

SECTION 4

CLUTCH AND CLUTCH ADJUSTMENT

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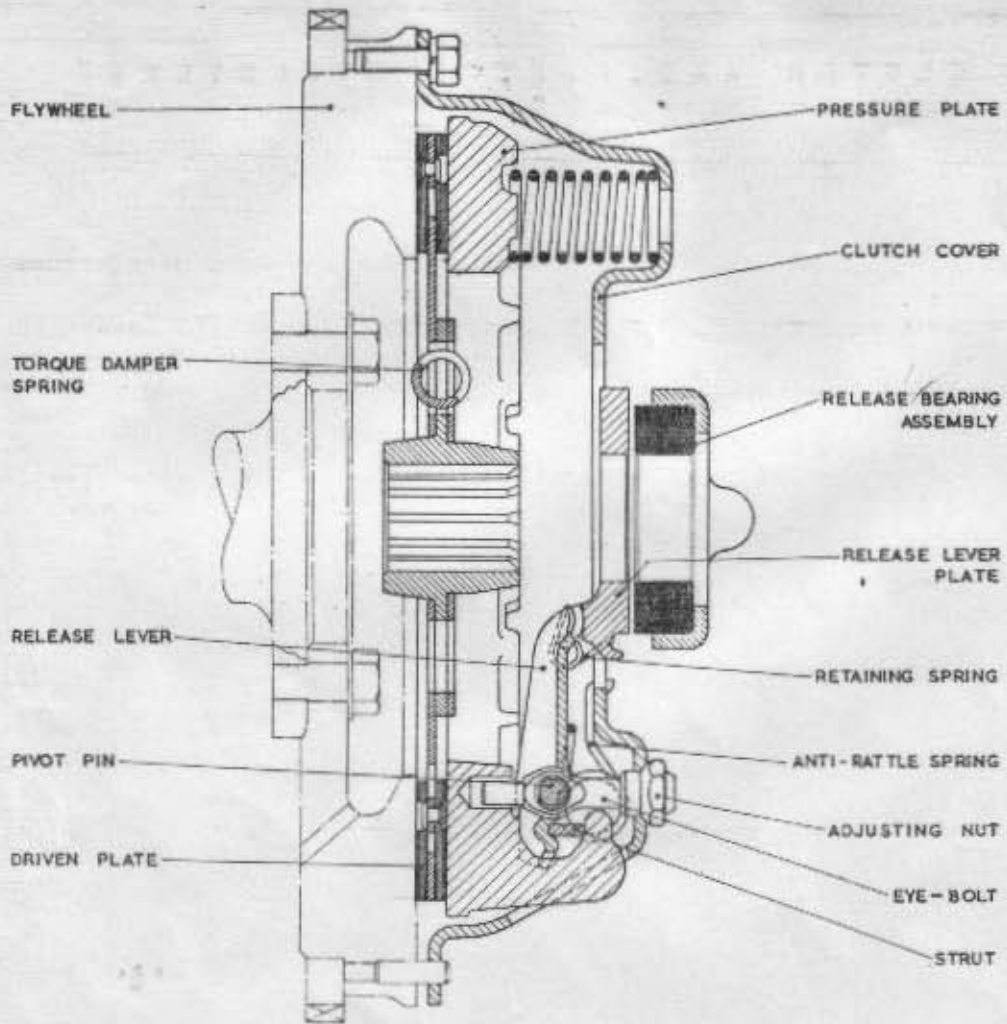


Fig. 1. Sectioned view of Clutch.

