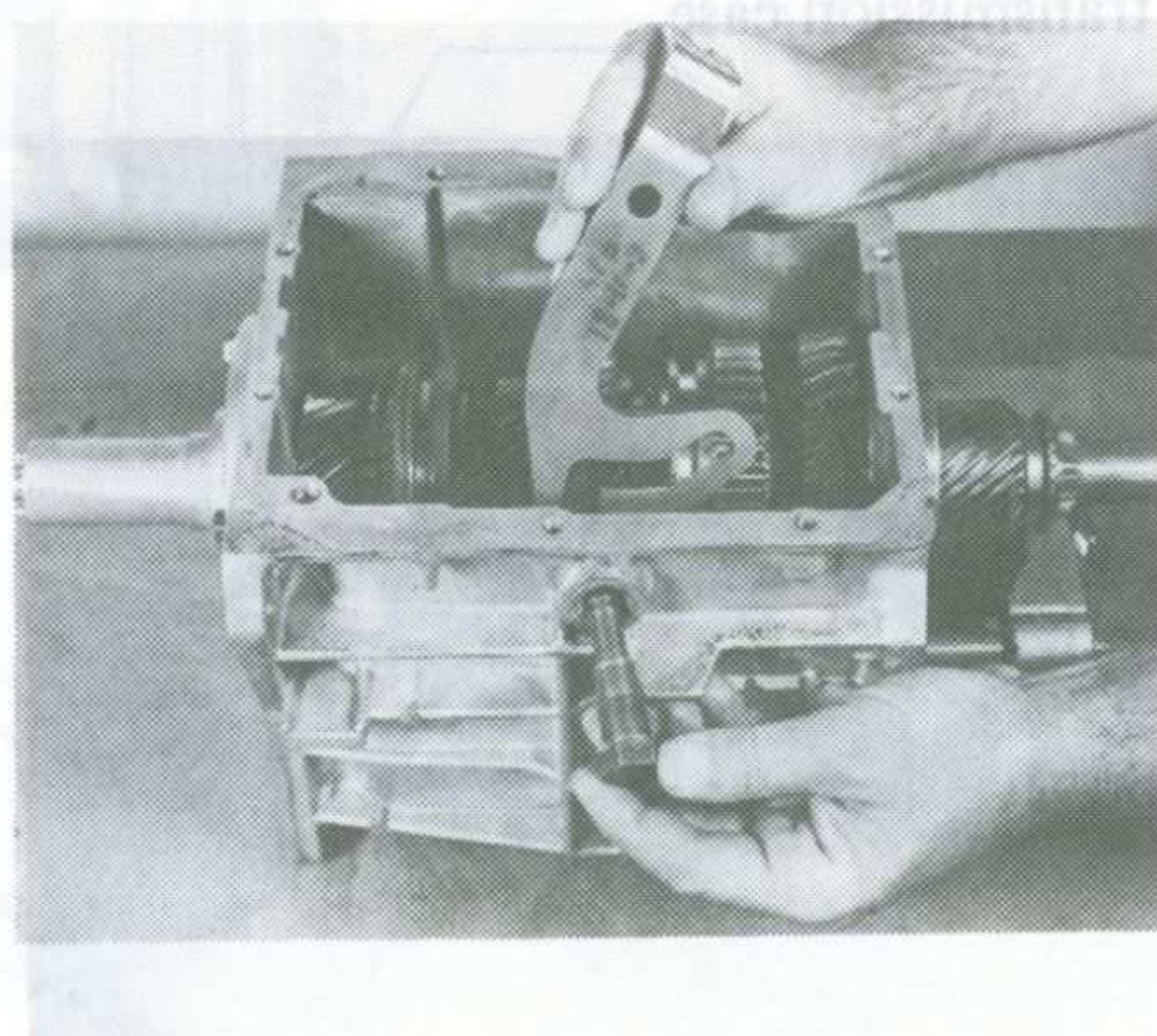
6. Apply sealant to threads and install case cover bolts.

Ⓙ : 8.1 - 14.7 N·m
(0.83 - 1.5 kg-m,
6.0 - 10.8 ft-lb)

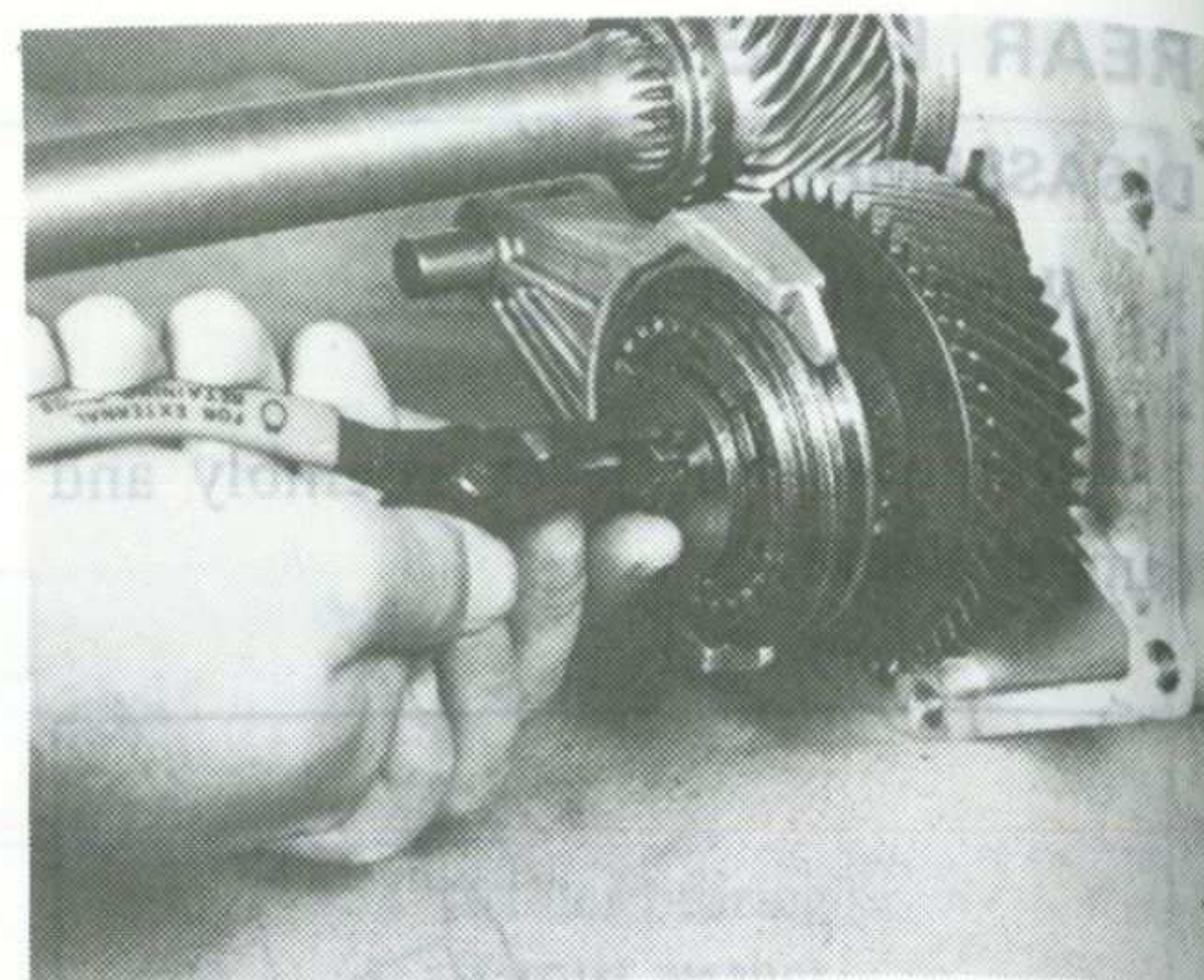
7. Install rear extension. Refer to rear extension for assembly.

TRANSMISSION CASE DISASSEMBLY

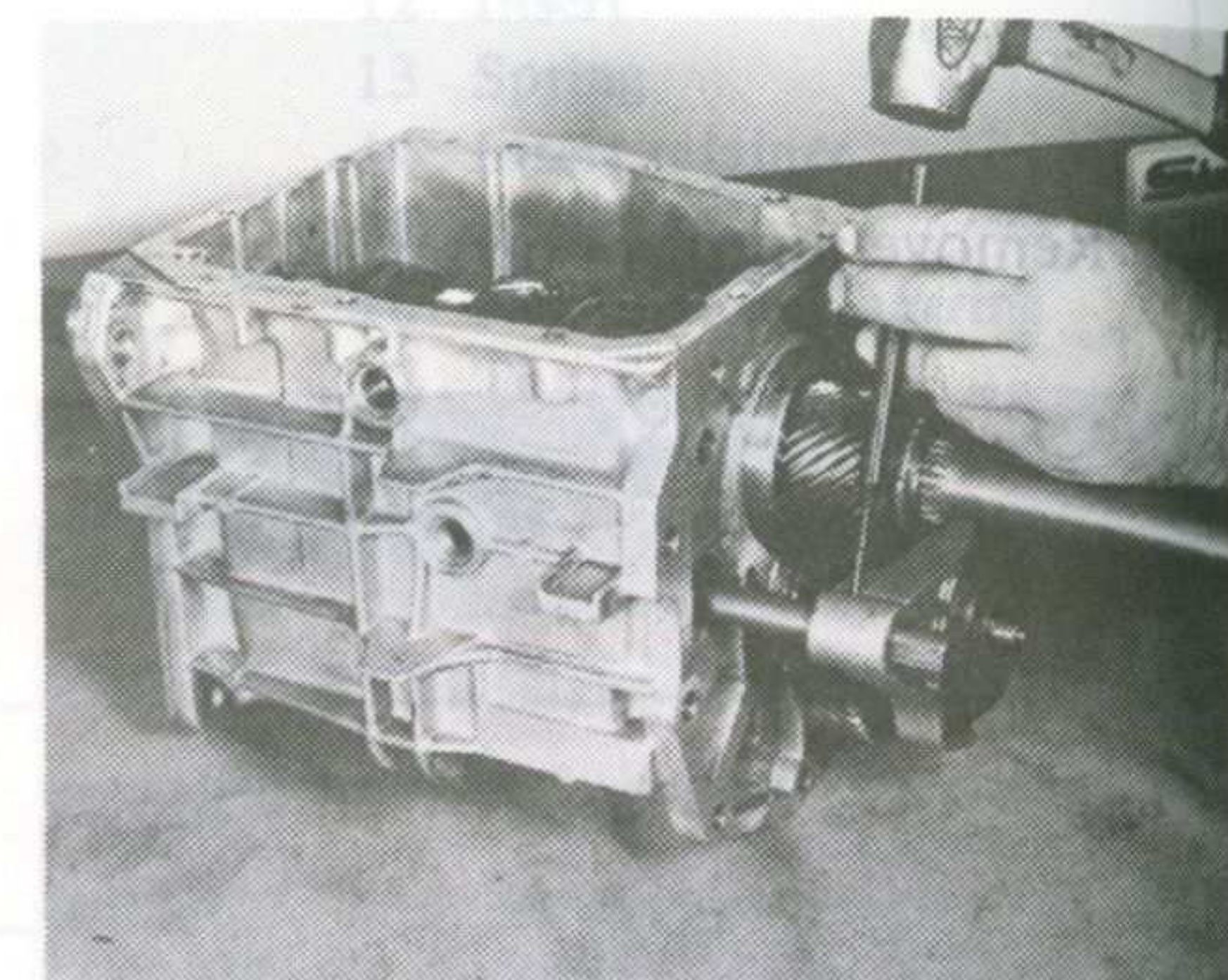
1. Remove rear extension. Refer to rear extension for disassembly.
2. Remove case cover. Refer to case cover for disassembly.
3. Remove back-up light switch.
4. Remove retainer ring and pivot pin.



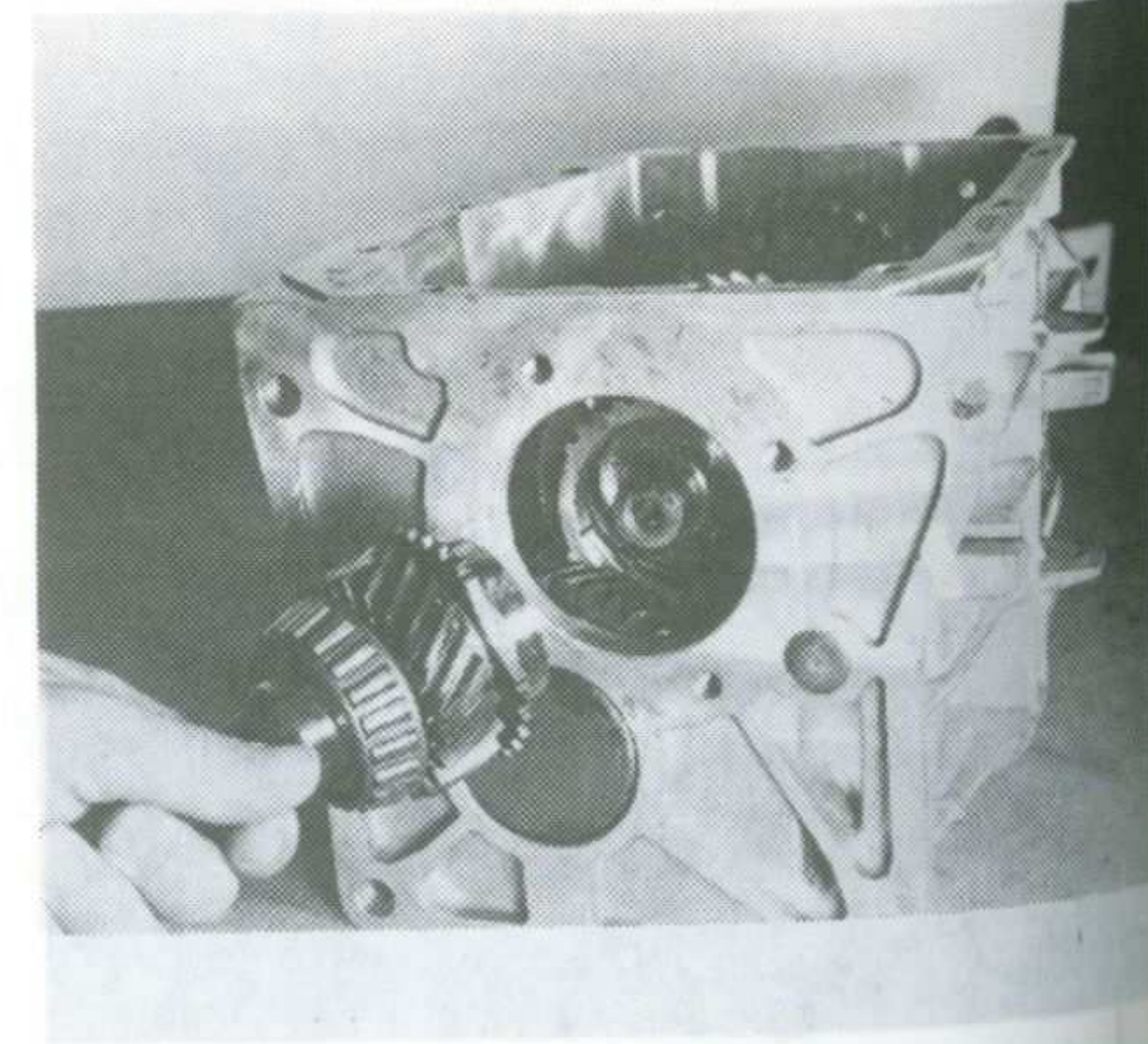
5. Remove funnel, thrust race, and needle thrust bearing.
6. Remove snap ring and thrust race from rear of 5th speed synchronizer hub.



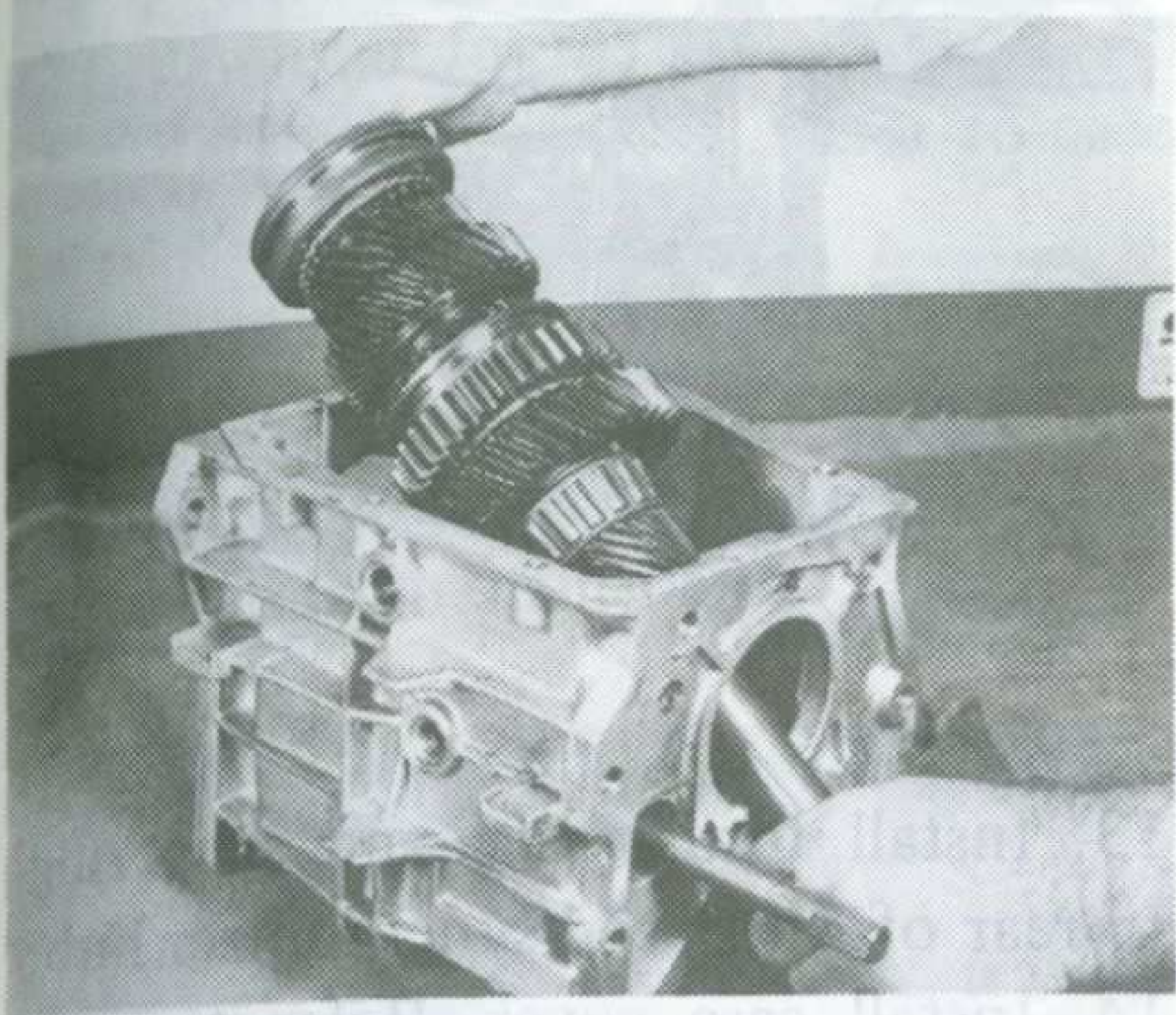
7. Remove pin from 5th speed shift fork.
8. Remove 5th speed shift fork, synchronizer and counter gear.



