

Traction Clutches

Foreword by Rob Little.

The following articles on setting up Traction clutches, written by Gerry Propsting and Jack Weaver both include valuable information. They should be read and fully understood before undertaking setting up a clutch. If followed you will achieve a lovely easy to operate clutch, the setting of the operating levers is crucial.

DOROTHY FIXX – ADVICE TO THE VEHICULARLY DISTRAUGHT ADJUSTING FOUR CYLINDER CLUTCH ASSEMBLIES – ONE METHOD

Over the years I have been asked to drive a number of Tractions in order to assess the feel and drivability of the cars. While some of them have been delightful, others have been spoiled by various deficiencies.

One major deficiency that can spoil an otherwise brilliant motor-car is the quality of the clutch engagement. A clutch that engages smoothly and progressively over the length of its travel is important to prevent shock loadings being transmitted through the gearbox. Depressing a smooth clutch can even be acting as a shock absorber when rounding a low speed corner in second gear, or traversing pot-holed surfaces at low speeds.

A shuddering or rapidly engaging clutch can be cured. The workshop manual refers to two fixtures: 1701-T and simplified fixture MR 3457/11. Both these fixtures provide adjustment conditions in the loaded position as if the clutch pedal were depressed and the clutch disengaged. Obviously, if you have the expertise or connections to make MR 3457/11 or can find a 1701-T, then by all means use it. These are the ideal methods by which to perform the adjustments. However, it is not a perfect world; I don't have these fixtures and hence I have arrived at the following method, which over the years has worked well for me.

Before we begin, a few precautions. Now is a good time to change the flywheel spigot bearing and the clutch thrust bearing. NSK 7207BW-407 is an acceptable alternative to the original thrust bearing but its use requires modification to the fin dust shield and cover that retains the bearing in the thrust block. Clean the flywheel and pressure plate very carefully and examine the working surfaces for scores or roughness. The instructions to rectify the flywheel are on page 45, Op 116 par 3/4 of the workshop manual. Examine the pressure plate springs toggles and fingers for damage

and wear. You may choose to dismantle the pressure plate to test or replace the springs if they can be obtained. They can be tested for load/length specifications by a reputable clutch specialist if desired. A quick test is to

examine for evenness in height by standing on a surface plate or sheet of glass

place two springs at a time end to end in the vice and partly compress them [very tricky]. Compare the lengths and weak springs become obvious by their shorter length.

Examine the wear on the contact face of the clutch fingers. It should appear rounded but will probably have a flat worn onto it. Choose the best you can. If you choose to dismantle, rectify and reassemble, then be sure to clean and roughen the friction surfaces with emery paper on both flywheel and pressure plate, in order to deglaze the working faces.

Now, proceed as follows:-

- 1 Fit the flywheel to the engine, mounting the new spigot bearing, lightly greased [HTB grease], the closing plate and nuts torqued to 18 ft lbs. Turn back locking flanges and the closing plate against flywheel nuts. NOTE: The six nuts are tightened on a "Star of David" pattern, to prevent distortion.
- 2 Place the pressure plate and friction plate onto the flywheel using an old primary shaft as a mandrel to align the friction plate with the spigot bearing. Fit spring washers under heads of the set screws and tighten to 14.5 ft lbs [☆ pattern again]. Incidentally the new thickness of a friction plate is 11mm. Be sure there is sufficient lining material on the plate you intend using. If you are having yours relined, select friction material as close to the original as you can. Soft linings can produce a

vicious clutch.

- 3 Ensure that the peening of the toggle nuts is removed with a hacksaw blade and that they can be turned smoothly on the toggle bolt. A little WD-40 or similar can help; but DO NOT contaminate the friction linings.
- 4 Fit the thrust race into the bell housing and fit the thrust race return spring. Undo the cross shaft return stop screw and lock nut in order that the thrust race can go FULLY IN on its side. Lightly oil the slide surface.

Condition 1: 11 BL, 11B and early Slough cars with cable clutch. Screw in cross shaft return stop screws until it just touches the shaft's return stop lever. Now screw in a further two turns and tighten lock nut. [This screw will need to be set again later and then reset at the end of the operation.]

Condition 2: L15 and B15 rod operated clutches. To prevent fouling of the clutch lever on the radiator cross member a distance of 155mm must exist between the rear face of the bell housing and the centre line of the clevis pin hole in the lever. Set the stop screw to give this condition.