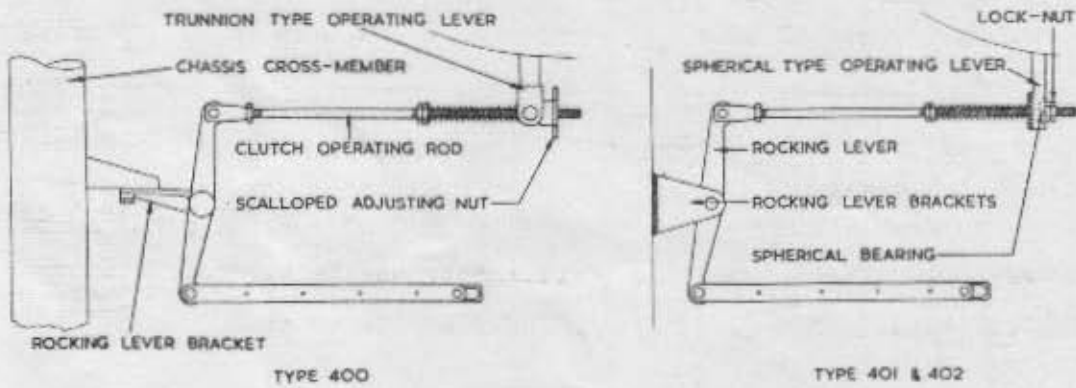


Fig. 2. Clutch adjustment details.

Torque damper springs						
Type ...	...	...	...	...	...	Coil
Colour..	...	...	...	...	...	Yellow
Facings						
Type ...	...	...	...	...	...	Raybestos W.R.7 or Ferodo R.Y.Z.
Outside diameter	...	...	...	...	...	8.0in. (203.2 m.m.)
Inside diameter	...	...	...	...	...	5.75in. (146.0 m.m.)
Total area	...	...	...	...	...	48.6 sq.in. (313 sq.c.m.)
Clutch pedal adjustment	...	...	...	...	...	1in. free travel before release bearing contacts release lever plate!
Effective clutch pedal travel	...	...	...	...	...	3.75in. (95.3 m.m.)

ADJUSTMENTS

The clutch will run for very long periods without any adjustments, but the free travel of the clutch pedal diminishes due to wear of the driven plate linings, and the clutch mechanism may be damaged unless the correct travel is restored.

In other instances, the clutch pedal travel may increase due to wear of the graphite release bearing. This condition renders gear changing difficult since the release bearing assembly must move forward a greater distance before contacting the release lever plate, thus reducing the effective travel with resultant clutch drag since the pressure plate is only partly disengaged when the clutch pedal is depressed fully.

Adjustment is effected in the linkage at the clutch operating lever, and although access to the adjusting nut may be obtained by opening the bonnet, it is advisable to jack up the side or front of the car and to effect the adjustment from beneath the chassis.

Warning :- Clutch adjustment must only be made at the adjuster at the front end of the operating rod. Do not attempt to obtain adjustment at any other point in the linkage.

Note that the clutch operating lever is "handed" in the clutch casing according to the drive side of the car. Note also that the adjustment assembly varies according to the car type, (see Fig.2). On the majority of Type 400 cars, the rocking lever pivots on a light-alloy bracket bolted to No.2 chassis cross member, the operating rod engaging a trunnion mounted in the forked clutch operating lever. Adjustment is provided by a scalloped adjusting nut at the front end of the rod. On all type 401 and 402 cars and on some type 400 cars, the rocking lever pivots between two steel brackets welded to No.2 chassis cross member, and adjustment is provided at the front end of the operating rod by a lock-nut and special nut incorporating a spherical base which mates with a spherical seat in the clutch operating lever.

Jack up the front or appropriate side of the car, then turn the adjusting nut at the front end of the operating rod connected to the clutch operating lever until the required in. free travel at the clutch pedal is obtained.

Note :- On early cars, the clutch operating rod passes through a trunnion in the operating lever, and care should be taken to make sure that the scalloped seating of the adjusting nut seats squarely on the trunnion after adjustment has been effected.

REMOVING AND REFITTING

To remove the clutch unit, proceed as follows :-

1. Remove the gearbox as described in Section 5, then detach the release bearing and cup assembly from the lever in the clutch casing.

2. Working diagonally, slacken the six clutch unit 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, taking care to retain the driven plate within the cover, lift the clutch away from the flywheel.

Before refitting the clutch unit, first make sure that the flywheel face is perfectly clean and dry, then proceed as follows :-

1. Although not strictly necessary, it is preferable to fit a suitable mandrel (if available) into the bore of the bearing in the rear end of the crankshaft then locate the clutch driven plate on the mandrel, making sure that the shorter spigot of the driven plate hub faces towards the flywheel!
2. Offer the clutch 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 a torque loading of 10 lb.ft. (+ 2lb.ft.).
4. Withdraw the mandrel (if this has been used).
5. Refit the release bearing and cup assembly to its lever in the clutch casing, then refit the gearbox as described in Section 5.
6. Adjust as described previously.

