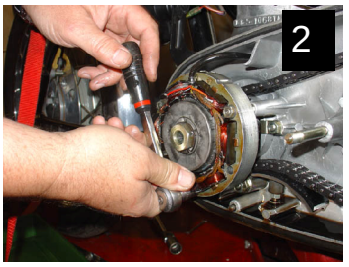
THE BULLET CLUTCH

Dismantling, reassembling, adjusting and modifying
the Bullet clutch for four speed models.

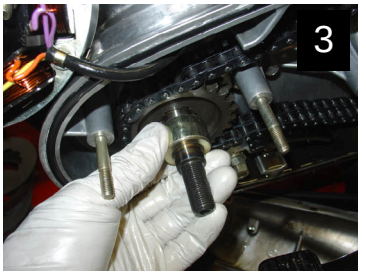
Some riders find the Bullet clutch temperamental; either dragging, creating problems for gear selection or slipping, with consequent loss of power to the drive. There are many possible causes for these problems, among them poor adjustment; worn or buckled clutch plates and unsuitable lubrication in the primary drive.

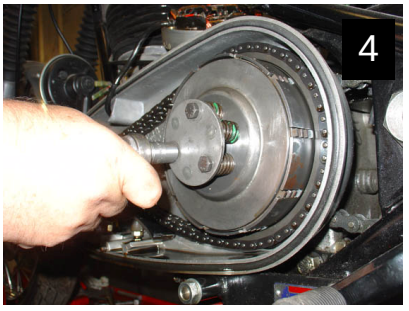
Dismantling and rebuilding the Bullet clutch is quite straightforward and should take no more than a couple of hours. (Much of what follows applies to Redditch Bullets, Twins and five speed models.) There are a few special tools that will make the job easier: clutch holding tool (ST25104), clutch centre extractor (ST25099) and possibly the engine sprocket extractor (ST25098).

Firstly, remove the left hand foot rest and the rear brake rod adjusting nut to allow the brake pedal to drop out of the way. Place an oil tray below the primary chain case cover. Remove the primary chain case cover by undoing the large hexagon nut and washer in the centre of the chain case (photo 1). Loosen the cover and allow the oil to flow out, then remove the cover.



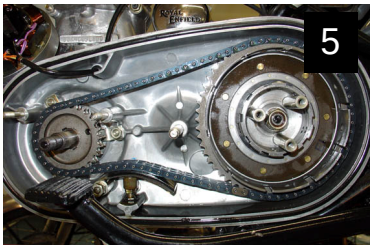
Because the primary drive uses an ‘endless’ chain, both the engine and clutch sprockets must be withdrawn together with the chain, as one complete assembly. To facilitate this it is necessary to remove the alternator stator and rotor. Remove the stator by undoing the three holding nuts (photo 2) then lift the stator away, placing it out of harm’s way on the top of the crankcase. Remove the three spacers from their studs. Also remove the large hexagon nut, with its locking washer, at the centre of the rotor and draw the rotor from its shaft. Remove the woodruff key and the large spacer from the shaft (photo 3).



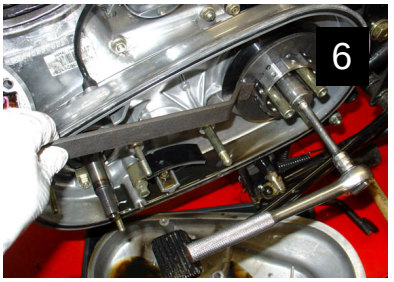


Slacken and remove the three clutch spring pins. Lift away the springs, the outer clutch plate and clutch pad, ensuring that any ball bearing, if fitted, does not drop out of the end of the gearbox mainshaft (photo 4).

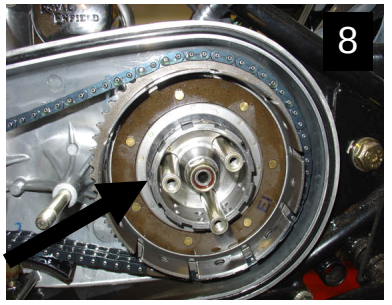
Remove the clutch plates—lay out the plates carefully in the exact sequence of fitting, this will help when reassembling. Carefully remove the large retaining circlip with the aid of a small blunt screwdriver, from the clutch hub. Now the engine and clutch sprockets can be withdrawn together with the primary drive chain (photo 5). Normally the engine sprocket should slide off the crankshaft with no special tools required, but the special extractor, part ST25098 may be required.

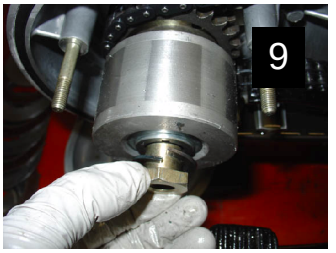


Hold the clutch centre with the special tool, remove the large nut and washer (photo 6). The clutch centre is easily removed with the clutch centre extractor (photo 7).



