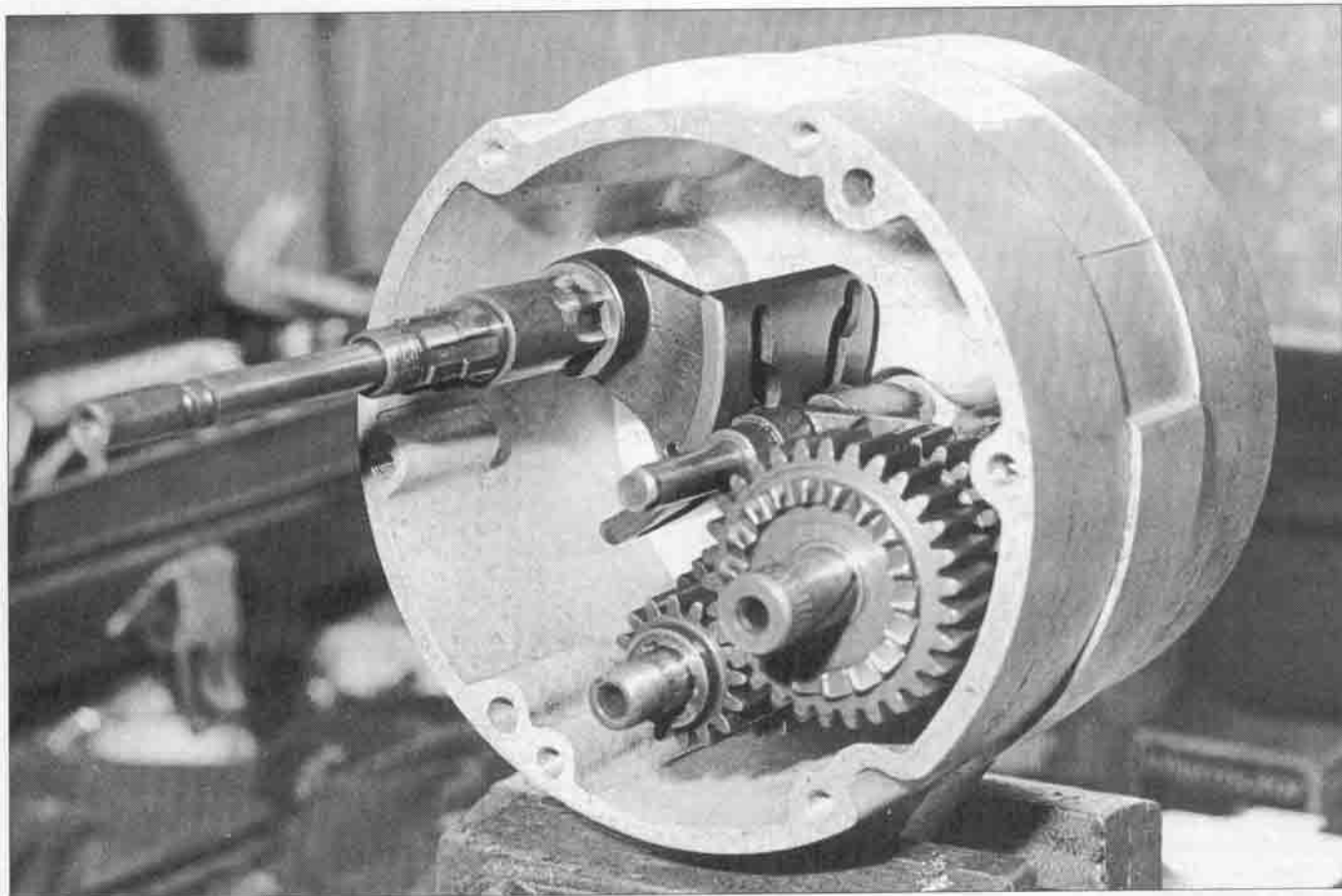


# AJS gearbox rebuild

Virgin restorer Neil Webster looks at the internals of his little AJ's gearbox and immediately calls in expert Bill Redford to undertake the strip and rebuild. Only the engine to do now...the bike will be on the road soon, promises Neil



**J**UST one look at the exploded drawing of my AJS's gearbox was enough to convince me I would need to find help. Not a job I felt confident of tackling. Enter AJS and Matchless Owners Club member Bill Redford, a former mechanic with the depth of experience that I sadly lack.