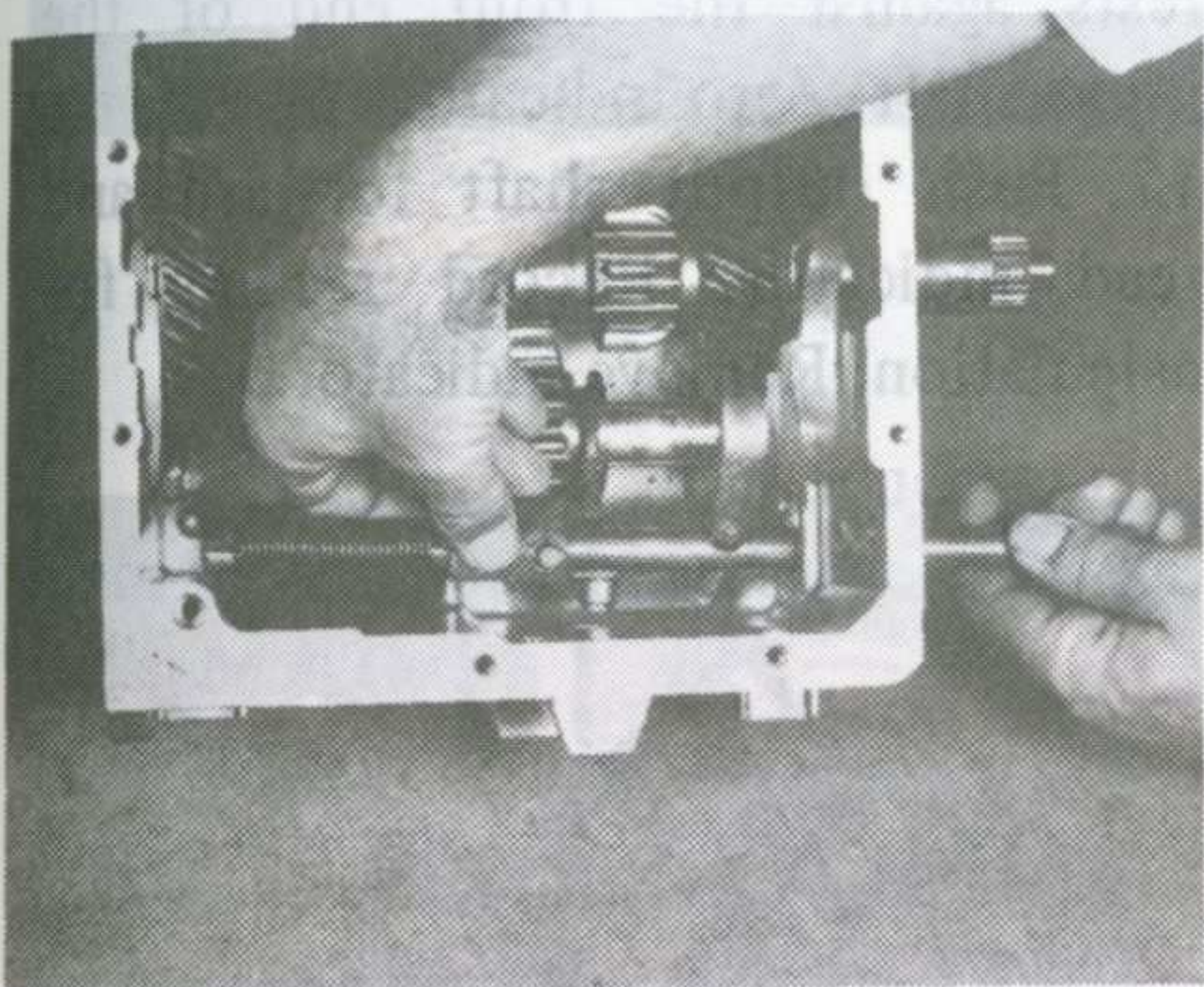
9. Remove front bearing retainer.
10. Remove input shaft and main drive gear assembly. Position flat area of main drive gear toward the counter gear and remove through the front of the case.



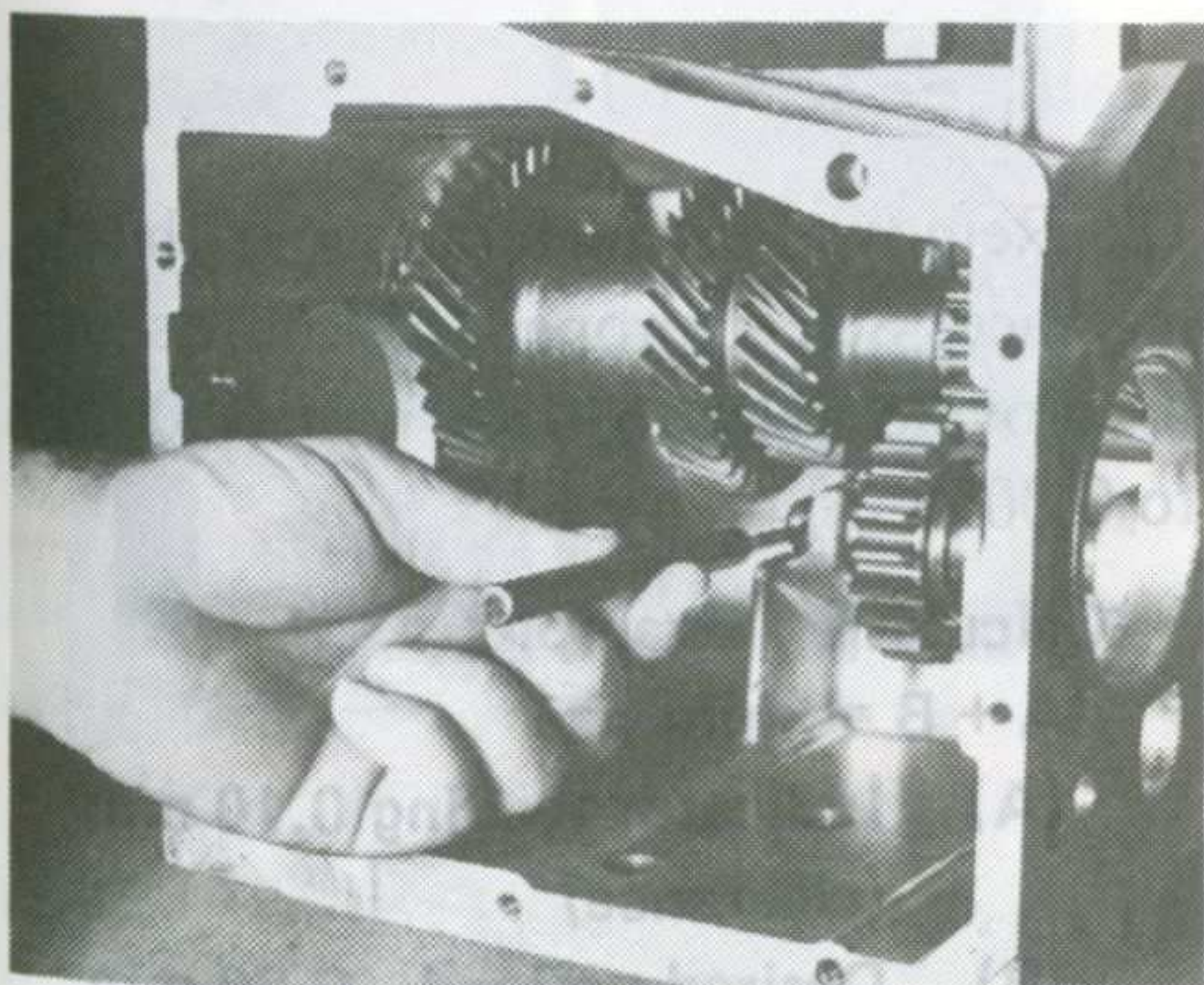
11. Remove mainshaft rear bearing race and remove mainshaft assembly through top of case.



12. Remove 5th speed shift rail, reverse fork with 5th and reverse relay lever, and spring.



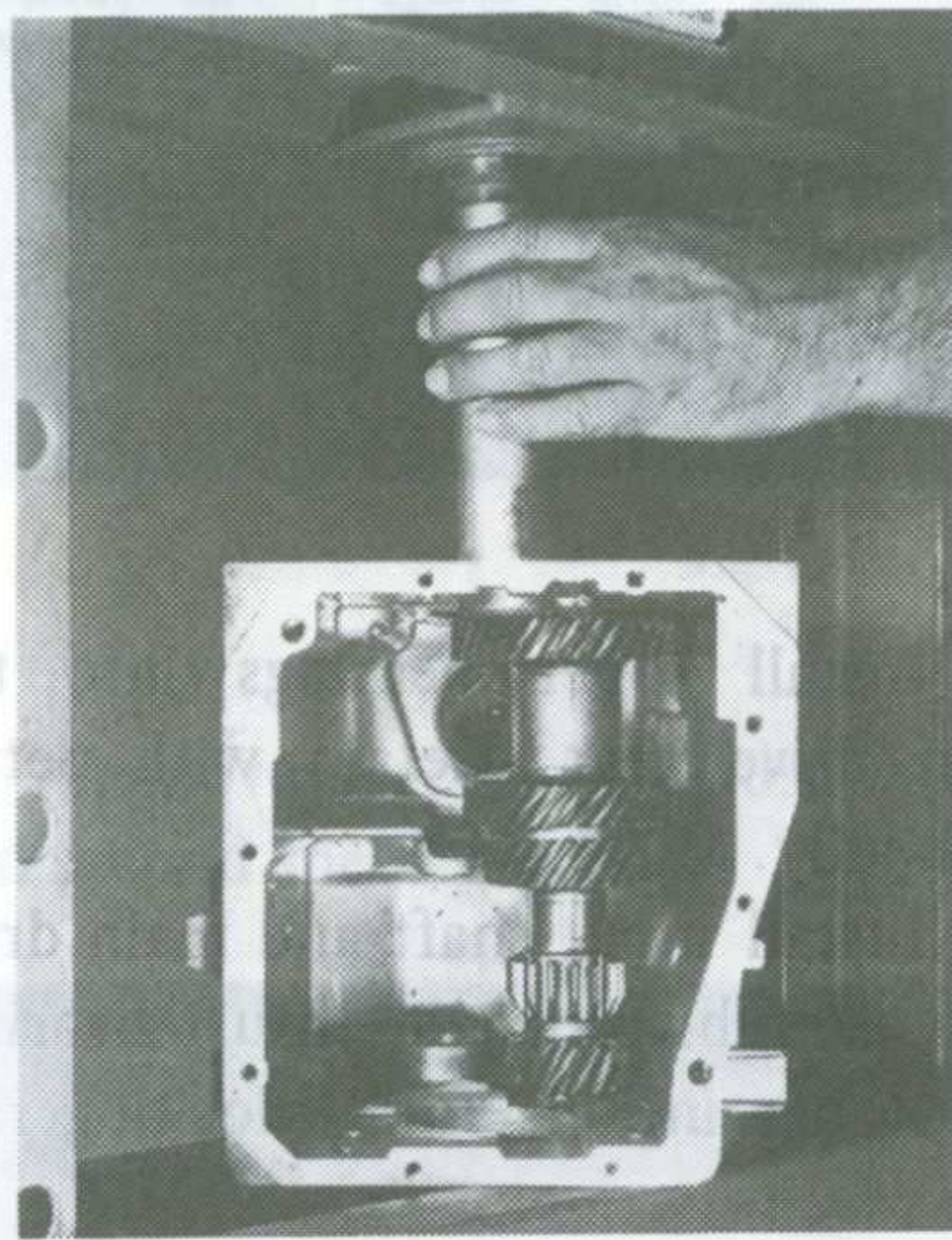
13. Remove pin from reverse idler shaft. Remove reverse idler shaft and gear.



14. Remove snap ring and spacer from rear of counter gear bearing.
15. Remove counter gear rear bearing by pressing counter gear toward rear of case until bearing is free. Remove bearing and spacer from rear of counter gear.

CAUTION:

When pressing out bearing, hold hand under counter gear so bearing does not drop.



16. Remove counter gear and front thrust washer through top of case.
17. Press front counter gear bearing from case.

This bearing should not be removed unless replacement is necessary.

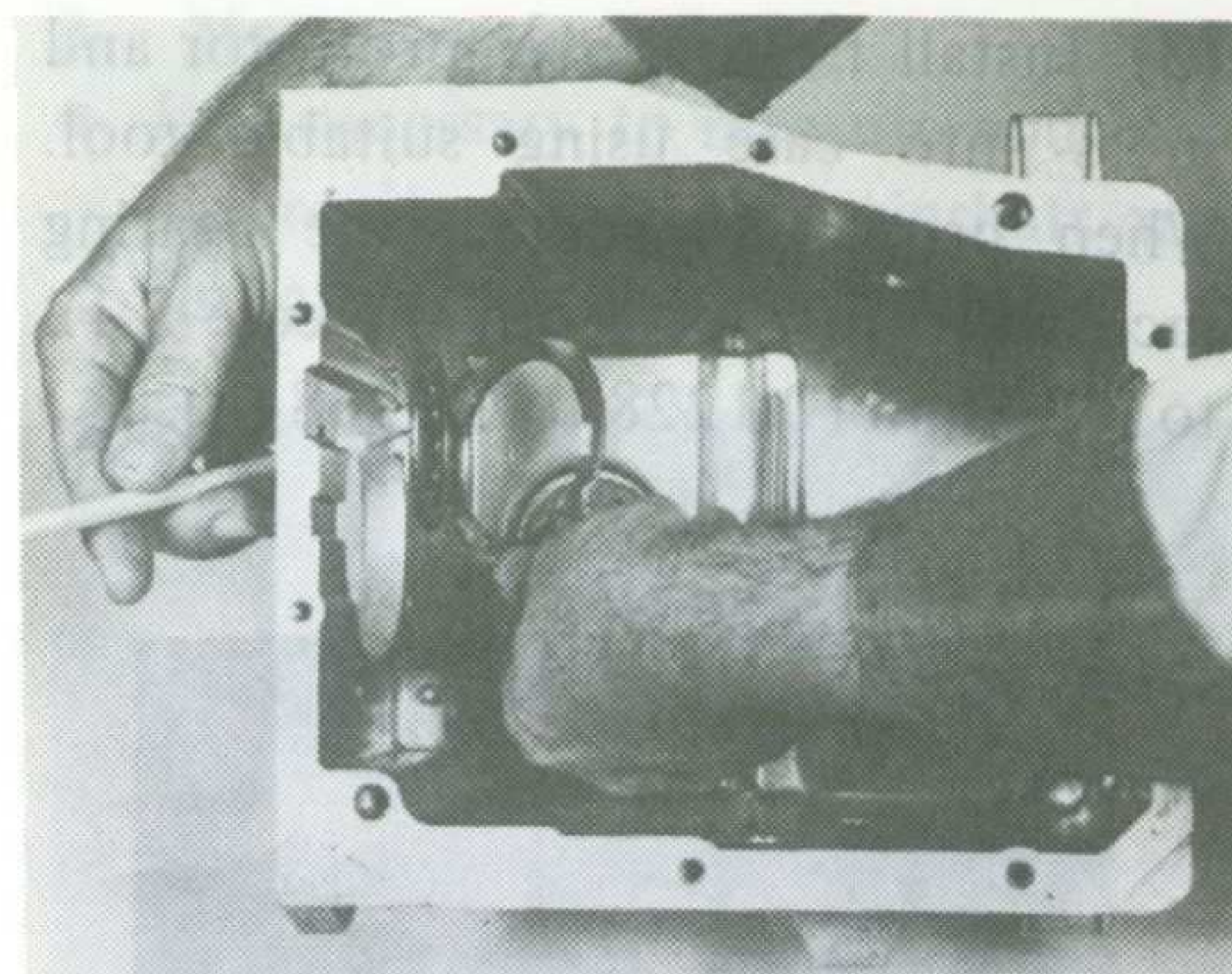
INSPECTION

1. Clean with solvent and check for cracks or pits.
2. Check mating surfaces of transmission case for small nicks, projections or sealant.

