

CHANGING THE GEARBOX SPROCKET ON A 4-SPEED KICKSTART BULLET

Useful tools – oil drip tray 90155; clutch holding tool ST25104; clutch puller ST25099; engine sprocket extractor ST25098; gearbox sprocket spanner 98315; alternator spacer shim 98240.

Replacement parts – clutch nyloc nut 140769; gearbox sprocket tab washer 111161; chaincase gasket 144621; clutch oil seal 111888; adaptor plate gasket 144624; primary chain buffer 200140; chaincase oil (ATF) SILK55.

One simple and effective modification for a Bullet is fitting a larger gearbox sprocket. This raises the gear ratio, improving economy and reducing stress on the engine. If you live in a hilly district, raising the gearing may not be a good idea, but it's a sensible modification if you use the bike for touring. It is normally enough to increase the gearbox sprocket by one tooth.

Changing the gearbox sprocket sounds like a major job, but in a couple of hours and working through this step-by-step guide, the job will be done! Please note that all nuts are standard threads, there are no left handed threads during this process.

STEP 1: Remove the left side footrest and slacken off the rear brake adjustment. Place an oil tray, (90155) under the primary chaincase, to catch the oil that will be released when the cover is removed. Slacken off the large nut in the centre of the chaincase and lift the chaincase away.



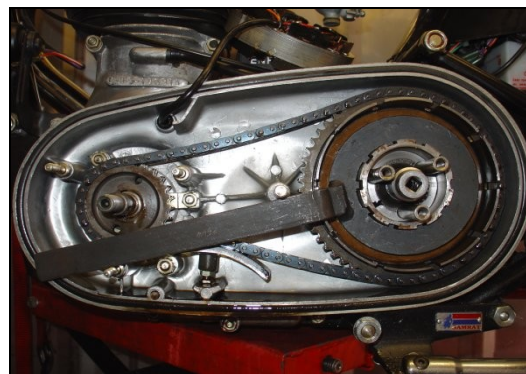
STEP 2: Remove the three nuts and washers that hold the stator in position. Lift the stator clear and carefully place it out of the way taking care that there is no stress on the



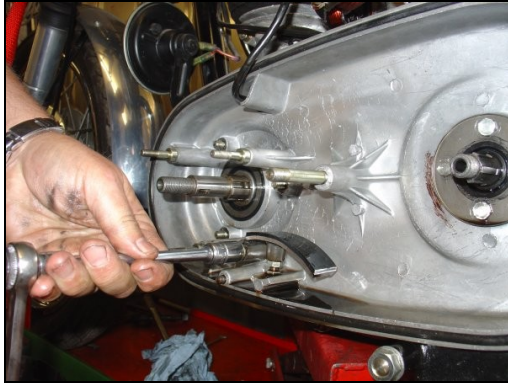
cables. Be careful not to lose the three small spacers, one on each of the studs that support the stator.

Remove the large nut securing the rotor. Do this by putting the bike in gear and locking the rear wheel. With a suitable spanner placed on the nut, give the spanner a sharp knock to free the nut. Remove this along with the spring washer and the rotor will now slide off its shaft. As you remove the rotor also remove the small woodruff key and spacer behind the rotor.

STEP 3: Slacken off evenly the three bolts that secure the clutch spring retaining plate, remove these, the washers, plate and springs. The large pressure plate can now be removed along with the clutch plates. **Note: carefully stack the clutch plates in the order you remove them, it helps when**



reassembling the clutch. To remove the clutch centre retaining nut, lock the clutch with the clutch holding tool (ST25104) and undo the large nut. Using the clutch puller tool (ST25099) remove the clutch centre from its splined shaft, the sprocket comes away with the centre.



STEP 4: Undo the nut holding the primary chain tensioner and slide the tensioner off. The clutch centre with sprocket, engine sprocket and chain will now slide off their splines as an assembly. If the engine sprocket is tight on its shaft use the special engine sprocket extractor tool (ST25098).

Behind the engine sprocket is an oil seal which does not need to be disturbed, but remove the three nuts and tabs that hold this seal in place, the inner primary chaincase can now be removed carefully.

Now you'll have access to the gearbox sprocket. The gearbox sprocket nut will be secured by a locking tab washer. Undo the large nut with the special box spanner (98315). Slacken the rear wheel spindle and nuts and adjust the snail cam, to give the final drive chain more free-play. Remove the connecting link from the final drive chain and remove the sprocket from its shaft.



