Chapter 6
Clutch

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General information 1

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

General

Type	Single friction disc with diaphragm spring pressure plate, cable- or hydraulically-operated according to model

Clutch pedal travel (cable-operated type)

1.2 litre models	155.0 ± 10 mm
1.4 litre models	155.0 ± 10 mm
1.6 litre models	170.0 ± 10 mm
1.8 litre models	170.0 ± 10 mm

Friction disc diameter

1.2 and 1.4 litre models	190.0 mm
1.6 litre models	200.0 mm
1.8 litre models	215.0 mm

Torque wrench setting

	Nm	lbf ft
Pressure plate retaining bolts	25	18

1 General information

Vehicles with manual transmission are fitted with a single friction disc with diaphragm spring pressure plate clutch system. When the clutch pedal is depressed, effort is transmitted to the clutch release mechanism either mechanically by means of a cable, or hydraulically by means of a master cylinder and slave cylinder. The release fork forces the release bearing against the centre of the diaphragm spring, which withdraws the pressure plate from the flywheel and releases the friction disc.

Where applicable, the hydraulic fluid employed in the clutch system is the same as that used in the braking system, hence fluid is supplied to the master cylinder from a tapping on the brake fluid reservoir. The clutch hydraulic system must be sealed before work is carried out on any of its components and then on completion, topped up and bled to purge any accumulated air.

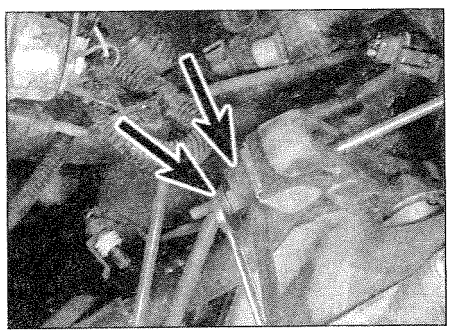
2 Clutch - adjustment

Note: *This procedure applies to models fitted with a cable-operated clutch release mechanism. No adjustment is possible on models with the hydraulically-operated system.*

1 The clutch adjustment is checked by measuring the clutch pedal travel. If a new cable has been fitted, settle it in position by depressing the clutch pedal at least five times.

2 Ensure that there are no obstructions beneath the clutch pedal, then measure the distance from the upper edge of the clutch pedal pad to the floor by resting a ruler on the floor. Position the ruler directly in line with the movement of the clutch pedal.

3 Have an assistant fully depress the pedal, then measure the distance from the same point on the pedal to the floor.



2.6 Clutch cable adjustment

4 Subtract the second measurement from the first to obtain the clutch pedal travel. If this is not within the range given in the Specifications at the start of this Chapter, adjust the clutch as follows.

5 The clutch cable is adjusted by means of the adjuster nut on the transmission end of the cable. Access to the nut is best achieved from under the vehicle. Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*).

6 Working under the left-hand side of the engine compartment, loosen the locknut on the end of the clutch cable. Adjust the position of the adjuster nut, then depress the clutch pedal several times and re-measure the clutch pedal travel. Repeat this procedure until the clutch pedal travel is as specified **(see illustration)**.

7 Once the adjuster nut is correctly positioned, and the pedal travel is correctly set, securely tighten the cable locknut then lower the vehicle to the ground.

3 Clutch cable - removal and refitting

Note: *This procedure applies to models fitted with a cable-operated clutch release mechanism.*

Removal

1 Remove the battery and battery tray as described in Chapter 5A, and unbolt the battery mounting bracket. Move the relay holder box to one side after removing the cover and unscrewing the mounting bolts.

2 On 1.2 and 1.4 litre models, unscrew the adjustment locknut and adjuster nut from the end of the cable fitting, then release the inner and outer cables from the transmission housing. Note the position of the damper block.

3 On 1.6 and 1.8 litre models, release the outer cable from the transmission and unhook the inner cable from the release lever.

4 Working inside the vehicle, fold back the carpet then unhook the inner cable from the top of the clutch pedal.

5 Returning to the engine compartment, release the cable from the supports then pull it from the bulkhead at the same time releasing the rubber buffer. Withdraw the cable assembly from the engine compartment.

