

# Chapter 6 Transmission

For modifications, and information applicable to later models, see Supplement at end of manual

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## Specifications

### General

Type .....	Manual gearbox with 4 or 5 forward speeds plus reverse. All forward speeds have synchromesh	
Identification codes:		
4-speed .....	BE1/4	
5-speed .....	BE1/5	
Ratios:	<b>BE1/4</b>	<b>BE1/5</b>
1st .....	3.31:1	3.31:1
2nd .....	1.88:1	1.88:1
3rd .....	1.15:1	1.28:1
4th .....	0.80:1	0.97:1
5th .....	–	0.76:1
Reverse .....	3.33:1	3.33:1
Final drive ratios:		
1.1 litre .....	4.43:1	
1.3 litre .....	4.06:1	
1.6 litre .....	3.81:1	

### Lubrication

Oil type/specification .....	Multigrade engine oil, viscosity SAE 10W/40 or 15W/40 (Duckhams QXR, Hypergrade, or 10W/40 Motor Oil)
Capacity .....	2.0 litre (3.5 pints)

### Torque wrench settings

	Nm	lbf ft
Rear cover bolts (use thread locking compound) .....	12	9
Input and output shaft nuts .....	50	37
Rear bearing retainer bolts .....	15	11
Selector rod backplate bolt .....	15	11
End casing to main casing bolts .....	12	9
Reverse idler spindle bolt .....	20	15
Selector shaft spring bracket .....	15	11
Reverse selector spindle nut .....	20	15
Breather .....	15	11
Reversing lamp switch .....	25	18
Drain plug (gearbox) .....	9	7
Drain plug (final drive) .....	30	22
Speedometer pinion adaptor .....	12	9
Final drive extension housing bolts .....	15	11
Crownwheel securing bolts .....	65	48
Final drive half housing bolts, 10 mm .....	41	30
Final drive half housing bolts, 7 mm .....	12	9
Clutch release bearing guide tube bolts .....	12	9
Mounting stud nut .....	100	74

1 General description

A four or five-speed gearbox will be fitted depending on the vehicle model. The 5th speed gears of the BE1/5 gearbox are located on the primary and secondary shafts, but otherwise both gearbox types are similar in construction.

The transmission is of conventional two shaft constant-mesh layout. There are four pairs of gears, one for each forward speed. The gears on the primary shaft are fixed to the shaft, while those on the secondary or pinion shaft float, each being locked to the shaft when engaged by the synchromesh unit. The reverse idler gear is on a third shaft.

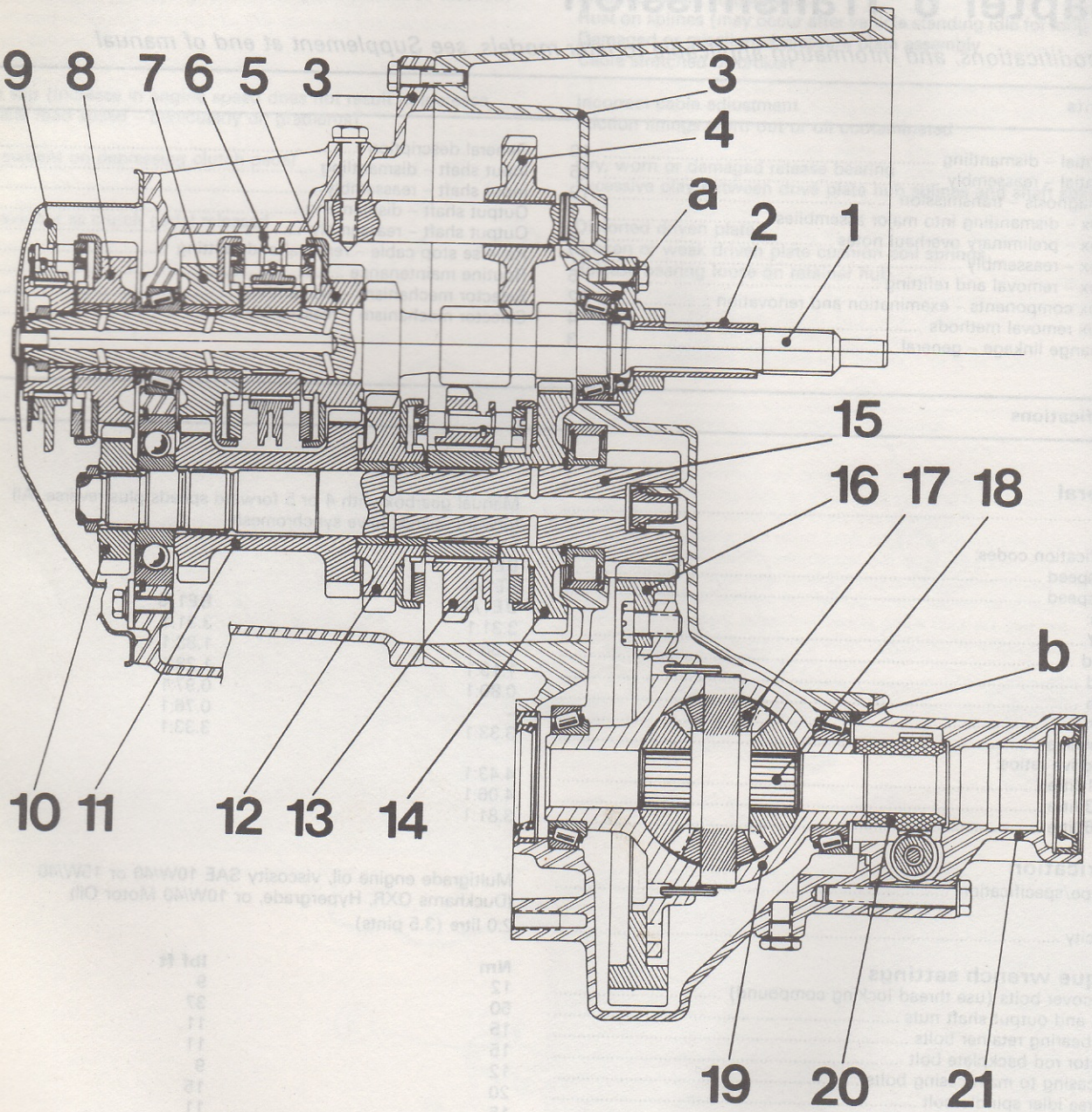


Fig. 6.1 Sectional view of the BE1/5 transmission (Sec 1)

- |                              |                           |                         |   |
|------------------------------|---------------------------|-------------------------|---|
| 1 Input shaft                | 8 5th gear (driving)      | 14 1st gear (driven)    | 20 Speedo driving gear                          |
| 2 Release bearing guide tube | 9 5th synchro             | 15 Output shaft         | 21 Extension housing                            |
| 3 Casings                    | 10 5th gear (driven)      | 16 Crownwheel           | a Selective shim - input shaft bearing preload  |
| 4 Reverse idler gear         | 11 3rd/4th gears (driven) | 17 Differential gear    | b Selective shim - differential bearing preload |
| 5 3rd gear (driving)         | 12 2nd gear (driven)      | 18 Side gear            |   |
| 6 3rd/4th synchro            | 13 1st/2nd synchro        | 19 Differential carrier |   |
| 7 4th gear (driving)         |                           |                         |   |

On five-speed units, the 5th speed gears are of fixed type with an extra synchromesh assembly.

The gear selector forks engage in the synchromesh unit; these slide axially along the shaft to engage the appropriate gear. The forks are mounted on selector shafts which are located in the base of the gearbox.

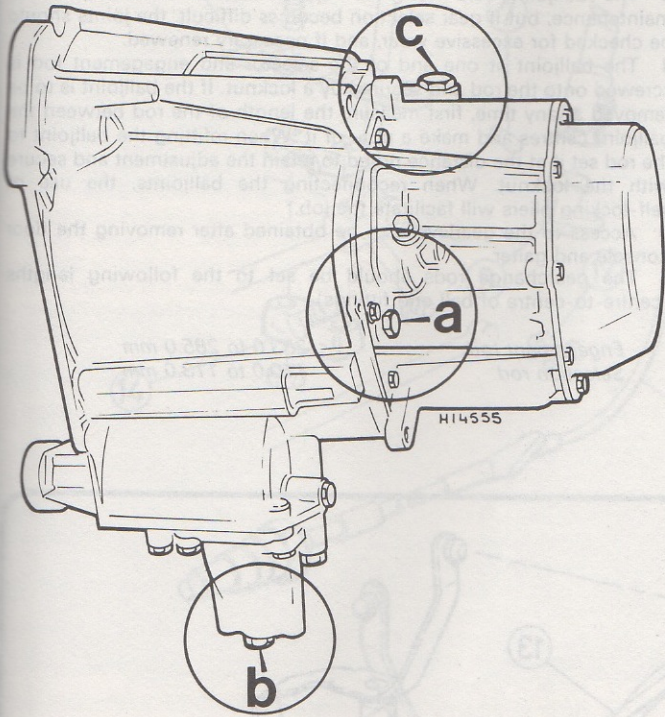


Fig. 6.2 Oil drain and filler plug positions – early 1986 models (Sec 2)

- a Gearbox drain plug
- b Final drive drain plug
- c Oil filler plug

The helical gear on the end of the pinion shaft drives directly onto the crownwheel mounted on the differential unit. The latter differs from normal practice in that it runs in shell bearings and the end play is taken up by thrust washers in a similar manner to the engine crankshaft.

**2 Routine maintenance**

1 The only regular maintenance required is to change the transmission oil at the specified intervals. The oil level, drain and filler plug locations differ in accordance with the model year and are shown in Figs. 6.2 and 6.3.

2 On earlier models there is no transmission level plug, and to check the level the oil must be drained completely by removing the gearbox and final drive drain plugs, then measuring the total amount drained to see if it complies with the amount specified.

3 When draining later models, the removal of the differential unit

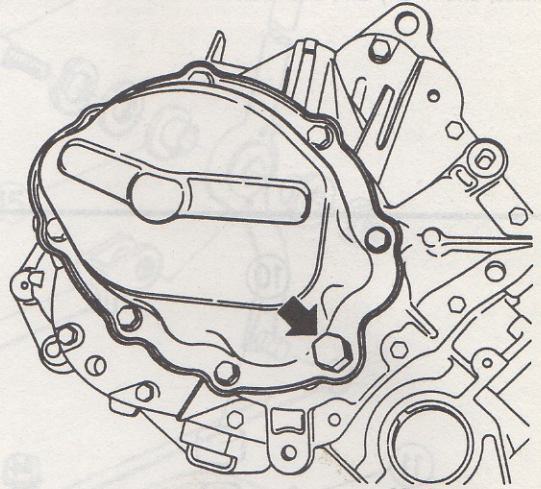


Fig. 6.3 Gearbox/final drive level plug location (arrowed) – 1986 on (Sec 2)

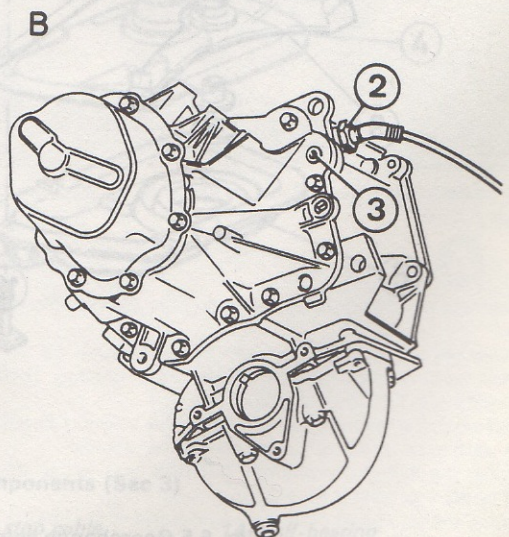
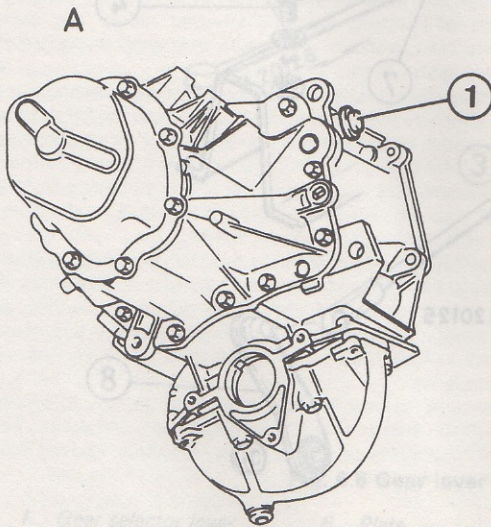


Fig. 6.4 Early (A) and late (B) type gearboxes (Sec 2)

- 1 Breather
- 2 Reverse lock mechanism
- 3 Breather

drain plug drains both the differential and gearbox housing oils. As a combined level/filler plug is fitted to later models, draining is only necessary when removing the transmission unit or when renewing the transmission oil.

4 When checking the oil level in the transmission on later models with a combined level/filler plug, the oil level must be up to the base of the plug hole.

5 On earlier models, a differential level plug was fitted, but this was deleted with the introduction of the reverse lock mechanism (in early 1986), when the breather location was also changed (Fig. 6.4).

6 Access to the oil drain and filler/level plugs may necessitate the removal of the engine undertray and the side shields.

7 Do not overfill the transmission and use only the specified grade of oil. On completion ensure that the drain and filler plugs are secured to the specified torque wrench settings.

8 On earlier models, where the oil filler plug does not act as a level gauge as well, measure out the required amount of oil before filling.

9 Apart from the regular oil change at the specified intervals the oil should be changed in a new or reconditioned unit after the first 1000 to 1500 miles, and in any unit after detection and rectification of an oil leak.

### 3 Gearchange linkage – general

1 The gearchange linkage assemblies are shown in Figs. 6.5 and 6.6.

2 The gear selector and engagement rods have balljoint connections. The balljoints can be detached by prising them free from the lever balls, using an open-ended spanner.

3 The balljoints are 'long-life' types and as such require no maintenance, but if gear selection becomes difficult, the joints should be checked for excessive wear, and if necessary renewed.

4 The balljoint at one end of the selector and engagement rod is screwed onto the rod and secured by a locknut. If the balljoint is to be removed at any time, first measure the length of the rod between the balljoint centres and make a note of it. When refitting the balljoint to the rod set it at the distance noted to retain the adjustment and secure with the locknut. When reconnecting the balljoints, the use of self-locking pliers will facilitate the job.