Before we begin reassembly ***keep in mind that there are a range of special parts available to improve the operation and performance of the Bullet clutch. Some of these we will list at the end of this article.*** Before refitting the clutch centre, check the splines where the clutch plates locate are smooth and free from wear and that the backplate is not warped. Replace the clutch centre with its large nut and washer, use the clutch holding tool, tighten the nut to 40lbs/ft. torque. Replace the two sprockets and primary drive chain assembly. Install the large circlip in its groove on the clutch centre (photo 8).





Before replacing the rotor, slide the rotor spacer onto the shaft and replace the rotor woodruff key followed by the rotor. Locate the rotor lock-washer and nut and tighten to 40lb/ft. (photo 9). Position the three stator spacers on their studs and replace the stator, the lock-washers and nuts ***before tightening these, ensure you have an equal air gap between the rotor and stator otherwise serious damage may occur.*** An alternator clearance gauge makes this task simple—Hitchcock's part number 98240 or you can use a suitable piece of cut up plastic from an old coke bottle which can be wrapped round the rotor. Once in place the 3 stator nuts can be tightened, the plastic removed and a final check to ensure there is still an air gap.

Before replacing the clutch plates, take time to check that the plates are perfectly flat using a straight edge and the friction plates have a working thickness of friction material (the friction discs when new are approx 4.5—4.7mm thick). Clean the discs (carb cleaner is an ideal choice for this) then replace in the correct order, the reverse order in which they were removed.

1) dished plate with the **raised centre facing towards you;**
2) 24 segment type friction plate
3) flat steel plate
4) bonded friction plate
5) flat steel plate
6) bonded friction plate
7) dished plate with the **raised centre facing away from you**
8) bonded friction plate
9) outer pressure plate

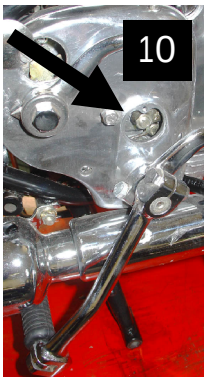
The 'three plate' clutch fitted to early 350's does not have plates 4 and 5.

Replace the clutch operating pad, the clutch front plate, the six clutch springs (if these are of different strengths, ensure they are fitted alternately), the clutch cap and the three clutch spring pins. Tighten the spring pins (approx 10ft/lbs). Check that the primary drive chain is correctly adjusted—with about 1/2 inch movement at the centre of the top chain run (no more than 1/4 inch in each direction). Check the chain tension in 3 or 4 places. If necessary adjust the chain tension by screwing or unscrewing the adjuster bolt on the tensioner pad.

Replace the primary drive cover, first checking the condition of the large rubber sealing ring, renew if the ring shows any signs of damage. Take care not to over-tighten the large chaincase centre nut (approx 12ft/lbs). Replace the oil in primary drive, 420 ml of automatic transmission fluid (ATF) is an ideal lubricant.

The only remaining task is to adjust the clutch and the clutch cable. This can be a bit random! The solution is a trial and error method. Firstly, ensure the cable adjuster (either at the handlebar lever or half-way along the cable) is screwed fully in (i.e. fully slackening off the cable).

Loosen and remove the lower of the two inspection covers on the gearbox cover (photo 10). This uncovers the clutch adjuster and its lock-nut (photo 11). Loosen the lock nut on the adjusting screw—***take great care not to remove the nut from the adjuster.*** Tighten the screw until some resistance is felt. This can be difficult to determine, so slacken the nut off and retry this a number of times, until you sense the position where there is resistance. Slacken the screw off about half a turn. Then tighten the lock-nut and replace the inspection cover and screw. Adjust the cable free play with the cable adjuster, allowing about 5mm free play at the lever. Take your bike for a test ride, if necessary repeat the adjustment procedure until the clutch operates satisfactorily.



The Bullet standard clutch is simple and normally adequate but can, on occasions, be troublesome—slipping, dragging or a combination of both. The good news is that there is a wide range of improvement parts available. In particular **Hitchcock's Motorcycles** offer a 5 friction plate improvement that can be fitted into the standard four plate clutch basket, this will help prevent clutch slip and improve drive (the five plate clutch can be fitted to all 500 Bullets and 350 Bullets which currently have the 4 plate set up).

Also to help avoid clutch slip is a 6 piece spring set, using three light and three heavier springs. A clutch pad with roller bearings will ensure a cleaner lift of the plates to help cure drag. To smooth out the transmission, a clutch cush drive, using rubber shock absorbers, is another option.

At the real 'high end' is a dry clutch assembly and high quality belt primary drive set up. This clutch is also offered as a straight replacement of the Bullet clutch, retaining the standard chain primary drive. Richard Ross