- 5 Mount the bell housing [gearbox removed for lightness] using only the 12mm headed screws either side of the housing. The camshaft dog, flat sided set screws and large bolts are not necessary as the housing will be removed later. Turn the flywheel so one finger is visible through the front of the bell housing.
- 6 Now, release the lock nut on the stop screw while holding the stop screw stationary with a screwdriver. Tighten the stop screw one full turn and retighten lock nut. This corresponds to the point of contact between the clutch fingers and

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DOROTHY FIXX – ADVICE TO THE VEHICULARLY DISTRAUGHT – ADJUSTING FOUR CYLINDER CLUTCH ASSEMBLIES – ONE METHOD

the thrust race, and when returned to the previous position the stop screw then serves to give 1mm running clearance from the fingers to the thrust race. NOTE: Do not worry if the fingers do not contact the thrust race at this point. It is probable that they won't.

- 7 Reference finger adjustment. Using a screwdriver and a 14mm spanner turn the toggle nut so that the finger comes into contact with the thrust race. Access is gained through the bell housing frontal aperture. Test the degree of contact by pushing on clutch withdrawal lever...aim for soft contact. DO NOT be tempted to take a short cut at this point and adjust the other fingers this way! it will NOT be ACCURATE. The first toggle is adjusted in this way merely as a reference for accurate measurement to adjust the other fingers.

- 8 Remove the bell housing and reset stop screw of the cross shaft by screwing OUT one full turn. Tighten lock nut. The thrust race running clearance has now been set.

- 9 At this stage you will need access to a good quality vernier calliper with a depth gauge facility and a 30cm steel rule to use as a straight edge. Placing the straight edge across the pressure plate housing EDGE ON so that it passes over the contact surface of the reference finger [previously set], measure with the depth gauge vernier the distance from the TOP EDGE of the steel rule to the clutch finger contact point. This point is rounded so make sure the depth gauge pointer is on the very top part of the finger's contact surface. You will find you will be able to hold the vernier and straight edge together and rock the pointer across the finger to "feel" the point at which the gauge is most accurate. The vernier at this point MUST BE perpendicular to the pressure plate housing. When satisfied with the



reading LOCK UP the thumb screws on the vernier to PRESERVE this measurement.

- 10 The aim is now to bring both of the other clutch fingers to the same height setting as the reference finger. Adjust each in turn, paying particular attention to accuracy. Rock the vernier to get a good feel for the measurement, as before, and compare the feel to the reference finger often [aim for a "light" touch]. Once you are satisfied with the three settings bounce the face of an engineers hammer against each finger contact point and re-check the measurements of all three fingers. Re-adjust if there is a change. You may have to reset the vernier to the reference finger if it has also changed.

- 11 Once the settings are stable, punch an amount of metal from the toggle locknut into the toggle slot to fix the adjustment.

- 12 Replace the bell housing, remembering the camshaft drive dog and tighten all set screws. Fit the flywheel closing shield and large bolts. Tighten well. Check that 1mm running clearance does exist between clutch fingers and thrust race. If not, re-adjust clutch shaft stop screws.

If you have been very particular you should now have a very smooth and progressive clutch.

MS FIXX WOULD LIKE TO TAKE THIS OPPORTUNITY TO THANK CCOCA MEMBER GERRY PROPSTING FOR THE TECHNICAL ADVICE AND EXPERTISE IN PREPARING AND WRITING THIS ARTICLE.

DOROTHY FIXX — ADVICE TO THE VEHICULARLY DISTRAUGHT —
— LICKY UNDER TRACTION CLUTCHES — SOME SHORT CUTS.

Here, as I promised in the last issue of 'Front Drive', is the method we employ in our workshop to adjust 4-cylinder Traction clutch pressure-plate finger heights.

This clutch's pressure-plate is of conventional Borg and Beck design, but Citroën — being Citroën — do not set the fingers at what would be a conventional height. This is the mistake most clutch specialists make when setting a 4-cylinder pressure plate, and results in a clutch with a long, non-progressive engagement and a generally 'soggy' feel.

For our method, all the 'special' tools you need are something similar to a 12" [300mm] steel rule and a piece of metal $\frac{3}{4}$ " [19mm] square or $\frac{3}{4}$ " in at least one dimension and between 25 and 50mm long. This is your 'feeler gauge'.

With the engine out, the transmission off at the bell housing and the pressure-plate removed, examine the clutch plate. If it has a 'cushion' centre, the cushion springs should not be broken or loose. None of the wave plates or their rivets should be cracked, broken or missing. The retaining rivet heads should be well below the surface of the facings. The thickness of a new clutch plate is around 8mm. [Trucks and tractors are some 11mm thick, but not Light 15s.] Normally a clutch plate down to 7mm thick is still serviceable and worth re-fitting.