REPLACING RELEASE BEARING AND CUP ASSEMBLY

When the car has covered a considerable mileage and further adjustment at the clutch linkage to compensate for release bearing wear is ineffective, a replacement bearing and cup assembly should be fitted as follows :-

1. Remove the gearbox as described in Section 5.
2. Within the clutch casing, release the two retainer springs and lift the bearing and cup assembly from the yoke of the operating lever.

3. Apply a trace of high melting point grease to the bearing cup trunnions and fit the replacement assembly to the lever, then refit the two retainer springs.
4. Refit the gearbox to the engine as described in Section 5, and adjust the clutch pedal travel as described previously under "Adjustments".

DISMANTLING

Before commencing to dismantle the clutch cover and pressure plate assembly, mark the cover and pressure plate lugs relative to each other and number the release levers; this will ensure that all components will be re-assembled into their original positions, thus preserving the balance of the clutch, which is a vitally important factor.

1. Detach the release lever plate from the three retainer springs; remove the springs.
2. Place the cover and pressure plate assembly on the table of a press. Place a block of wood about 6in. square and 2in. thick beneath the pressure plate so that the clutch cover is free to move downwards when pressure is applied.
3. Place a block of wood across the cover, resting on the thrust spring bosses, and compress the cover with the spindle of the press.
4. Holding the cover under compression, exert sufficient turning pressure with a spanner to each adjusting nut to shear away the peening of the eye-bolts; remove the nuts.
5. Release the pressure slowly to prevent the thrust springs from flying out, then lift off the clutch cover and detach the anti-rattle springs.
6. Lift each eye-bolt in turn, draw the release lever towards the eye-bolt as far as possible and disengage the strut from the heel of the lever by pulling the strut towards the outer edge of the pressure plate (see Fig. 3). Withdraw each eye-bolt and release lever unit and detach the struts; mark each strut with its position number.
7. Withdraw each eye-bolt and pivot pin from its release lever and remove the pins from the eye-bolts.

INSPECTION

If the driven plate facings are not worn unduly, check the appearance of their contact surfaces. The facings are satisfactory if they are a light brown colour with a highly polished surface through which the grain of the material can be seen clearly. However, this condition must not be confused with glazing of the friction surfaces. This is caused by oil or grease penetrating to the facings causing clutch slip, the oil being burnt off leaving a thin layer of carbon which glazes the material. In such instances the facings are much darker in colour and the grain of the material cannot be seen through the glazing. Where this is encountered, the driven plate should be rejected. In more extreme instances of oil or grease penetration, the lubricant may partially burn leaving a resinous deposit on the facings, while still greater quantities of oil produce a black soaked appearance of the facings. The driven plate must be rejected if either of the foregoing conditions are observed and the facings should be renewed.

Where the driven plate facings are considered serviceable, check the fit of the plate on the splines of the gearbox drive shaft. A free sliding fit without slackness must be obtained in every combination of spline engagement. Reject the plate if slackness is confirmed.

Check that the six thrust springs are of the same height; if a spring has collapsed or shows signs of collapse, the entire set should be rejected and a replacement set obtained. Check the condition of the three anti-rattle springs and the retainer springs of the release lever plate.

Examine the release levers for fretting in the strut and pivot pin locations and for wear on the thrust pad faces; reject if any of these defects are observed.

Check the pivot pins for wear, and the three struts for burring of the contact faces.

Inspect the eye-bolts for wear in their pivot pin bores. Check the bolt threads and those of the adjusting nuts for serviceability. If the threads are torn, due to breaking away the peening when dismantling, reject the eye-bolts and nuts.

Inspect the release lever plate for wear or scoring of the thrust face; reject if this is confirmed. The release bearing and cup assembly should be rejected and a replacement obtained if the bearing is worn excessively.

RE-CONDITIONING

Except for generally dressing the release lever contact faces and removing any burrs on the struts by light stoning, re-conditioning and repair of the clutch unit consists of direct replacement of the unserviceable components. If the clutch pressure plate has been rejected, it is recommended that a replacement clutch cover assembly (which includes the pressure plate) is obtained and fitted. This is necessary since the assembly is balanced, an operation which involves the use of special equipment.