Refitting

6 Apply a smear of multi-purpose grease to the inner cable and end fittings, then pass the cable through the bulkhead. Make sure that the rubber buffer is pressed firmly into the bulkhead before locating the end of the outer cable in it.

7 Inside the vehicle, hook the inner cable onto the top of the clutch pedal.

8 On 1.2 and 1.4 litre models, locate the outer cable on the transmission housing, then refit the adjustment and lock nuts.

9 On 1.6 and 1.8 litre models, hook the inner cable onto the release lever and locate the outer cable on the transmission.

10 Adjust the cable as described in Section 2.

11 Refit the relay holder box, battery and mounting bracket, referring to Chapter 5A as necessary. Also refit the carpet inside the vehicle.

4 Clutch hydraulic system - bleeding

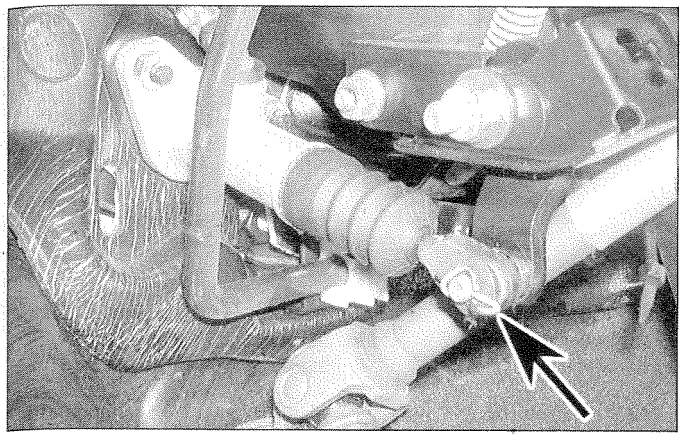
Note: *This procedure applies to models fitted with the hydraulically-operated clutch release mechanism.*

Warning: Hydraulic fluid is poisonous; thoroughly wash off spills from bare skin without delay. Seek immediate medical advice if any fluid is swallowed or gets into the eyes. Certain types of hydraulic fluid are inflammable and may ignite when brought into contact with hot components; when servicing any hydraulic system, it is safest to assume that the fluid IS inflammable, and to take precautions against the risk of fire as though it were petrol that was being handled. Hydraulic fluid is an effective paint stripper and will also attack many plastics. If spillage occurs onto painted bodywork or fittings, it should be washed off immediately, using copious quantities of fresh water. It is also hygroscopic - it can absorb moisture from the air, which then renders it useless. Old fluid may have suffered contamination, and should never be re-used. When topping-up or renewing the fluid, always use the recommended grade, and ensure that it comes from a new sealed container.

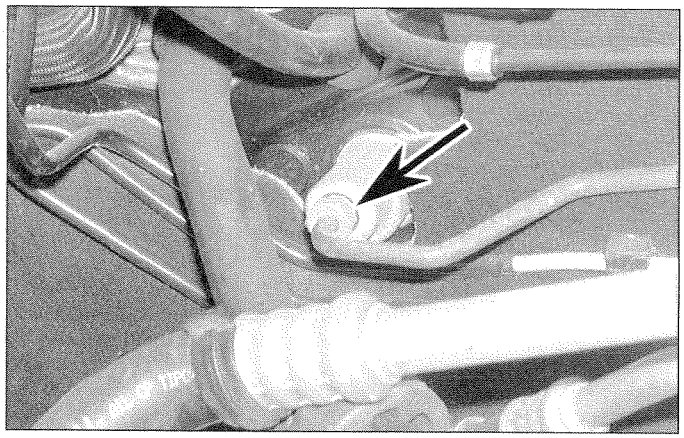
General information

1 Whenever the clutch hydraulic lines are disconnected for service or repair, a certain amount of air will enter the system. The presence of air in any hydraulic system will introduce a degree of elasticity, and in the clutch system this will translate into poor pedal feel and reduced travel, leading to inefficient gear changes and even clutch system failure. For this reason, the hydraulic lines must be sealed using hose clamps before any work is carried out and then on completion, topped up and bled to remove any air bubbles.

2 The most effective way of bleeding the clutch hydraulic system is to use a pressure brake bleeding kit. These are readily available in motor accessories shops and are extremely



5.7 Clip securing the clutch pedal to the master cylinder pushrod



5.8 Union nut on the clutch master cylinder

effective, and the following sub-section describes bleeding the clutch system using such a kit. The alternative method is to bleed the system by depressing the clutch pedal as for bleeding the brake hydraulic system - refer to Chapter 9 for details of this method.