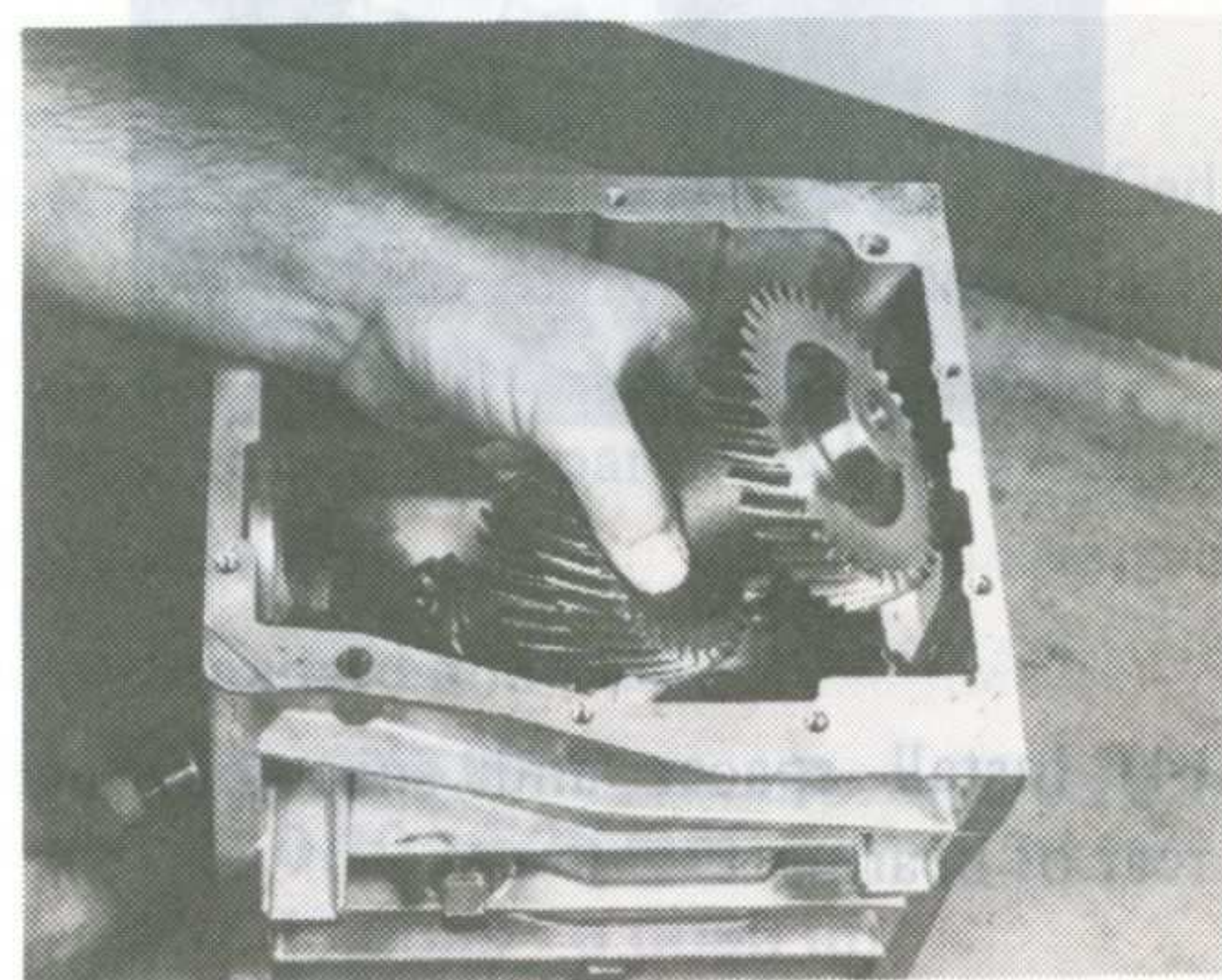
The magnet at the bottom of the case is held in place by a clip and a special glue. It should not be removed from the case.

ASSEMBLY

1. Install front counter gear bearing as follows:
 - (1) Apply a small bead of adhesive agent to outside diameter of bearing.
 - (2) Press bearing into case until the front edge is flush with the front edge of the case.
2. Install the counter gear thrust washer into the case being sure to align the tang with the notch in the case. Retain the washer in the case with a light coat of petroleum jelly.



3. Install the counter gear into the case and engage its front journal into the front bearing.



4. Install the rear counter gear bearing as follows:

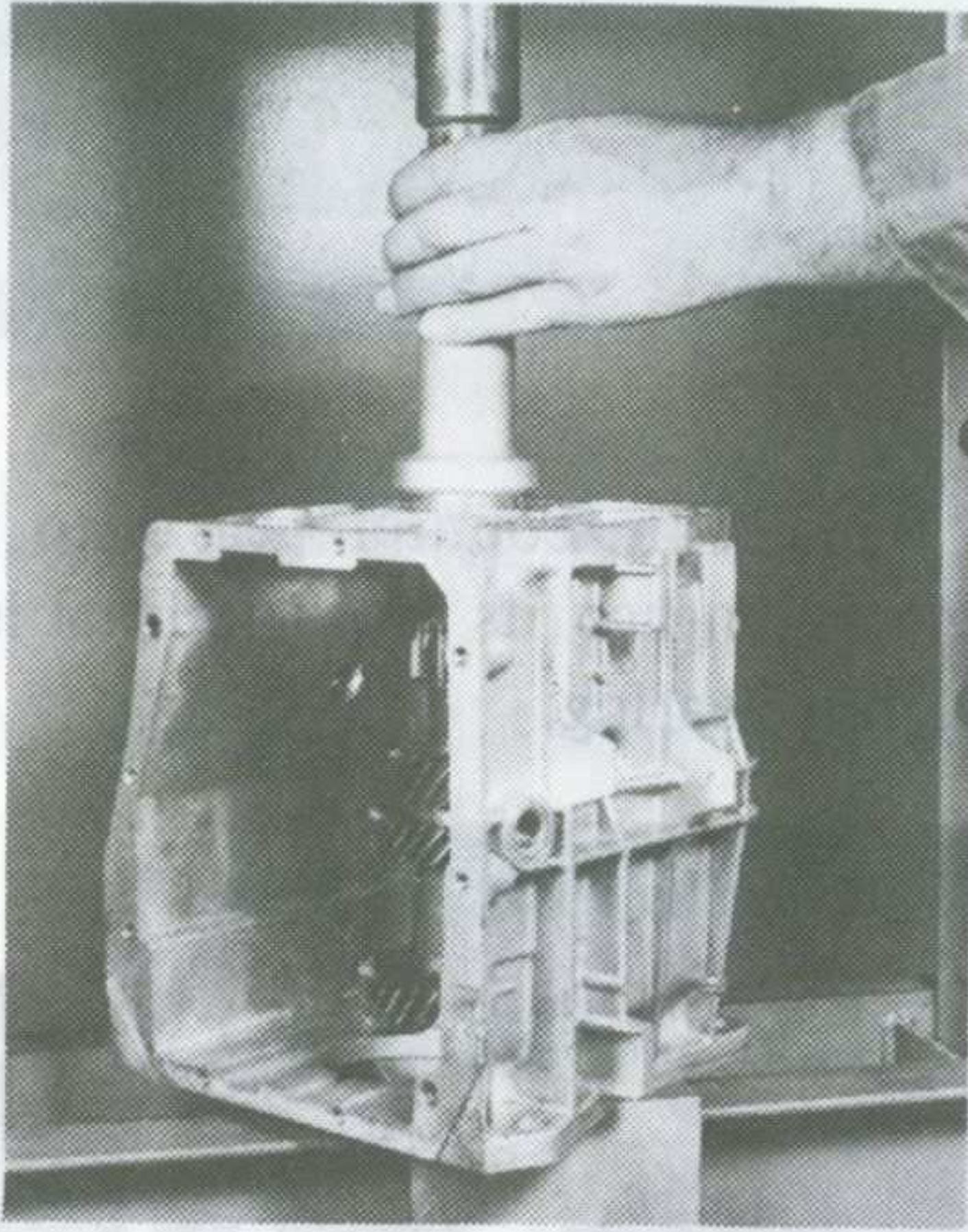
- (1) Install spacer to the rear of counter gear.



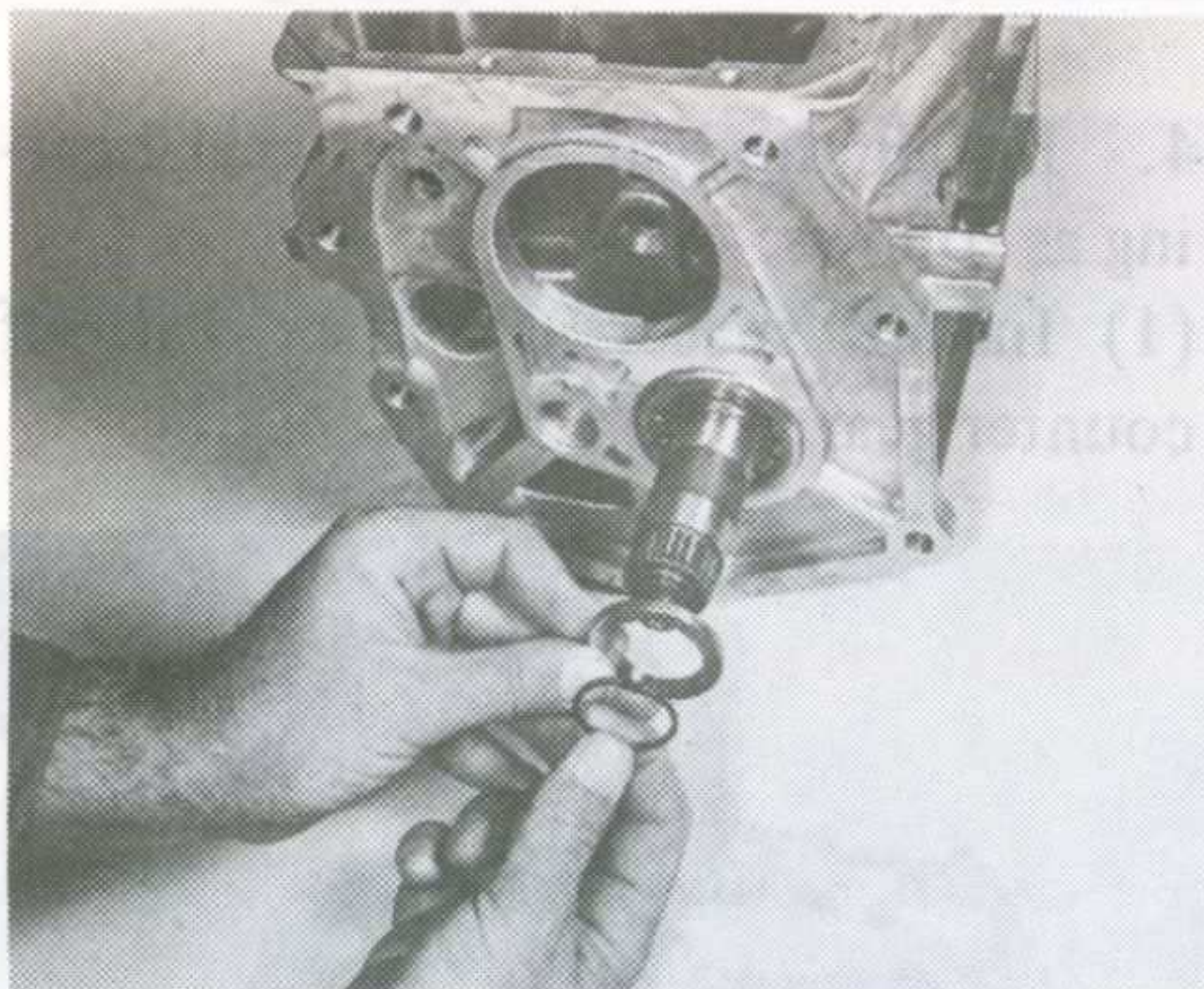
- (2) Install suitable tool on the counter gear.



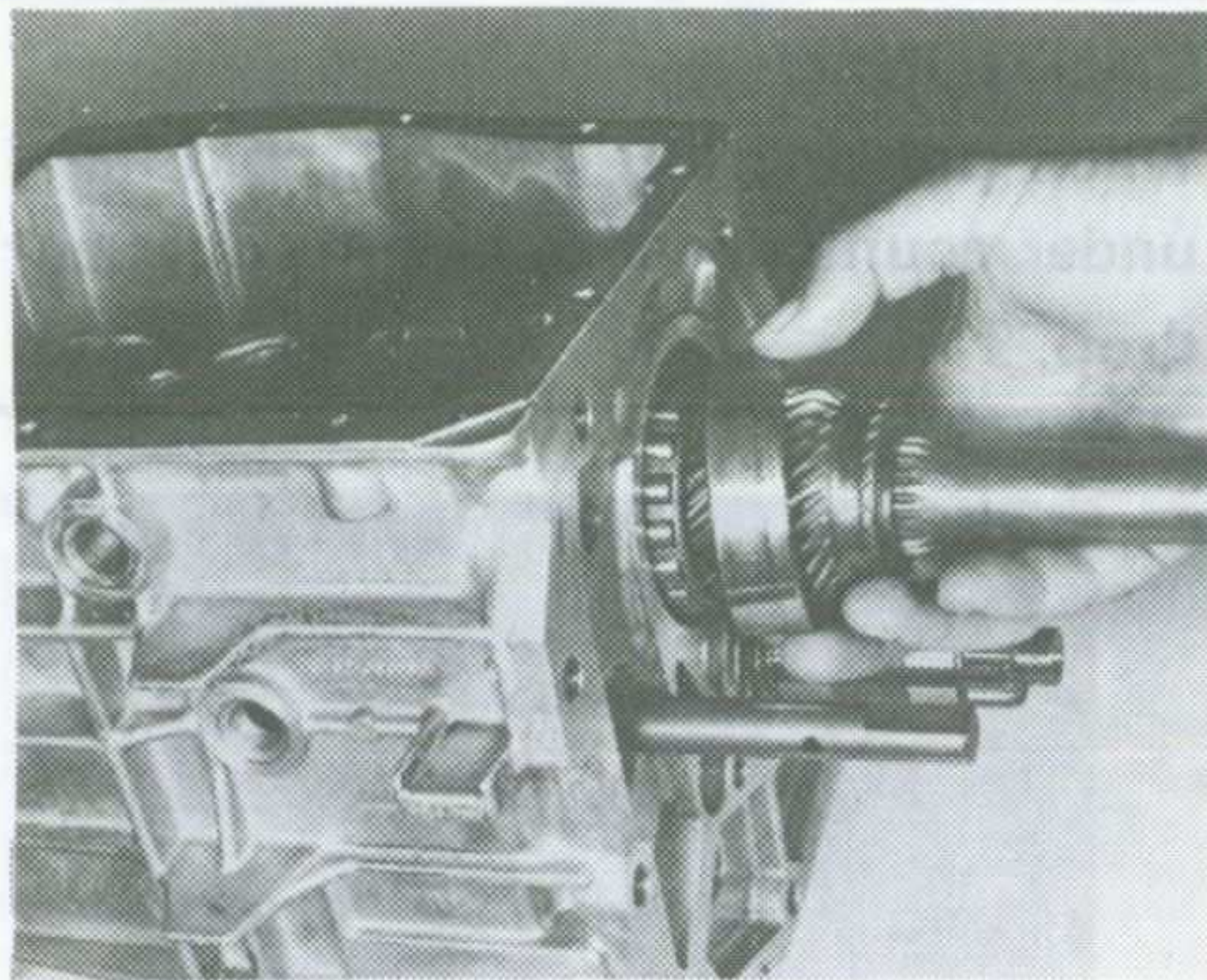
(3) Install bearing over protector and press into case using suitable tool. When properly installed, the bearing race will protrude from the case 3.12 to 3.22 mm (0.1228 to 0.1268 in).



(4) Install spacer and snap ring at rear of bearing.



5. Install reverse idler gear into case with shift fork groove toward the rear. Install reverse idler shaft, O-ring and retaining pin.
6. Install reverse fork with 5th and reverse relay lever, 5th speed shift rail and spring. Install backup light switch.
7. Install mainshaft assembly into the case and install mainshaft rear bearing race.

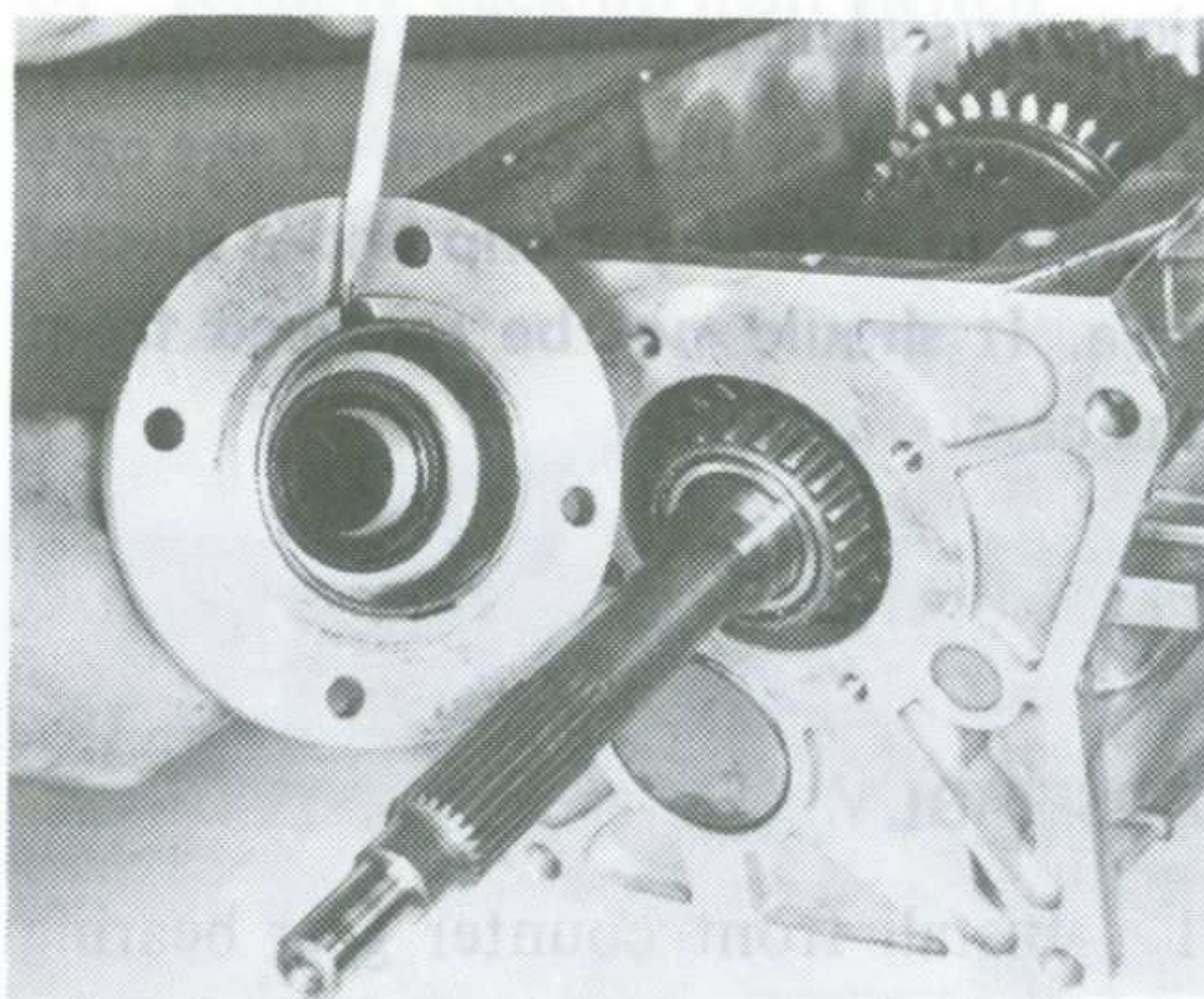


8. Install roller bearings into the main drive gear. Retain with petroleum jelly.
9. Install input shaft and main drive gear assembly, needle thrust bearing, thrust bearing race and blocking ring into case.