- Bill agreed to tackle the job from start to finish and soon the ugly story started to un-

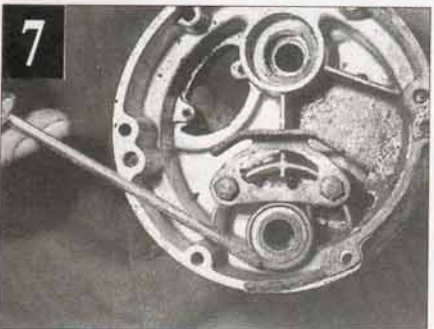
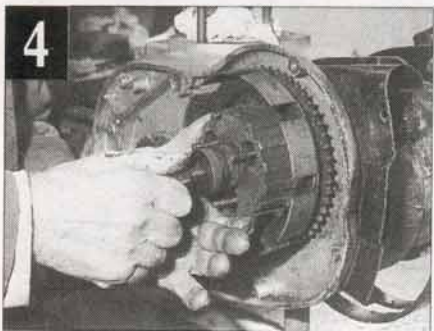
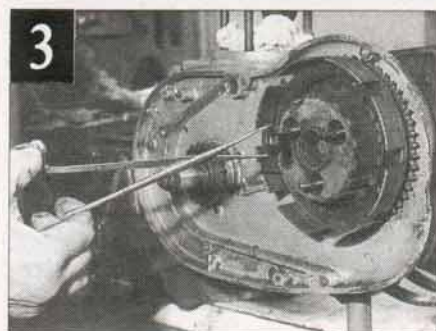
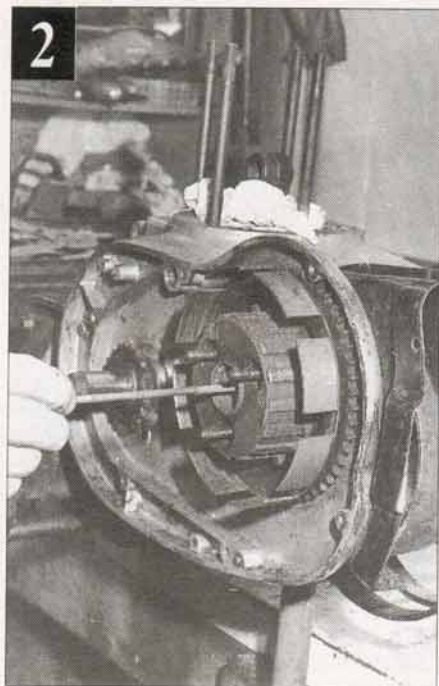
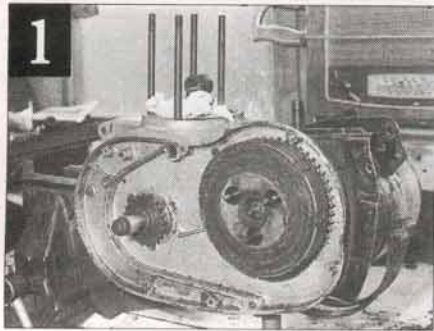
## AJS 250 restoration: part nine

fold. The AJS lightweight gearbox comes as a separate item held to the engine by straps and studs. To remove it, you first remove these retaining items and then the clutch.

- I was unable to even undo the spring re-

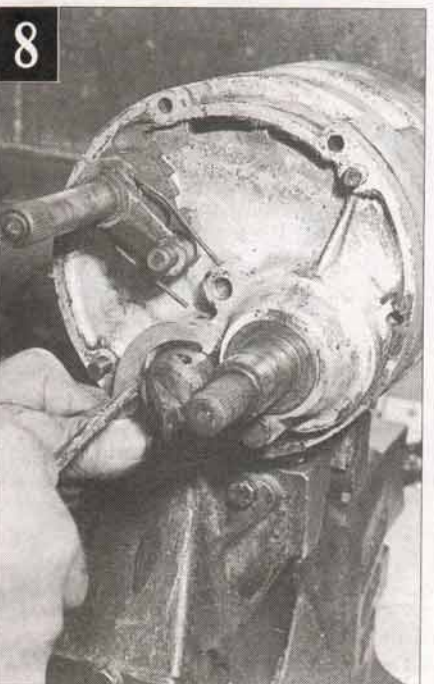
taining nuts to release the clutch pressure plate, but Bill, using the biggest screwdriver I have ever seen (bought for a shilling in 1956), got them out with a sharp tap on a brass drift. He then removed the clutch pushrod adjuster and locknut and pulled off the plate to expose the clutch (pic 1).

