

S E C T I O N 4

C L U T C H A N D C L U T C H A D J U S T M E N T

C O N T E N T S

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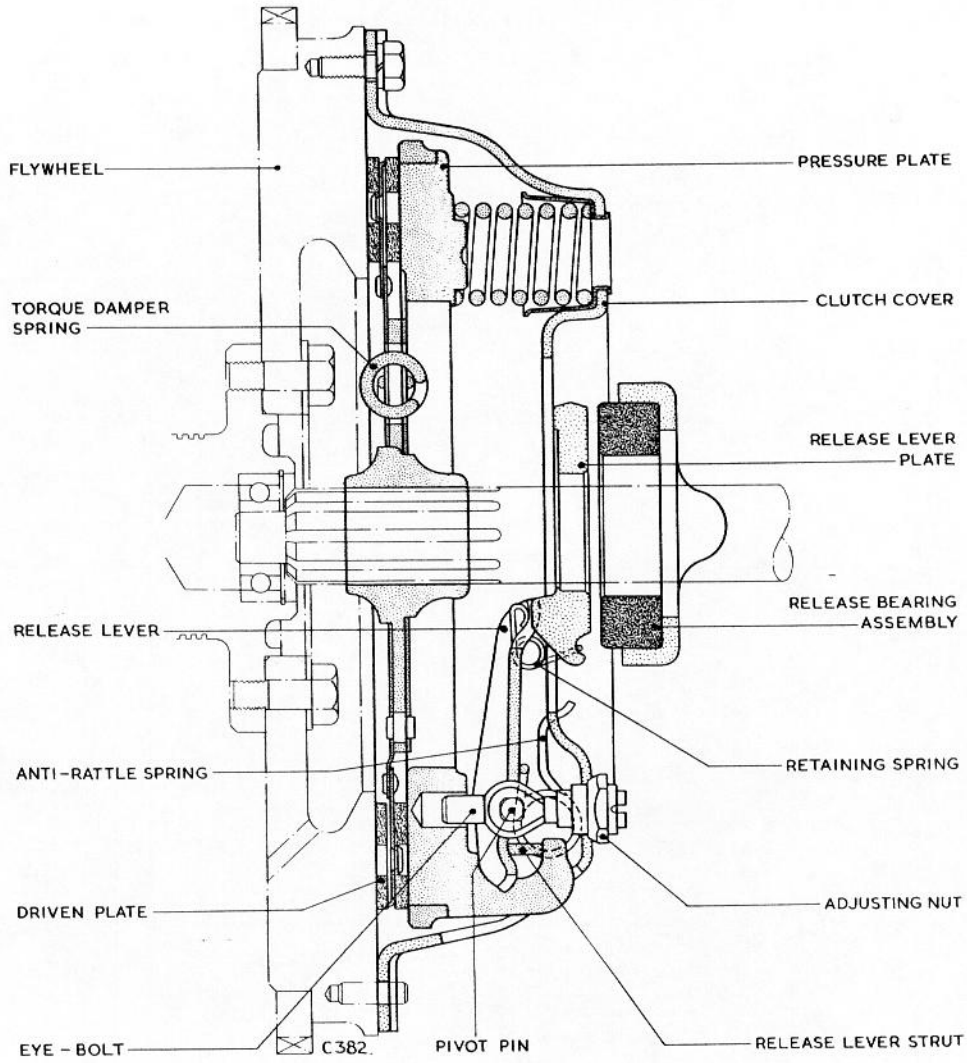


Fig.1 Section of clutch.

C L U T C H A N D C L U T C H A D J U S T M E N T

DESCRIPTION

The clutch is of Borg and Beck design and manufacture and is a single-plate dry type. The assembly consists of the following components :-

1. The clutch cover assembly.
2. The 8in. driven plate assembly.
3. A three-lever type withdrawal mechanism.

The clutch cover is bolted direct to the flywheel face and the pressure plate (which is located within the cover) "sandwiches" the driven plate between it and a ground track on the flywheel. The engine therefore is coupled permanently to the cover and pressure plate assembly and transmits its drive to the driven plate which is splined to the gearbox drive shaft.