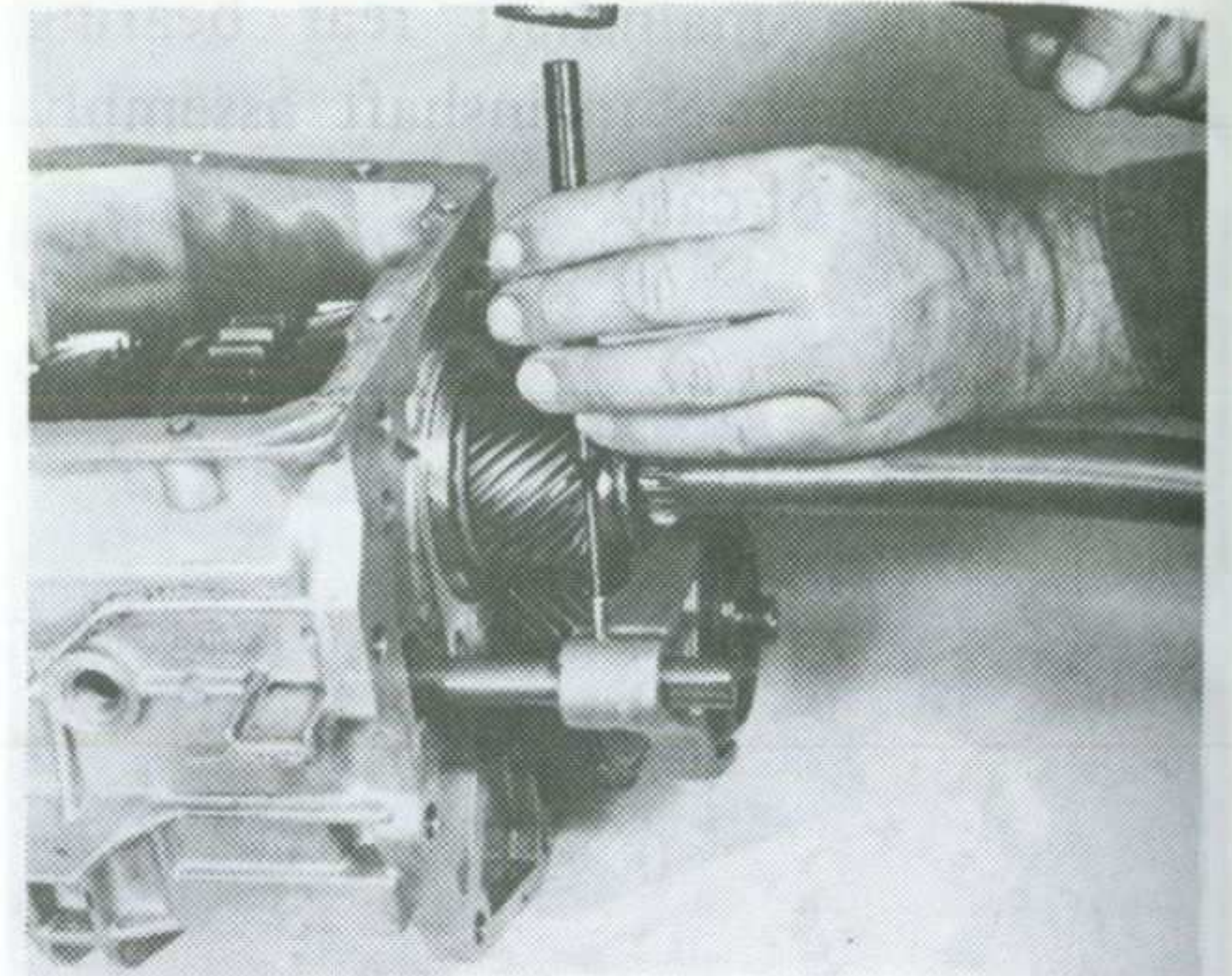
Be sure to align the flat area of the main drive gear with the countergear and install carefully so as not to dislodge the roller bearings.

10. Remove at least 0.15 mm (0.0059 in) from under front bearing race in bearing retainer. Install remaining shims and race into retainer.
11. Install front bearing retainer to case. Be sure to position it so that the oil collector groove is up.

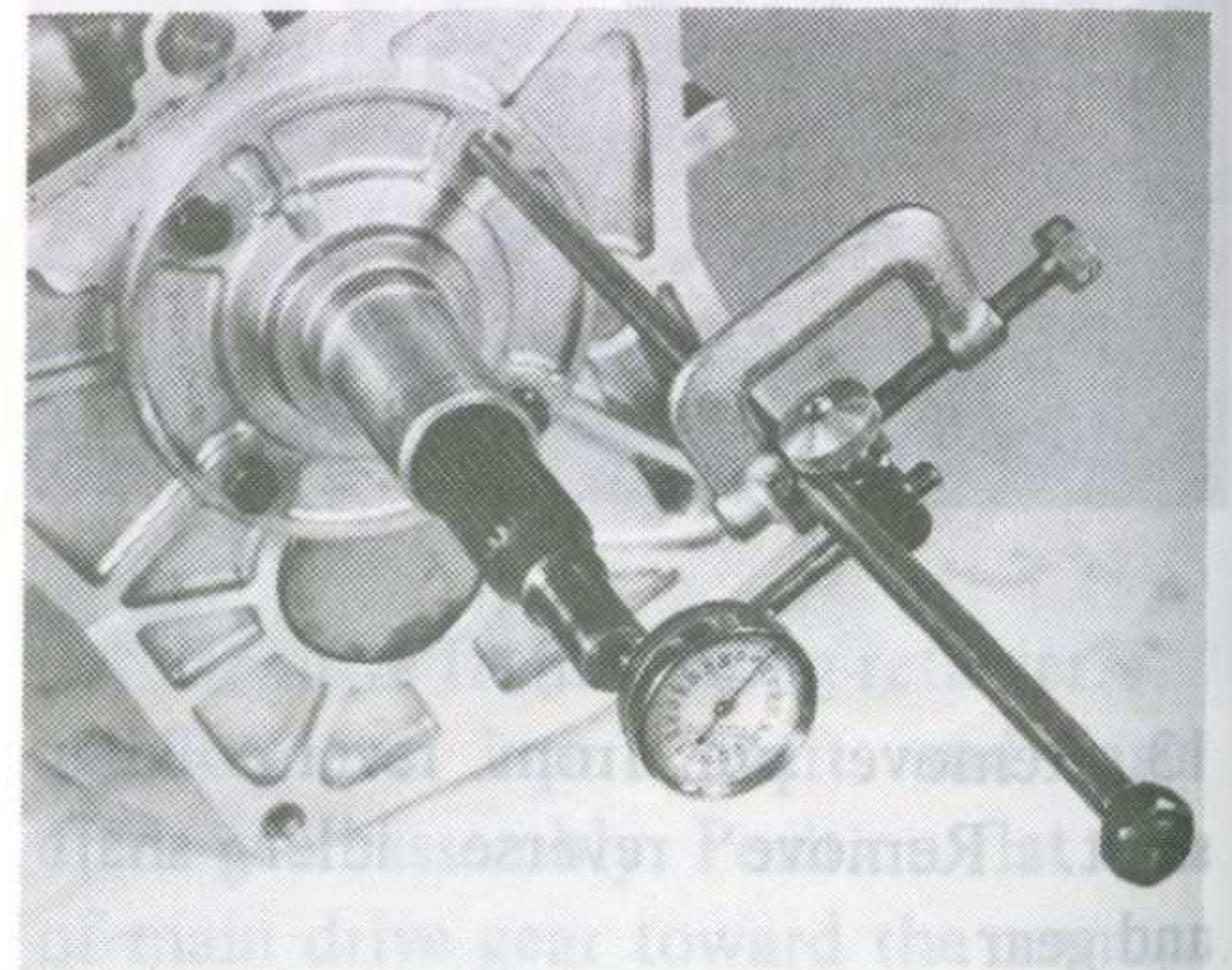
**T : 15 - 27 N·m
(1.5 - 2.8 kg·m,
11 - 20 ft·lb)**



12. Install 5th speed shift fork, 5th speed counter gear and synchronizer as a unit. Align pin holes in shift fork and shift rail and install retaining pin.



13. Install thrust race and snap ring to rear of 5th speed synchronizer hub.
14. Install case cover. Refer to case cover for assembly.
15. Install rear extension. Refer to rear extension for assembly.
16. Push input shaft to rear and mount dial indicator so that its stem rests against the front end of the input shaft. Zero indicator.
17. Push output shaft forward and read indicator. Record reading for calculation. Remove indicator.



18. Remove bearing retainer and bearing race. Select proper thickness shim to provide 0.13 to 0.25 mm (0.0051 to 0.0098 in) preload.

Calculation Example:

A + B = Shim size

(A) Indicator reading 0.10 mm (clearance)

**(B) Desired preload 0.20 mm
Additional shim required 0.30 mm**

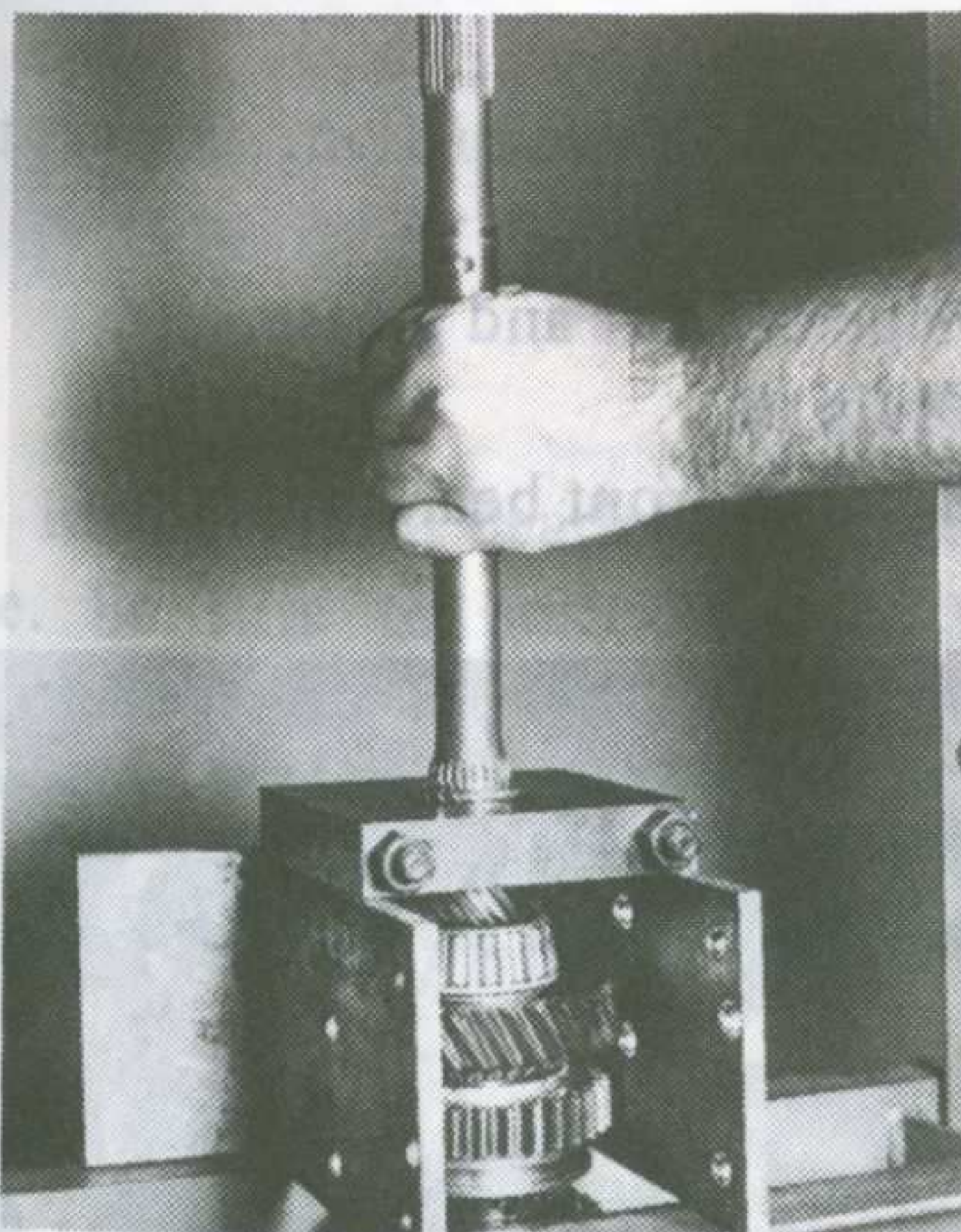
19. Apply a continuous bead of sealant to bearing retainer mating surface and threads of bolts.
20. Install shims and bearing race into bearing retainer and install the bearing retainer as in Step 11.

GEARS & SHAFTS DISASSEMBLY

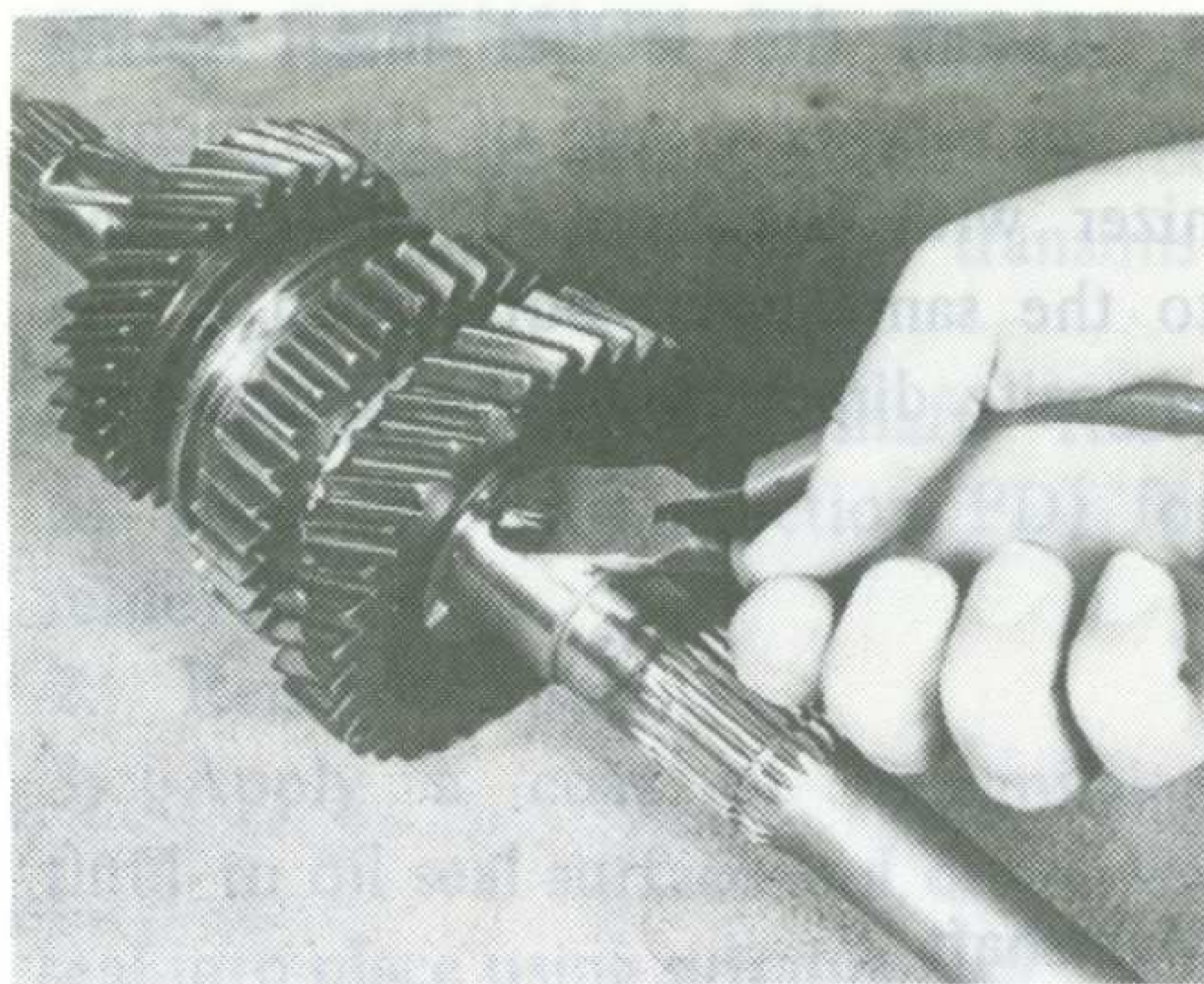
1. Remove rear extension. Refer to rear extension for disassembly.
2. Remove case cover. Refer to case cover for disassembly.
3. Remove transmission case. Refer to transmission case for disassembly.
4. Remove speedometer gear and drive ball from mainshaft.