If the driven plate has been rejected, check the fit of the replacement plate 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 drive plate splines lightly until this is obtained, then place the plate aside pending the assembly of the clutch and gearbox to the engine.

REPLACEMENTS

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

RE-ASSEMBLING

Before commencing re-assembly, make sure that all components are perfectly clean and dry. The bearing surfaces of the release levers, pivot pins, struts, eye-bolt seats in the clutch cover, the plain end of each eye-bolt and the sides of the pressure plate drive lugs should be lubricated with a smear of grease such as Duckhams H.P.2295 or Keenol KG.20 immediately before assembly.

1. Assemble the anti-rattle springs to the clutch cover.
2. Fit each strut to its appropriate drive lug, then assemble the pivot pins to the eye-bolts and fit to the release levers.
3. Note the position of the release levers, then assemble the eye-bolt and lever assemblies into their respective positions in the following manner. Hold the threaded end of the eye-bolt and the inner end of the release lever as close together as possible (see Fig.3). Draw the strut towards the outer edge of the pressure plate and fit the eye-bolt into its location.
4. Move the strut upwards into the slots in the pressure plate lug, over the heel of the release lever and drop it into the groove formed in the lever; release the eye-bolt and lever.
5. Place the pressure plate on the 6in. square wooden block located on the table of a press and assemble the six thrust springs to the plate, seating them on the bosses provided.
6. Arrange the clutch cover in its correct relationship to the pressure plate lugs, then lower it carefully into position, making sure that the thrust springs are directly under the seats in the cover.
7. Place a block of wood across the cover, resting on the spring bosses, then compress the cover, carefully guiding the eye-bolts through their respective holes.
8. Maintain the pressure and fit new adjusting nuts to the eye-bolts.

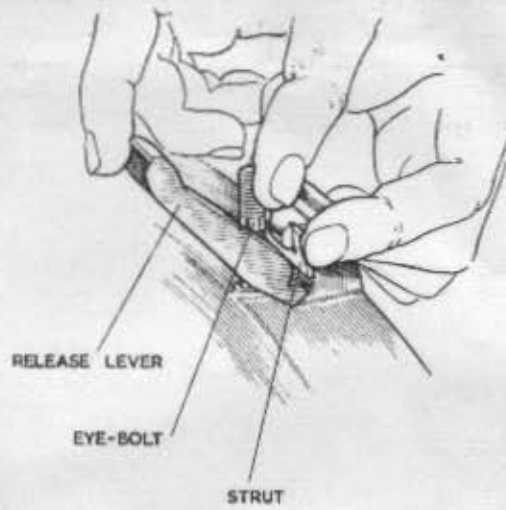


Fig. 3. Removing Release Lever and Eye-bolt.

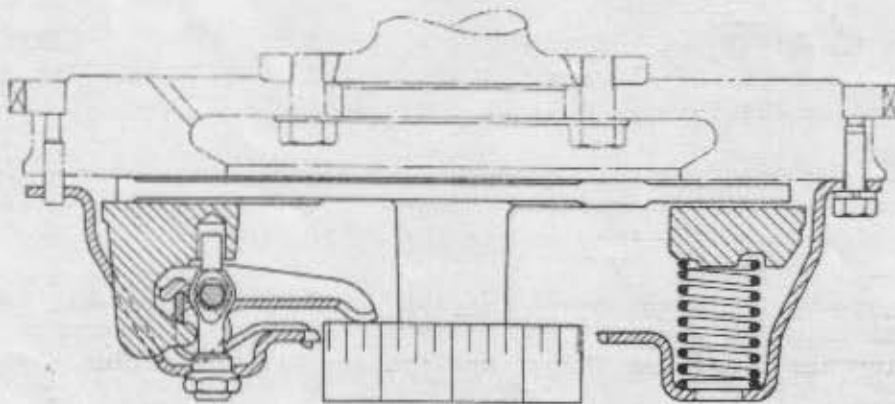


Fig. 4. Release Lever adjustment.

9. Operate the clutch a few times with the press to ensure that the working parts have settled in their correct positions, then remove the assembly from the press.

The release levers must now be set in the following manner, in which it is assumed that a Borg and Beck gauge plate (Part No. CG.10516) is available.