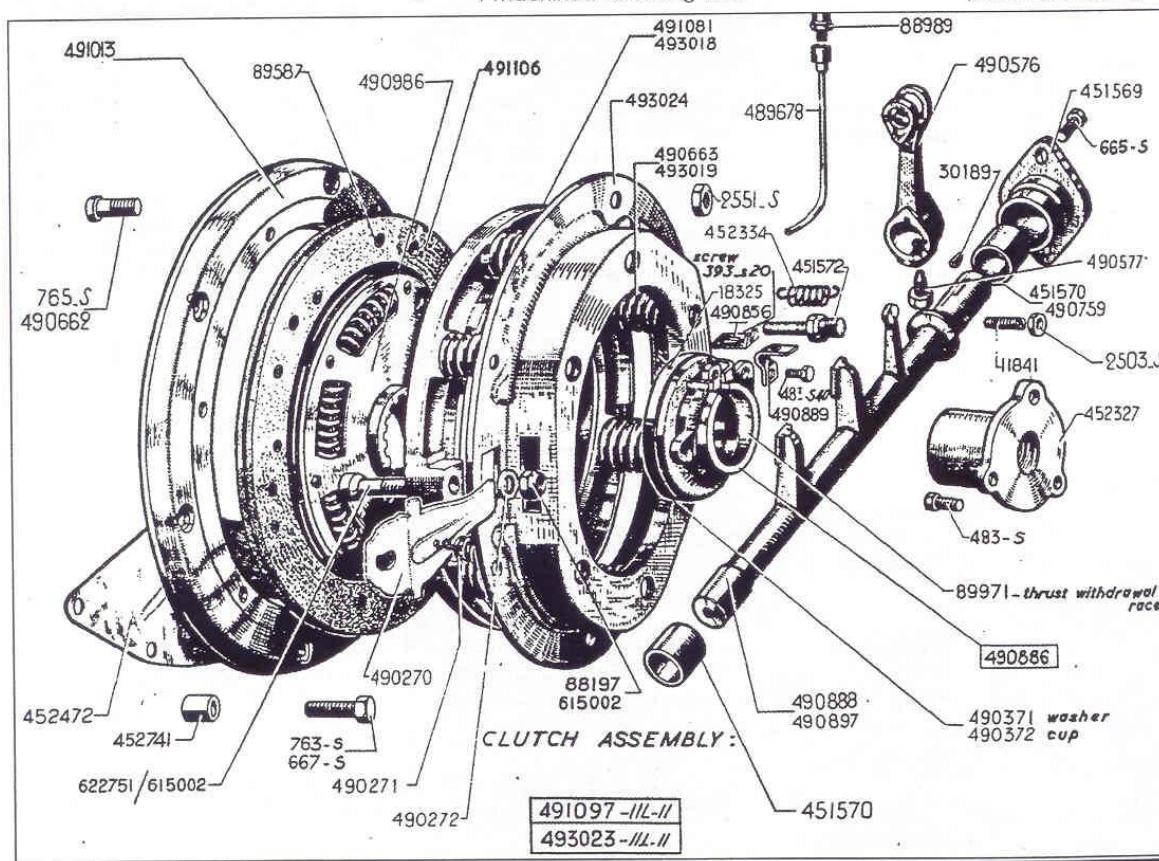
Run a hacksaw blade through the slots in the toggle bolts to clear the staked-in parts of the adjusting nuts. Carefully undo the nuts one turn at a time and in sequence, until the pressure plate 'falls apart' into its component pieces. You should then have :-

- a pressed steel plate bolted in it
- 1 pressure pad (an iron casting)
- 9 springs
- 3 toggle bolts
- 3 adjusting nuts
- 3 toggle bolt washers
- 3 clutch fingers.

Check the friction drive faces of both the flywheel and the pressure pad. If scored or severely heat cracked, they will have to be machined before re-assembly.

Gerry's comments regarding finger wear and springs are very good but, to make things easier when checking the spring lengths, a 75mm length of dowel which fits snugly inside the springs will keep them end to end when clamping them in the vice and ensures each pair tested is compressed equally. The springs are also less prone to

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DOROTHY FIXX – ADVICE TO THE VEHICULARLY DISTRAUGHT – 4-CYLINDER TRACTION CLUTCHES – SOME SHORT CUTS.

shoot off at a tangent around the workshop!