5 Access to the gearlever can be obtained after removing the floor console and gaiter.

6 The gearchange rods should be set to the following lengths (centre-to-centre of ball end fittings)

Engagement rod  
Selection rod

283.0 to 285.0 mm  
110.0 to 113.0 mm

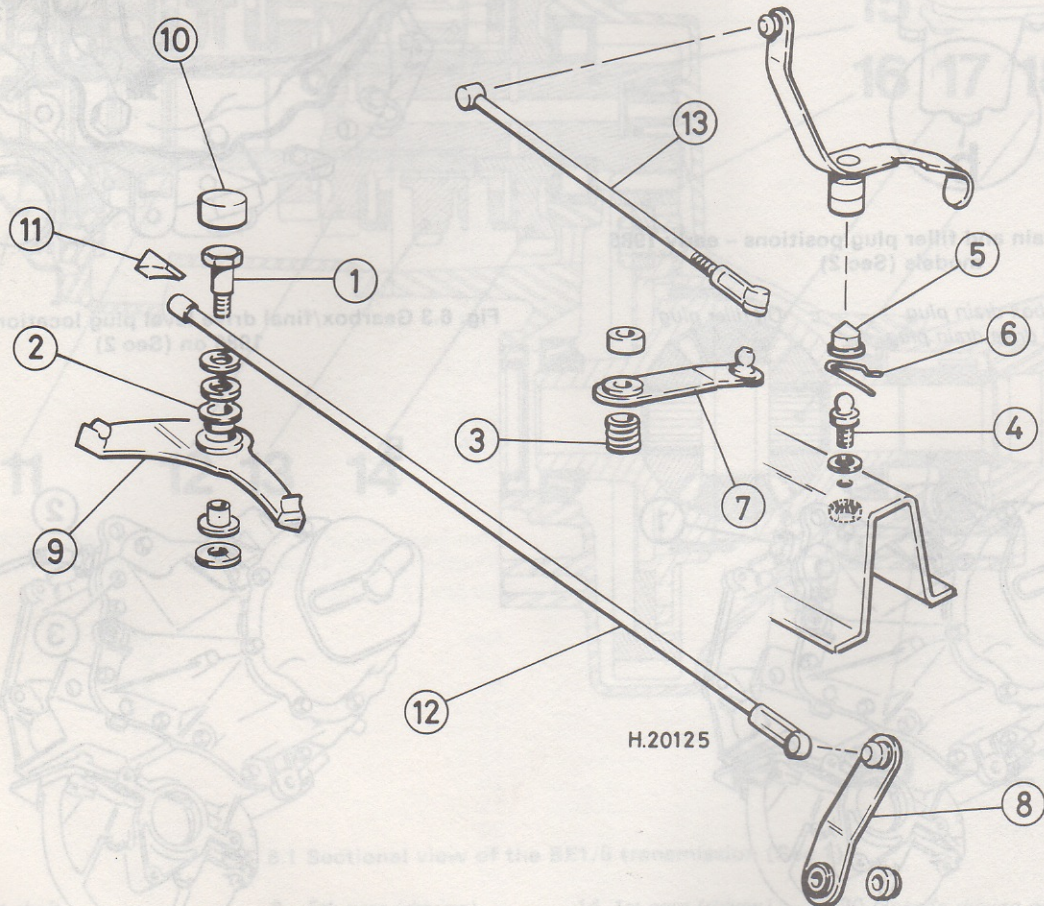


Fig. 6.5 Gearchange selector rods and associated components (Sec 3)

1 Layshaft (pivot bolt)

2 Bush

3 Spring

4 Ball-head screw

5 Bush

6 Snap ring

7 Lever (gear selection)

8 Lever (gearshift passage)

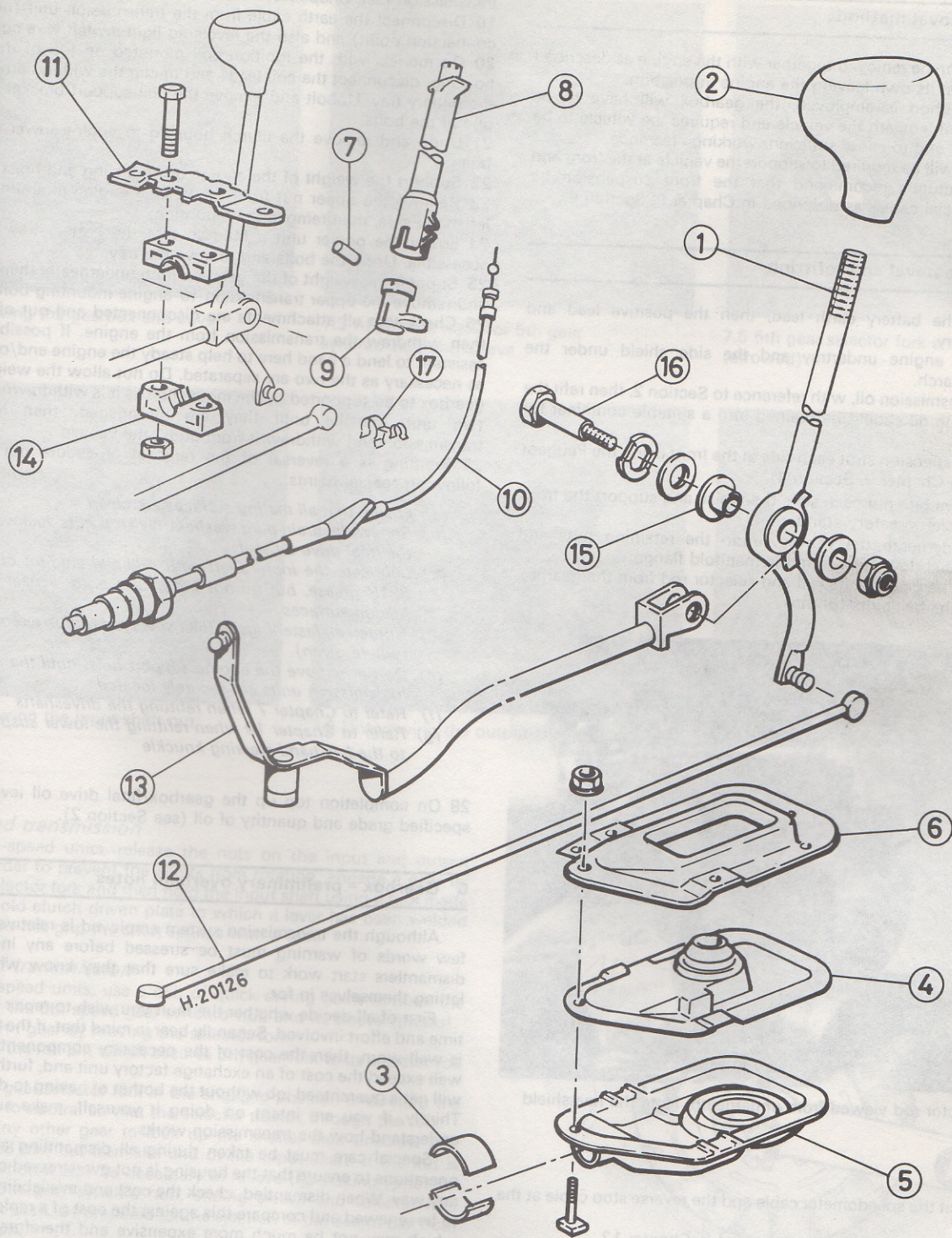
9 Countershaft

10 Protector cap

11 Heat shield

12 Engagement rod

13 Gear selection rod



**Fig. 6.6 Gear lever and associated components (Sec 3)**

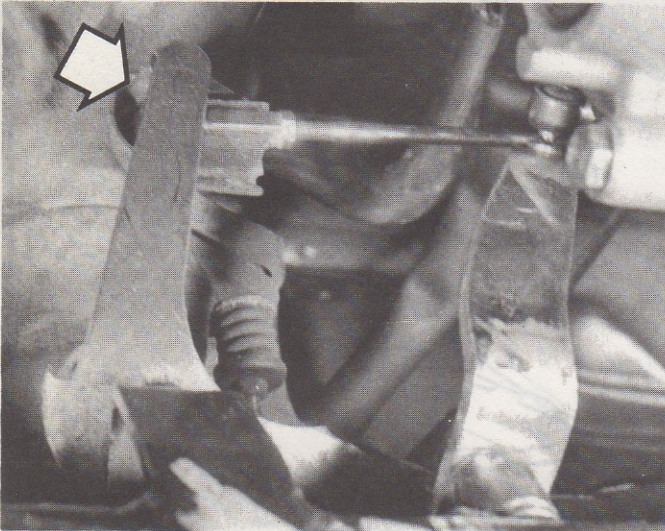
- |                       |                |                          |                       |
|-----------------------|----------------|--------------------------|-----------------------|
| 1 Gear selector lever | 6 Plate        | 10 Reverse stop cable    | 14 Half-bearing       |
| 2 Gear lever knob     | 7 Rubber dowel | 11 Bearing support       | 15 Lever bush         |
| 3 Half-bearing        | 8 Upper sleeve | 12 Gearshift passage bar | 16 Lever shaft        |
| 4 Boot                | 9 Lower sleeve | 13 Gear selector bar     | 17 Cable support clip |
| 5 Gasket              |                |                          |                       |

#### 4 Gearbox removal methods

- 1 The gearbox can be removed together with the engine as described in Chapter 1, or on its own leaving the engine in position.
- 2 Whichever method is employed, the gearbox will have to be withdrawn from underneath the vehicle and requires the vehicle to be raised at the front end to allow sufficient working clearance.
- 3 Safety stands will be required to support the vehicle at the front end and the manufacturers recommend that the front suspension be retained with special cables as described in Chapter 9, Section 4.

#### 5 Gearbox – removal and refitting

- 1 Disconnect the battery earth lead, then the positive lead and remove the battery.
- 2 Remove the engine undertray and the side shield under the left-hand wheel arch.
- 3 Drain the transmission oil, with reference to Section 2, then refit the drain plug(s). The oil should be drained into a suitable container for disposal.
- 4 Retain the suspension strut each side at the front using the Peugeot special tool (see Chapter 9, Section 4).
- 5 Undo the front hub nut each side, then raise and support the front end of the vehicle on safety stands.
- 6 Working underneath the vehicle, undo the retaining nuts and detach the exhaust downpipe from the manifold flange.
- 7 Disconnect the gearchange rod and selector rod from the gearbox by prising free the balljoints (photo).



5.7 Gear selector rod viewed from underneath. Note the heatshield (arrowed)

- 8 Disconnect the speedometer cable and the reverse stop cable at the gearbox.
- 9 Remove the starter motor as described in Chapter 12.
- 10 Unbolt and remove the clutch housing closing (belly) plate together with the TDC sensor and cable.
- 11 Disconnect the suspension arm from the steering knuckle at the balljoint each side, referring to Chapter 10 for details.
- 12 Remove the balljoint protectors but take care not to damage the balljoint boots – protect with a cloth.
- 13 Remove the left-hand driveshaft as described in Chapter 7.
- 14 Unbolt and remove the torque reaction link.
- 15 Remove the right-hand driveshaft with reference to Chapter 7.
- 16 Remove the fuel system air cleaner and ducting with reference to Chapter 3.
- 17 On fuel injection models, remove the airflow sensor unit (see Chapter 3).

- 18 Disconnect the clutch cable from the operating lever and transmission (see Chapter 5).
- 19 Disconnect the earth cable from the transmission unit (noting its connection point) and also the reversing light switch wire connector.
- 20 On models with the ignition coil mounted on top of the clutch housing, disconnect the coil leads and unclip the wiring harness from the battery tray. Unbolt and remove the coil support bracket and refit one of the bolts.
- 21 Undo and remove the clutch housing-to-engine lower retaining bolts.
- 22 Support the weight of the engine using a sling and hoist.
- 23 Remove the upper nut from the flexible engine mounting on the left-hand side, then remove the mounting.
- 24 Lower the power unit a little so that the battery tray bolts are accessible. Undo the bolts and remove the tray.
- 25 Support the weight of the gearbox from underneath, then unscrew and remove the upper transmission-to-engine mounting bolts.
- 26 Check that all attachments are disconnected and out of the way then withdraw the transmission from the engine. If possible get an assistant to lend a hand here to help steady the engine and/or gearbox as necessary as the two are separated. Do not allow the weight of the gearbox to be supported by the input shaft as it is withdrawn. Keep the two units parallel until they are disengaged, then lower the transmission and withdraw it from under the vehicle.
- 27 Refitting is a reversal of the removal procedure but note the following special points.

- (a) Ensure that all mating surfaces are clean
- (b) Renew the drain plug washers, Nylstop nuts, lockwashers and the final drive oil seals
- (c) Lubricate the input shaft with a liberal amount of Molykote 321R grease, but do not get grease onto or near the clutch friction surfaces
- (d) Tighten all fastenings to their specified torque wrench settings (where given)
- (e) Do not remove the engine support hoist until the engine and transmission units are securely located
- (f) Refer to Chapter 7 when refitting the driveshafts
- (g) Refer to Chapter 10 when refitting the lower suspension arm to the left-hand steering knuckle

- 28 On completion top up the gearbox/final drive oil level with the specified grade and quantity of oil (see Section 2).

#### 6 Gearbox – preliminary overhaul notes

Although the transmission system employed is relatively simple, a few words of warning must be stressed before any inexperienced dismantlers start work to make sure that they know what they are letting themselves in for.

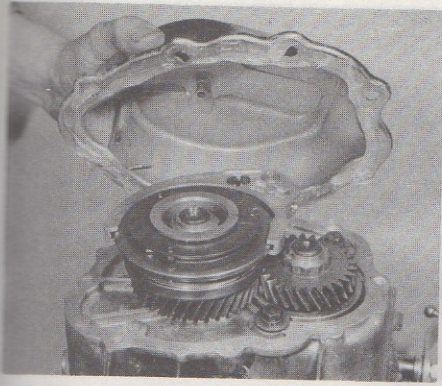
First of all decide whether the fault you wish to repair is worth the time and effort involved. Secondly bear in mind that, if the transmission is well worn, then the cost of the necessary component parts could well exceed the cost of an exchange factory unit and, furthermore, you will get a guaranteed job without the bother of having to do it yourself. Thirdly, if you are intent on doing it yourself, make sure that you understand how the transmission works.

Special care must be taken during all dismantling and assembly operations to ensure that the housing is not overstressed or distorted in any way. When dismantled, check the cost and availability of the parts to be renewed and compare this against the cost of a replacement unit, which may not be much more expensive and therefore would be a better proposition.