- With the clutch plates removed (mine were in a dreadful condition) the clutch pushrod was then taken out (pic 2), the re-



● With the box mounted in a solid vice the sprocket lock tabs were knocked back (pic 5) and the sprocket retaining nut undone. To lock the gears a spare piece of chain was slipped round the sprocket and held in the vice (pic 6) allowing the nut — note it has a left hand thread — to be undone.

clutch operating arm mechanism was undone with a 'C' spanner. Bill used a screwdriver to make up for his spanner being too big but stressed it was not really the right way to do things. Maybe not, but it worked (pic 8). The alternative is to use a hammer and a punch, but that can easily damage the mechanism.

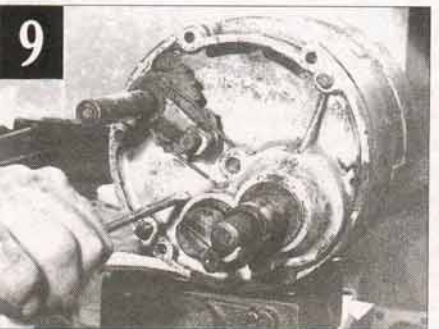


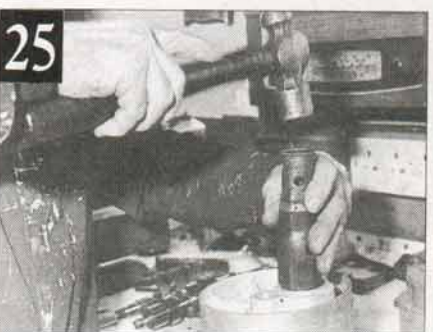
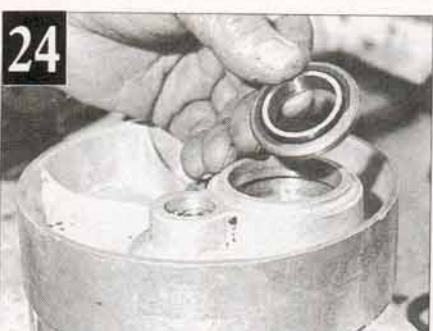
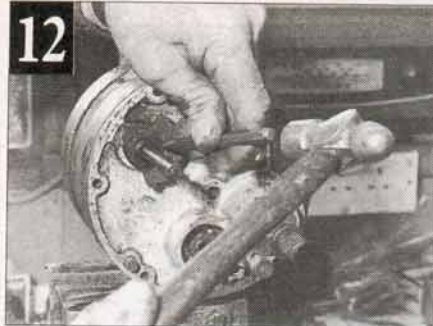
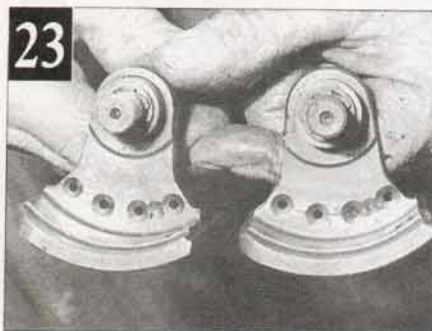
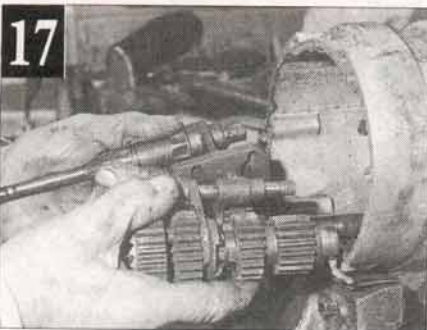
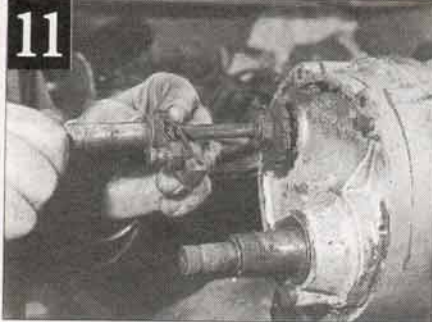
● With the washer and sprocket removed (mine was worn but serviceable) Bill moved to the other side of the box to undo the end cover which pulled off once the screw bolts were taken out.