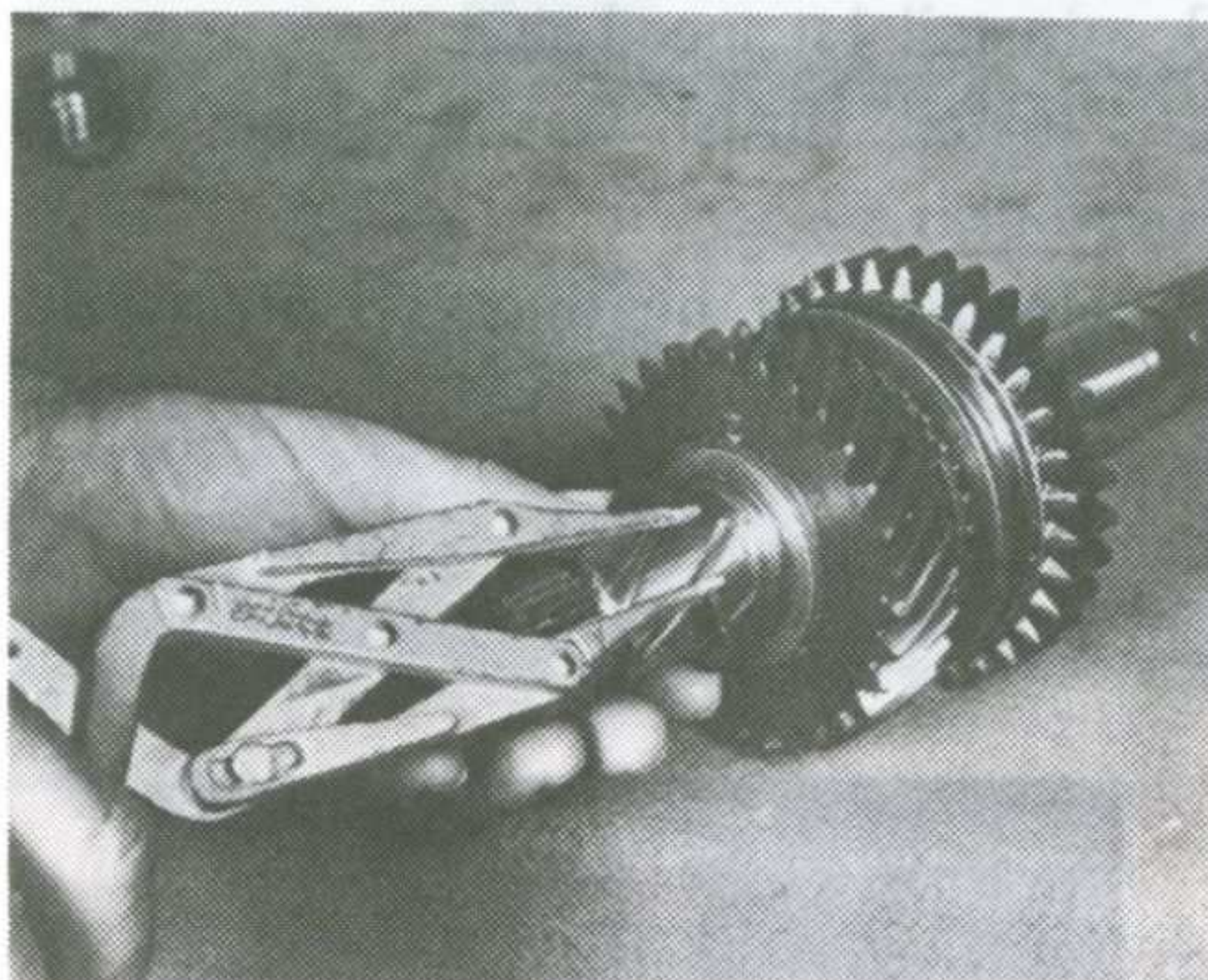
5. Press 3rd and 4th synchronizer from front of mainshaft. Remove 3rd speed gear.
6. Press 5th speed gear from mainshaft.



7. Slip rear bearing off shaft. Remove thrust washer.
8. Remove pin from mainshaft and remove 1st speed gear.



9. Remove snap ring, thrust washer, and second speed gear.



10. Remove 1st and 2nd synchronizer sleeve, inserts and springs.

INSPECTION

Bearings

1. Thoroughly clean and dry with compressed air.

CAUTION:
Do not allow bearing to spin as it will damage the race and rollers.

2. When race or rollers are worn or rough, replace bearing.
3. Replace needle rollers if worn or damaged.

Gears and shafts

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shafts for bending, cracks, wear and worn splines; replace if necessary.

3. Measure gear end play.
 - It is necessary to measure end play before disassembling mainshaft and also after reassembling it.



- If end play is not within specified limits, disassemble and check parts for condition.
- Replace any part which is worn or damaged.

Standard end play:

1st main gear

0.10 - 0.25 mm
(0.0039 - 0.0098 in)

2nd main gear

0.10 - 0.25 mm
(0.0039 - 0.0098 in)

3rd main gear

0.15 - 0.40 mm
(0.0059 - 0.0157 in)

5th counter gear

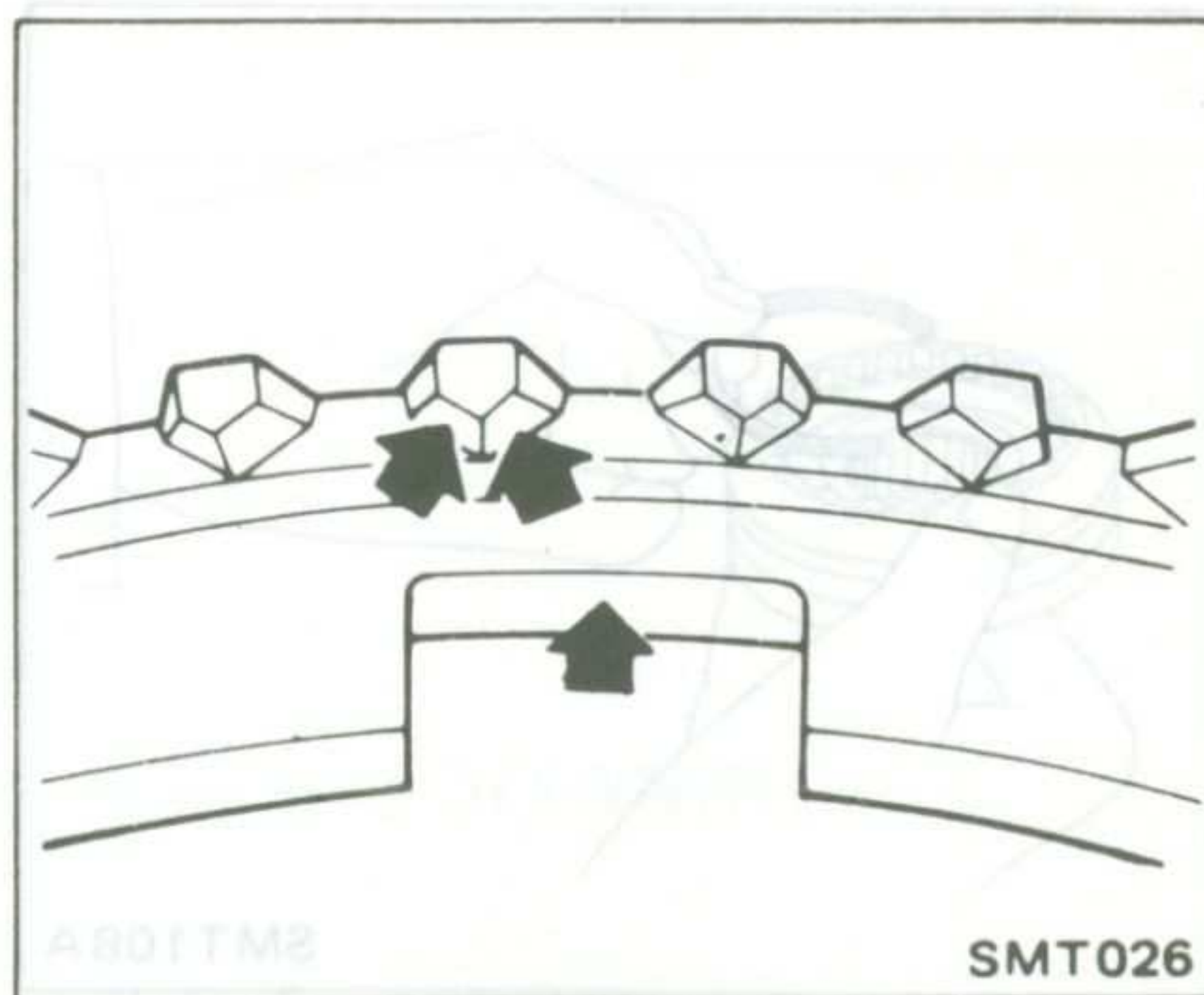
0.10 - 0.48 mm
(0.0039 - 0.0189 in)

Counter gear

0.25 - 0.50 mm
(0.0098 - 0.0197 in)

Baulk rings

1. Replace baulk ring if found to be deformed, cracked or otherwise damaged.
2. Check teeth and insert notches for wear.



3. Inspect cone surface for excessive wear.

Shifting insert

Replace if worn excessively, worn unevenly, or damaged.

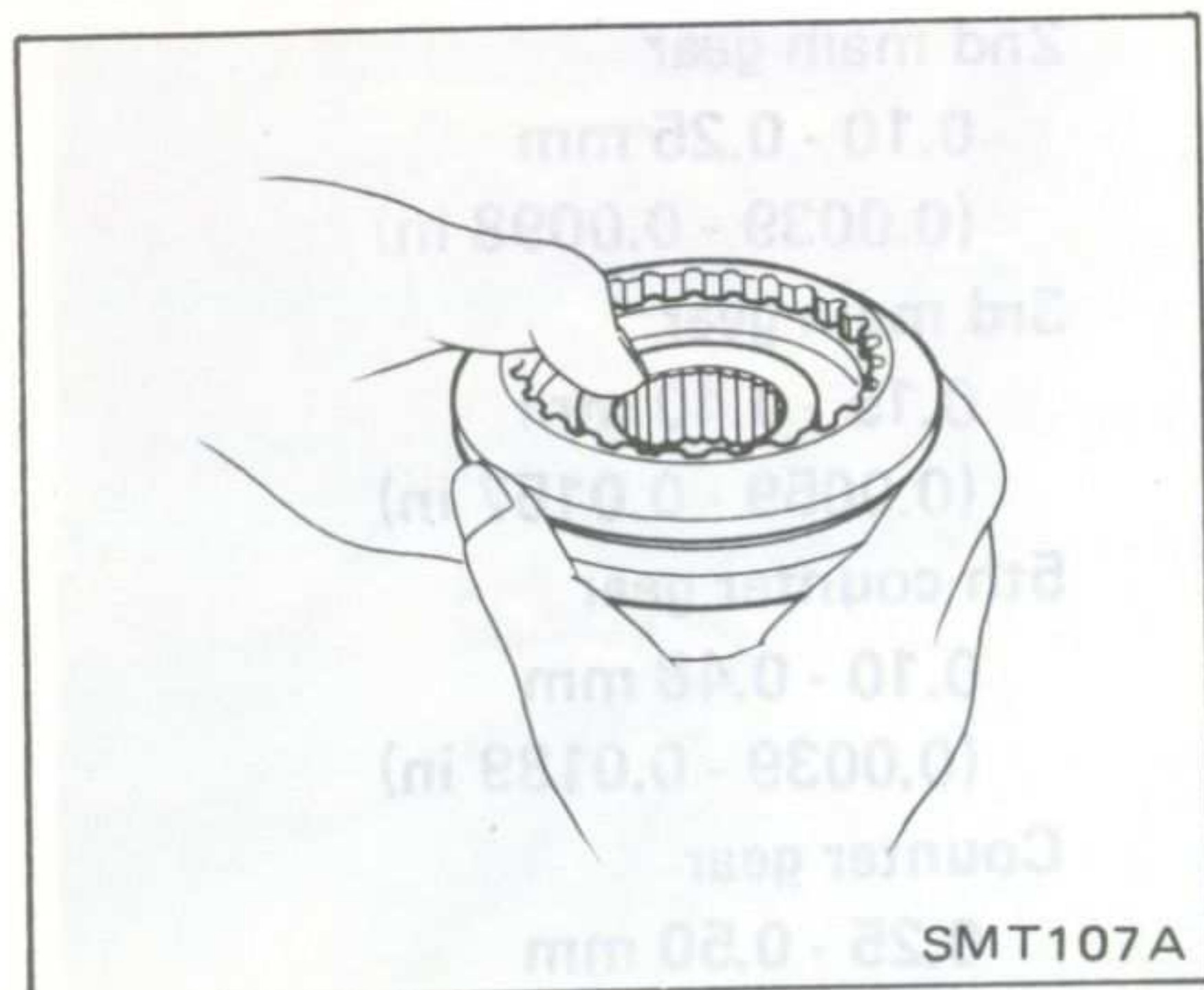
Oil seals

1. Replace oil seal if sealing lip is deformed or cracked. Also discard oil seal if spring is out of position.
2. Check contact between oil seal lip and shaft; if necessary, replace oil seal and shaft as a set.

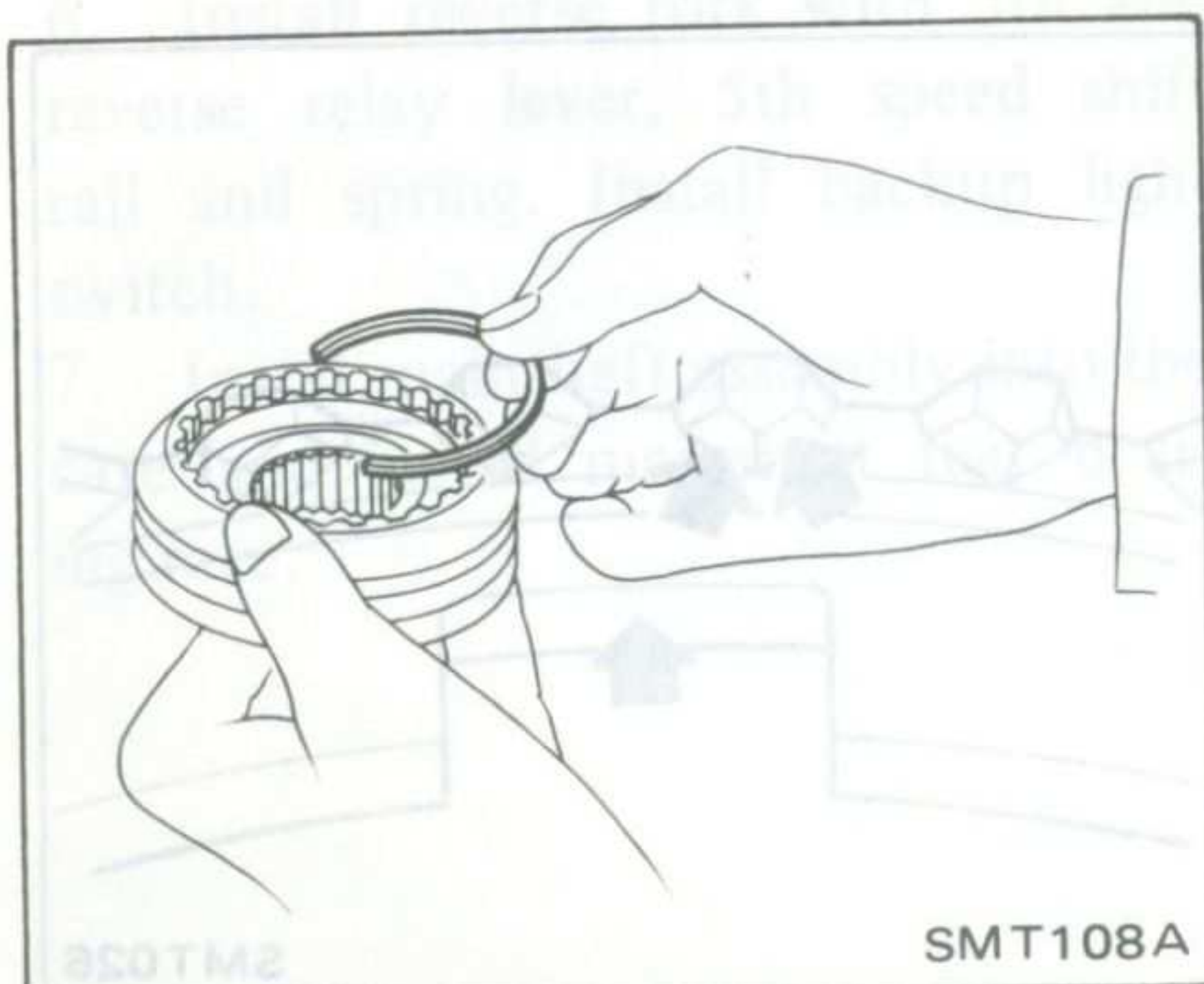
ASSEMBLY

Synchronizers

1. Assemble coupling sleeve to synchronizer hub. Make sure that the sleeve slides freely on the hub.



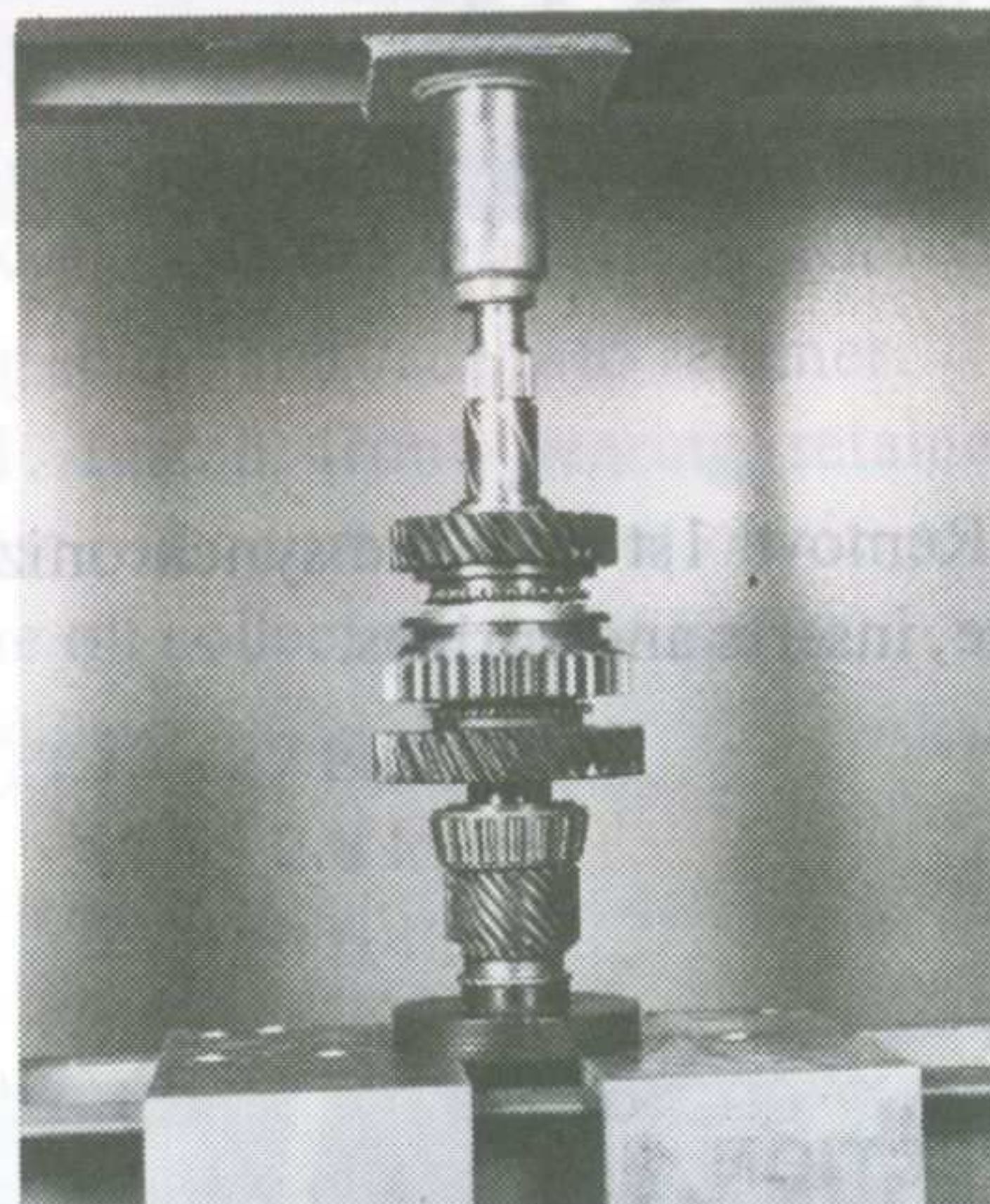
2. Position shifting inserts into 3 slots in synchronizer hub with raised portion facing outward.
3. Install first insert spring with hooked end engaged to one of the shift inserts.