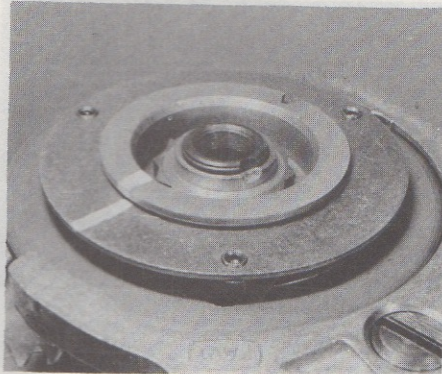
On reassembly, take careful note of the tightening procedures and torque wrench settings of the relevant nuts and bolts. This is most important to prevent overtightening, distortion and oil leakage, and also to ensure smooth, trouble-free running of the unit.

#### 7 Gearbox – dismantling into major assemblies

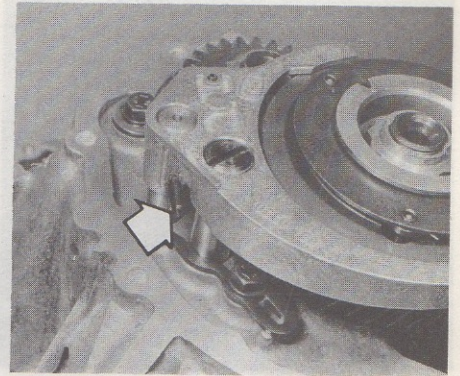
- 1 Remove the eight bolts and washers which secure the end cover. Remove the cover (photo).



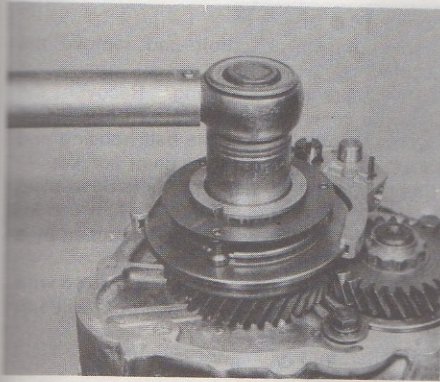
7.1 Removing the gearbox end cover



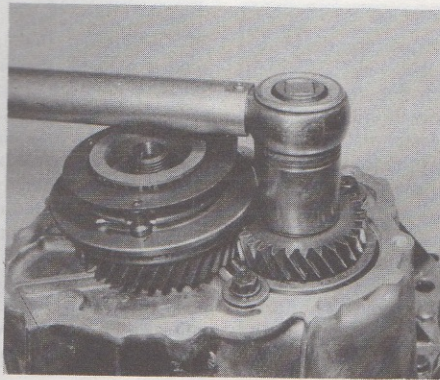
7.3 Alignment mark for 5th gear synchro-hub and sleeve



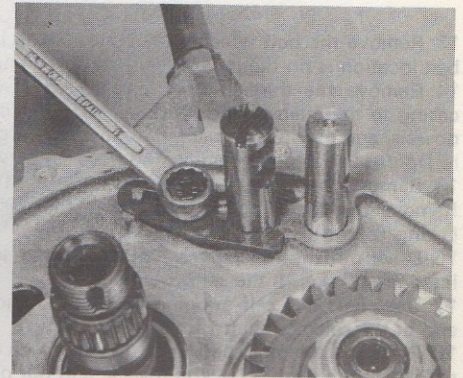
7.5 5th gear selector fork and roll pin (arrowed)



7.7 Unscrewing the input shaft nut



7.9 Unscrewing the output shaft nut



7.12 Remove the selector rod lockplate bolt

**Four-speed transmission**

2 On four-speed units, release the nuts on the input and output shafts. In order to prevent the shafts from rotating, engage a gear by moving a selector fork and then hold the input shaft using a tool made up from an old clutch driven plate to which a lever has been welded (Fig. 6.7). Do not grip the shaft splines with a tool.

**Five-speed transmission**

- 3 On five-speed units, use a dab of quick drying paint to mark the alignment of the 5th speed gear synchro-hub and its sleeve (photo).
- 4 Engage 5th gear by moving the selector fork.
- 5 Drive out the roll pin which secures 5th gear fork to its selector rod (photo).
- 6 Hold 5th gear selector fork in the engaged position and return the gear selector to neutral so that the selector passes through the fork.
- 7 Engage any other gear to lock up the shafts, then unscrew and remove the 28 mm nut from the end of the input shaft. If the nut is staked in position it may be necessary to relieve the staking (photo).
- 8 Remove 5th gear synchro-hub, sliding sleeve and selector fork from the input shaft. Be prepared for the ejection of the detent ball from the selector fork.
- 9 Refit the 5th gear sliding sleeve and hub and engage 5th gear again. Relieve the staking from the output shaft nut and remove the nut. Remove the sliding sleeve and hub again (photo).
- 10 Remove from the input shaft the 5th gear, its bush and the spacer.

**Four- and five-speed transmissions**

- 11 Remove the two bolts and washers which secure the output shaft rear bearing. Remove the circlip from the output shaft rear bearing by prising up its ends. The circlip should be renewed anyway, so do not be afraid of breaking it. Raise the output shaft if the circlip is jammed in its groove.
- 12 Extract its securing bolt and remove the selector rod lockplate (photo).

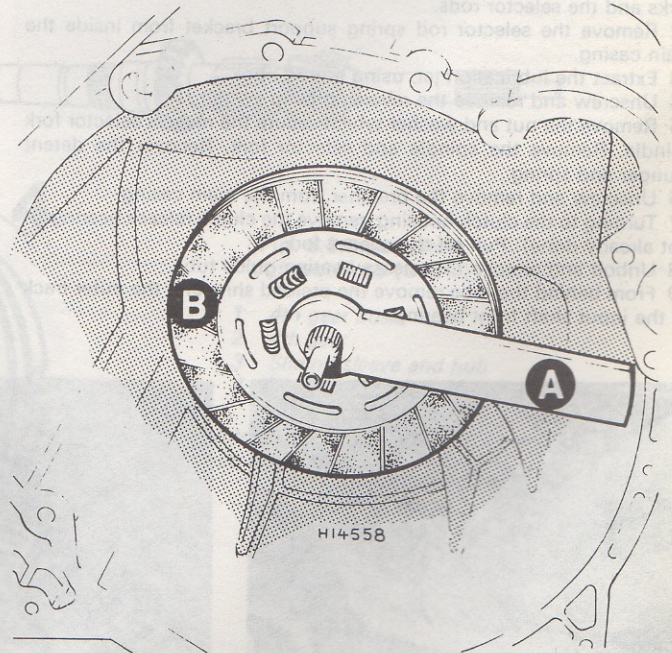
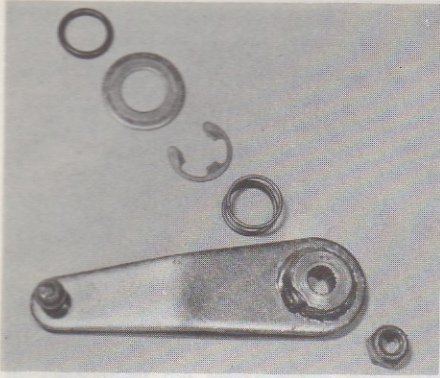
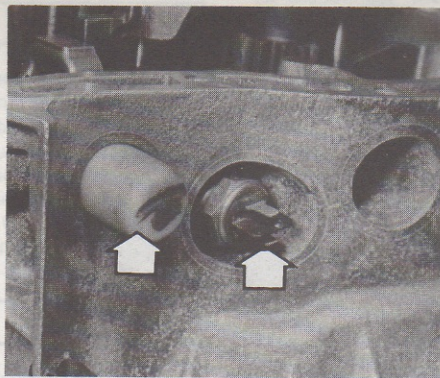


Fig. 6.7 Typical tool for locking the input shaft on the 4-speed gearbox (Sec 7)

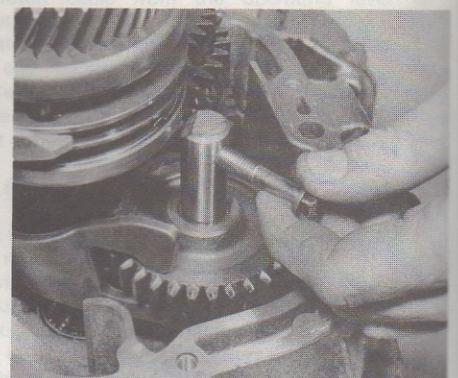
A Lever B Old clutch driven plate



7.15 Selector arm, spring, circlip, washer and O-ring



7.17 Selector shaft cover and reverse lamp switch (arrows)



7.19 Removing the reverse idler spindle

13 Remove the bolt which retains the reverse idler gear spindle. The bolt location is on the lower side face of the end case.

14 Remove the thirteen bolts and washers which secure the end casing to the main casing. Withdraw the end casing; it is located by dowels, and may need striking with a wooden or plastic mallet to free it. Do not use a metal hammer, nor lever in between the joint faces.

15 Remove the selector arm and spring from the gear selector shaft. Remove the circlip and washer, push the shaft in and recover the O-ring (photo).

16 Drive out the roll pins which secure the selector finger and the interlock bracket to the selector shaft.

17 Use pliers or a self-gripping wrench to remove the cover from the end of the selector shaft (if required) (photo).

18 Press the selector shaft from the casing so that the circlip can be removed then push it back in reverse and out of the casing.

19 Screw the reverse idler spindle retaining bolt back into the spindle and use it as a lever to extract the spindle. Remove the reverse idler gear itself (photo).

20 Remove the swarf-collecting magnet from the casing (photo).

21 Carefully lift out the two geartrains with their shafts, the selector forks and the selector rods.

22 Remove the selector rod spring support bracket from inside the main casing.

23 Extract the lubrication jet, using a wire hook.

24 Unscrew and remove the reversing lamp switch.

25 Remove the nut and washer which secure the reverse selector fork spindle. Remove the spindle and selector fork. Recover the detent plunger and spring.

26 Unscrew and remove the breather from the main casing.

27 Turning to the clutch housing, remove the clutch release bearing (if not already done). Pull off the release fork.

28 Unbolt and remove the release bearing guide tube.

29 From behind the tube remove the preload shim and the outer track of the input shaft front bearing.

30 To remove the final drive unit, first unbolt and remove the speedometer pinion and its adaptor.

31 Unbolt and remove the extension housing. Recover the speedometer driving gear and the bearing preload shim (if fitted).

32 Unbolt the final drive half housing. Remove the half housing and final drive unit. Note the location of the gearchange pivot bracket.

33 Identify the final drive bearing outer tracks; if they are to be re-used they must be refitted on the same sides.

34 Remove the selector lever from the main casing. It is retained by a circlip and a washer.

35 If it is wished to remove the clutch release lever balljoint, do so with a slide hammer having a suitable claw. (A new gearbox will not necessarily be fitted with a balljoint).

36 The gearbox is now dismantled into its major assemblies.

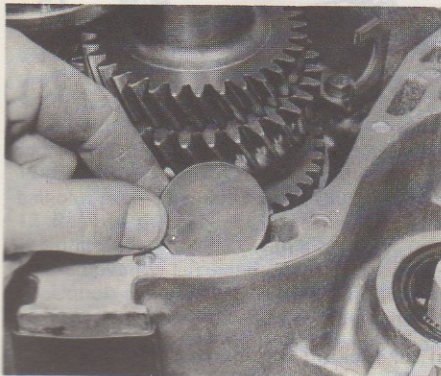
## 8 Input shaft – dismantling

1 Remove the 3rd and 4th gear components from the input shaft by supporting the assembly under the 3rd gear and pressing or driving the shaft through. Protect the end of the shaft. Once the rear bearing is free, the other components can be removed from the shaft in order: 4th gear and its bush, 3rd/4th synchro sleeve and hub and 3rd gear (photos).

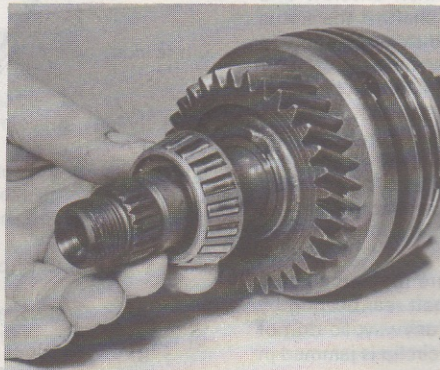
2 Mark the synchro sleeve and hub relative to each other and to show which side faces 4th gear (Fig. 6.8).

3 Remove the front bearing from the shaft, preferably with a press or a bearing puller. As a last resort it may be possible to support the bearing and drive the shaft through; be sure to protect the end of the shaft if this is done.

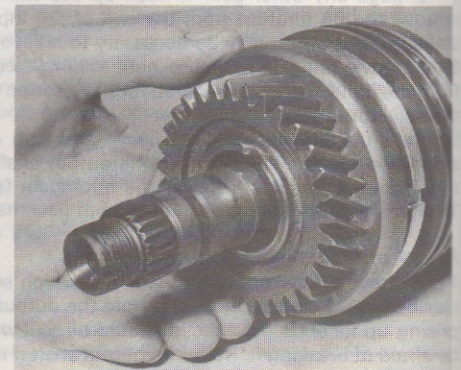
4 Once the input shaft bearings have been removed, they must be renewed. Press the rear bearing outer track from the end casing and press in the new track, making sure it enters squarely.



