Lagondaforum: G9 gearbox

G9 gearbox

Written by bill at Jun 08, 2011 7:17 pm

I wonder if anyone has any information on rebuilding the G9 gearbox please ? I am a little mystified as to how the double helical gears find their correct position in relation to each other between the layshaft and the mainshaft. 2nd and third on the layshaft have a fixed position and cannot move sideways. But 2nd and 3rd on the mainshaft have a certain amount of sideways movement. Are 2nd and 3rd intended to have a certain amount of sideways movement so that they effectively line up correctly when "driving" ? On my gearbox (already dismantled and I am now rebuilding) there appears to be approx 1mm gap between 1st and 2nd and also between 2nd and 3rd on the mainshaft. Is this ok ? However what happens when a certain amount of side load is applied when changing into 2nd and also (in the opposite direction) when changing into 3rd. The bush inside 3rd gear has a large "shoulder" on the side between 2nd and 3rd. Presumably this is to take a certain amount of side load ? What sort of gap should be left between 2nd gear and the shoulder of the bush in 3rd Gear ?

4th gear is different as it is fixed on the mainshaft (input shaft) but not on the layshaft. There is considerable "float" on the layshaft (about 5mm on the layshaft itself !). There appears to be no provision to space out this gap. Is this really correct and that therefore 4th gear on the input shaft finds its own (correct) position when driven ?

One further point please. Is it correct that the bush between the input shaft and the output shaft is designed to move in relation to both shafts ? i.e. it is NOT fixed inside the 4th gear shaft. I realise how vital this bush is. If it is worn it can allow the output shaft (supported only by one bearing at the back) to "droop" and this often causes broken teeth. If it must be able to revolve in relation to both inoput and output shafts why is this ?

Sorry to post such a long question but any technical information gratefully received.

Many thanks in anticipation if anyone out there is kind enough to take the trouble to reply.

Re: G9 gearbox

Written by Julian at Jun 11, 2011 9:18 am

Morning Bill,

Good questions, but ones I can answer if I understand your questions correctly.

1st and 3rd Q. The gears on the Lay shaft are all Fixed permanently in place, Other than the "Drop gear" which you call 4th. You need to space and adjust these correctly on each individual box you build or trouble may arise! The mating Herring bone gear should engage tightly with it's corresponding gear on the Main shaft and this Main shaft gear should float and then be located by the Lay shaft gear. The Drop gear on the input shaft will do the same to the corresponding "floating" gear on the input of the Lay shaft. NO movement is allowed here other than small gear clearance. Your bearings for those gears on the Main shaft should also be absolutely perfect and not sloppy or gear damage will occur! Obviously the position of the gears on the Lay shaft relates to the gears on the Main shaft and a little trial and error will be needed here to get all perfect. We "bench build" a couple of times just to make absolutely perfect. The synchro hub needs to be centred fairly well with Third and Fourth and the selectors checked for positioning.

2nd Q. An even gap is required between 1st and 2nd and preferably between 3rd and 4th, whatever this is depends on the individual box being built. ALL are a little different! However 1mm seems very tight ! Side load is what breaks the Herringbone teeth more than anything else! Try to avoid forcing 3rd and 4th like the plague! as you can imagine, because the gears are only located by their "mesh" with the Lay shaft gear, any side load is taken directly on the teeth! Being weak anyway, this is not good!

4th Q. The sleeve bearing between the input and output shafts is Double floating for the following reason.

Sometimes bearings / shaft assemblies like this have a tendency at certain speeds to "Gyrate" while turning and thus cause damage. By making the bearing float both internally and externally this motion is dampened and therefore nullified! (Look at modern Turbocharger bearings for example)

Hope I understood your questions Bill, but please don't hesitate to post again or phone if you need any other info etc. Pleased to help if we can.