STEP 5: Reassembly is the reverse process, but a few tips may help. It is advisable to replace the gearbox sprocket tab washer (111161) not forgetting to bend the tab once the sprocket nut is tightened to approx 70 NM. When fitting the final drive chain ensure the split link is fitted with the closed end facing the direction of travel. Check the oil seal behind the clutch (111888) and if there are signs of damage or wear replace along with its gasket (144624). Be careful when sliding the seal over the shaft that you do not cause damage.

Remove the old gasket between the inner chaincase and crankcase and replace with part 144621. It is not normal to need sealant on this, but a small amount of Hylomar or Wellseal will not harm. Re-fit the inner chaincase and fit the three nuts and tabs positioning them to secure the crankshaft oil seal. Replace the engine sprocket, clutch centre/sprocket and primary chain assembly on their shafts, turning slightly to locate the splines.

Using the clutch holding tool, fit the lock washer and clutch retaining nyloc nut, tighten to torque, 55 NM. It is advisable to use a new nyloc nut, 140769. Replace the clutch plates in the correct order – starting from the clutch back plate –

- 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.)

Refit the clutch springs, clutch spring retaining plate, and three bolts with washers. If it's difficult to compress the springs sufficiently to start the bolts in their threads, try using a 1/4 BSF bolt about 1/2 inch longer than standard and tighten sufficiently to allow the other two standard bolts to start, then replace the long bolt with the 3rd standard bolt. Tighten all 3 bolts fully.

Refit the chain tensioner and tighten up the securing nut. You might want to fit the rubber buffer chain adjuster (200140), a modification that helps prevent noise and vibration.



HITCHCOCK'S MOTORCYCLES
OLDWICK LANE WEST
CHADWICK END
SKIDDELL
B93 0BJ ENGLAND
TELEPHONE 01564 783 102
FAX 01564 783 313
Web: www.hitchcock-motorcycles.com
Email: info@hitchcock-motorcycles.com

BULLET IGNITION TIMINGS		
	Retarded	Advanced
Degrees	10°	32°
Inches	1/32"	5/16"
Millimetres	0.8mm	8.5mm