7.20 Withdraw the casing magnet

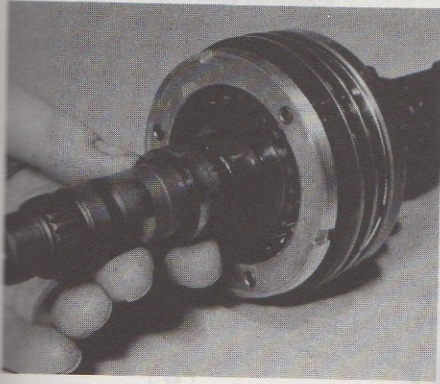


8.1A Input shaft bearing

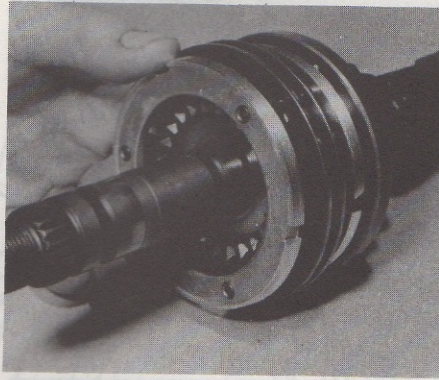


8.1B 4th gear on the input shaft

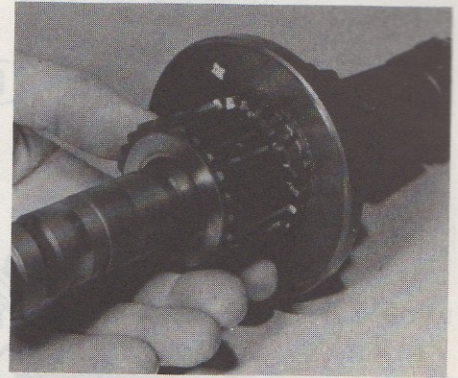




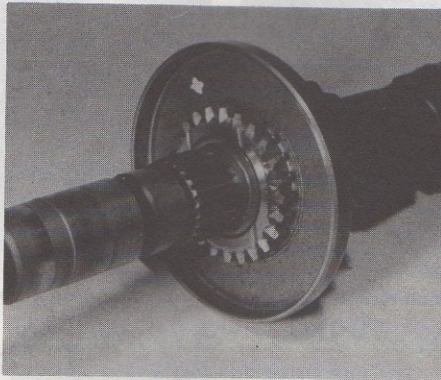
8.1C 4th gear bush



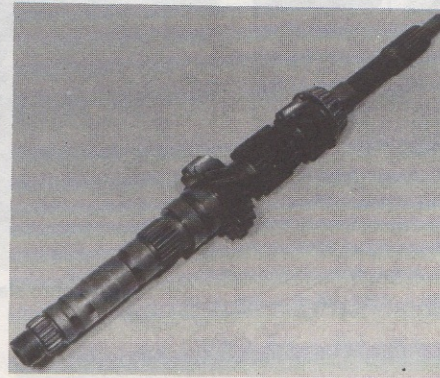
8.1D 3rd/4th synchro sleeve on input shaft



8.1E 3rd/4th synchro-hub on input shaft



8.1F 3rd gear on input shaft



8.1G Input shaft stripped except for front bearing

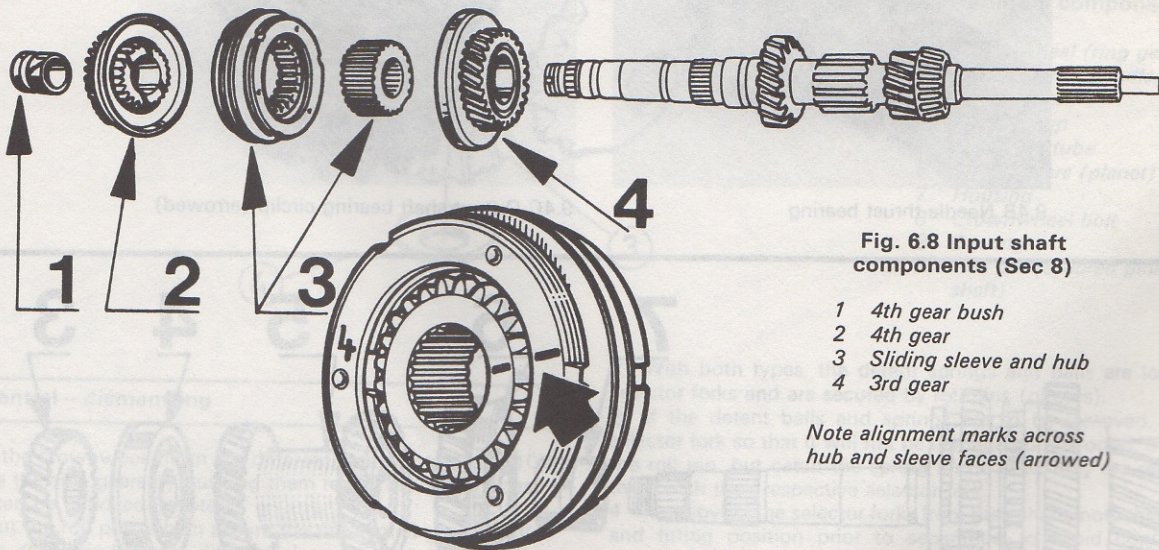


Fig. 6.8 Input shaft components (Sec 8)

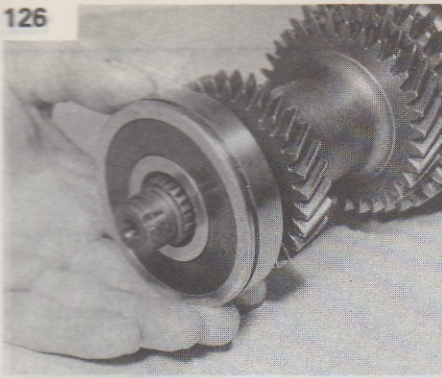
- 1 4th gear bush
- 2 4th gear
- 3 Sliding sleeve and hub
- 4 3rd gear

Note alignment marks across hub and sleeve faces (arrowed)

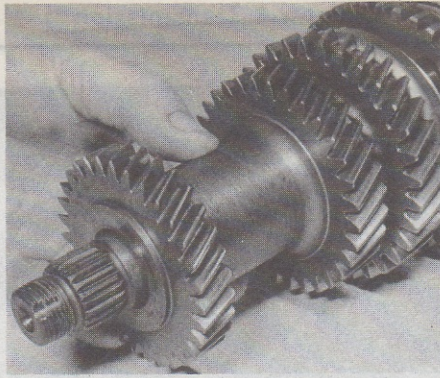
## 9 Output shaft – dismantling

- 1 Remove 5th gear (when applicable) and the rear bearing from the output shaft. Use a puller or bearing extractor if they are a tight fit on the shaft (photo).
- 2 Remove 3rd/4th gear assembly, 2nd gear and its bush (photos).

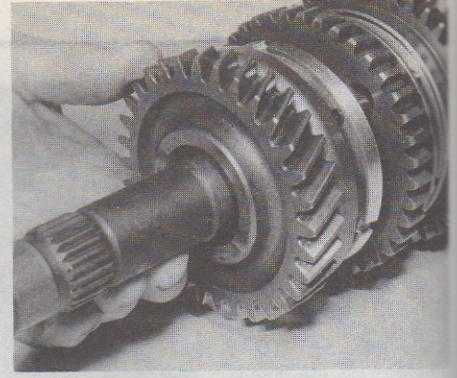
- 3 Make alignment marks between the 1st/2nd synchro-hub and sleeve, then remove them from the shaft (photo).
- 4 Remove 1st gear and the thrust bearing. Remove the bearing circlip (photos).
- 5 Press or drive the shaft out of the pinion end bearing, protecting the end of the shaft.



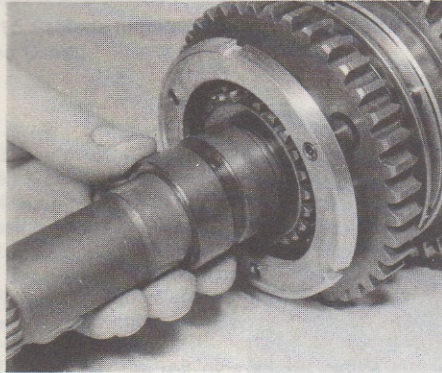
9.1 Output shaft rear bearing



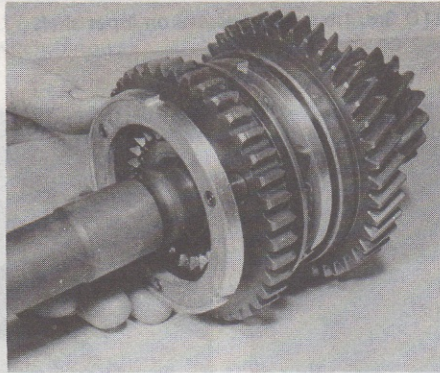
9.2A 3rd/4th gear assembly on output shaft



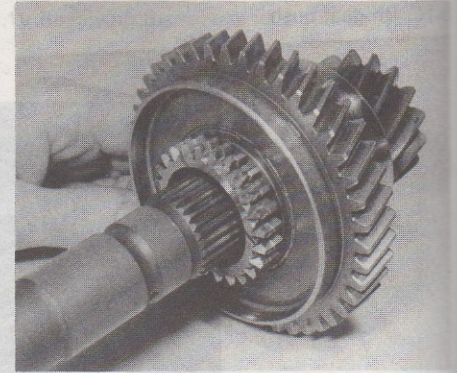
9.2B 2nd gear on output shaft



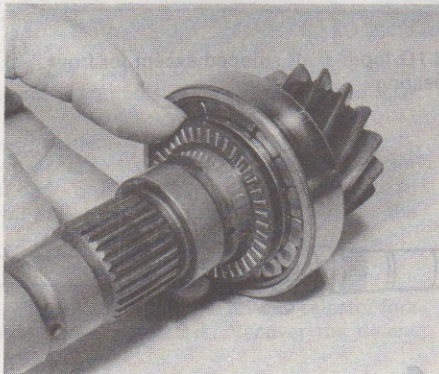
9.2C 2nd gear bush



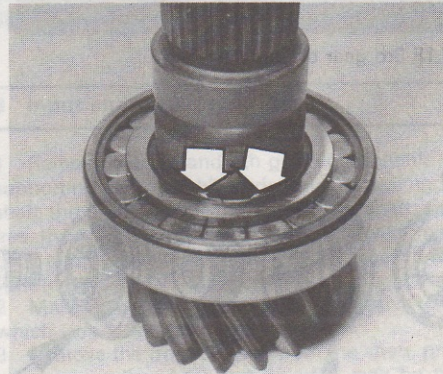
9.3 1st/2nd sychro sleeve on output shaft



9.4A 1st gear on output shaft



9.4B Needle thrust bearing



9.4C Output shaft bearing circlip (arrowed)

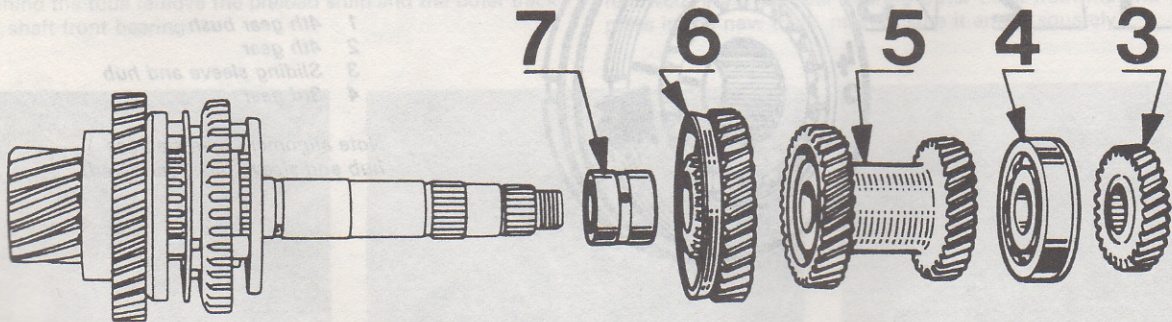


Fig. 6.9 Output shaft components (Sec 9)

3 5th gear (driven)  
4 Bearing

5 3rd/4th gear (driven)  
6 2nd gear

7 Bush (2nd gear)

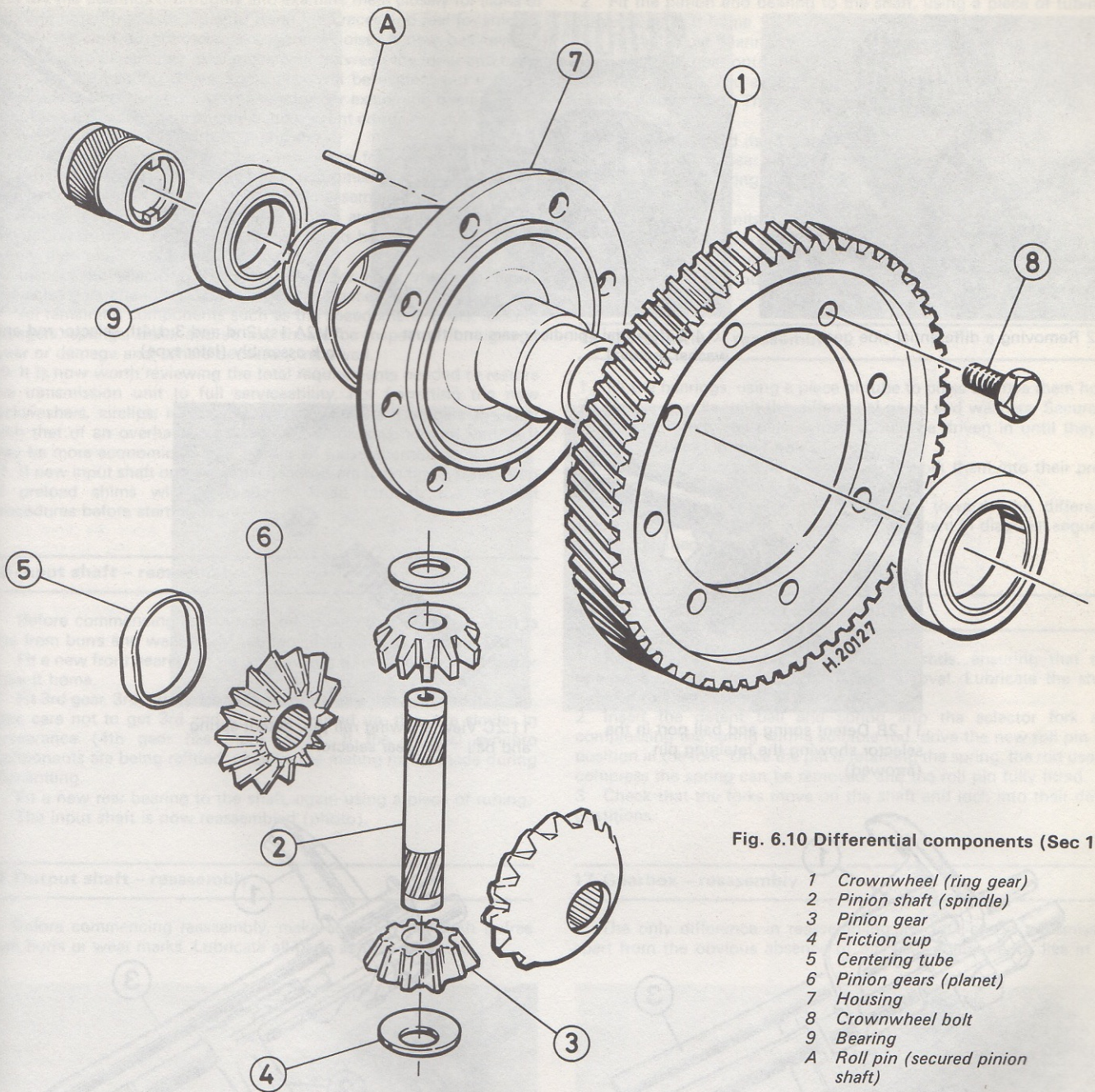


Fig. 6.10 Differential components (Sec 10)

- 1 Crownwheel (ring gear)
- 2 Pinion shaft (spindle)
- 3 Pinion gear
- 4 Friction cup
- 5 Centering tube
- 6 Pinion gears (planet)
- 7 Housing
- 8 Crownwheel bolt
- 9 Bearing
- A Roll pin (secured pinion shaft)

## 10 Differential – dismantling

- 1 Unbolt the crownwheel from the differential housing (Fig. 6.10).
- 2 Remove the side gears by pushing them round inside the housing until they can be removed (photo).
- 3 Drive out the roll pins which secure the differential gear spindle.
- 4 Remove the spindle, the differential gears and their washers (photo).
- 5 Use a press or bearing extractor to remove the bearings.