Clutch cover assembly

The pressure plate is an annular casting with a shrunk-on steel rim to release it of undue centrifugal stresses. A ground track on the front face forms its working surface; on the rear face are three equidistant integral lugs which engage in rectangular apertures in the clutch cover. Beneath the undercut of each lug is a seating for a release lever strut, and between each lug are two bosses to locate the pressure springs, i.e. six altogether. When the clutch cover is bolted to the flywheel, it drives and locates the pressure plate while

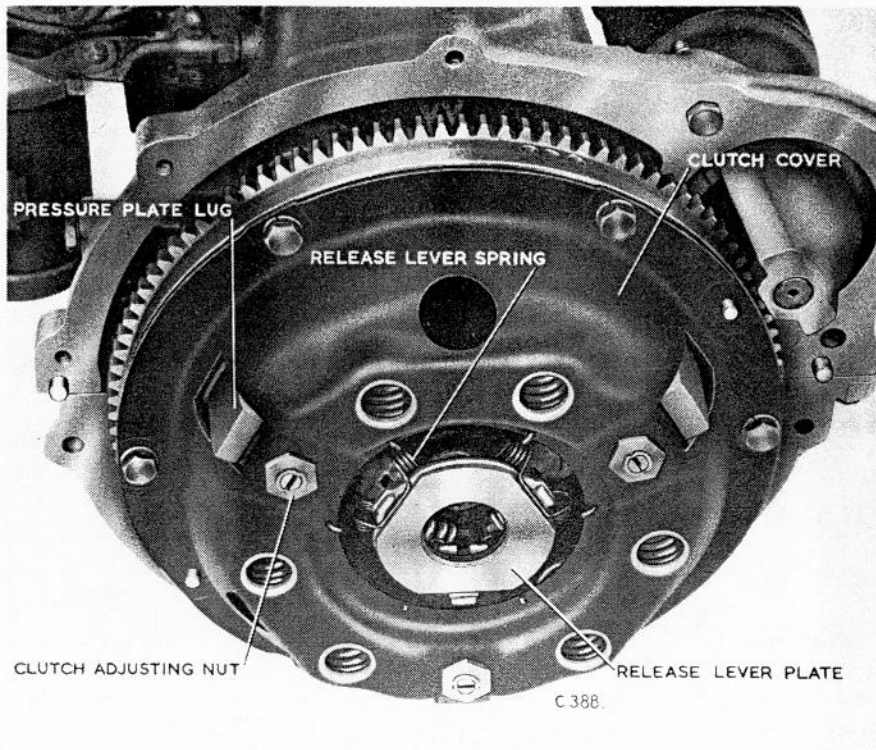


Fig.2 Clutch assembly on flywheel.