● An important point is to mark the gear-

● If the bolts won't loosen, Bill's tip is to drill the heads off, remove the cover and then use mole grips on the remaining bolt shafts.

● With the cover off a sorry story started to unfold. Damp and water had been inside leaving a rusty mess and the gearchange spring was broken (pic 7). And that was just the first bad news. With the cover off, the





box case in line with the mechanism before removing it to ensure it goes back in the same place (pic 9). The mechanism then pulls out (pic 10).

● The gear selector mechanism is then pulled off (pic 11) and the gearchange quadrant position marked (pic 12) before it too is removed.

● The crankshaft retaining nut is undone using a large socket (pic 13) and locking the gearbox by putting a mole grip on the shaft against the vice. Not the textbook way, but it worked in Bill's experienced hands.

● Using a rubber hammer the internal cover then came away (pic 14) to reveal more horrors. The kickstart quadrant and bearing housing were both badly damaged (pic 15), probably when the bearing broke.

● That means a new cover will be needed. With the gear selector locating rod in the centre of the gearbox undone (pic 16) the gear cluster then came away (pic 17) and was laid on the bench for examination (pic 18). Left to right: gear selector shaft, mainshaft, selector forks, lay shaft.

● The output shaft is then tapped out with a rubber hammer (pic 19) leaving the roller bearing in the case (pic 20).

● Examination showed the gear cluster to have a whole range of problems, in addition to rust. The bearing track on the output shaft was worn and although the shoulders were okay and not rounded (pic 21) it needed replacing. Rounded shoulders would cause the gears to jump in use.

● The gear selector shaft was serviceable but had lost a peg on the end that should carry the gear indicator (pic 22). This can be ignored if total originality is not a priority. There was a marked wear line on the line of the locating holes caused by the locating plunger running without sufficient oil in the box (pic 23). The one on the left is an undamaged example. Again, replacement is necessary.

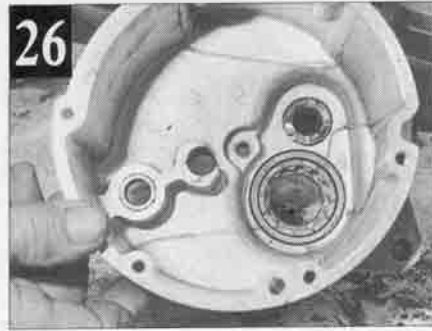
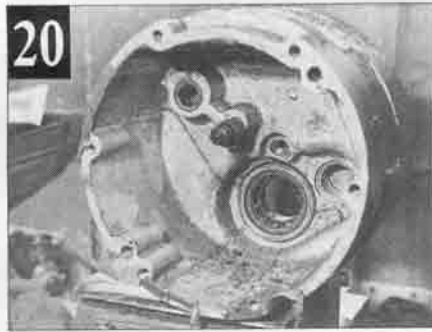
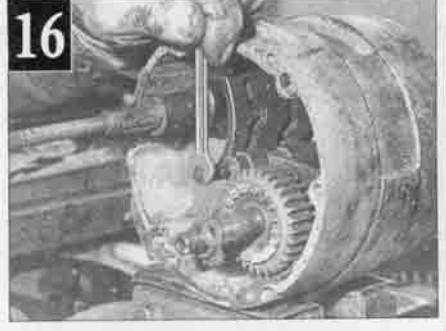
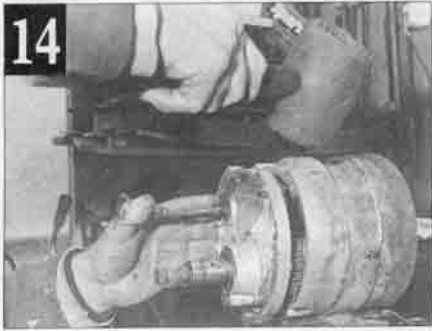
● The mainshaft and gear cluster were dirty and suffered from surface rust but could have been used again after a good clean, along with the selector forks. Other problems were: a bronze bush that will need replacing after coming out with the layshaft; wear on the kickstart face of first gear; and damage to the roller bearing race. A new output shaft oil seal will also need fitting as a matter of course.