4. Install the second insert spring on the opposite side of the synchronizer with the hooked end engaged to the same insert but turned in the opposite direction of the first spring.

Mainshaft

1. Assemble the 1st and 2nd synchronizer sleeve, inserts and springs to the synchronizer hub.
2. Install 2nd speed gear, thrust washer and snap ring.
3. Install 1st speed gear.
4. Install thrust washer against 1st speed gear.
5. Install rear bearing and press 5th speed gear onto mainshaft using suitable tool.



6. Install 3rd speed gear. Press 3rd and 4th synchronizer onto front of mainshaft using suitable tool. Be sure that the portion of the hub with the extended hose is toward the front.



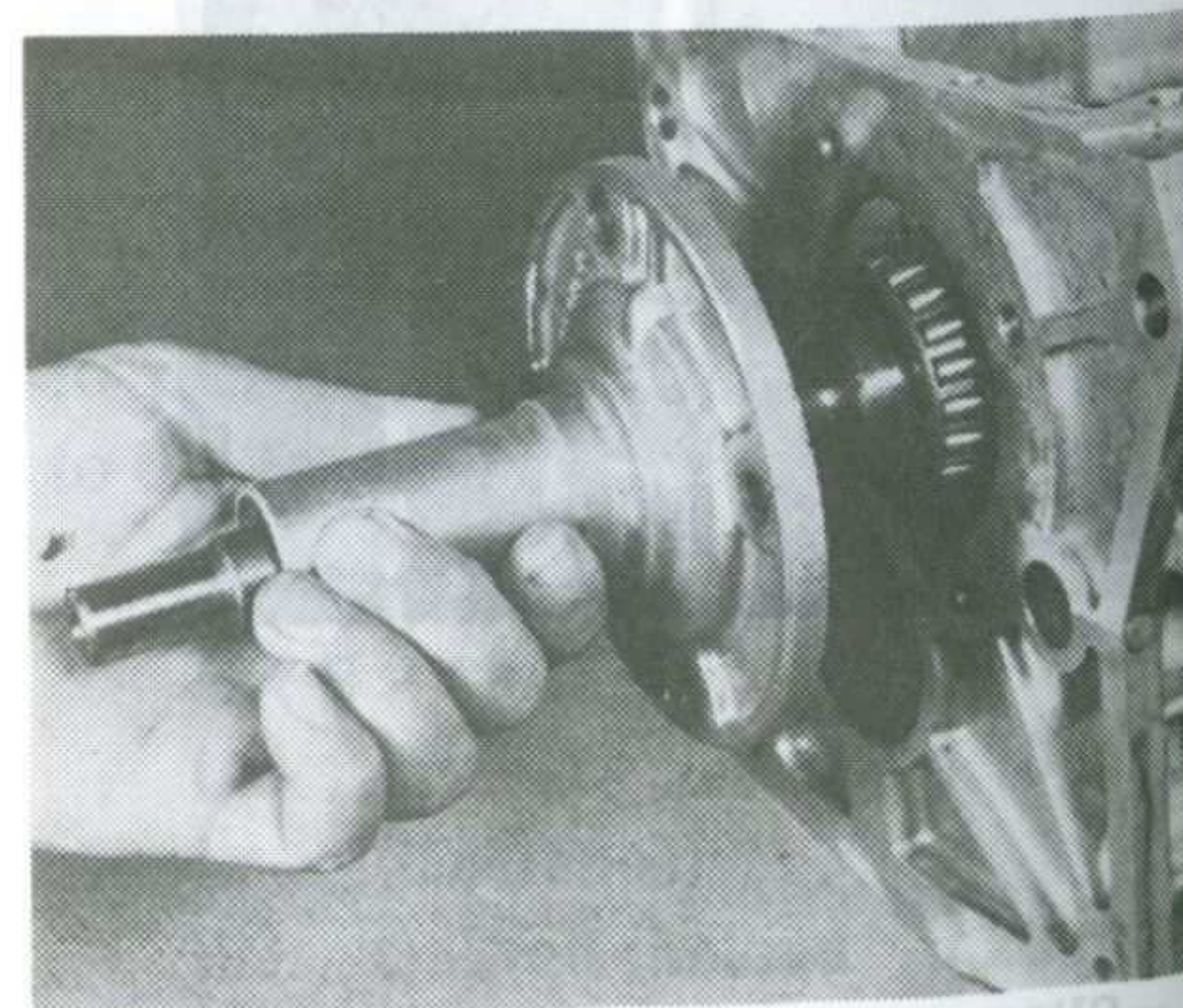
7. Install speedometer drive ball, speedometer gear, and snap ring.
8. Install transmission case. Refer to transmission case for assembly.
9. Install case cover. Refer to case cover for assembly.
10. Install rear extension. Refer to rear extension for assembly.

REPLACEMENT OF OIL SEALS

FRONT BEARING RETAINER SEAL

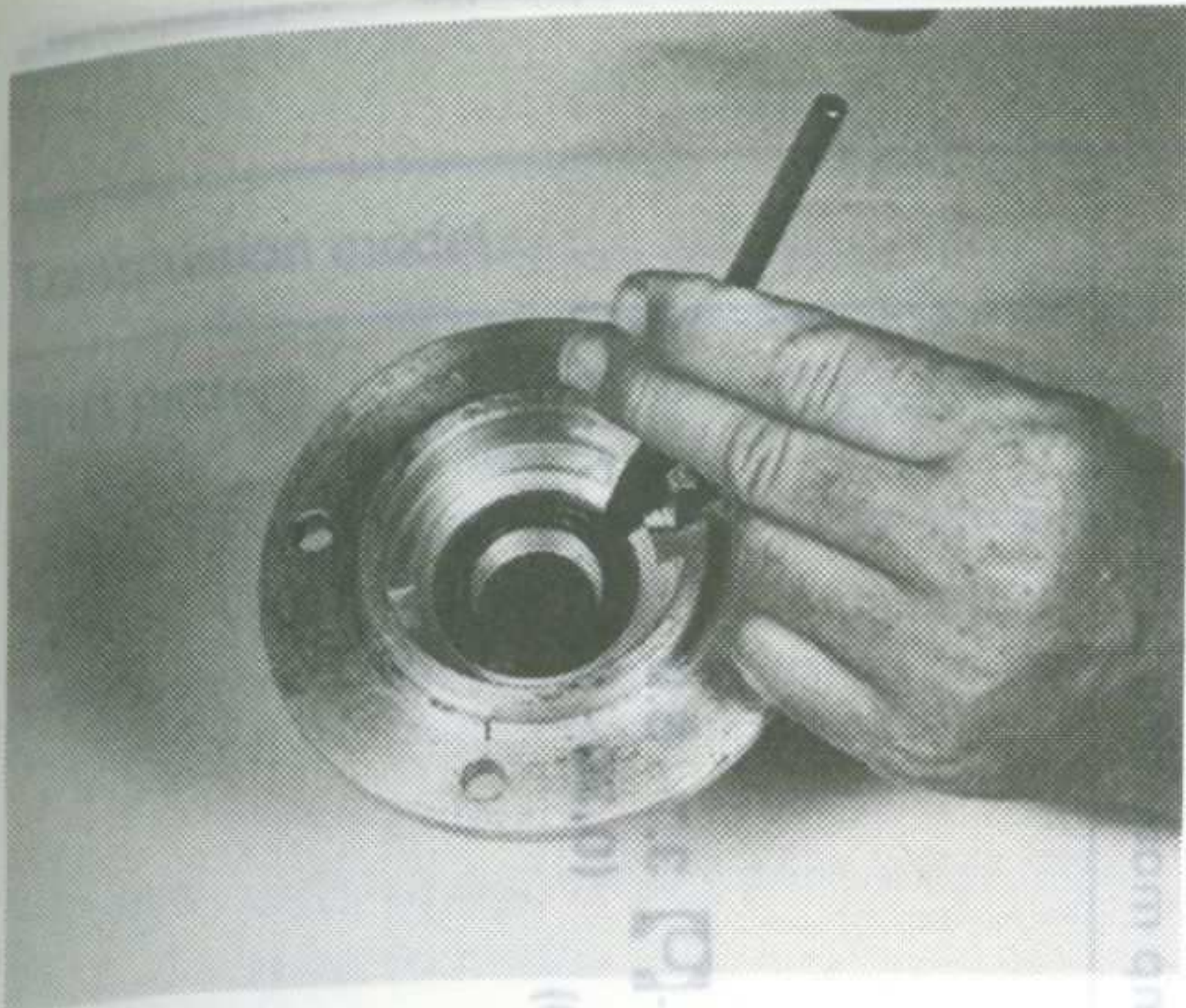
It is necessary to remove transmission unit from car. Replace oil seal as follows:

1. Remove transmission. Refer to removal.
2. Wipe off dirt and grease.
3. Drain oil.
4. Remove front bearing retainer.



5-SPEED TRANSMISSION [Model: BW T-5 (FS5R90A)]

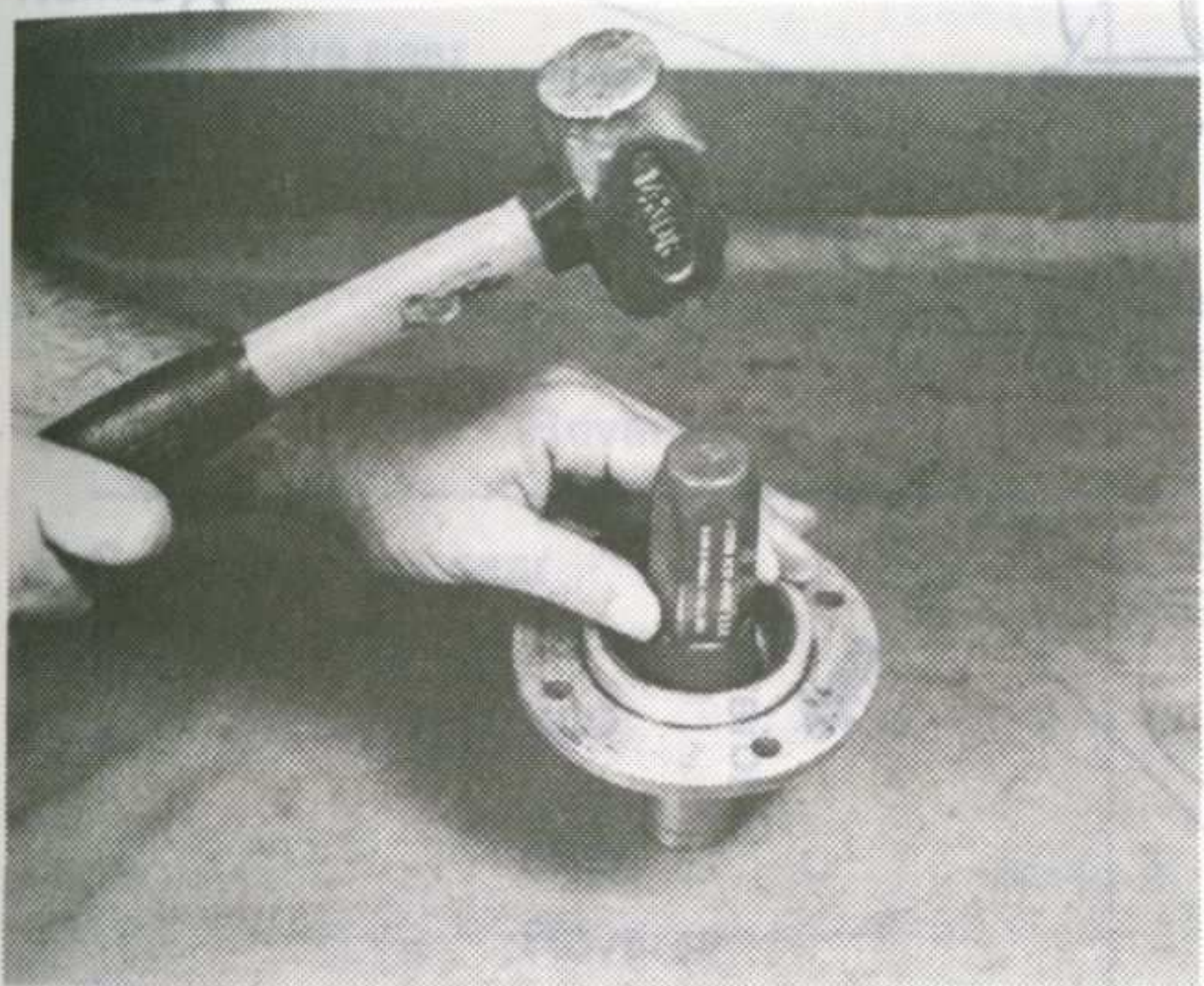
5. Remove oil seal.



6. Clean bearing retainer and case mating surface.

7. Check bearing retainer and mating surface for cracks, nicks, projections or sealant.

8. Apply a coat of transmission fluid to oil seal surface and install seal using suitable tool.



9. Install front bearing retainer to case. Be sure to position it so that the oil collector groove is up.

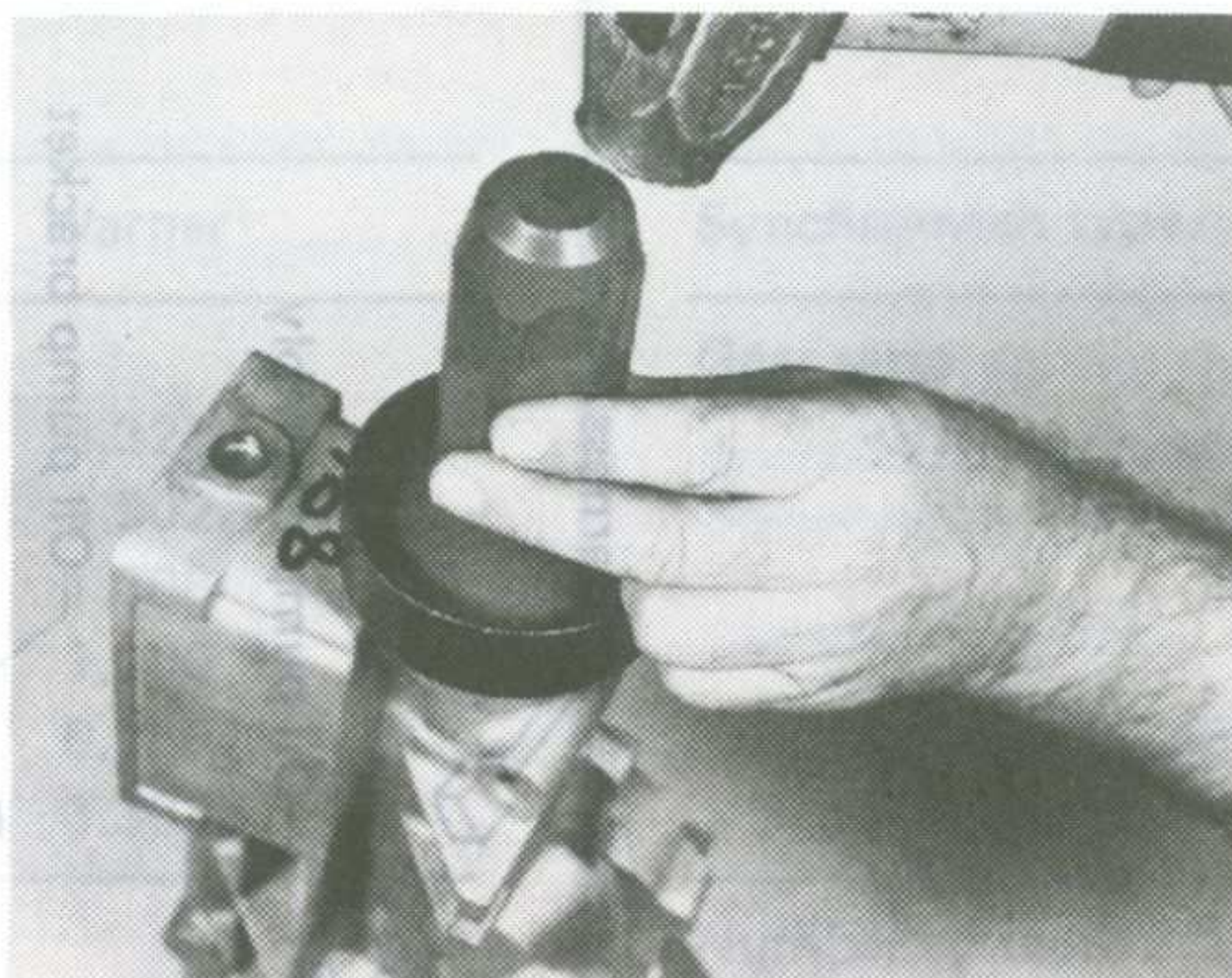
T : 15 - 27 N·m
(1.5 - 2.8 kg-m,
11 - 20 ft-lb)