10. Assemble the clutch cover assembly to the engine flywheel, substituting the gauge plate CG.10516 for the clutch driven plate. Make sure that the gauge is centralised correctly with its three machined lugs aligned with the release levers, and tighten the clutch securing set-bolts evenly and diagonally.
11. Place a small straight-edge across the central boss of the gauge and the bearing surface of one of the release levers, then turn the appropriate adjusting nut until the lever just contacts the straight-edge; repeat the operation for the two remaining release levers.
12. When satisfactory adjustment has been obtained, lock the adjusting nuts by peening the end of each eye-bolt lightly into the nut slots.
13. Remove the clutch assembly and gauge plate, then fit the retainer springs of the release lever plate to the levers. Fit the release lever plate in position and spring the retainers over the three lips of the plate, preparatory to fitting the clutch to the engine.

If the Borg and Beck gauge plate is not available, the setting of the release levers should be adjusted as follows. Bolt the cover assembly to a suitable surface plate with the driven plate interposed and, using a height gauge, set the levers by adjusting the eye-bolt nuts until the dimension from the bearing surface of each lever to the surface plate is 1.812in. Now assemble the release lever plate and retainer springs to the levers, check the rear bearing face of the plate for truth with a clock gauge, then release the clutch, rotate the driven plate through 90° and re-check the adjustment with the clock gauge; re-adjust the levers as necessary. This action is necessary to counteract any lack of parallelism in the plate and to ensure that the release levers are in place with each other.

FAULTS AND REMEDIES

Drag or spin

Oil or grease on the driven plate facings.

Fit replacement driven plate. Locate source of oil or grease and correct.

Improper pedal adjustment not allowing full movement of release bearing.

Correct the pedal adjustment.

Warped or damaged pressure plate on clutch cover.

Renew defective part.

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

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

Driven plate hub binding on splined shaft.

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

Broken driven plate facings.

Check flywheel and pressure plate faces for damage and fit new driven plate.

Dirt or foreign matter in clutch.

Dismantle clutch from flywheel and clean the unit.

Caution:- Do not use petrol or paraffin for cleaning.

Worn carbon release bearing necessitating repeated adjustment.

Fit a new bearing.

Fierceness or snatch

Oil or grease on driven plate facings.

Fit replacement driven plate, trace source of oil or grease and correct.

Binding of clutch pedal mechanism.

Free and lubricate journals.

Driven plate facings worn out.

Fit replacement driven plate.

Slip

Oil or grease on driven plate facings.

Fit replacement plate and eliminate cause of foreign entry.

Binding of clutch pedal mechanism.

Free and lubricate journals.

Improper pedal adjustment.

Correct pedal adjustment to obtain lin. free movement.

Judder

Oil, grease or foreign matter on driven plate facings.

Fit replacement driven plate and eliminate cause of foreign entry.

Pressure plate out of parallel with flywheel face.

Re-adjust release covers and replace eye-bolts if necessary.

Contact area of driven plate facings not evenly distributed.

Check driven plate for distortion and fit replacement if confirmed.

Pedal throb due to release plate not being level.

Re-adjust toggles.

Rattle

Damaged driven plate, i.e. broken damper springs, etc.

Worn parts in release mechanism.

Excessive backlash in transmission.

Wear in transmission bearings.

Worn splined shaft.

Graphite release bearing loose on forked lever.

Fit new parts as necessary.

Tick or knock

Driven plate hub splines worn badly.

Fit replacement driven plate.

Worn crankshaft rear bearing.

Fit replacement bearing.

Squeal

If heard when disengaging clutch, indicates worn thrust block or block loose in housing.

Fit new release bearing and cup assembly.

Abnormal facing wear

Usually produced by overloading and by the excessive slip during starting due to overloading.

In the hands of the car owner.

Fracture of driven plate

Cracks located in segment necks between damper springs. Caused by distortion (see "Drag or Spin").

Fit replacement driven plate.



WORKSHOP MANUAL

Section:- 4

Bulletin No:- 1

Subject:-

CLUTCH AND CLUTCH ADJUSTMENT

TYPE 403 CAR

The information given in this Section relating to the Type 401 car is applicable to the Type 403 car with the following exception.

On the Type 403 car, a grease nipple is fitted to the clutch pedal to cater for the lubrication of the pedal fulcrum. This is accessible from beneath the car. Lubrication is necessary only after completion of every 6,000 miles (10,000 km.).