*ALL-in-all a right mess. We decided on a drastic solution. Ernie Merryweather's stock of Owners Club secondhand bits provided a complete gearbox in much better condition than mine. It was bought for £15 and we decided to rebuild it instead. All that was needed in addition to what we had was a set of gaskets, an oil seal, a pair of gearchange springs (of which more later) a kickstart spring and a set of second hand clutch plates. Total cost £17.33.*

**B**ACK in Bill's workshop for the rebuild all parts were cleaned in paraffin and the gearbox shell warmed up to ensure the output shaft bearing dropped in easily. The seal and its sleeve (pic 24) were first tapped into place (pic 25) and the bearing, which had been cooled in the freezer, dropped in from the inside (pic 26) and was tapped home. When driving bearings home it is important to make sure the case is solidly supported, otherwise the force could cause it to crack.

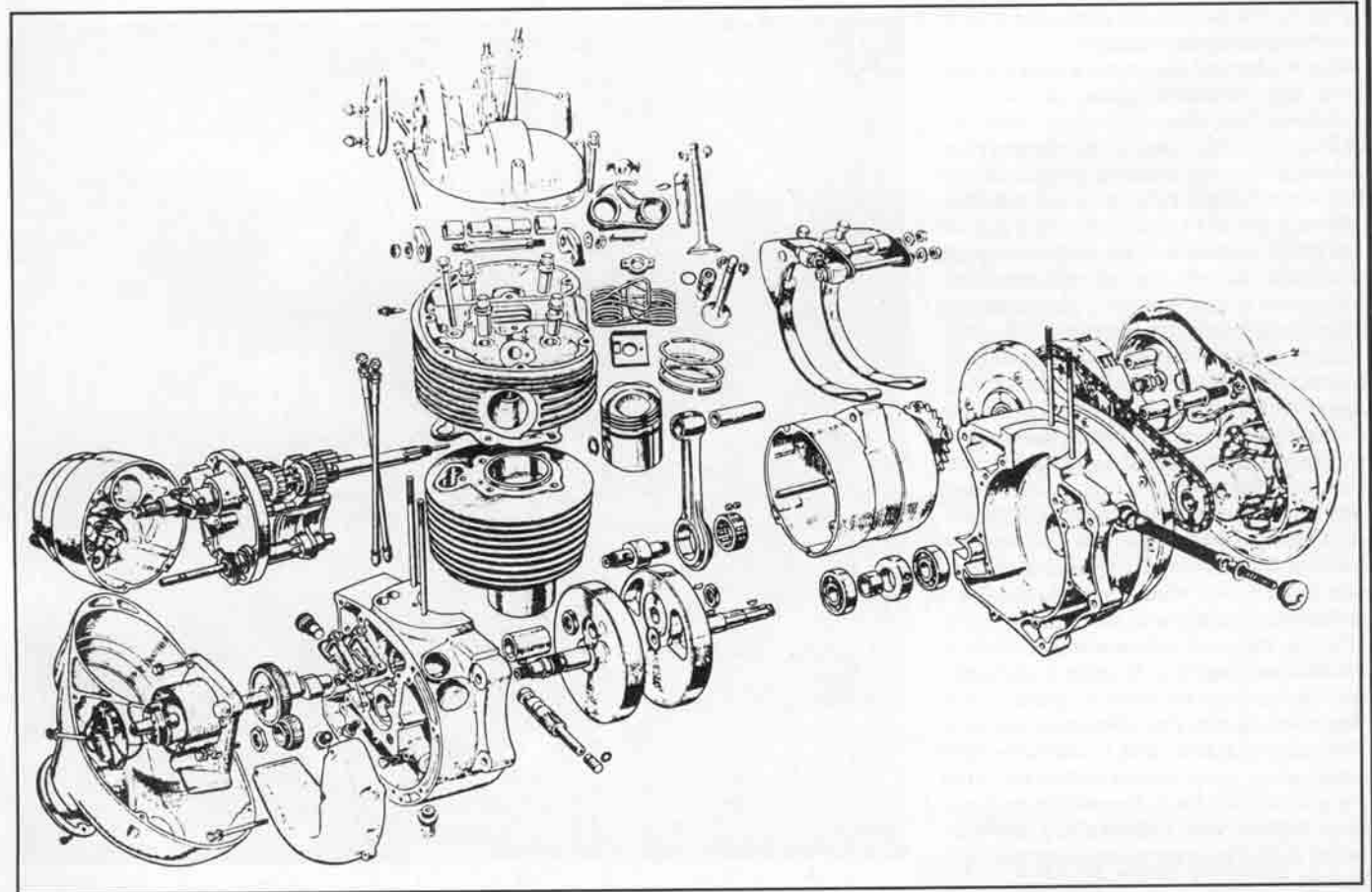
● With the shell then mounted in the vice the bearing surface of top gear was oiled (pic 27) and the gear fitted into the bearing (pic 28). The cluster was then re-assembled (pic 29), put back into the case as a unit and the selector fork spindle screwed in and tightened with a spanner (pic 30). The result should be as in pic 31.