10. Install transmission. Refer to installation.

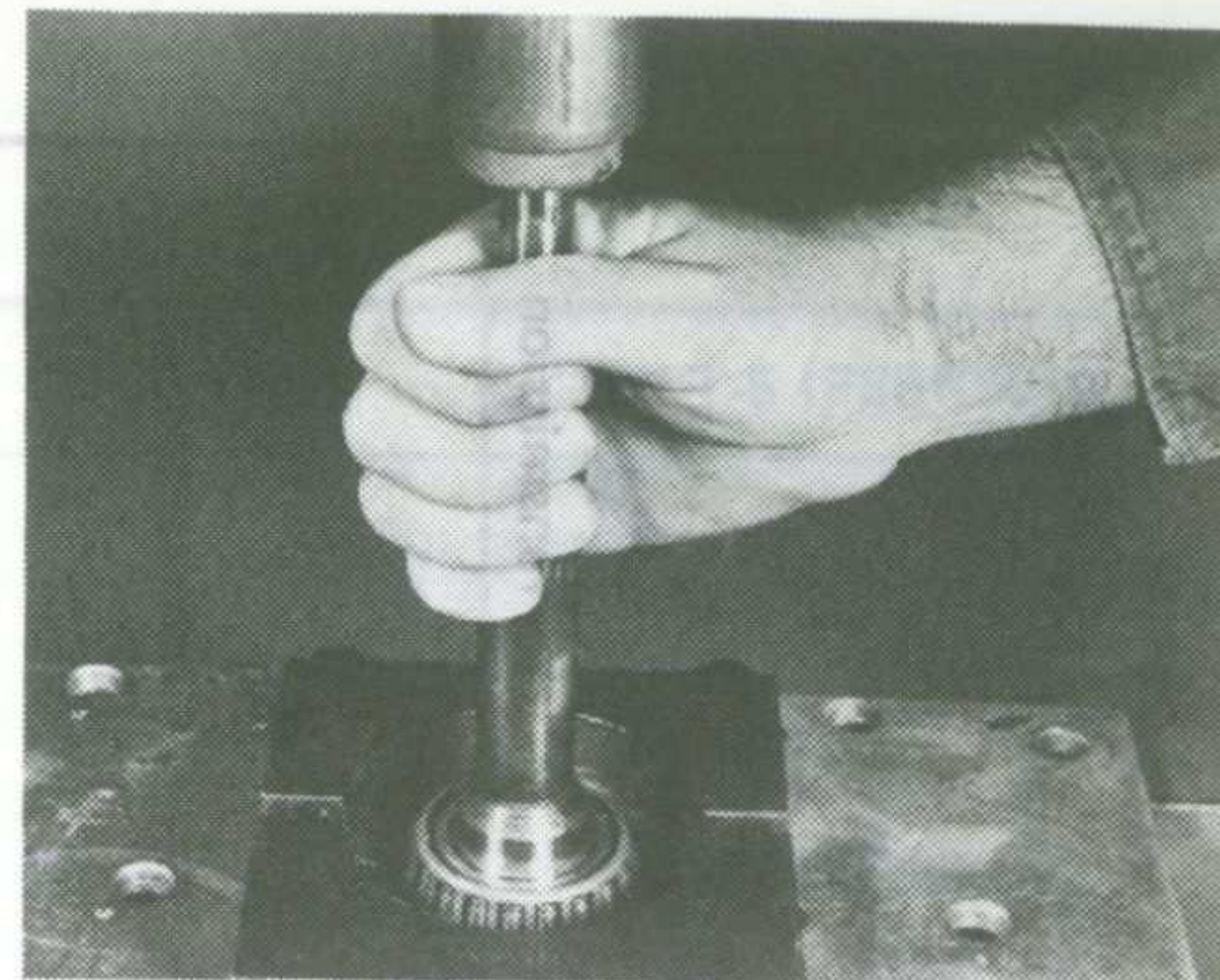
REAR EXTENSION OIL SEAL

The rear extension oil seal can be replaced without removing transmission from car.

1. Remove propeller shaft. Refer to propeller shaft (section PD) for removal.
2. Remove oil seal.
3. Apply a coat of transmission fluid to oil seal surface and drive new seal into place using suitable tool.



4. Install propeller shaft. Refer to propeller shaft (section PD) for installation.



5. Press new main drive bearing to input shaft using suitable tool.

6. Replace rear bearing. Refer to gears and shafts for disassembly and assembly.

7. Install front and rear counter-gear bearings. Refer to transmission case for assembly.

8. Install transmission case. Refer to transmission case for assembly.

9. Install case cover. Refer to case cover for assembly.

10. Install rear extension. Refer to rear extension for assembly.

REPLACEMENT OF BEARINGS

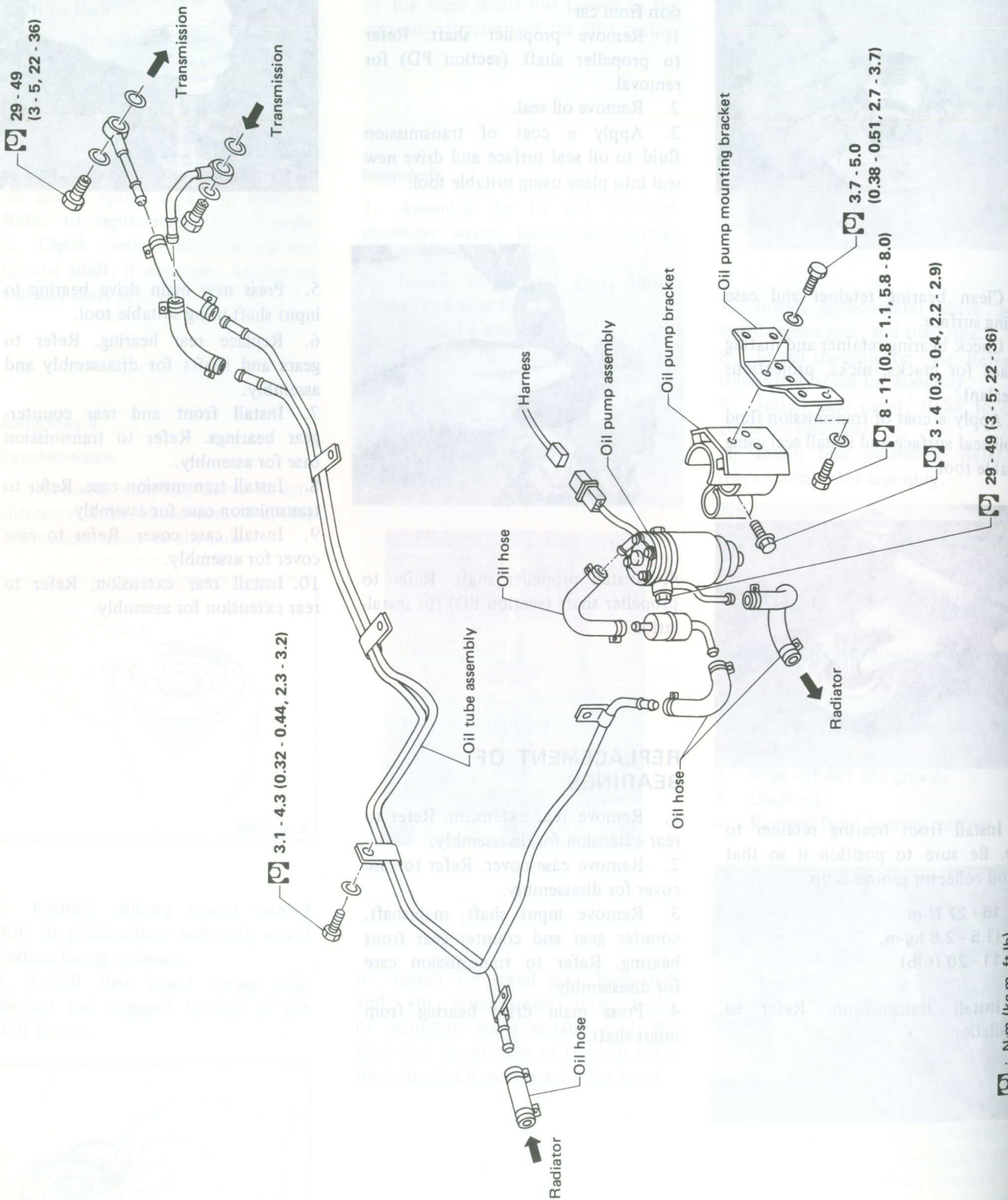
1. Remove rear extension. Refer to rear extension for disassembly.

2. Remove case cover. Refer to case cover for disassembly.

3. Remove input shaft, mainshaft, counter gear and counter gear front bearing. Refer to transmission case for disassembly.

4. Press main drive bearing from input shaft.

TRANSMISSION OIL COOLER SYSTEM



□ : N·m (kg·m, ft·lb)

SMT110A

- For SCHEMATIC and WIRING DIAGRAM, refer to PD section.

SERVICE DATA AND SPECIFICATIONS

General Specifications

Transmission model	FS5W71C												
Shift pattern													
Synchronesh type	Warner												
Gear ratio	<table> <tr><td>1st</td><td>3.321</td></tr> <tr><td>2nd</td><td>1.902</td></tr> <tr><td>3rd</td><td>1.308</td></tr> <tr><td>4th</td><td>1.000</td></tr> <tr><td>O.D.</td><td>0.759</td></tr> <tr><td>Reverse</td><td>3.382</td></tr> </table>	1st	3.321	2nd	1.902	3rd	1.308	4th	1.000	O.D.	0.759	Reverse	3.382
1st	3.321												
2nd	1.902												
3rd	1.308												
4th	1.000												
O.D.	0.759												
Reverse	3.382												
Number of teeth													
Main drive gear	22												
Main gear													
1st	33												
2nd	27												
3rd	26												
O.D.	21												
Reverse	36												
Counter drive gear	31												
Counter gear													
1st	14												
2nd	20												
3rd	28												
O.D.	39												
Reverse	15												
Reverse idler gear	21												
Oil capacity	liter (Imp pt) 1.9 (3-3/8)												

Transmission model	BW T-5 (FS5R90A)												
Shift pattern													
Synchronesh type	Warner												
Gear ratio	<table> <tr><td>1st</td><td>3.350</td></tr> <tr><td>2nd</td><td>2.056</td></tr> <tr><td>3rd</td><td>1.376</td></tr> <tr><td>4th</td><td>1.000</td></tr> <tr><td>O.D.</td><td>0.779</td></tr> <tr><td>Reverse</td><td>3.153</td></tr> </table>	1st	3.350	2nd	2.056	3rd	1.376	4th	1.000	O.D.	0.779	Reverse	3.153
1st	3.350												
2nd	2.056												
3rd	1.376												
4th	1.000												
O.D.	0.779												
Reverse	3.153												
Number of teeth													
Main drive gear	23												
Main gear													
1st	34												
2nd	32												
3rd	27												
O.D.	29												
Reverse	32												
Counter drive gear	34												
Counter gear													
1st	15												
2nd	23												
3rd	29												
O.D.	55												
Reverse	15												
Reverse idler gear	20												
Oil capacity	liter (Imp pt) 1.9 (3-3/8) 2.1 (3-3/4)*												

* With transmission oil cooler

SERVICE DATA AND SPECIFICATIONS

Inspection and Adjustment

FOR MODEL FS5W71C

Gears

Unit: mm (in)

Gear backlash	
Main drive gear	0.05 - 0.10 (0.0020 - 0.0039)
1st gear	0.05 - 0.20 (0.0020 - 0.0079)
2nd gear	0.05 - 0.20 (0.0020 - 0.0079)
3rd gear	0.05 - 0.20 (0.0020 - 0.0079)
O.D. gear	0.05 - 0.20 (0.0020 - 0.0079)
Reverse idler gear	0.05 - 0.20 (0.0020 - 0.0079)

Gear end play	
1st gear	0.31 - 0.41 (0.0122 - 0.0161)
2nd gear	0.11 - 0.21 (0.0043 - 0.0083)
3rd gear	0.11 - 0.21 (0.0043 - 0.0083)
O.D. gear	0.32 - 0.39 (0.0126 - 0.0154)
Reverse idler gear	0.05 - 0.50 (0.0020 - 0.0197)

Baulk ring to gear clearance	
Standard	
1st & 2nd gear	1.00 - 1.40 (0.0394 - 0.0551)
3rd & main drive gear	1.20 - 1.60 (0.0472 - 0.0630)
O.D. gear	1.00 - 1.40 (0.0394 - 0.0551)

Wear limit	
1st & 2nd gear	0.5 (0.020)
3rd & main drive gear	0.8 (0.031)
O.D. gear	0.5 (0.020)

Available snap ring

Main drive gear bearing

Thickness mm (in)	Part number
1.73 (0.0681)	32204 - 78005
1.80 (0.0709)	32204 - 78000
1.87 (0.0736)	32204 - 78001
1.94 (0.0764)	32204 - 78002
2.01 (0.0791)	32204 - 78003
2.08 (0.0819)	32204 - 78004

Mainshaft front

Thickness mm (in)	Part number
2.4 (0.094)	32263 - V5200
2.5 (0.098)	32263 - V5201
2.6 (0.102)	32263 - V5202

Mainshaft rear end bearing

Thickness mm(in)	Part number
1.1 (0.043)	32228 - 20100
1.2 (0.047)	32228 - 20101
1.3 (0.051)	32228 - 20102
1.4 (0.055)	32228 - 20103

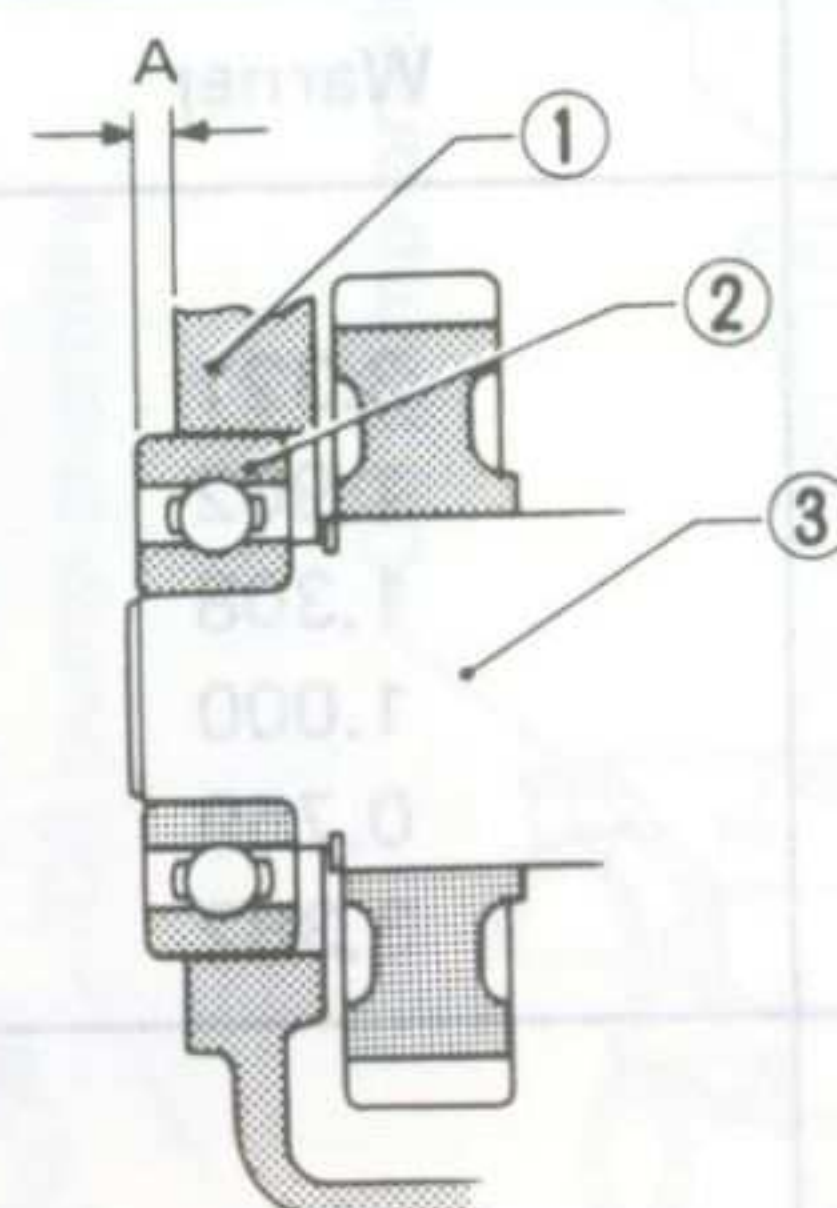
Counter drive gear

Thickness mm (in)	Part number
1.4 (0.055)	32215 - E9000
1.5 (0.059)	32215 - E9001
1.6 (0.063)	32215 - E9002

Available shim

Counter front bearing

Unit: mm (in)



A: Distance from bearing surface to transmission case

- 1 Transmission case
- 2 Counter gear front bearing
- 3 Counter gear

TM371

"A"	Thickness of shim	Part number
4.52 - 4.71 (0.1780 - 0.1854)	Not necessary	
4.42 - 4.51 (0.1740 - 0.1776)	0.1 (0.004)	32218 - V5000
4.32 - 4.41 (0.1701 - 0.1736)	0.2 (0.008)	32218 - V5001
4.22 - 4.31 (0.1661 - 0.1697)	0.3 (0.012)	32218 - V5002
4.12 - 4.21 (0.1622 - 0.1657)	0.4 (0.016)	32218 - V5003
4.02 - 4.11 (0.1583 - 0.1618)	0.5 (0.020)	32218 - V5004
3.92 - 4.01 (0.1543 - 0.1579)	0.6 (0.024)	32218 - V5005

FOR MODEL BW T-5 (FS5R90A)

Unit: mm (in)