BULLET TORQUE SETTINGS — CHASSIS			
ITEM	kgm	lb/ft	ft/lb
Frame Bolt (Nut) Shim (212)	1.00	27.5	1.20
Front Endnut Shim (214) (215)	1.00	27.5	1.30
Front Endnut Shim (216) (217)	1.00	27.5	1.40
Chainnut Shim (218)	1.00	27.5	1.50
Chainnut Shim (219)	1.00	27.5	1.60
Chainnut Shim (220)	1.00	27.5	1.70
Chainnut Shim (221)	1.00	27.5	1.80
Chainnut Shim (222)	1.00	27.5	1.90
Chainnut Shim (223)	1.00	27.5	2.00
Chainnut Shim (224)	1.00	27.5	2.10
Chainnut Shim (225)	1.00	27.5	2.20
Chainnut Shim (226)	1.00	27.5	2.30
Chainnut Shim (227)	1.00	27.5	2.40
Chainnut Shim (228)	1.00	27.5	2.50
Chainnut Shim (229)	1.00	27.5	2.60
Chainnut Shim (230)	1.00	27.5	2.70
Chainnut Shim (231)	1.00	27.5	2.80
Chainnut Shim (232)	1.00	27.5	2.90
Chainnut Shim (233)	1.00	27.5	3.00
Chainnut Shim (234)	1.00	27.5	3.10
Chainnut Shim (235)	1.00	27.5	3.20
Chainnut Shim (236)	1.00	27.5	3.30
Chainnut Shim (237)	1.00	27.5	3.40
Chainnut Shim (238)	1.00	27.5	3.50
Chainnut Shim (239)	1.00	27.5	3.60
Chainnut Shim (240)	1.00	27.5	3.70
Chainnut Shim (241)	1.00	27.5	3.80
Chainnut Shim (242)	1.00	27.5	3.90
Chainnut Shim (243)	1.00	27.5	4.00
Chainnut Shim (244)	1.00	27.5	4.10
Chainnut Shim (245)	1.00	27.5	4.20
Chainnut Shim (246)	1.00	27.5	4.30
Chainnut Shim (247)	1.00	27.5	4.40
Chainnut Shim (248)	1.00	27.5	4.50
Chainnut Shim (249)	1.00	27.5	4.60
Chainnut Shim (250)	1.00	27.5	4.70
Chainnut Shim (251)	1.00	27.5	4.80
Chainnut Shim (252)	1.00	27.5	4.90
Chainnut Shim (253)	1.00	27.5	5.00
Chainnut Shim (254)	1.00	27.5	5.10
Chainnut Shim (255)	1.00	27.5	5.20
Chainnut Shim (256)	1.00	27.5	5.30
Chainnut Shim (257)	1.00	27.5	5.40
Chainnut Shim (258)	1.00	27.5	5.50
Chainnut Shim (259)	1.00	27.5	5.60
Chainnut Shim (260)	1.00	27.5	5.70
Chainnut Shim (261)	1.00	27.5	5.80
Chainnut Shim (262)	1.00	27.5	5.90
Chainnut Shim (263)	1.00	27.5	6.00
Chainnut Shim (264)	1.00	27.5	6.10
Chainnut Shim (265)	1.00	27.5	6.20
Chainnut Shim (266)	1.00	27.5	6.30
Chainnut Shim (267)	1.00	27.5	6.40
Chainnut Shim (268)	1.00	27.5	6.50
Chainnut Shim (269)	1.00	27.5	6.60
Chainnut Shim (270)	1.00	27.5	6.70
Chainnut Shim (271)	1.00	27.5	6.80
Chainnut Shim (272)	1.00	27.5	6.90
Chainnut Shim (273)	1.00	27.5	7.00
Chainnut Shim (274)	1.00	27.5	7.10
Chainnut Shim (275)	1.00	27.5	7.20
Chainnut Shim (276)	1.00	27.5	7.30
Chainnut Shim (277)	1.00	27.5	7.40
Chainnut Shim (278)	1.00	27.5	7.50
Chainnut Shim (279)	1.00	27.5	7.60
Chainnut Shim (280)	1.00	27.5	7.70
Chainnut Shim (281)	1.00	27.5	7.80
Chainnut Shim (282)	1.00	27.5	7.90
Chainnut Shim (283)	1.00	27.5	8.00
Chainnut Shim (284)	1.00	27.5	8.10
Chainnut Shim (285)	1.00	27.5	8.20
Chainnut Shim (286)	1.00	27.5	8.30
Chainnut Shim (287)	1.00	27.5	8.40
Chainnut Shim (288)	1.00	27.5	8.50
Chainnut Shim (289)	1.00	27.5	8.60
Chainnut Shim (290)	1.00	27.5	8.70
Chainnut Shim (291)	1.00	27.5	8.80
Chainnut Shim (292)	1.00	27.5	8.90
Chainnut Shim (293)	1.00	27.5	9.00
Chainnut Shim (294)	1.00	27.5	9.10
Chainnut Shim (295)	1.00	27.5	9.20
Chainnut Shim (296)	1.00	27.5	9.30
Chainnut Shim (297)	1.00	27.5	9.40
Chainnut Shim (298)	1.00	27.5	9.50
Chainnut Shim (299)	1.00	27.5	9.60
Chainnut Shim (300)	1.00	27.5	9.70
Chainnut Shim (301)	1.00	27.5	9.80
Chainnut Shim (302)	1.00	27.5	9.90
Chainnut Shim (303)	1.00	27.5	10.00

Replace the rotor spacer onto the crankshaft, fit the woodruff key and slide the rotor onto the shaft. Refit the large spring washer and nut that hold the rotor in place and tighten to the correct torque, 55 NM. To avoid serious and expensive damage, there must be an even air gap between the rotor and the stator, a minimum of

0.008". To ensure the correct air gap wrap the alternator spacer shim (98240) or similar around the rotor, fit the stator, and tighten the three securing nuts and washers and then remove the shim.

Adjust the primary chain tensioner to give between 10 and 12mm free play (5-6mm upwards movement and 5-6mm downward movement) on the top run of the chain. Rotate the chain and check the free play again.

Check the "O" ring around the circumference of the inner chaincase and replace if damaged (these are normally in good condition). Refit the primary chaincase outer cover and tighten the nut and washer to 14 NM. Refill the chaincase to the level plug with approximately 430ml of ATF oil (SILK 55).

Adjust the final drive chain, tighten the anchor nut and axle nuts, refit the footrest and re-adjust the rear brake.

Make sure there are no parts left over - if not, job done!