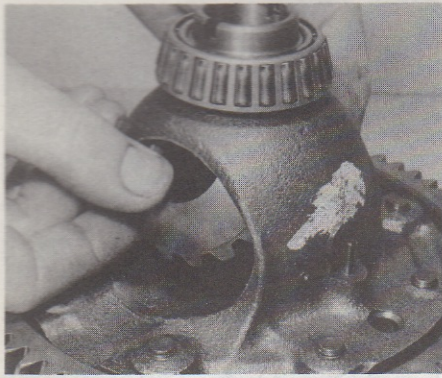
## 11 Selector mechanism – dismantling

- 1 On early models the selector mechanism assembly is as shown in Fig. 6.11, whilst later models (from about April 1986 on) have the type shown in Fig. 6.12.

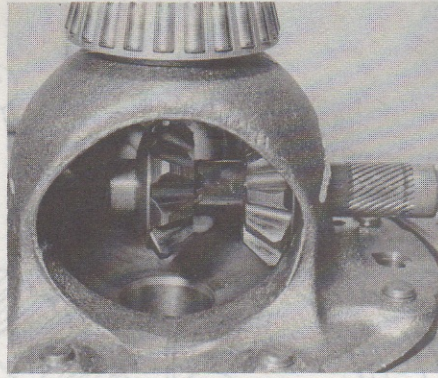
- 2 With both types, the detent springs and balls are located in the selector forks and are secured by roll pins (photos).
- 3 If the detent balls and springs are to be removed, support the selector fork so that it will not be damaged or distorted, then drive out the roll pin, but catch the spring and ball as they are released. Keep them with their respective selector fork.
- 4 If removing the selector forks from their shafts note their orientation and fitting position prior to separation to avoid confusion when reassembling.

## 12 Gearbox components – examination and renovation

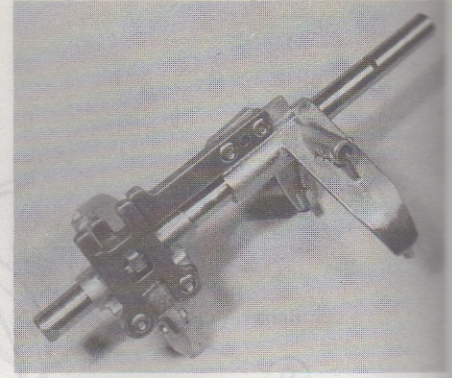
- 1 Having removed and dismantled the transmission unit, the various components should be thoroughly washed with a suitable solvent or with petrol and paraffin, and then wiped dry. Take care not to mix to lose identification of where they fit and which way round they should be fitted. Don't use hard scrapers or emery cloth to clean



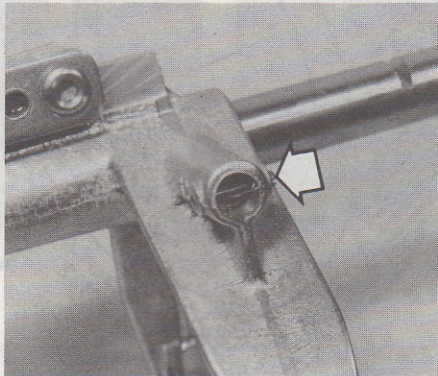
10.2 Removing a differential side gear



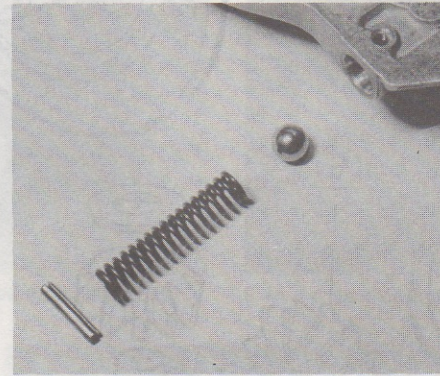
10.4 Differential spindle, gears and thrust washer removal



11.2A 1st/2nd and 3rd/4th selector rod and fork assembly (later type)



11.2B Detent spring and ball port in the selector showing the retaining pin (arrowed)



11.2C View showing roll pin, detent spring and ball – 5th gear selector

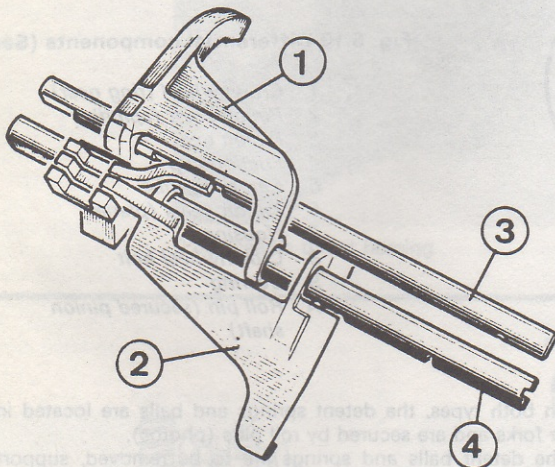


Fig. 6.11 Selector mechanism – early type (Sec 11)

- |                |                              |
|----------------|------------------------------|
| 1 1st/2nd fork | 3 Rod with 5th gear fork dog |
| 2 3rd/4th fork | 4 Selector rod (fixed)       |

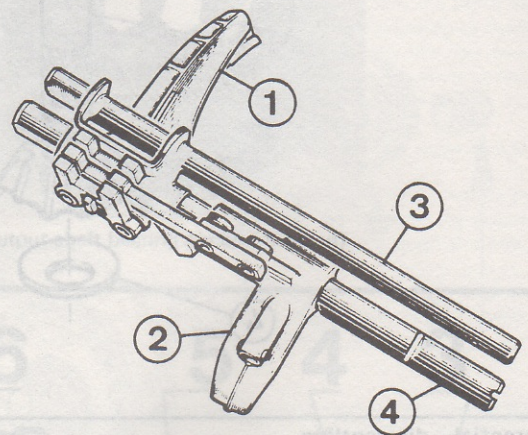


Fig. 6.12 Selector mechanism – late type (Sec 11)

- |                |                              |
|----------------|------------------------------|
| 1 1st/2nd fork | 3 Rod with 5th gear fork dog |
| 2 3rd/4th fork | 4 Selector rod (fixed)       |

the housing mating faces as the surface must be kept perfectly flat and undamaged.

2 Inspect the transmission housing and the differential unit housing for cracks or damage, particularly near bearings or bushes. The transmission housing, differential housing and the mainshaft centre bearing cap are all machined after assembly and none of these parts must be renewed separately.

3 Components requiring special attention will have been noted as a result of the performance of the transmission when installed in the car or will have been noted during dismantling.

4 Examine the teeth of all gears for signs of uneven or excessive wear or chipping. If you find a gear in a bad state have a close look at the gear it engages with – this may have to be renewed as well. All gears should run smoothly on their bushes or in their bearings with no sign of rocking or sloppiness.

5 A not so obvious cause of noise and trouble is bearing wear. Wash

and dry the bearings thoroughly and examine them closely for signs of scoring, pitted tracks or blueing. Rotate the races and feel for smooth movement with no grittiness or abnormal noise. A new ball-bearing will show no perceptible axial movement between the inner and outer races. As the bearing wears, some play will be evident but if this is excessive the bearing must be renewed. After examining bearings they should be lubricated with engine oil to prevent corrosion, and wrapped to avoid contamination with dust and dirt.

6 Carefully inspect the synchromesh units for excessive wear or damage. If weak or ineffective synchromesh action has been experienced, renew the units as complete assemblies.

7 Check the selector forks for wear in the areas which contact the synchromesh units. Any wear evident should be minimal; if in doubt renew the forks.

8 Inspect the selector shafts and detents for wear which can cause imprecise gear changing, and renew where necessary.

9 All remaining components such as the speedometer gears, locking plungers, springs, balls, and so on, should be inspected for signs of wear or damage and, where necessary, renewed.

10 It is now worth reviewing the total requirements needed to restore the transmission unit to full serviceability, not forgetting the new lockwashers, circlips, roll pins, seals and gaskets. Compare the cost with that of an overhauled or good condition secondhand unit as it may be more economical to go for one of these alternatives.

11 If new input shaft or differential bearings are to be fitted, a selection of preload shims will be required. Read through the relevant procedures before starting work.

### 13 Input shaft – reassembly

1 Before commencing reassembly, make sure that the input shaft is free from burrs and wear marks. Lubricate all parts as they are fitted.

2 Fit a new front bearing to the shaft, using a suitable tube to press or drive it home.

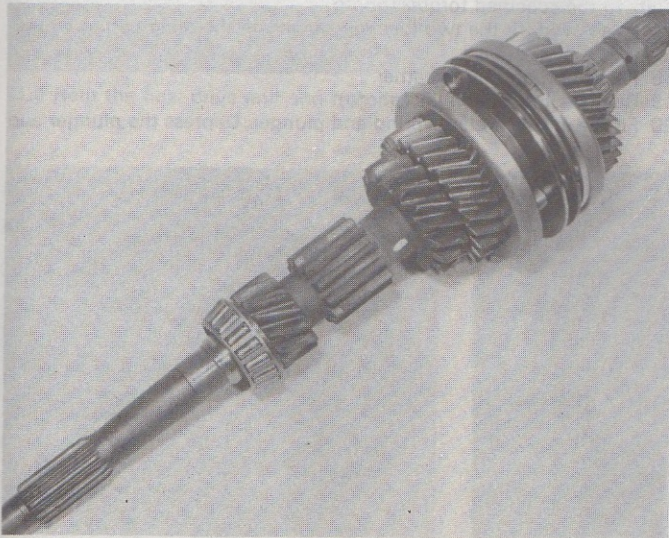
3 Fit 3rd gear, 3rd/4th synchro-hub and sleeve, 4th gear and its bush. Take care not to get 3rd and 4th gears mixed up, they are similar in appearance (4th gear has more teeth). If the original synchro components are being refitted, observe the mating marks made during dismantling.

4 Fit a new rear bearing to the shaft, again using a piece of tubing.

5 The input shaft is now reassembled (photo).

### 14 Output shaft – reassembly

1 Before commencing reassembly, make sure that the shaft is free from burrs or wear marks. Lubricate all parts as they are fitted.



13.5 Input shaft assembly

2 Fit the pinion end bearing to the shaft, using a piece of tubing to drive or press it home.

3 Fit the thrust bearing into position against the pinion end bearing then slide 1st gear onto the shaft and up to the thrust bearing.

4 Refit the 1st/2nd synchro unit, observing the mating marks made when dismantling. The chamfer on the external teeth must face towards 1st gear.

5 Fit 2nd gear and its bush.

6 Fit the 3rd/4th gear assembly, making sure it is the right way round.

7 Fit the rear bearing, with the circlip groove nearest the tail of the shaft.

8 On five-speed units, fit the 5th gear so that the boss on the gear is towards the shaft bearing (photo).

9 On four-speed units, fit the shaft spacer (Fig. 6.13).

10 Screw on a nut, but do not tighten at this stage.

### 15 Differential – reassembly

1 Fit the bearings, using a piece of tube to press or drive them home.

2 Fit the spindle with the differential gears and washers. Secure the spindle with new roll pins, which should be driven in until they are centrally located in their holes (photo).

3 Fit the side gears, one at a time, and work them into their proper positions.

4 Fit the crownwheel with its chamfer towards the differential housing. Secure with the bolts, tightening them in diagonal sequence to the specified torque (photos).

### 16 Selector mechanism – reassembly

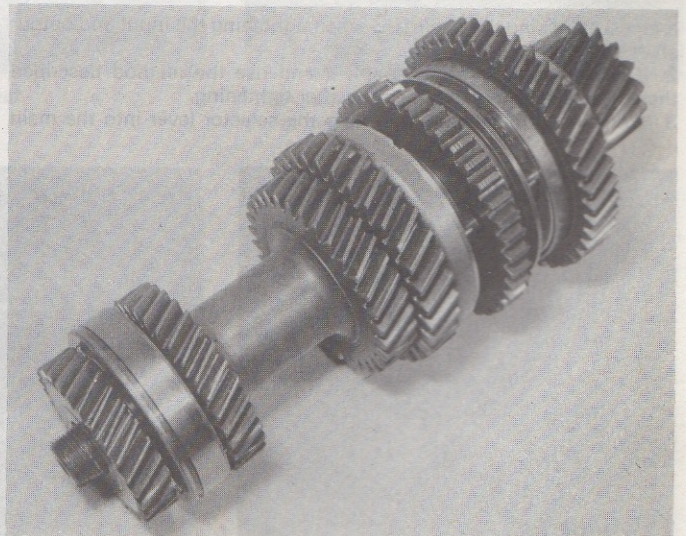
1 Reassemble the selector forks to the rods, ensuring that their orientation is correct as noted during removal. Lubricate the shafts with oil to ease assembly.

2 Insert the detent ball and spring into the selector fork and, compressing the spring with a suitable rod, drive the new roll pin into position in the fork. Once the pin is retaining the spring, the rod used to compress the spring can be removed, and the roll pin fully fitted.