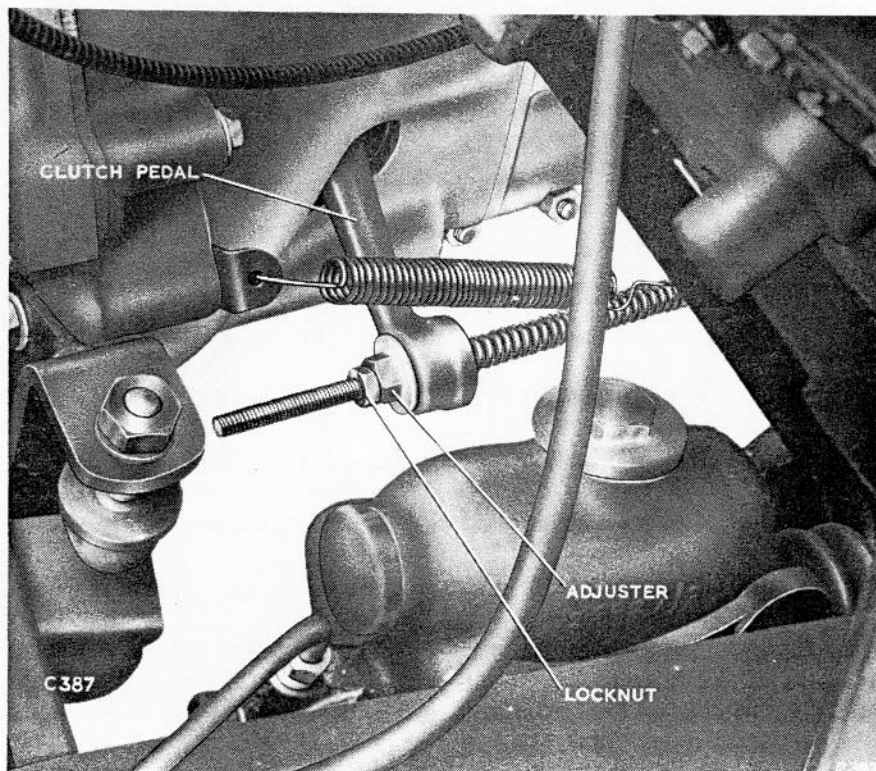


Fig.3 Clutch adjustment.

allowing for fore and aft movement of the pressure plate during engagement and disengagement of the drive.

The dome-shaped steel clutch cover forms the foundation from which the withdrawal mechanism operates and in which the springs react on the pressure plate. The springs are positively located in pressed steel thimbles peened into holes around the dome of the cover.

The three release levers each pivot about a pin inserted across the shank of an eye-bolt, the outer end of which is threaded and secured to the clutch cover by a cone-seated barrel adjusting nut. The inner end of the eye-bolt is a sliding fit in a guide drilled in the pressure plate, see Fig.1. Outboard of the pivot pin, a strut is fitted between the lever and the pressure plate lug, displacement of the strut being prevented by an extension on either side of its working surface. The forked inboard tips of the release levers bear on the release lever plate, where a small extrusion fits into the fork of each lever for accurate location. The release levers are kept in contact with and support the release lever plate by retaining springs, see Fig.2.

Assembled within the clutch casing secured to the front face of the gearbox is a carbon thrust bearing. This has two spigots which locate in the fork end of the operating lever, being held in position by two retaining springs as shown in Fig.4. The operating lever pivots in a fulcrum block secured to the clutch casing and the lever protrudes through a slot in the side of the casing. It terminates in a spherical seating into which fits the spherical adjusting nut of the operating rod.

When the clutch pedal is depressed, the carbon thrust bearing is pressed forward (first taking up the "free" space) on to the face of the release lever

plate. The inner tips of the release levers are therefore pressed in towards the flywheel. Each lever turning about its pivot pin reacts at its outer end against the strut, and since the pivot pin is secured to the clutch cover via the eye-bolt, the pressure plate is drawn rearwards against the pressure springs and away from the driven plate, thereby releasing the drive to the gearbox.

GENERAL DATA

Complete clutch assembly including cover assembly, driven plate and release bearing.	Borg and Beck BB.8/72.
Clutch cover assembly	Borg and Beck 45688/32.
8in. driven plate assembly	Borg and Beck 45593/30.
Release bearing and cup assembly	Borg and Beck 46896.
Release bearing retaining springs	Borg and Beck 41628.
Release lever plate.	Borg and Beck 44930.
Clutch pedal adjustment... ..	1in. (2.54 c.m.) free travel (measured at pedal pad) before release bearing contacts release lever plate.
Effective clutch pedal travel... ..	3.75in. (95.3 m.m.).
Torque loading of clutch cover set-bolts	10 lb.ft. (\pm 2 lb. ft.). (14.88 kg/m \pm 2.97 kg/m).

ADJUSTMENTS

The clutch will normally give satisfactory service for very long periods without adjustment. However as wear takes place in the linings, it tends to decrease the "free" travel of the clutch pedal, i.e. it decreases the clearance between the release bearing and the release lever plate, but it is not unusual

that the wear on the release bearing surfaces (which tends to increase this clearance) will counteract the wear of the linings. Under competition conditions, or fierce use of the clutch however, this may not be so.

Never allow the pedal "free" travel to be absorbed completely for this will keep the release bearing surfaces in permanent contact, causing overheating and excessive wear, and will lead ultimately to clutch slip. If too much "free" travel is permitted, the effective travel of the clutch pedal is decreased and the clutch cannot fully be disengaged; this will cause overheating and wear of the linings and will also overload the synchromesh mechanisms of the gearbox and make gear engagement difficult.