Bleeding

3 Remove the battery and battery tray as described in Chapter 5A, and unbolt the battery mounting bracket for access to the bleed screw on the clutch slave cylinder. Move the relay holder box to one side after removing the cover and unscrewing the mounting bolts. Removal of the air cleaner ducting may also provide additional working room.

4 Remove the protective cap from the bleed screw.

5 Fit a ring spanner over the bleed screw head, but do not slacken it at this point. Connect a length of clear plastic hose over the nipple and insert the other end into a clean container. Pour hydraulic fluid into the container, such that the end of the hose is covered.

6 Following the manufacturer's instructions, pour hydraulic fluid into the bleeding kit container.

7 Unscrew the brake fluid reservoir cap, then connect the bleeding kit fluid supply hose to the reservoir.

8 Connect the pressure hose to a supply of compressed air - a spare tyre is a convenient source.

Caution: Check that the pressure in the tyre does not exceed the maximum supply pressure quoted by the kit manufacturer, let some air escape to reduce the pressure, if necessary. Gently open the air valve and allow the air and fluid pressures to equalise. Check that there are no leaks before proceeding.

9 Using the spanner, loosen the bleed screw until fluid and air bubbles can be seen to flow through the tube, into the container. Maintain a steady flow until the emerging fluid is free of air bubbles, then tighten the bleed screw. Keep a watchful eye on the level of fluid in the bleeding kit container and the brake fluid reservoir - if it is allowed to drop too low, air may be forced into the system, defeating the object of the exercise. To refill the container, turn off the compressed air supply, remove the lid and pour in an appropriate quantity of clean fluid from a new container - do not re-use the fluid collected in the receiving container. Repeat as necessary until the ejected fluid is bubble-free.

10 On completion, pump the clutch pedal several times to assess its feel and travel. If firm, constant pedal resistance is not felt throughout the pedal stroke, it is probable that air is still present in the system - repeat the bleeding procedure until the pedal feel is restored.

11 Depressurise the bleeding kit and remove it. At this point the fluid reservoir may be 'over-full', and the excess should be removed using a *clean* pipette to reduce the level to the MAX mark.

12 Remove the plastic hose from the bleed screw and refit the protective cap.

13 Refit the battery and mounting bracket, and also the air cleaner ducting if removed.

5 Clutch master cylinder - removal and refitting

Warning: Refer to the warning at the beginning of Section 4.

Note: *This procedure applies to models fitted with the hydraulically-operated clutch release mechanism.*

Removal

1 Where applicable, remove the air cleaner air inlet duct from the engine compartment front crossmember by unscrewing the two bolts.

2 Remove the battery and battery tray as described in Chapter 5A, and unbolt the battery mounting bracket. Release the wiring from the supports on the bracket. Move the relay holder box to one side after removing the cover and unscrewing the mounting bolts.

3 Remove the air cleaner ducting as described in Chapter 4A or 4B. Also remove the air duct resonator (as applicable) for access to the bulkhead at the rear of the engine compartment.

4 Release the hydraulic hose from its supports over the transmission.

5 At the brake fluid reservoir, fit a hose clamp to the clutch master cylinder supply hose. Alternatively syphon all the fluid from the reservoir.

6 Working inside the vehicle, loosen the clip and disconnect the supply hose from the top of the clutch master cylinder. Anticipate some loss of fluid by placing cloth rags on the floor below the master cylinder.

7 Extract the clip, remove the washer, and disconnect the master cylinder pushrod from the clutch pedal **(see illustration)**.

8 Unscrew the clutch master cylinder mounting nuts and withdraw the master cylinder until the high pressure pipe union nut can be unscrewed from the outlet on the rear of the unit. Alternatively, unscrew the union nut from inside the engine compartment, although access is not easy **(see illustration)**. Withdraw the master cylinder from inside the vehicle and recover the gasket.

9 It is not possible to obtain an overhaul kit from FIAT however some motor factors may be able to supply one. Follow the instructions with the repair kit if obtained.