3 Check that the forks move on the shaft and lock into their detent positions.

### 17 Gearbox – reassembly

1 The only difference in reassembling the four-speed transmission apart from the obvious absence of 5th gear components, lies in the



14.8 Output shaft assembly

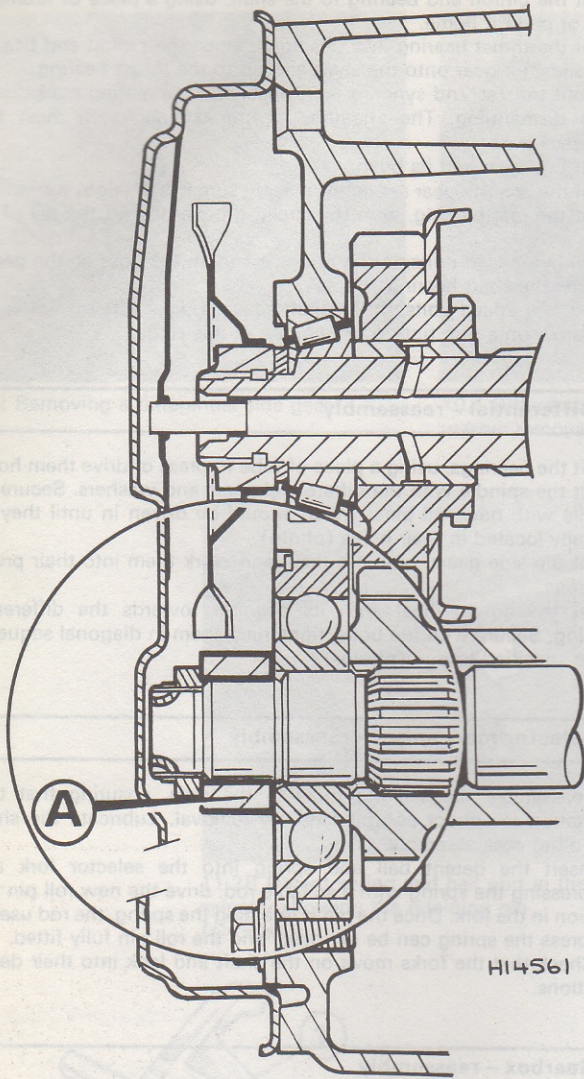
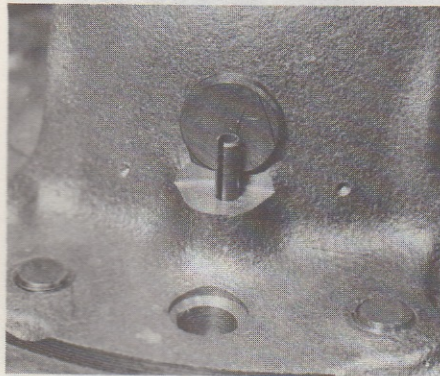


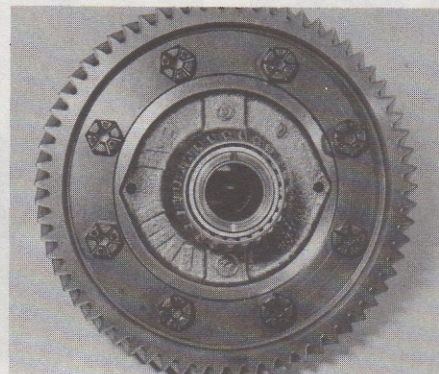
Fig. 6.13 Shaft spacer (A) on four-speed gearbox (Sec 14)

method of locking the geartrains when tightening the input and output shaft nuts.

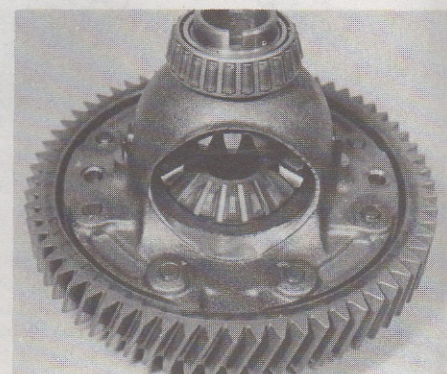
- 2 Refer to Section 7, paragraph 2 and use the method described there. Remember to stake the nuts after tightening.
- 3 Commence reassembly by fitting the selector lever into the main



15.2 Differential spindle roll pin



15.4A View showing crownwheel and retaining bolts



15.4B General view of the reassembled differential unit

casing. Make sure that the locating dowel is in position in the final drive housing mating face.

4 Apply jointing compound to the mating face, then fit the differential assembly with its bearing tracks.

5 Before proceeding further it must be noted that the preload procedure for the differential bearings differs according to the type of extension housing fitted. On earlier models the extension housing shoulder protrusion is 8.65 mm (0.341 in) and shims are used to set the bearing preload. On later models the extension housing shoulder protrusion is 10 mm (0.394 in) and in this instance no preload shims are required. To clarify which type is being fitted measure the shoulder protrusion of the extension housing. For the earlier type extension housing, proceed as described in paragraphs 6 to 12 inclusive. For the later type extension housing proceed as described in paragraphs 6, 11 and 12 but ignore the reference to preload shims in paragraph 12. As the extension housing bolts are tightened, turn the differential to seat the bearings.

6 Fit the final drive half housing and the extension housing, but only tighten their securing bolts finger tight at this stage (photo).

7 Fit a new oil seal, lips well greased, to the other side of the final drive housing from the extension (photo).

8 Remove the extension housing, fit a preload shim 2.2 mm thick to the bearing outer track and refit the extension housing (without its O-ring). Rotate the crownwheel while tightening the extension housing bolts until the crownwheel just starts to drag. This operation seats the bearings.

9 Remove the extension housing and the preload shim. With an accurate depth gauge, measure the distance from the final drive housing joint face to the bearing outer track. Call this dimension A. Similarly measure the protrusion of the spigot on the extension housing above the joint face. Call this dimension B (photos).

10 The thickness S of preload shim required is determined by the formula:

$$S = (A - B) + 0.10 \text{ mm}$$

The extra 0.10 mm is the preload factor for the bearings. Shims are available in thicknesses of 1.1 to 2.2 mm in steps of 0.1 mm.

11 Tighten the final drive half housing securing bolts to the specified torque (photo).

12 Fit the preload shim just determined (where applicable), and the speedometer driving gear and the extension housing with a new O-ring. Tighten the securing bolts to the specified torque. Make sure that the crownwheel is still free to rotate (photos).

13 Fit a new oil seal, lips well greased, into the extension housing.

14 Fit a new gear selector shaft oil seal in the main casing.

15 From the clutch housing side, fit the clutch release bearing guide tube. Do not use a gasket under the guide tube flange, and only tighten the bolts finger tight. Invert the casing and fit a preload spacer (any size) and the input shaft bearing outer track (photos).

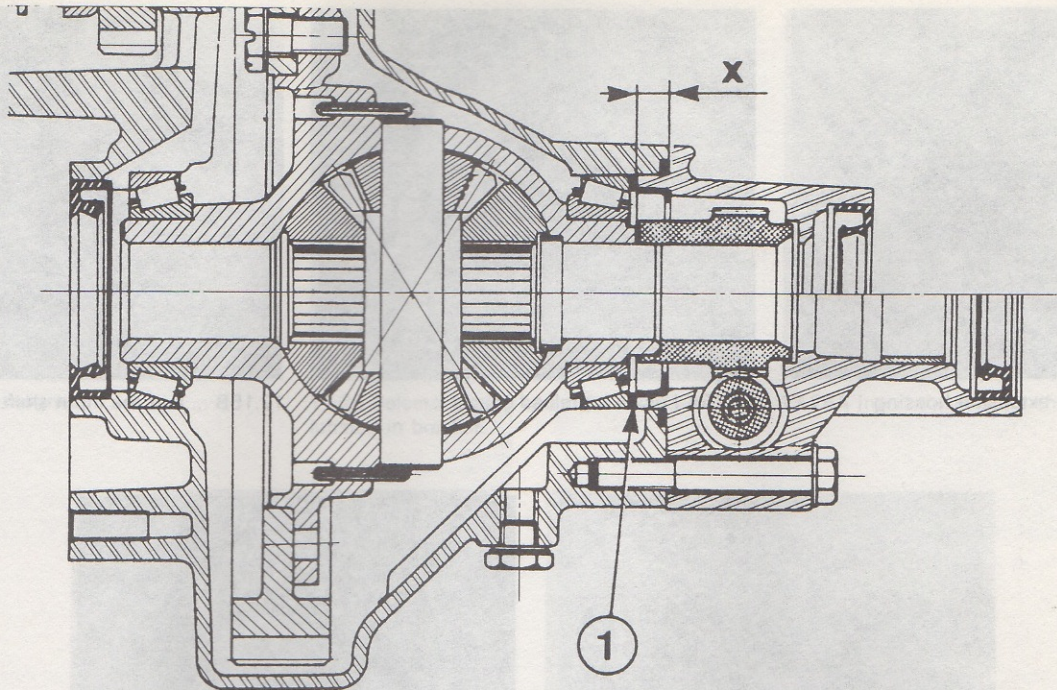
16 Fit the gear selector shaft spring bracket and tighten its securing bolts to the specified torque (photo).

17 If removed, fit the two locating dowels in the main casing mating face.

18 Fit and tighten the breather.

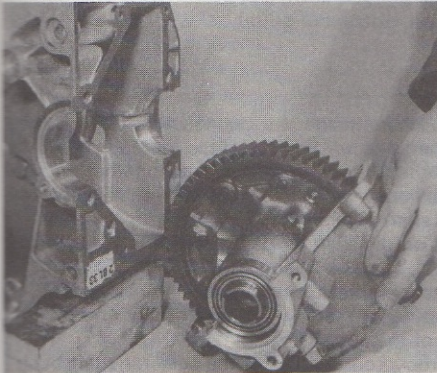
19 Refit the lubrication jet (photo).

20 Fit the reverse detent spring and plunger. Depress the plunger and



**Fig. 6.14** Sectional view of the extension housing and differential (Sec 17)

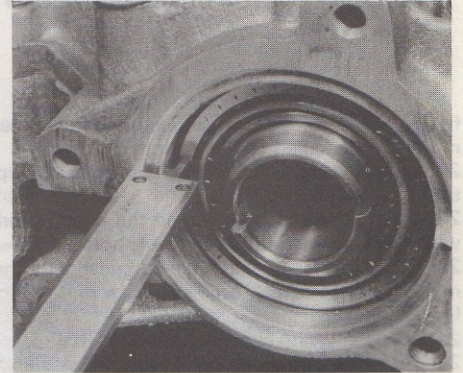
*Measure distance at X to see if preload shims (1) are required*



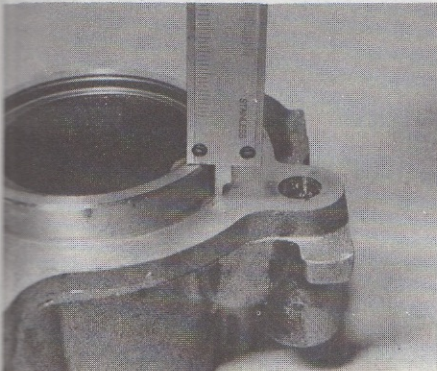
17.6 Refit the final drive unit and housing



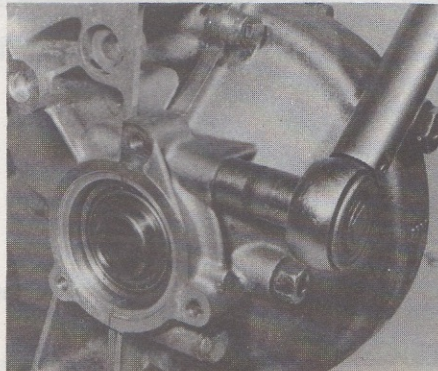
17.7 Locate a new oil seal



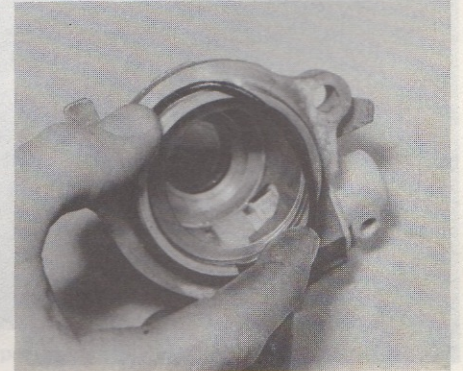
17.9A Measure the bearing outer track recess depth ...



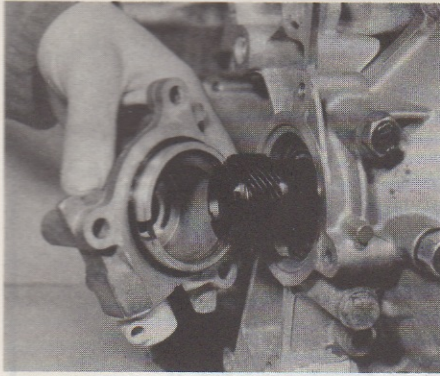
17.9B ... and the extension housing spigot projection



17.11 Tighten the bolts to the specified torque



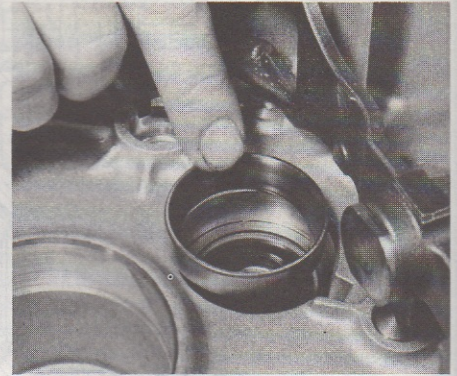
17.12A Locating the O-ring seal



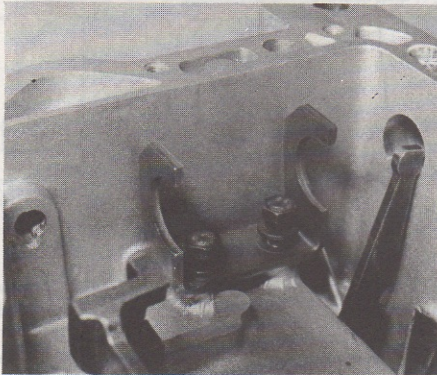
17.12B Fitting the extension housing



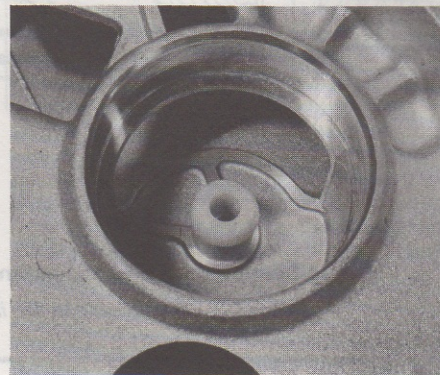
17.15A Locate a preload spacer ...



17.15B ... and the input shaft bearing track



17.16 Refit the selector shaft spring bracket



17.19 Fit the lubrication jet

fit the reverse selector fork and its spindle. Tighten the spindle securing nut to the specified torque (photo).

21 Fit the reversing lamp switch using a new copper washer. Tighten it to the specified torque.

22 Assemble the geartrains and the selector forks and rods. Offer the whole assembly to the gearcase (photo).

23 Fit the reverse idler spindle and gear, with the chamfer towards the rear of the gearbox. Make sure the 5 mm pin in the shaft is correctly located (photo).