● The gearbox sprocket was then refit-



ted (pic 32) — remember the retaining nut is left hand thread — to hold things in place during the rest of the rebuild.

- The kickstart gear is then put into the cover and the spring prised into position (pic 33), making sure the spring isn't too tight, which could cause it to snap when used.
- The first gasket is then put in place (pic 34) after a good smearing with Silver Hermetite — which doesn't show up as much as red or blue versions. Another tip from Bill is to soak the gasket in water if it seems tight. Tightness is usually caused

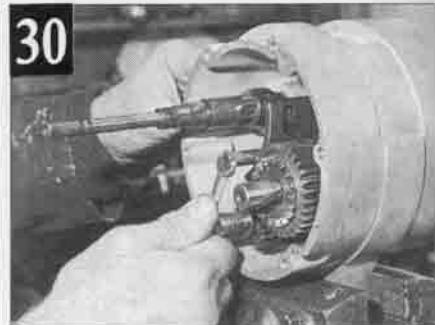




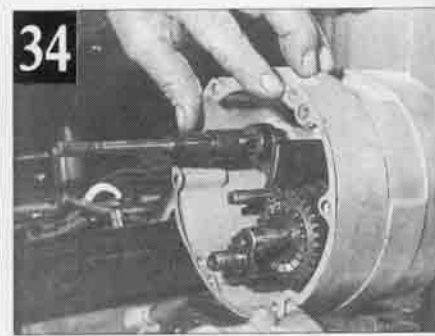
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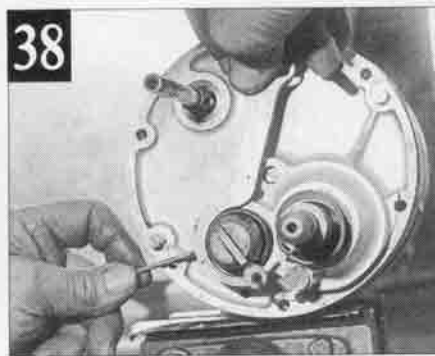
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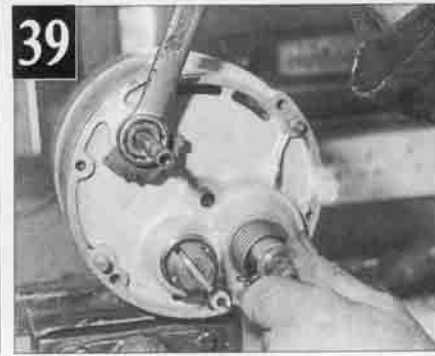
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by the gasket being dry and stretching it to fit will cause it to break.