Adjustment is effected by means of the spherically-seated adjusting nut screwed to the forward end of the clutch operating rod at its junction with the clutch operating lever, see Fig. 3. The location of this adjustment is readily seen from beneath the bonnet on the driver's side, but it is advisable to adjust (when necessary) from beneath the car as follows :-

1. Slacken the locknut.
2. Turn the adjusting nut as required until the "free" travel quoted in the General Data is obtained at the pedal pad.
3. When satisfactory, tighten the locknut.

Note:- Clutch adjustment for service purposes must be made only at the forward end of the operating rod. Do not attempt to adjust at any other point in the mechanism.

REMOVING

To remove the clutch unit, proceed as follows :-

1. Remove the gearbox as described in Section 5.
2. Working diagonally, slacken the six clutch cover retaining set-bolts one turn at a time, until the pressure of the clutch thrust springs is relieved.
3. Support the unit and remove the six set-bolts and spring washers then lift the clutch assembly away from the flywheel, taking care to avoid dropping the driven plate.

REFITTING

Before refitting the clutch unit, check that the flywheel face is perfectly clean and dry (see page 69, Section 1), then proceed as follows :-

1. Place the driven plate against the face of the flywheel with the shorter side of the splined hub towards the engine and retain it by hand pending the next operation. Although not strictly necessary, it is an advantage to use a mandrel to fit the bore of the bearing in the rear end of the crankshaft and the hub of the driven plate in order to retain and locate the plate positively.
2. Offer the clutch assembly to the rear face of the flywheel, aligning the two locating holes in the clutch cover flange with the two locating dowels in the flywheel.
3. Fit the six set-bolts and spring washers and, working diagonally, tighten each bolt evenly, finally tightening to the torque loading given in the General Data. If no mandrel is used, take care to centralise the driven plate before tightening the clutch assembly against it.
4. Withdraw the mandrel (if this has been used).
5. Refit the gearbox as described in Section 5.
6. Adjust as described previously.

REPLACING RELEASE BEARING ASSEMBLY

When the car has covered a considerable mileage and further adjustment of

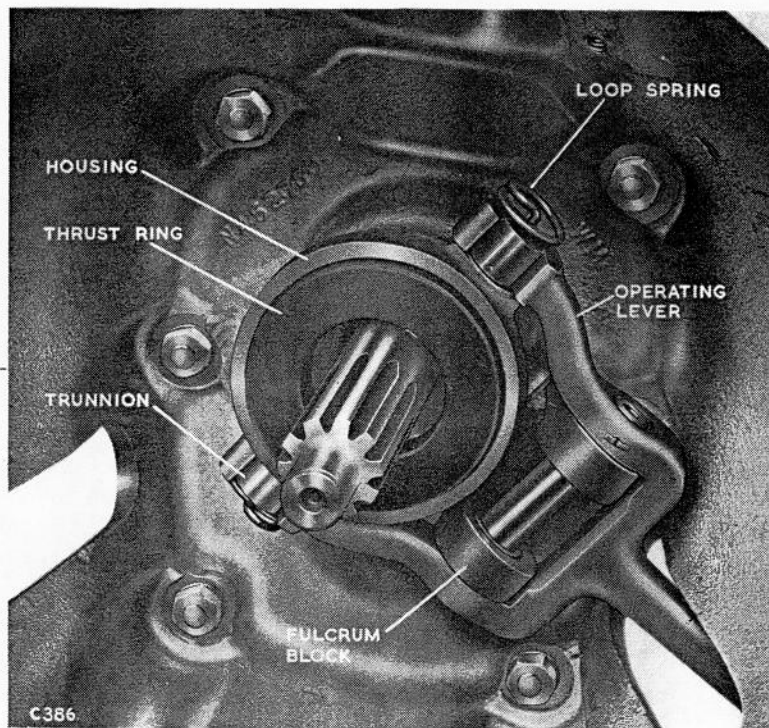


Fig. 4 Release bearing.