Refitting

10 Refitting is a reversal of removal, but apply a little grease to the clutch pedal pivot. Tighten the mounting bolts and union nut securely. On completion bleed the clutch hydraulic system as described in Section 4.

6 Clutch slave cylinder - removal and refitting

Warning: Refer to the warning at the beginning of Section 4.

Note: *This procedure applies to models fitted with the hydraulically-operated clutch release mechanism.*

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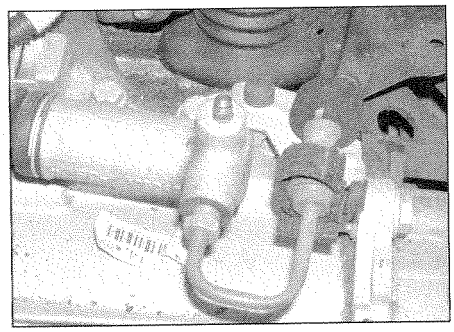
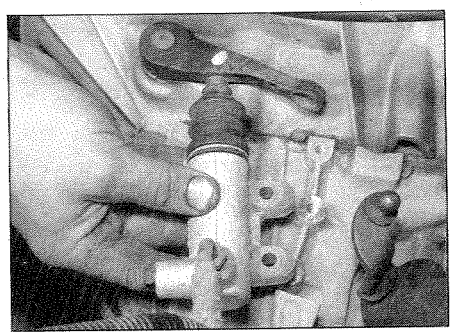
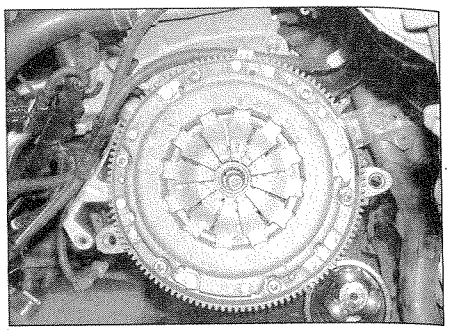


6.4 Clutch slave cylinder location on the transmission



6.6 Removing the clutch slave cylinder from the transmission



7.1 View of the clutch with the transmission removed

Removal

1 Remove the battery and battery tray as described in Chapter 5A, and unbolt the battery mounting bracket. Release the wiring from the supports on the bracket. Move the relay holder box to one side after removing the cover and unscrewing the mounting bolts.
2 Remove the air cleaner ducting as described in Chapter 4A or 4B. Also remove the resonator (as applicable).
3 To seal off the hydraulic supply to the clutch slave cylinder, fit a brake hose clamp to the flexible section of the hose located over the transmission.
4 Unscrew the union nut and disconnect the hydraulic pipe from the slave cylinder **(see illustration)**. Be prepared for some fluid loss by placing rags beneath the cylinder.
5 Unscrew the mounting bolts and release the slave cylinder pushrod from the release arm on the transmission, then remove the slave cylinder from the engine compartment **(see illustration)**.
6 It is not possible to obtain an overhaul kit from FIAT however some motor factors may be able to supply one. Follow the instructions with the repair kit if obtained.

Refitting

7 Refitting is a reversal of removal, but apply a little grease to the tip of the slave cylinder pushrod. Tighten the mounting bolts and union nut securely. On completion bleed the clutch hydraulic system as described in Section 4.

7 Clutch assembly - removal, inspection and refitting

Warning: Dust created by clutch wear and deposited on the clutch components may contain asbestos, which is a health hazard. DO NOT blow it out with compressed air, or inhale any of it. DO NOT use petrol or petroleum-based solvents to clean off the dust. Brake system cleaner or methylated spirit should be used to flush the dust into a suitable receptacle. After the clutch components are wiped clean with rags, dispose of the contaminated rags and cleaner in a sealed, marked container.

