

## Villiers 1F Clutch Strip

Do you remember the good old days when Classic and Motorcycle Mechanics used to do those very useful stage by stage strip down articles of Villiers engines? As a learner at this game I have found them very useful when exploring the innards of Villiers engines, but unfortunately they have abandoned this sector of motorcycling activities to concentrate on Japanese machines. As the Club which represents this need I thought that it would be good to have our own versions and decided that I would try my hand at an equivalent article for the Villiers 1F which is fitted to my James Comet.

The problem which prompted this strip down was a degree of clutch drag which meant that when I engaged first gear there was always a nasty clangcrunch as the dogs meshed together. I was worried that frequent use was gradually ruining the gears so resolved to check that the clutch was sound and properly set up, but on the 1F the clutch is not as easy to get at as it is on the 'D' and 'E' series engines. The 1F has only two main castings, the left hand incorporates the crankcase and gear box, and the right hand acts as the primary chain case and carries the kickstart mechanism and the armature plate. The clutch assembly runs between these two so they have to be separated to examine the clutch.

On a bike as simple as this it is easy to get the engine out of the frame. There are only three mounting bolts and the other connections are easily separated and the engine can then be lifted out onto the bench. To hold it steady while you grapple with the dismantling I recommend bolting on a piece of plate (I used 5mm drilled to take an engine mounting bolt) which can then be clamped in the vice

Remove the flywheel cover plate and then the flywheel. If you have a Villiers Hammertite spanner you can just hold the flywheel while you give the spanner a smart rap with a copper hammer. The nut then unscrews a bit and tightens when it will need a bit more force to undo as the nut pulls it off the taper. Once you have the flywheel off put it in a plastic bag otherwise the magnets will attract all the metallic rubbish which floats around the work area.

Also remove the kickstart cover.

Next remove the armature plate which carries the coils and is held onto the clutch case by four small slot head screws. These are often difficult to shift and will need a screwdriver that is really clean and neatly squared off to give a good fit in the slots. Having removed these the armature plate comes easily off its boss on the clutch case. At this stage also remove the kick start ratchet which is held on by a circlip.

Now remove the drain plug in the bottom of the clutch case and collect any dirty oil. You can then undo the clutch cover fixings (2 nuts on studs, 2 slot head screws, 2 hex head screws). In my copy of the Villiers 1F manual there is an illustration of an elaborate extractor (ST 148) for withdrawing the clutch case off the clutch shaft and crank shaft. My engine is a bit worn so there are no tight fits and with a judicious tap with a mallet the two halves of the engine came apart easily to reveal the primary drive.

To remove the clutch assembly it is necessary to remove the engine sprocket. You will need to devise a way of locking the sprocket. Villiers supplied a special tool for this that dropped over the sprocket and was bolted to the gear case but we can get by with a suitable piece of wood jammed against the chain. Pull the engine sprocket off its keyway at the same time as the clutch assembly is withdrawn. Sprocket, clutch shaft and chain can be removed as a unit. The clutch assembly can then be examined. You will see that I keep a collection of ice cream tubs which are ideal for sorting parts as they are taken off, keeping different sub-assemblies separate.

Holding the clutch shaft in the vice enables you to remove the clutch nut lock washer, clutch nut, clutch spring and its bush, before removing the clutch plates. The clutch spring is under compression so as the nut is undone it will come off with a bit of a jump. As you remove the plates watch out for the positioning of the cotter that releases the clutch plate pressure.

You can then examine the clutch plates for deterioration, buckled plates, worn corks, gummy residues and so on. Everything on mine seemed to be acceptable so I commenced re-assembly.

With the clutch shaft still in the vice I put the plates back in reverse order. First the outer plate with holes goes next to the circlip that retains the gear wheel. Then the tanged plate,

dished centre plate with the dished side towards the tanged plate. The cotter should then be fitted into the slot in the shaft, then the chain wheel and finally the outer plate. Then you have the problem of assembling the clutch spring nut against the pressure of the spring. I found that a piece of tube placed over the clutch shaft after the nut was in place enabled me to squeeze up the spring in the vice to the point where the nut was about to engage the thread on the shaft. A careful turn of the spanner got the nut going on its thread and then finally fully tightened.

The final position of the nut is crucial because the clutch assembly is sandwiched between bearings which are housed in the two main castings. Villiers provided a gap gauge to dealers with a max of 3.696" (93.88 mm) and a min of 3.676" (93.37 mm)

If the nut is overtightened the dimension will be too small and when the clutch is operated the whole assembly will move rather

than compressing the spring. To get a clearer view of this I cut an old casting in half to see the action

Once this stage is over it remains to re-assemble the rest of the parts. There are only two points of special note. Firstly, I always add a drop of Loctite when re-fitting the armature plate fixing screws. Secondly because the fly wheel is not keyed it is necessary to retune the magneto, but this is easy by getting the timing marks in line when the piston is at top dead centre.

Finally, after all this I put the engine back into the bike and started the engine and checked the clutch. Clangcrunch! Just the same as before! I put the bike in the shed and sulked away to do something else. After a few days when I had cooled off I started to wonder what the problem was. It occurred to me that the clutch operating arm on the engine was not getting its full movement. A quick check showed that it was fully operating after 15mm of movement. For some reason the clutch lever on the handlebar was only giving 11 mm so the problem was that there was insufficient movement. Why was this ? By comparing the two levers, clutch and front brake I found that the lever has at some time been bent slightly, and it was coming up against the handle bar rubber too early. These levers are only a spindly bit of brass and a careful bit of bending away from the handlebar pretty well solved the problem. It's called learning the hard way.

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