the clutch linkage is ineffective, fit a replacement release bearing assembly and check that the release lever plate face is in good condition and shows a good polish. If the face is scored, cracked, badly discoloured or worn concave or convex, fit a new one. The operations are as follows :-

1. Remove the gearbox as described in Section 5.
2. Within the clutch casing, release the two retainer springs, lift the release bearing assembly from the fork of the operating lever and discard the release bearing assembly.
3. Apply a trace of high melting point grease to the release bearing trunnions, fit the bearing to the operating lever fork, then fit the retainer springs.
4. If the release lever plate on the clutch assembly is unfit for further service (as described above), unhook the release lever springs from the tongues on the release lever plate, see Fig.2, then remove and discard the plate.
5. Fit a new release lever plate and secure it to the release levers by the retaining springs.
6. Ensure that the release lever plate bears fully on each of the three levers then, with a dial gauge at the maximum radius of the working face, turn the engine over slowly by hand and check that the bearing surface is parallel to the clutch assembly. If it is not, remove the release lever plate and refit it in another position and re-check. If it is unsatisfactory in all positions, remove the clutch from the flywheel as described previously. It is most important that the release lever plate is parallel to the clutch assembly, otherwise the clutch pedal will vibrate as the release mechanism comes into operation and the clutch pressure plate will be withdrawn askew.
7. Refit the gearbox to the engine as described in Section 5 and adjust the clutch pedal "free" travel as described previously under "Adjustment".

REPLACEMENTS

Where possible, every use should be made of the Borg and Beck replacement service which is available for the clutch assembly and the 8in. driven plate.

If a replacement driven plate is to be fitted, check its fit on the splines of the gearbox drive shaft in every position of spline engagement. A free sliding fit without slackness is essential; if necessary, ease the driven plate splines lightly until this is obtained, then place the plate aside pending the assembly of the clutch and gearbox to the engine.

For re-conditioning the friction surface of the flywheel, see Section 1, page 69.

FAULTS AND REMEDIES

Drag or spin

Excessive "free" travel of the pedal.

Correct the pedal adjustment.

Break-up of the fabric lining.

Fit a new driven plate.

Distorted driven plate due to weight of gearbox being allowed to hang in clutch plate during erection.

Fit a new driven plate assembly, taking care to support the gearbox adequately during fitting.

Driven plate hub binding on splined gearbox drive shaft.

Clean up splines and lubricate with a small quantity of high melting point grease.

Worn or broken carbon release bearing necessitating repeated adjustment.

Fit a new bearing, and check the condition of the release lever plate.

Fierceness or snatch

Binding of the clutch withdrawal linkages or pedal fulcrum.

Free and lubricate the linkage joints or pedal fulcrum.

Break-up of the torque springs in the driven plate.

Fit a replacement driven plate.

Slip

Oil or grease on the fabric linings.	Fit a replacement plate and eliminate the cause of lubricant entry.
Binding of the clutch pedal mechanism.	Free and lubricate the pedal fulcrum and/or linkage joints.
No "free" travel of the pedal.	Correct the pedal adjustment to obtain 1in. free movement at the pedal pad.

Judder

Collapse or breakage of the compression spring or springs.	Dismantle. Inspect and re-assemble the clutch with new parts as required.
Pressure plate engagement out of truth.	Dismantle. Inspect and re-assemble the clutch with new parts as required.
Glazing on fabric linings, due to oil soaking with subsequent "cooking" through excessive slip.	Dismantle. Inspect and re-assemble the clutch with new parts as required.
Clutch lining worn to rivet heads.	Fit a replacement driven plate.

Rattle

Rivets loosening at boss assembly of driven plate.))) Fit new parts as necessary.
Broken anti-rattle spring or springs.	
Graphite release bearing retaining springs broken or displaced.	

Squeal

If heard when engaging or disengaging the clutch :- worn thrust block or block loose in housing.	Fit a new release bearing and cup assembly.
Collapse of the driven plate centre assembly.	Fit a new driven plate.

Abnormal facing wear

Usually produced by excessive slip during starting due to overloading or habitually using a high gear to start.

Adopt correct methods of starting and driving.