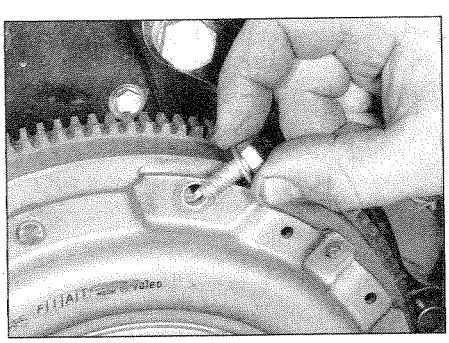
Note: *Although some friction materials may no longer contain asbestos, it is safest to assume that they DO, and to take precautions accordingly.*

Removal

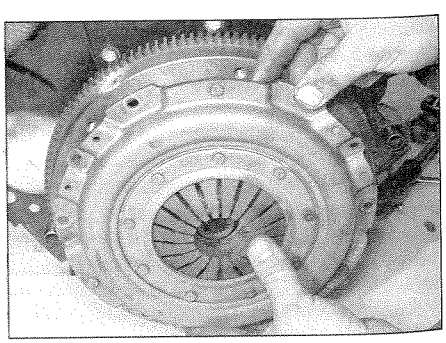
1 Unless the complete engine/transmission is to be removed from the car and separated for major overhaul (see Chapter 2E), the clutch can be reached by removing the transmission as described in Chapter 7A **(see illustration)**.
2 Before disturbing the clutch, use chalk or a marker pen to mark the relationship of the pressure plate assembly to the flywheel.
3 Working in a diagonal sequence, unscrew the pressure plate bolts by half a turn at a time, until spring pressure is released and the bolts can be removed by hand **(see illustration)**. Note that on some models, the bolts are of Ribe-type, requiring a special key to remove them.
4 Prise the pressure plate assembly off its locating dowels, and collect the friction disc, noting which way round the friction disc is fitted **(see illustration)**.

Inspection

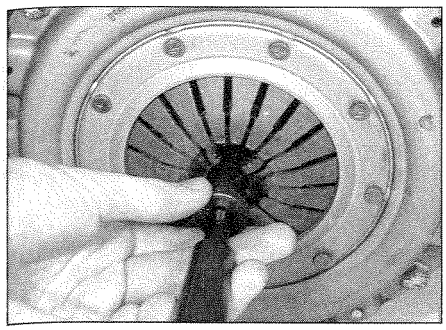
Note: *Due to the amount of work necessary to remove and refit clutch components, it is usually considered good practice to renew the clutch friction disc, pressure plate assembly and release bearing as a matched set, even if only one of these is actually worn enough to require renewal. It is also worth considering the renewal of the clutch components on a preventative basis if the engine and/or transmission have been removed for some other reason.*
5 Separate the pressure plate and friction disc and place them on the bench.
6 When cleaning clutch components, read first the warning at the beginning of this Section. Remove dust working in a well-ventilated atmosphere.
7 Check the friction disc facings for signs of wear, damage or oil contamination. If the friction material is cracked, burnt, scored or damaged, or if it is contaminated with oil or grease (shown by shiny black patches), the friction disc must be renewed.
8 If the friction material is still serviceable, check that the centre boss splines are unworn, that the torsion springs are in good condition and securely fastened, and that all the rivets are tight. If any wear or damage is found, the friction disc must be renewed.
9 If the friction material is fouled with oil, this must be due to an oil leak from the crankshaft rear (left-hand) oil seal, from the sump-to-cylinder block joint, or from the transmission input shaft. Renew the seal or repair the joint, as appropriate, as described in the relevant part of Chapter 2, before installing the new friction disc.
10 Check the pressure plate assembly for obvious signs of wear or damage. Shake it to check for loose rivets or worn or damaged fulcrum rings, and check that the drive straps securing the pressure plate to the cover do



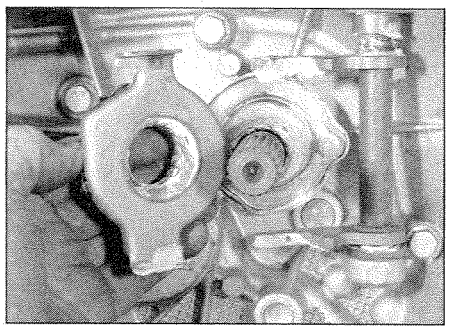
7.3 Removing the clutch pressure plate bolts



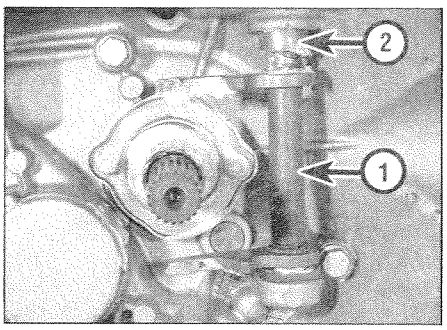
7.4 Removing the clutch pressure plate and friction plate



7.17 Using a clutch friction plate centralising tool



8.2 Removing the release bearing from the fork and guide tube



8.5 Clutch release shaft (1) and upper shaft bush (2)

not show signs (such as a deep yellow or blue discoloration) of overheating. If the diaphragm spring fingers are worn or damaged, or if the spring pressure is in any way suspect, the pressure plate assembly should be renewed.