24 Refit the swarf-collecting magnet (photo).

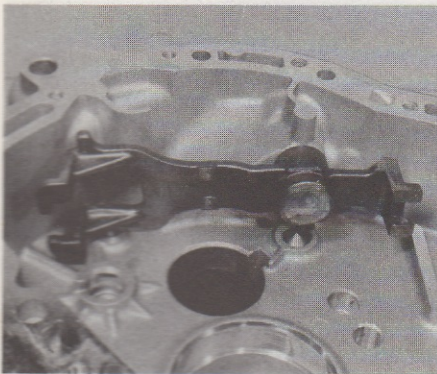
25 Insert the spring and washers into the bracket (photo).

26 Enter the selector shaft into the casing, passing it through the

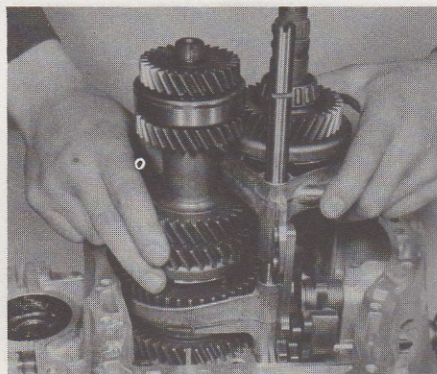
compressed spring and washers inside the casing. Also engage the shaft with the spacer washer, selector finger and the interlock bracket. It may be helpful to keep the finger and the bracket together with a short length of rod (maximum diameter 14 mm) which can be withdrawn as the selector shaft enters (photos).

27 Make sure that the flat on the shaft (if applicable) and the roll pin hole are correctly orientated, also the selector key (Fig. 6.15). Secure the selector finger and interlock bracket with two new roll pins. The slots in the roll pins should be 180° away from each other and in line with the longitudinal axis of the shaft (photo).

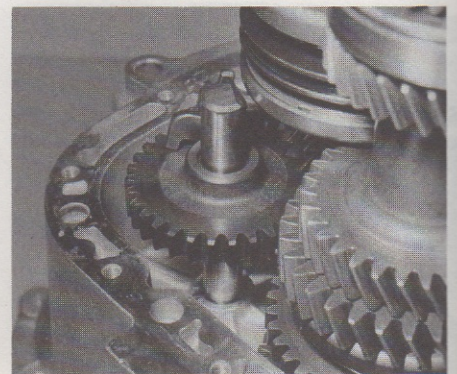
28 Fit the circlip to the groove on the end of the selector shaft bush (photo). Early models may also have an O-ring seal and washer fitted.



17.20 Reverse selector fork and spindle

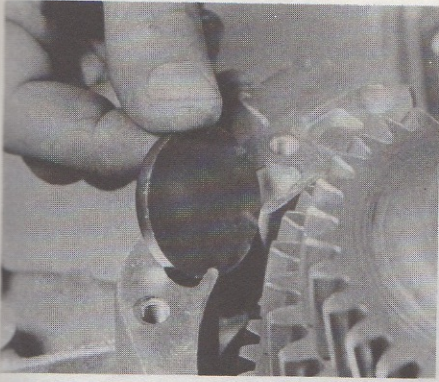


17.22 Refit the geartrains with selectors

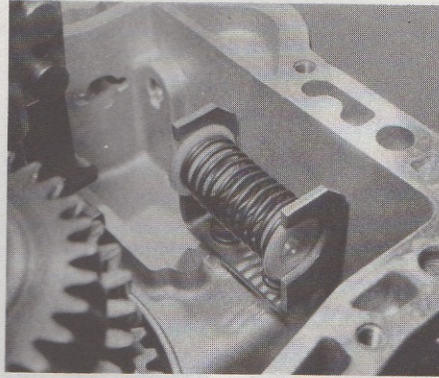


17.23 Reverse idle spindle and gear

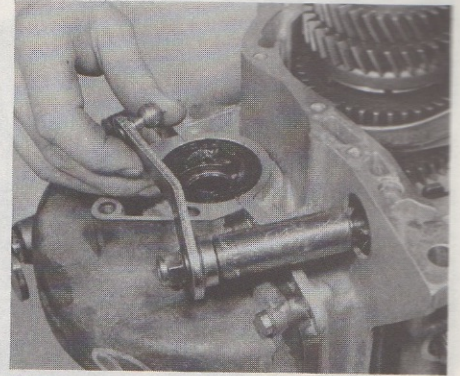




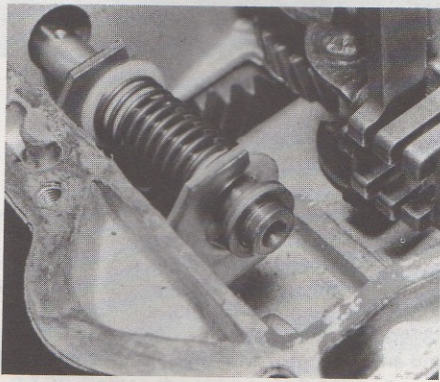
17.24 Locate the magnet



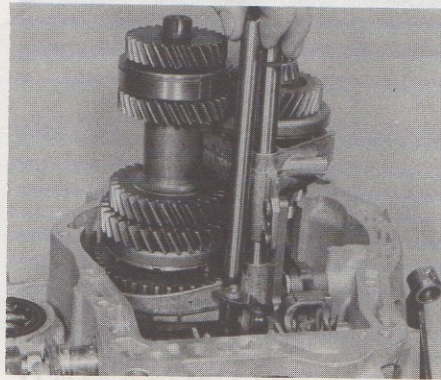
17.25 Selector spring and nylon washers located in bracket



17.26A Insert the selector shaft ...



17.26B ... passing it through the spring and fitting the spacer washer



17.26C Fit and engage the 5th gear rod

- 29 Refit the selector shaft end cover (photo).
- 30 Apply jointing compound to the main casing/end casing mating face. Fit the end casing, making sure that the input and output shafts and the selector rod pass through their respective holes. Fit the thirteen

- securing bolts and tighten them progressively to the specified torque (photo).
- 31 Fit the reverse idler spindle bolt, using a new washer. Tighten the bolt to the specified torque (photo).

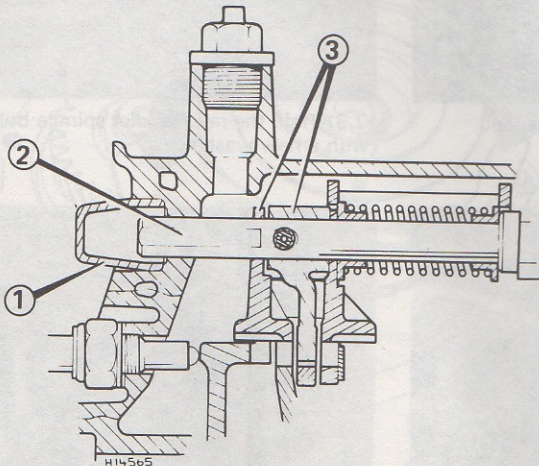
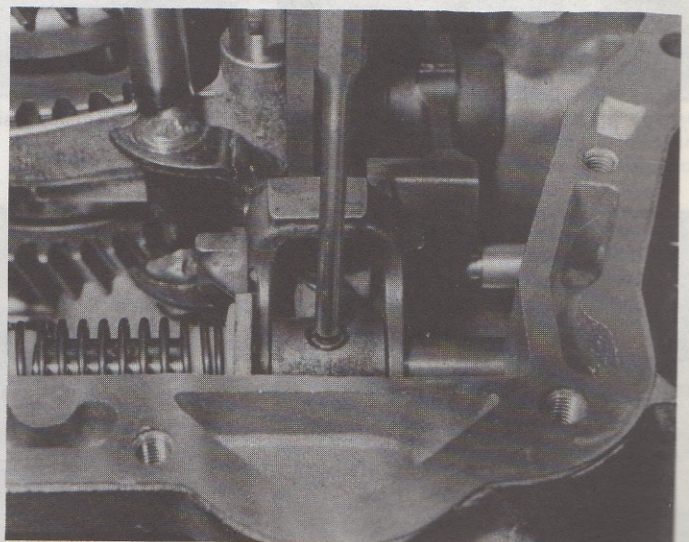
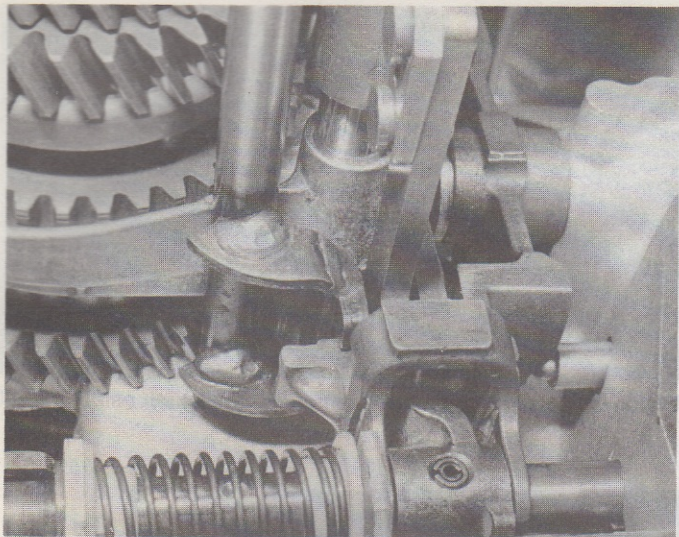


Fig. 6.15 Selector shaft fitting details – early type (Sec 17)

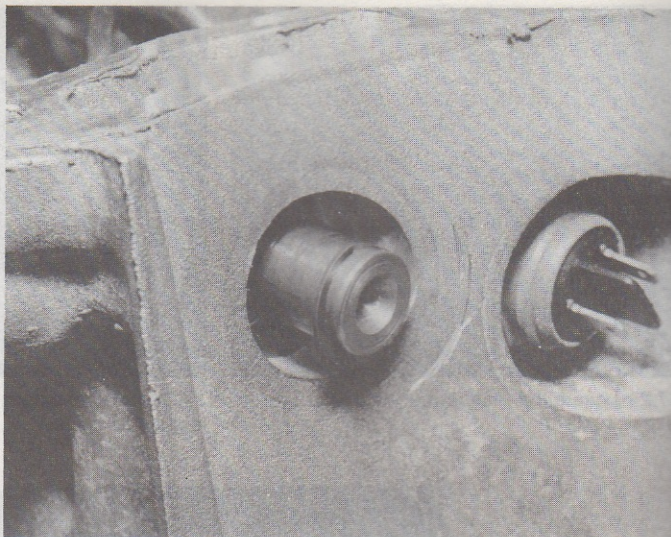
- 1 Cover
- 2 Flat on shaft
- 3 Selector finger and interlock bracket



17.27A Drift the new roll pins into position ...



17.27B ... with slots as shown. Interlock bracket key orientation must be as shown



17.28 Selector shaft and circlip

32 Fit the drain plugs, using new washers, and tighten them to the specified torque.

33 Fit the selector rod lockplate. Secure it with its bolt and washer, tightening the bolt to the specified torque (photo).

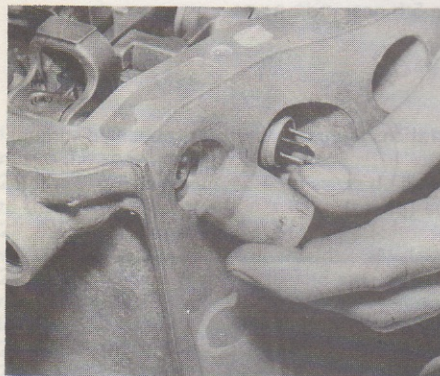
34 Fit the output shaft bearing circlip, making sure it is properly located in the groove (photo).

35 Fit the output shaft rear bearing retaining washers and bolts. Tighten the bolts to the specified torque (photo).

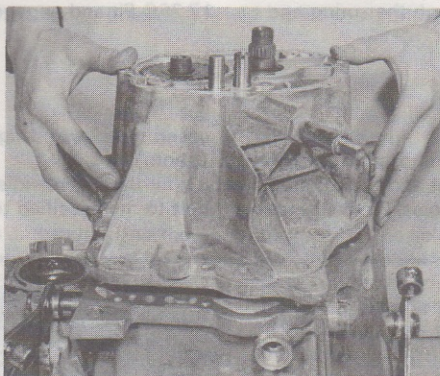
36 On four-speed units, lock up the gearshafts as described in Section 7, paragraph 22, tighten the shaft nuts to the specified torque and stake the nuts into the shaft grooves.

37 On five-speed units, fit the spacer (shoulder to bearing) then 5th gear bush and 5th gear to the input shaft followed by the sliding sleeve and hub, but not the selector fork (photos).

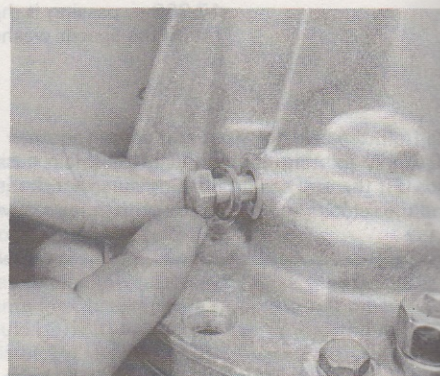
38 Lock up the geartrains by engaging 5th gear with the sliding sleeve and any other gear with the selector shaft. Fit the output shaft nut and



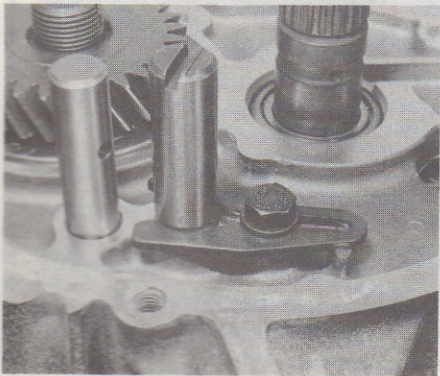
17.29 Fit the selector shaft end cover



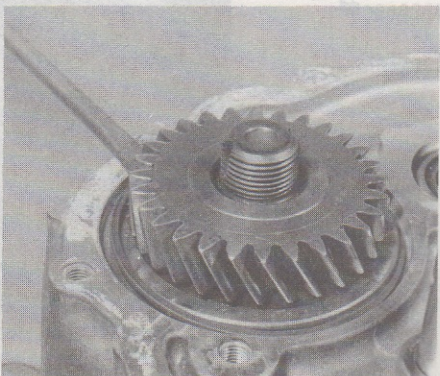
17.30 Refit the main casing to the end casing



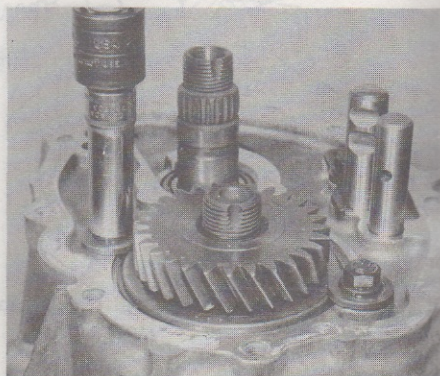
17.31 Refit the reverse idler spindle bolt (with a new washer)



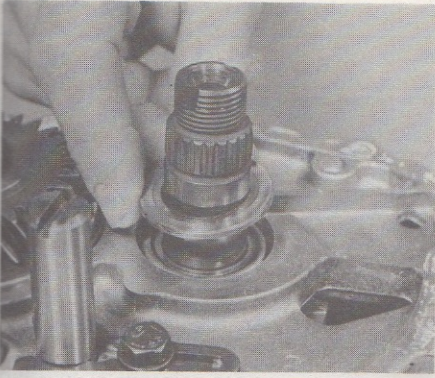
17.33 Fit the selector rod lockplate



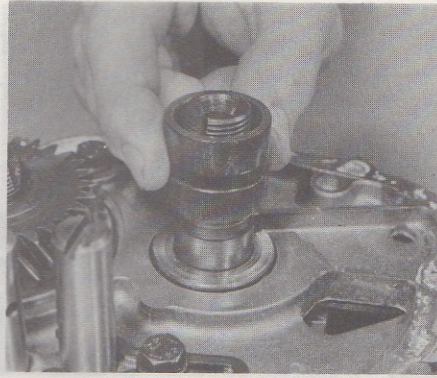
17.34 Locate the output shaft bearing circlip into its groove ...