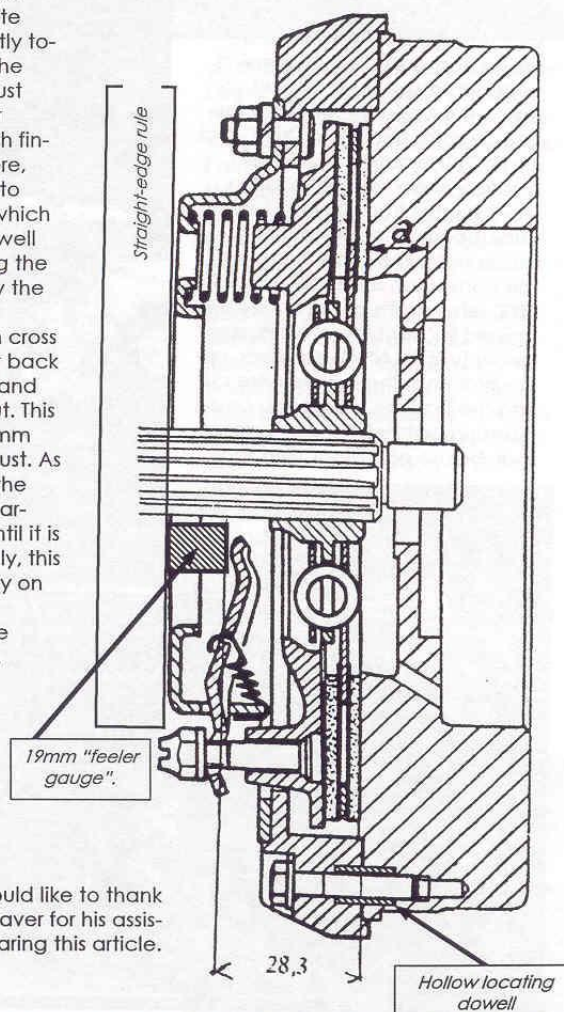
Assuming now you have nine matched springs, a good pressure pad, three fingers, and a set of toggle bolts, nuts and washers, clean them all and proceed to assemble the pressure plate. Make sure the springs are properly seated on the pressure pad and in the steel pressing. Put the toggle bolts through from the pressure pad side, drop on the fingers and the hardened washers, then start threading the adjusting nuts onto the toggle bolt threads. Sequentially tighten the nuts, one turn at a time, until about 3mm of thread projects through the nuts.

Put a flywheel on the bench, sit the clutch plate on it, centralise it by eye, then fit the pressure plate. Ensure the hollow dowel in the pressure plate lines-up with the dowel hole in the flywheel. [See illustration.] Fit and tighten in sequence, the bolts holding the pressure plate to the flywheel, making sure it is down evenly.

Now, after that comes the good part. Citroën, being in the northern hemisphere measure from the flywheel-side up. We, in the southern hemisphere measure from the machine face of the pressure plate down. This is when we put the rule across the top face and use our metal block as a 19mm feeler gauge to set each finger in turn. When all three fingers give a neat sliding fit of the gauge between the bottom of the rule and the finger, use the end of the hammer handle to thump each finger in turn, three or four times. Check, adjust, thump and check until there is no further change after the thumping part of the operation. At this point, use either an old screw driver or a thin chisel to stake the machined tops of the adjusting nuts into the slots in the toggle bolts to lock them. Thump and check the finger heights after staking the nuts onto the toggle bolts. Re-fit all the components

you removed from the crankshaft, using either a Light Fifteen spigot shaft or a spigoting tool to centralise the clutch plate before tightening the pressure plate bolts.

On the right hand side of the bell housing, slacken the lock nut of the clutch cross shaft stop, and with a screw driver, unscrew the adjusting screw 12 turns or so. Re-fit the transmission assembly, taking care not to omit the Oldham coupling between the auxiliary drive and the camshaft. Tighten all the bell housing bolts, making sure the bell housing is up evenly. With the left hand take hold of the clutch lever on the left side of the bell housing — at this point it should move back and forth quite readily. Push it lightly towards the rear of the car. The clutch thrust should then be just touching the clutch fingers. Holding it there, use a screw driver to screw in the stop which you had screwed well out before re-fitting the transmission. Screw the stop in until it just touches the clutch cross shaft, then screw it back out three full turns and tighten the lock nut. This gives the fingers 3mm from the clutch thrust. As the facings wear, the fingers rise and clearance decreases until it is non-existent. Initially, this wear occurs rapidly on a new clutch and should therefore be checked regularly.



Dorothy Fixx would like to thank her friend Jack Weaver for his assistance in preparing this article.