11 Check that the machined bearing surfaces of the pressure plate and flywheel are clean, completely flat, and free from scratches or scoring. If either is discoloured from excessive heat, or shows signs of cracks, it should be renewed - although minor damage of this nature can sometimes be polished away using emery paper.

12 Check that the release bearing contact surface rotates smoothly and easily, with no sign of noise or roughness. Also check that the surface itself is smooth and unworn, with no sign of cracks, pitting or scoring. If there is any doubt about its condition, the bearing must be renewed as described in Section 8.

Refitting

13 On reassembly, ensure that the bearing surfaces of the flywheel and pressure plate are completely clean. Use solvent to remove any protective grease from new components.

14 Fit the friction disc so that its spring hub assembly faces away from the flywheel. Note that there may also be a marking showing which way round the disc is to be refitted.

15 Refit the pressure plate assembly, aligning the marks made on dismantling (if the original pressure plate is re-used), and locating the pressure plate on its three locating dowels. Fit the pressure plate bolts, but tighten them only finger-tight, so that the friction disc can still be moved.

16 The friction disc must now be centralised, so that when the transmission is refitted, its input shaft will pass through the splines at the centre of the friction disc.

17 Centralisation can be achieved by passing a screwdriver or other long bar through the friction disc and into the hole in the crankshaft, so that the friction disc can then be moved around until the disc is centred on the crankshaft hole. Alternatively, a clutch-aligning tool can be used to eliminate the guesswork; these can be obtained from most accessory shops **(see illustration)**. A home-made aligning tool can be fabricated from a length of metal rod or wooden dowel which fits closely inside the crankshaft hole, and has insulating tape wound around it to match the diameter of the friction disc splined hole.

18 When the friction disc is centralised, tighten the pressure plate bolts evenly and in a diagonal sequence to the specified torque setting.

19 Apply a smear of high melting point grease to the splines of the friction disc and to the contact points of the diaphragm spring fingers. Also apply a little grease to the release bearing guide tube.

20 Refit the transmission with reference to Chapter 7A.

8 Clutch release mechanism - removal, inspection and refitting

Removal

1 Unless the complete engine/transmission is to be removed from the car and separated for major overhaul (see Chapter 2E), the clutch release mechanism can be reached by removing the transmission as described in Chapter 7A.

2 Unhook the release bearing from the fork and slide it off the guide tube **(see illustration)**.

3 Using circlip pliers extract the circlip from the top of the release fork shaft.

4 Note the position of the arm then slide it off the splines.

5 Prise out the release shaft upper bush from the transmission casing **(see illustration)**. If it is tight, use a thin drift from inside the bellhousing.

6 Lift the release shaft from the lower bush then remove it from inside the transmission bellhousing.

7 Extract the lower bush from the casing.

Inspection

8 Check the release components, renewing any worn or damaged parts. Carefully check all bearing surfaces and points of contact.

9 When checking the release bearing itself, note that it is often considered worthwhile to renew it as a matter of course. Check that the contact surface rotates smoothly and easily, with no sign of roughness, and that the surface itself is smooth and unworn, with no signs of cracks, pitting or scoring. If there is any doubt about its condition, the bearing must be renewed.

Refitting

10 Apply a smear of high melting point grease to the shaft pivot bushes and the contact surfaces of the release fork.

11 Tap the lower bush into the casing and refit the release shaft.

12 Slide the upper bush down the shaft and tap it into the casing making sure that the ridge engages with the cut-out, then slide the arm on the splines the correct way round.

13 Refit the circlip in the shaft groove.

14 Slide the release bearing onto the guide tube and engage it with the fork.

15 Refit the transmission with reference to Chapter 7A.

9 Clutch pedal - removal and refitting

The procedure is described as part of the brake pedal removal. Refer to Chapter 9, Section 11.