Transmission model	FS5R90A
--------------------	---------

Gear backlash	
Main drive gear	0.05 - 0.15 (0.0020 - 0.0059)
1st gear	0.05 - 0.15 (0.0020 - 0.0059)
2nd gear	0.05 - 0.15 (0.0020 - 0.0059)
3rd gear	0.05 - 0.15 (0.0020 - 0.0059)
5th gear	0.05 - 0.15 (0.0020 - 0.0059)
Reverse idler gear	0.10 - 0.20 (0.0039 - 0.0079)

Gear end play	
1st main gear	0.10 - 0.25 (0.0039 - 0.0098)
2nd main gear	0.10 - 0.25 (0.0039 - 0.0098)
3rd main gear	0.15 - 0.40 (0.0059 - 0.0157)
5th counter gear	0.10 - 0.48 (0.0039 - 0.0189)
Counter gear	0.25 - 0.50 (0.0098 - 0.0197)

Main drive gear bearing adjusting shim	
Preload	0.13 - 0.25 (0.0051 - 0.0098)

SERVICE DATA AND SPECIFICATIONS

Inspection and Adjustment (Cont'd)

Main drive gear bearing adjusting shim

Thickness mm (in)	Part number
0.31 (0.0122)	C2204-P9513
0.36 (0.0142)	C2204-P9510
0.41 (0.0161)	C2204-P9511
0.46 (0.0181)	C2204-P9512
0.51 (0.0201)	C2204-P9514
0.56 (0.0220)	C2204-P9516
0.81 (0.0319)	C2204-P9517
0.92 (0.0362)	C2204-P9515
1.12 (0.0441)	C2204-P9518

Tightening Torque

TRANSMISSION INSTALLATION

Unit	N·m	kg-m	ft-lb
Clutch operating cylinder	30 - 40	3.1 - 4.1	22 - 30
Transmission to engine	39 - 49	4.0 - 5.0	29 - 36
Engine rear plate to transmission	29 - 39	3.0 - 4.0	22 - 29
Crossmember to body	31 - 42	3.2 - 4.3	23 - 31
Rear mounting insulator to crossmember	31 - 42	3.2 - 4.3	23 - 31
Rear mounting insulator to rear extension	31 - 42	3.2 - 4.3	23 - 31
Transmission case to rear extension	16 - 21	1.6 - 2.1	12 - 15
Starter motor to transmission	29 - 39	3.0 - 4.0	22 - 29

TRANSMISSION OIL COOLER SYSTEM

Unit	N·m	kg-m	ft-lb
Oil pump bracket to oil pump mounting bracket	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Oil pump mounting bracket to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Oil pump bracket securing bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Oil pump joint tube to oil pump	29 - 49	3 - 5	22 - 36
Transmission joint tube to transmission	29 - 49	3 - 5	22 - 36
Oil tube clamp securing bolt	3.1 - 4.3	0.32 - 0.44	2.3 - 3.2

GEAR ASSEMBLY

Model: FS5W71C

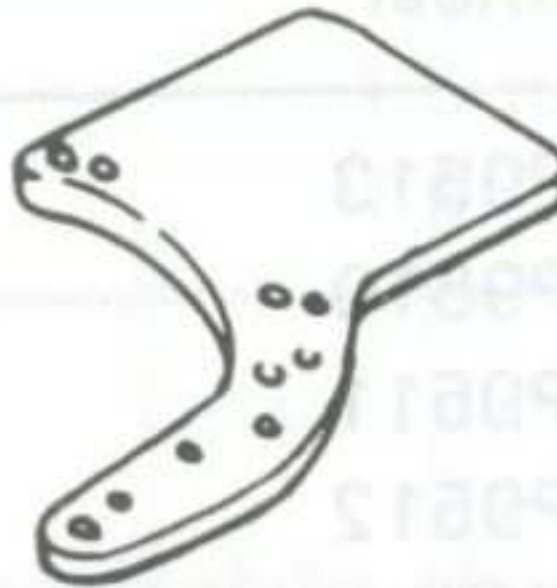
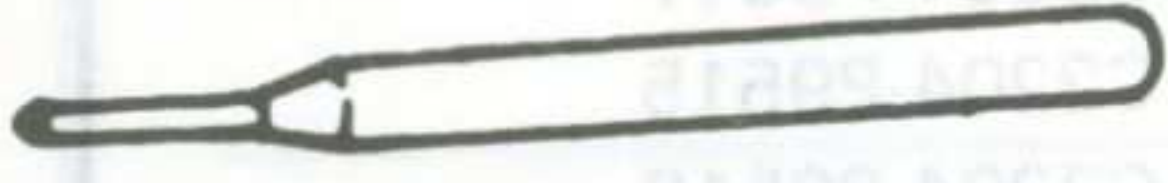
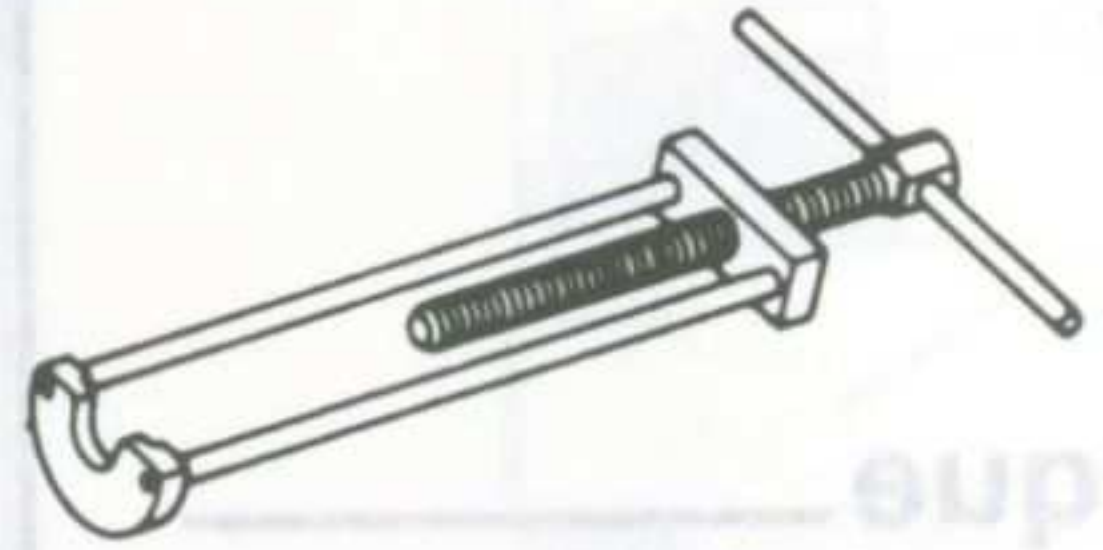
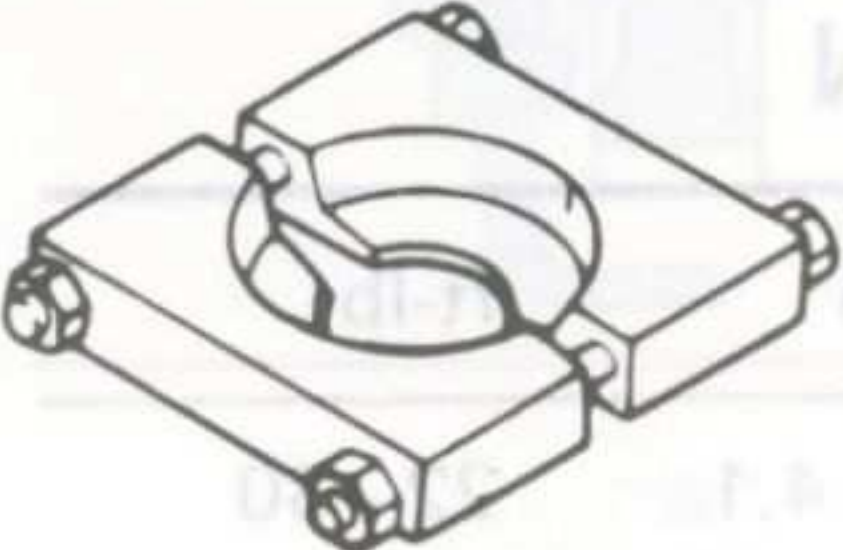
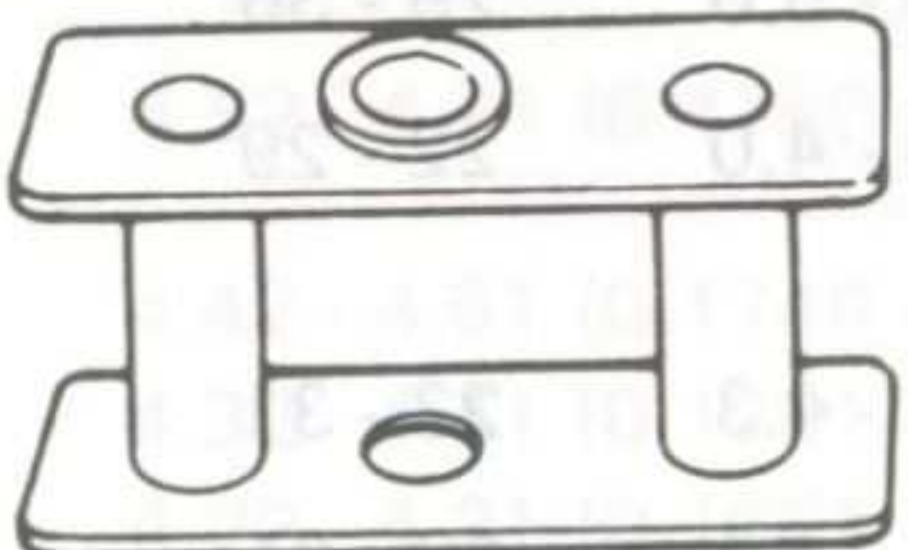
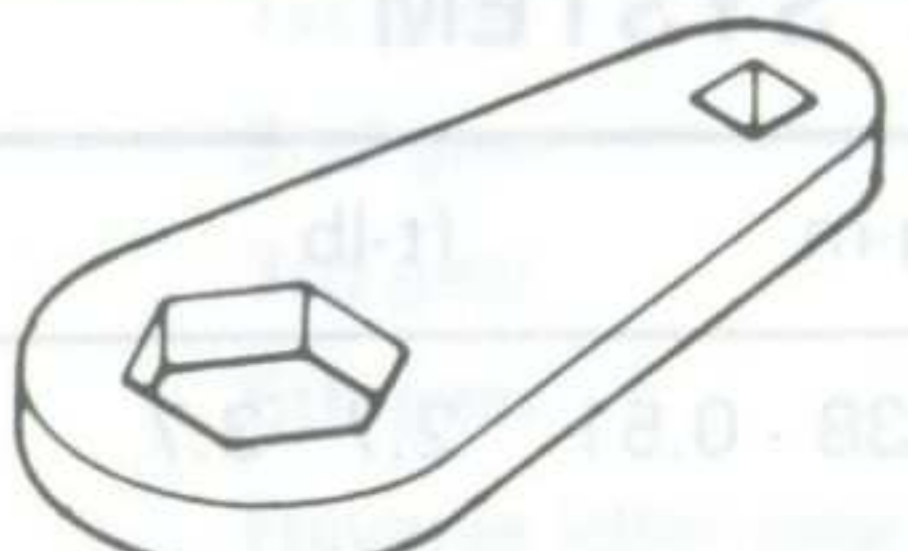
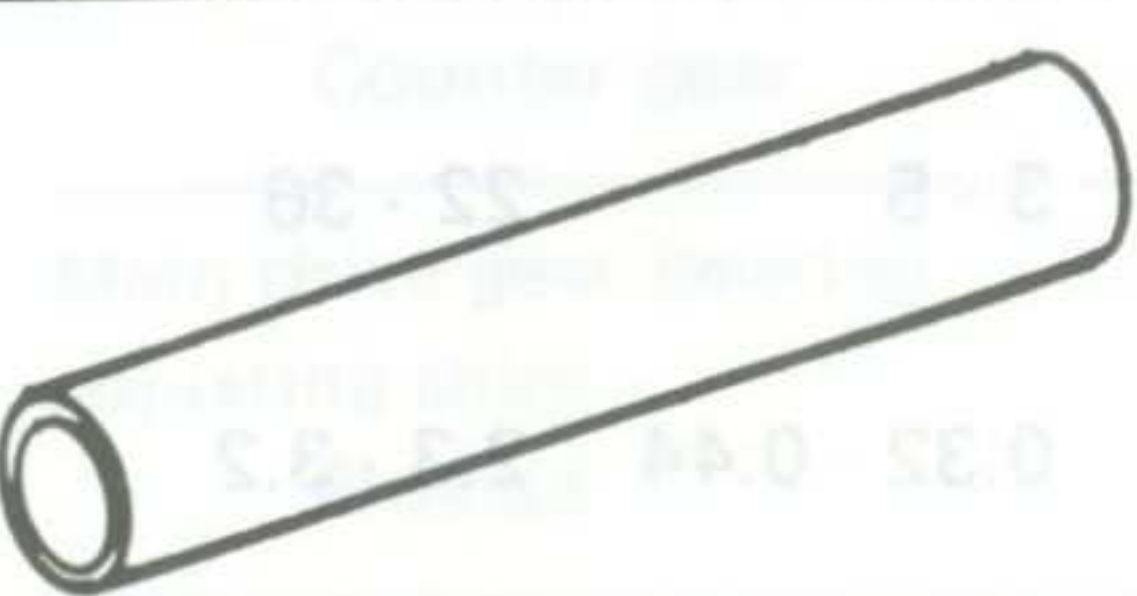
Unit	N·m	kg-m	ft-lb
Rear extension to transmission case	16 - 20	1.6 - 2.0	12 - 14
Front cover to transmission case	16 - 21	1.6 - 2.1	12 - 15
Control housing to rear extension	14 - 18	1.4 - 1.8	10 - 13
Ball pin	20 - 34	2.0 - 3.5	14 - 25
Filler plug	25 - 34	2.5 - 3.5	18 - 25
Drain plug	25 - 34	2.5 - 3.5	18 - 25
Speedometer sleeve installation	4 - 5	0.4 - 0.5	2.9 - 3.6
Return spring plug	20 - 29	2.0 - 3.0	14 - 22
Reverse check sleeve to transmission case	4 - 5	0.4 - 0.5	2.9 - 3.6
Reverse lamp switch	20 - 29	2.0 - 3.0	14 - 22
Check ball plug	19 - 25	1.9 - 2.5	14 - 18
Mainshaft lock nut	137 - 167	14.0 - 17.0	101 - 123
Countershaft lock nut	98 - 127	10.0 - 13.0	72 - 94
Striking lever lock nut	9 - 12	0.9 - 1.2	6.5 - 8.7
Bearing retainer to adapter plate	19 - 25	1.9 - 2.5	14 - 18

Model: BW T-5 (FS5R90A)

Unit	N·m	kg-m	ft-lb
Clutch housing to case	41 - 69	4.2 - 7.0	30 - 51
Cover to case	8.1 - 14.7	0.83 - 1.5	6.0 - 10.8
Front retainer to case	15 - 27	1.5 - 2.8	11 - 20
Filler plug	20 - 34	2.0 - 3.5	14 - 25
Drain plug	20 - 34	2.0 - 3.5	14 - 25
Speedometer sleeve	4 - 5	0.4 - 0.5	2.9 - 3.6
Reverse lamp switch	17 - 24	1.7 - 2.4	12 - 17
Reverse pivot pin	21 - 33	2.1 - 3.4	15 - 25
Neutral switch	20 - 29	2.0 - 3.0	14 - 22
Extension to case	27 - 62	2.8 - 6.3	20 - 46
Control lever housing to extension	15 - 27	1.5 - 2.8	11 - 20

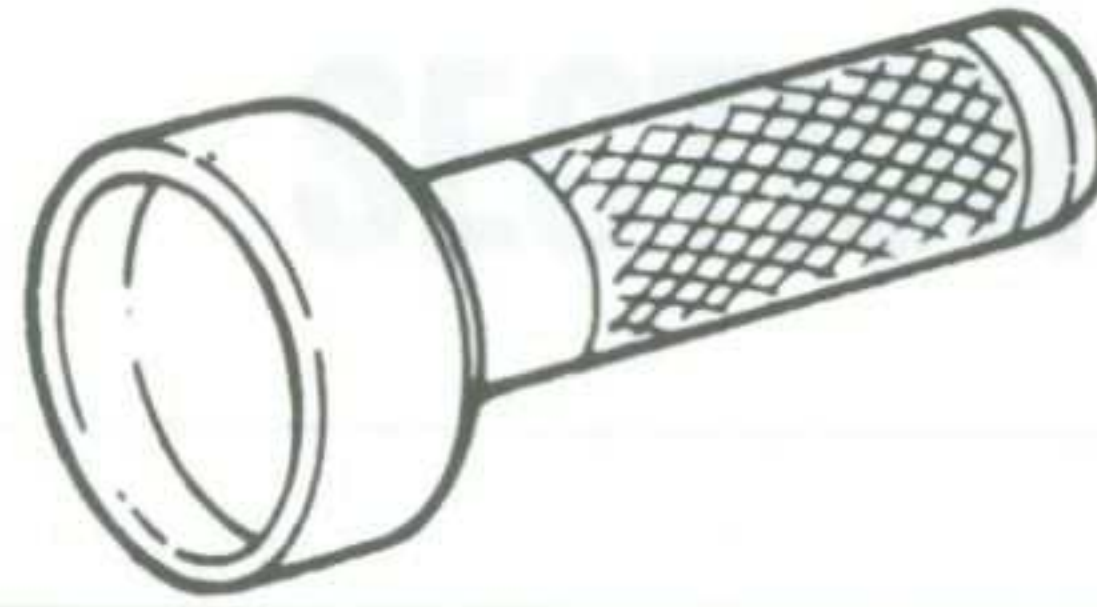
SPECIAL SERVICE TOOLS

Model: FS5W71C *Special tool or a commercial equivalent

Tool number	Tool name	
ST23810001	Adapter setting plate	
KV31100300 *	Fork rod pin punch	
KV32101330	Bearing puller	
ST30031000 *	Bearing puller	
KV31100401	Transmission press stand	
ST23860000 *	Counter gear drift	
ST22360002 *	Bearing drift	
ST22520000	Wrench	
ST22350000 *	Mainshaft bearing drift	
ST23800000 *	Transmission adapter	

SPECIAL SERVICE TOOLS

Tool number	Tool name
ST33400001 *	Oil seal drift



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