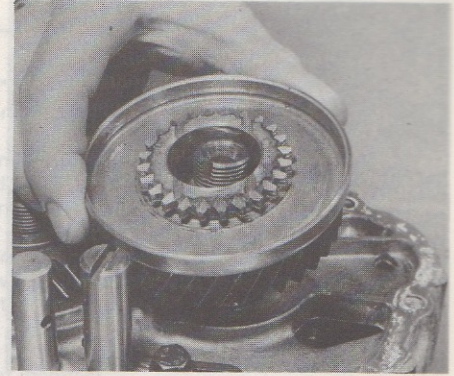
17.35 ... and fit the bearing retaining washers and bolts



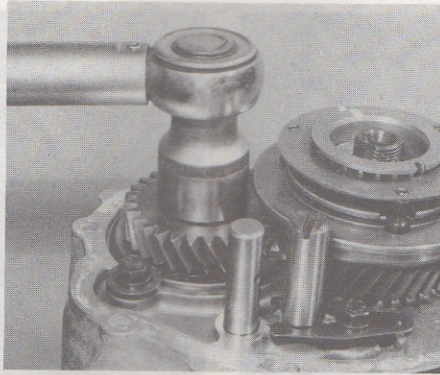
17.37A Fit the spacer over the input shaft (5-speed models) ...



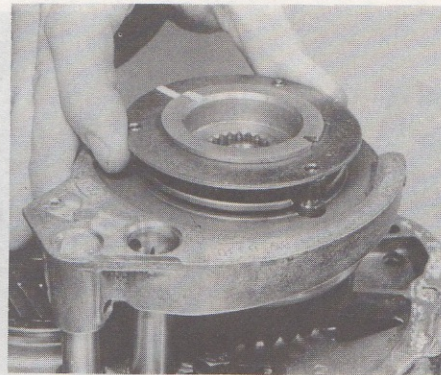
17.37B ... the 5th gear bush ...



17.37C ... and 5th gear



17.38 Tighten the output shaft nut to the specified torque



17.39 Fitting the 5th gear sliding sleeve, hub and selector fork

tighten it to the specified torque, then lock it by staking its skirt into the groove (photo).

39 Remove the 5th gear sliding sleeve and hub, then refit them with the selector fork. If the original components are being refitted, observe the mating marks made when dismantling. As the fork is being lowered into position insert the detent ball into its hole (Fig. 6.16). Alternatively

extract the roll pin and insert the detent ball and spring from the other end (photo).

40 Engage two gears again, then fit the input shaft nut and tighten it to the specified torque. Lock the nut by staking.

41 Secure 5th gear selector fork to its rod with a new roll pin (photo).

42 Coat the mating faces with jointing compound, then refit the rear cover. Use thread locking compound on the securing bolts and tighten them to the specified torque.

43 Turn to the clutch housing and remove the release bearing guide tube. If a new release lever balljoint is to be fitted, do so now; put thread locking compound on its splines and drive it in.

44 Refit the clutch release bearing guide tube with a spacer 2.4 mm thick and without a gasket. Insert the retaining bolts and tighten them progressively, at the same time rotating the input shaft. Stop tightening when the shaft *just* starts to drag: the bearings are then correctly seated.

45 Remove the guide tube and the shim. Using a depth gauge, accurately measure the distance from the bearing outer track to the joint face on the casing. Call this dimension C. Similarly measure the protrusion of the spigot on the guide tube flange above the joint face. Call this dimension D (photos).

46 The thickness T of the endfloat shim required is given by the formula:

$$T = (C - D) + 0.03 \text{ mm}$$

47 Fit a new oil seal, lips well greased, to the guide tube (photo).

48 Fit the shim (of calculated thickness), a new gasket and the guide tube. Secure with the bolts and tighten them to the specified torque (photos).

49 Refit the clutch release fork and release bearing.

50 If not already done, refit the gearchange levers, making sure that they are in the correct neutral position. Also refit the clutch bellcrank (if removed) and the gearchange pivot bracket.

51 Reassembly of the transmission is now complete. Do not refill it with oil until the driveshafts have been engaged.

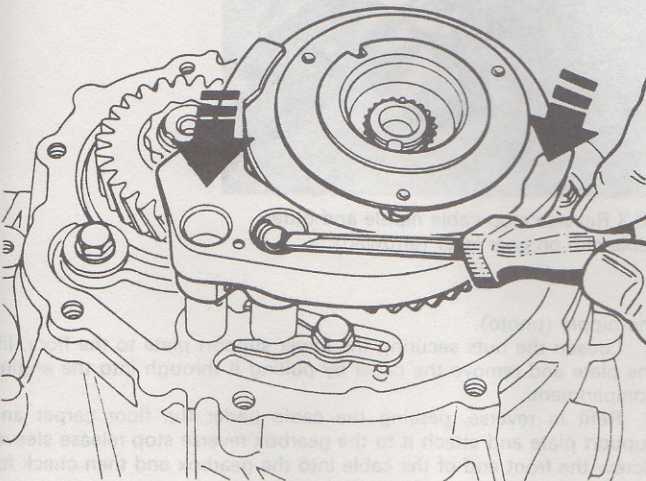
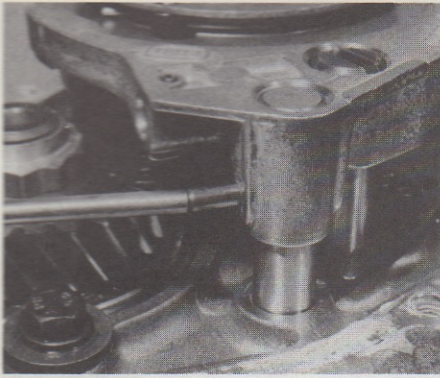
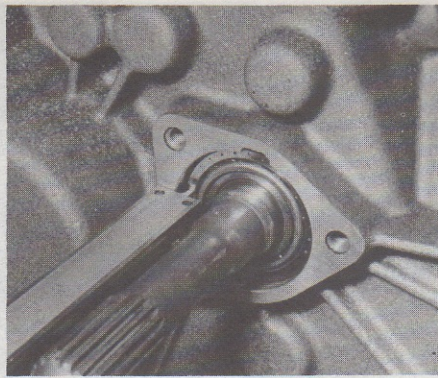


Fig. 6.16 Alternative method of fitting 5th gear selector fork detent spring and ball (Sec 17)

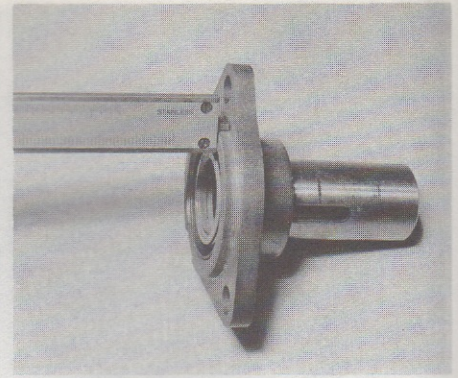
As the fork is lowered (arrows), insert the detent ball



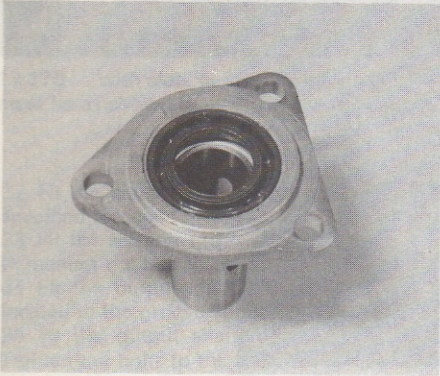
17.41 Drive the roll pin into position to secure the selector fork to the shaft



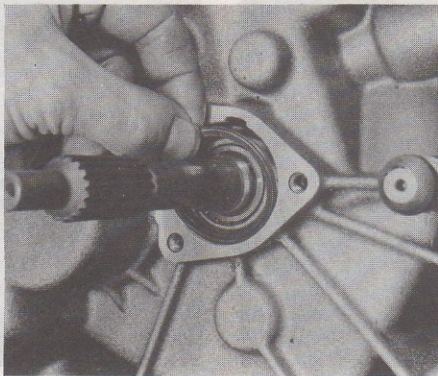
17.45A Measure the input shaft front bearing outer track recess ...



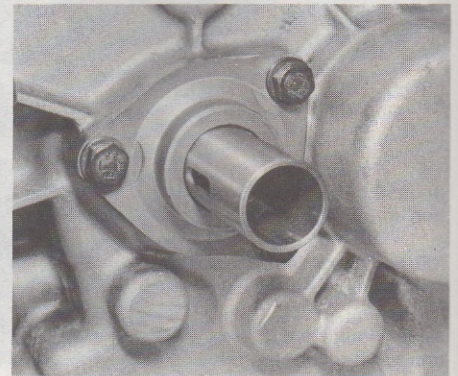
17.45B ... and the guide tube spigot projection



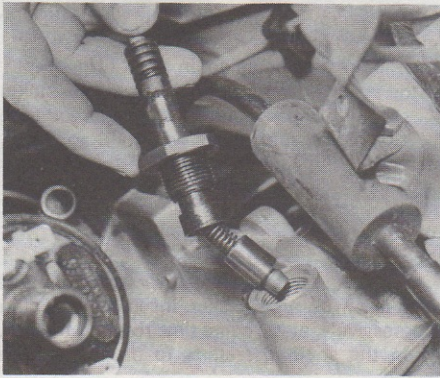
17.47 Fit a new oil seal into the guide tube



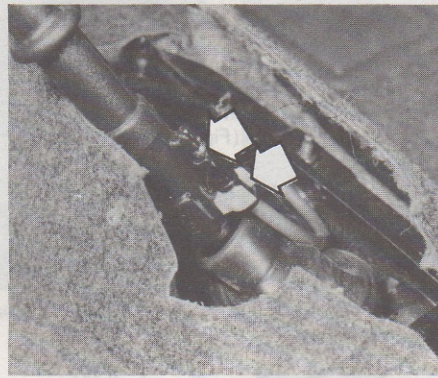
17.48A Locate the selected shim against the front of the bearing



17.48B ... then fit the guide sleeve



18.1 Reverse stop cable removal from the gearbox



18.3 Reverse stop cable nipple and outer cable clip on gear lever (arrowed)

## 18 Reverse stop cable – removal and refitting

- 1 At the gearbox end of the cable, undo the black plastic retainer and detach the cable from the gearbox (photo).
- 2 Working within the car, undo the two screws and remove the floor console away from the gear lever, (tilt it to one side).
- 3 Disconnect the reverse stop cable from the gear lever by detaching

the nipple (photo).

4 Loosen the nuts securing the lower support plate to the floor, lift the plate and remove the cable by pulling it through into the engine compartment.

5 Refit in reverse, passing the cable under the floor carpet and support plate and attach it to the gearbox reverse stop release sleeve. Screw the front end of the cable into the gearbox and then check for satisfactory operation before refitting the console.

19 Fault diagnosis – transmission

Symptom	Reason(s)
Weak or ineffective synchromesh	Synchromesh units worn, or damaged
Jumps out of gear	Gearchange mechanism worn Synchromesh units badly worn Selector fork badly worn
Excessive noise	Incorrect grade of oil or oil level too low Gear-teeth excessively worn or damaged Intermediate gear thrust washers worn allowing excessive end play Worn bearings
Difficulty in engaging gears	Clutch pedal adjustment incorrect Worn selector components Worn synchromesh units

Chapter 7 Driveshafts

For modifications, and information applicable to later models, see Supplement at end of manual.

Cover the rear axle to prevent dirt from falling into the axle.

1. Drive shaft intermediate bearing - removal

2. Drive shaft - removal and fitting

3. Four disc axle assembly - removal and refitting

4. Gear change mechanism - removal and refitting

5. Gear change mechanism - removal and refitting

6. Gear change mechanism - removal and refitting

7. Gear change mechanism - removal and refitting

8. Gear change mechanism - removal and refitting

9. Gear change mechanism - removal and refitting

10. Gear change mechanism - removal and refitting

11. Gear change mechanism - removal and refitting

12. Gear change mechanism - removal and refitting

13. Gear change mechanism - removal and refitting

14. Gear change mechanism - removal and refitting

15. Gear change mechanism - removal and refitting

16. Gear change mechanism - removal and refitting

17. Gear change mechanism - removal and refitting

18. Gear change mechanism - removal and refitting

19. Gear change mechanism - removal and refitting

20. Gear change mechanism - removal and refitting

21. Gear change mechanism - removal and refitting

22. Gear change mechanism - removal and refitting

23. Gear change mechanism - removal and refitting

24. Gear change mechanism - removal and refitting

25. Gear change mechanism - removal and refitting

26. Gear change mechanism - removal and refitting

27. Gear change mechanism - removal and refitting

28. Gear change mechanism - removal and refitting

29. Gear change mechanism - removal and refitting

30. Gear change mechanism - removal and refitting