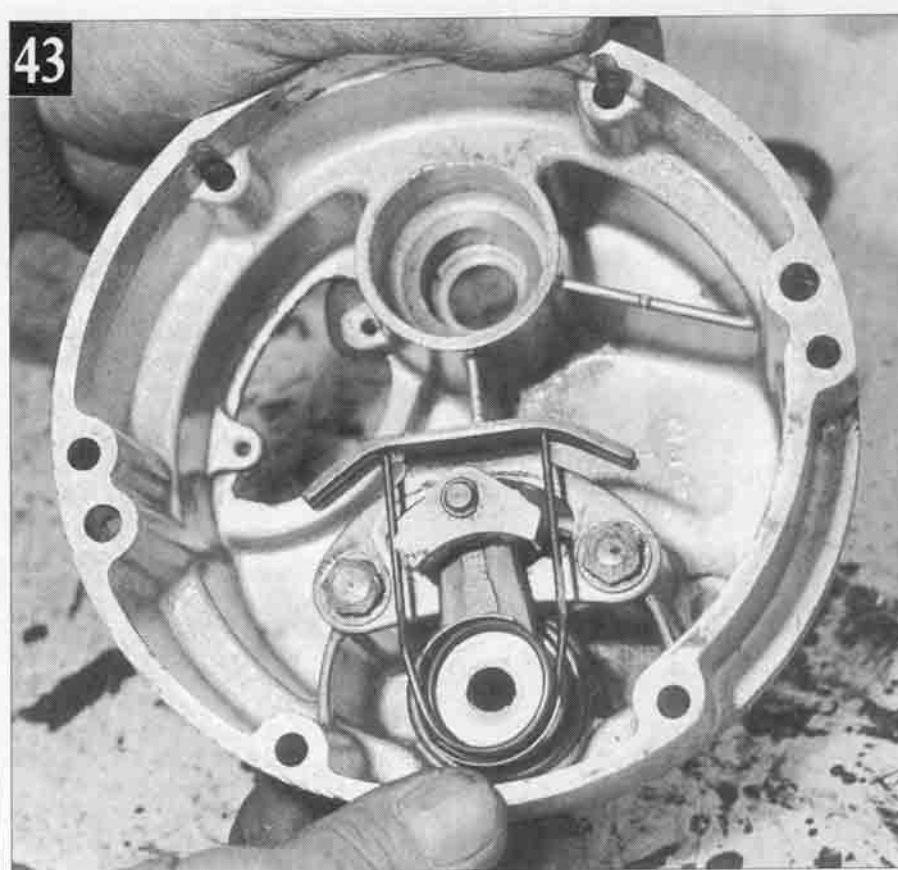
- The bushes and bearings are oiled and the cover slipped back into place and gently tapped home (pic 35).

- To replace the mainshaft nut the shaft has to be held in place. Bill used his vice for this but stressed that it must have soft jaws (pic 36).