Diaphragm Clutch Modification

using Mitsubishi Pressure Plate

L15 Clutch Pressure Plate Fitting Instructions and Drawing

E-mail sent Rob Little on Tue 11/07/2006 from Bourne P & P on fitting of clutch to L 15

1. Manufacture 6 off spacers 20mm o.d. x 6mm i.d. x 6mm thick from mild steel. Spacers must be of identical thickness.
2. Manufacture Thrust Bearing Carrier Adapter from 75mm dia mild steel. The 45mm dia is critical to allow an interference fit with the new Thrust Bearing, Do not countersink holes at this stage.
3. Remove 9mm from the Thrust Bearing face of the Original Thrust Bearing Carrier.
4. Place the new Thrust Bearing Carrier Adapter into the modified Original Thrust Bearing Carrier & mark the position of the 4 off holes in the Carrier for the M4 countersunk holding screws by spot drilling through the adapter.
5. Remove the Adapter & drill & tap the M4 holes into the Original Carrier.
6. Countersink the 4mm dia holes in the Adapter.
7. Drill 2 off 2mm dia holes at right angles to each other for locating the return spring.
8. Fit the Adapter to the modified Original Carrier using M4 countersunk screws. Treat screws with Loctite.
9. Fit Thrust Bearing # GSB 319 to the Modified Carrier & mount the assembly into the Bellhousing. Connect the Return Spring to the Carrier using the 2mm holes.
10. Fit the Clutch Plate & Pressure Plate to the Flywheel using the original fixing holes & placing 6 off 6mm spacers between the Flywheel & Pressure plate. Line up the Clutch Plate as normal. Use new 8.8 grade bolts with spring washers. Clutch Plate is standard Light 15, 8mm thick.
11. With the Bellhouse fitted, set the position of the Clutch Lever to 160mm from the centre of its connection hole to the Engine face of the Bellhousing.

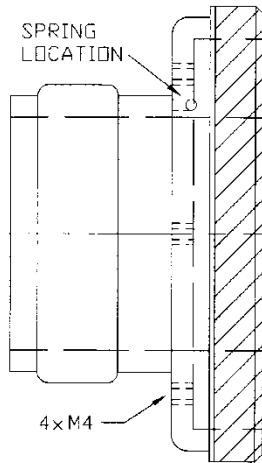
The Pressure Plate used is from a Mitsubishi Sigma 1977-82. # 850 614.

Pressure Plate & Thrust Bearing can be obtained from "Clutch & Brake Australia Pty.Ltd" (CBA). They can also reface the clutch plate if required.

It is recommended that the Flywheel should be lightened at this time. This, along with the weight lost with the Clutch modification, will assist with gear changing & engine braking. If it is decided to lighten the flywheel it is advisable to have it balanced.

ORIGINAL
CARRIER

SPRING
LOCATION



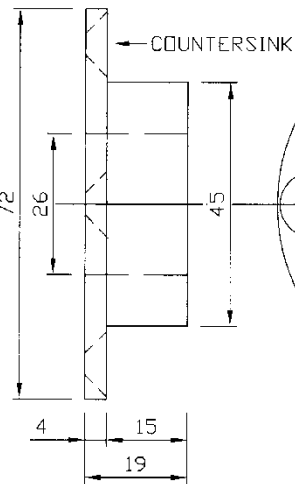
4xM4

RETAIN 4

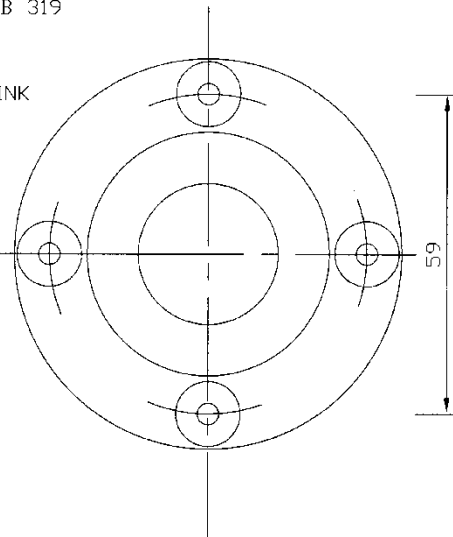
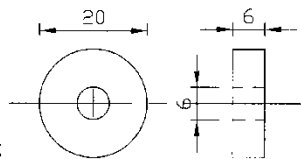
REMOVE

6 off SPACERS TO FIT UNDER
PRESSURE PLATE # 850 614
MITSUBISHI SIGMA 1977-82
USE EXISTING FLYWHEEL HOLES

ADAPTER FOR THRUST
BEARING # GSB 319



COUNTERSINK



CITROEN LIGHT 15
CLUTCH MODIFICATION
USING A DIAPHRAM
PRESSURE PLATE

PMB040706