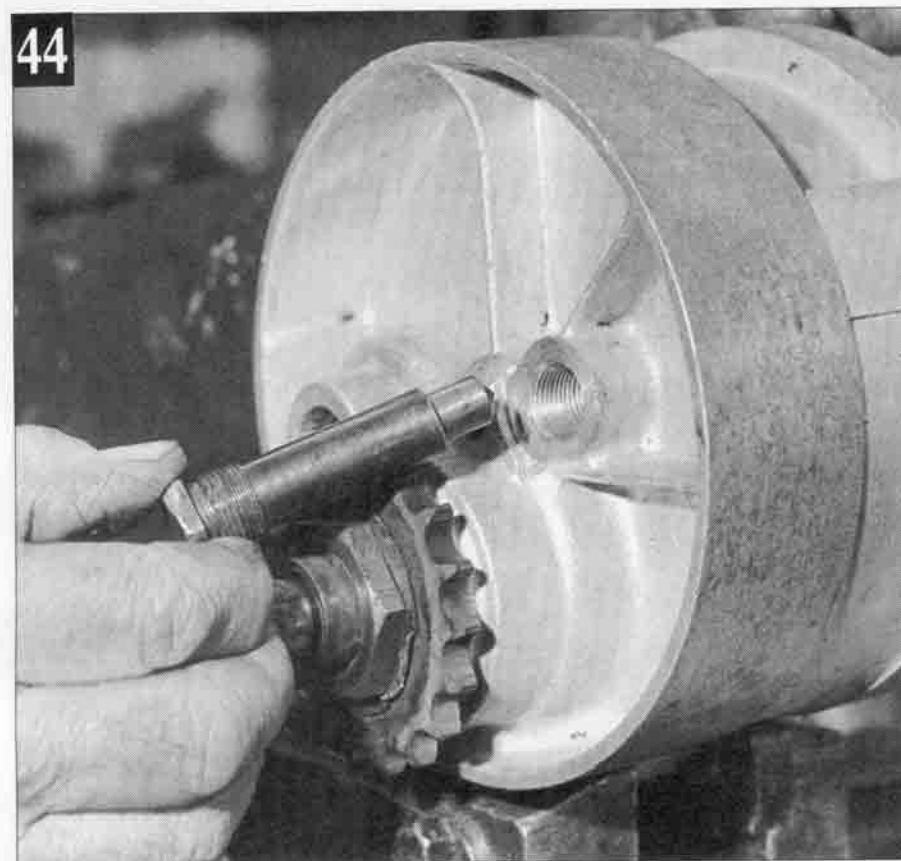
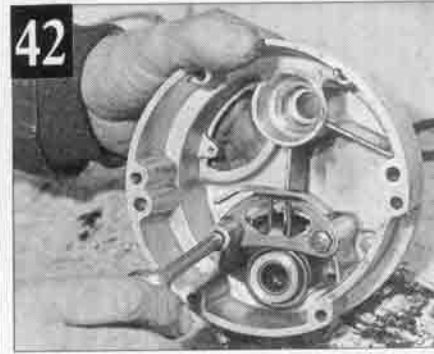
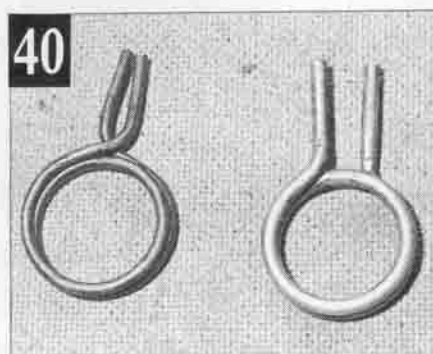
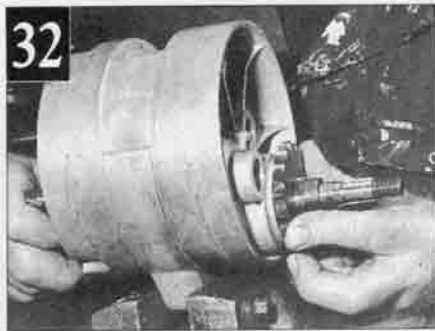
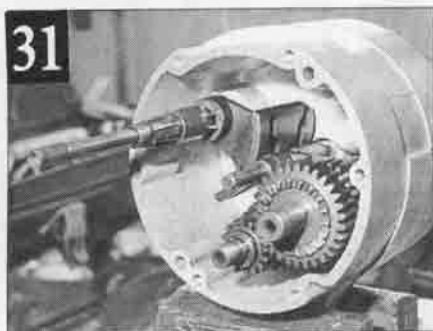
- After tightening the nut, check the mainshaft still rotates. The clutch operating mechanism is then fitted over the nut retaining the mainshaft, using a pointer through the hole in the housing shell to locate it in line with the cut-out in the mechanism itself (pic 37). You should also have a mark left during stripping to ensure things are correct, although as we used a new mechanism this wasn't relevant.

- With the mechanism located, a 'C' spanner tightens things up (pic 38). This is fiddly and can take time. Again, a punch and hammer can be used *with care* to do the job.

- The gear selector ratchet was replaced after checking its position against the selector fork housing, even though the item being refitted could be lined up against punch marks left during the stripdown (pic 39). The selector mechanism fits into the end cover, using a new spring if possible. This was not possible for us because the replacement pattern item proved to be very different from the original and impossible to fit (pic 40).



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● As the original wasn't in bad condition Bill decided it would be alright to risk it and slotted the unit into place (pics 41, 42 and 43). With the gasket fitted and shafts oiled the outer cover then slipped into place; movement on the gearchange and kickstart mechanisms checked; and the cover screws refitted.

● Finally the gearchange selector locating plunger was screwed home after checking that it was clean and had a smooth action (pic 44).

**B**ILL made the whole job look easy but I have to admit that watching him made glad I hadn't tried it myself. Maybe I'm a coward but there were times when there was no substitute for Bill's experience in overcoming problems.

Bill has also agreed to help me with the bottom end strip and rebuild and after looking at my unit he fears it may hold just as many problems as the gearbox did.

In the meantime the painting has been coming on and with the forks properly in place I have been getting the wheels ready for refitting. Things are moving rapidly at last...there seems to be light at the end of the tunnel. Just a faint glimmer, but at least I can see it.

● Pictures by  
**Doug Millhouse**