Best regards,

Julian

Re: G9 gearbox

Written by bill at Jun 13, 2011 10:00 pm

Dear Julian,

Sorry I have only just picked up your reply to my queries.
Firstly, very, very many thanks for taking the time and trouble to reply as I am sure you are very busy.
Thanks to your information I think that I understand the principles a little better !
Could I please ask you to clarify things a little more for me. I am sorry if I do not have the correct terminology. I will number my queries hopefully to make replying easier.
1. I am still a little unsure about the gaps between 1st and 2nd and 2nd and 3rd gears on the mainshaft itself. Should I try to adjust these at all ? If so should this be done by pressing the bushes slightly in or out of the centres of the gears ? Or is there a better way of doing it ? Alternatively should they be shimmed in some way ?
2. I am of course renewing all the ball and roller bearings and also the 3 brass/bronze bushes as I realise the condition of these is vital. Having fixed the layshaft and its gears in their final position inside the gearbox casing my intention then is to put 2nd and 3rd gear in on the mainshaft individually so that I can measure where each gear wants to be located when meshed firmly with its pair on the layshaft. I could then tell (I hope) whether the 1 mm clearance I have previously referred to is actually too much or too little and also in the correct place (i.e. not too far one side or the other). Does this make sense ?
3. The bush inside 3rd gear has a large shoulder on the side between 3rd and 2nd gear - presumably this is to absorb a certain amount of side load ? How should I decide what is its correct position ? If it is pushed too far sideways out of 3rd gear (towards 2nd gear) it could presumably harm the meshing of either gear with the individual drop gears on the layshaft. If it is pushed too far inside 3rd gear (giving a larger gap between 2nd and 3rd on the mainshaft) then the same consequence could happen. Is it intended to take side load or not and should I adjust it in this way ?
4. 4th gear (or rather its drop gear on the layshaft) does not seem to be as critical as 2nd and 3rd because there is 5mm "float" on the layshaft. Presumably with this gear the side load on the gear on the mainshaft/input shaft is less critical as the gear is fixed and it cannot really be pushed sideways. Am I correct on this ?
5. There was some evidence on my gearbox of overheating on the 3rd gear bush and I have therefore taken some trouble to push the gear itself off its keyways and clean out all the oilways. These seemed quite clogged. Were these gearboxes originally set up on Castrol R ? I have also done the same with 4th gear which seemed to have the same problem. Not an easy job !

Many, many thanks again for all your help. I hope I have explained everything clearly so that you can understand the problems I am referring to.

Re: G9 gearbox

Written by eddie bourke at Jun 14, 2011 12:04 am

Dear Bill,

As you are getting advice on your G9 I will only add that now you know why many cars were replaced with Alvis etc boxes.
I could suggest that if you need new gears get them cut single helical or straight.
Regards
Eddie.

Re: G9 gearbox

Written by bruffsup at Jun 14, 2011 12:42 pm

Here is the T9 gearbox on my M45. It seems to be in superb shape. I thought about an Alvis box but why change it if it has survived this long? It appears to be a very robust design and I hope I can master double clutching to keep it together!

Attachments:

LAG GEARBOX.jpg (filesize: 74.58 KB)

Re: G9 gearbox

Written by bill at Jun 14, 2011 7:15 pm

Dear Eddie
Thanks for your comment !
I know that the Alvis box is a better alternative but I want to drive a lagonda not a Lagonda/Alvis !

The G9 gearbox is very nice with much better ratios than the T8. I know that the G9 can be a bit delicate but at 75 years old I think it is worthwhile persevering with to get the genuine lagonda flavour. The most unfortunate thing is that there seems to be very little information available for the G9. Therefore Julian's fantastic reply is more than extremely helpful. Anyone else with a G9 who wants to rebuild it himself (or herself) will be delighted with the information from Julian.

Re: G9 gearbox

Written by eddie bourke at Jun 14, 2011 11:27 pm

Dear Bill,

I was not suggesting that you replace your box with an Alvis just letting you know that many were replaced in the 50's & 60's when the cars were of little yalue and the G9's were in need of dental work. A friend who rebuilt a team car over 30 yrs ago had a set of straight cut gears made up locally and they never gave any trouble. Its sister car then had a Bentley mk6 box. My friends team car had an ENV 150 box fitted after going through several G9's back in the 50's and I now have this box for my car. In fact I even swopped a G10 to get the spare ENV 150 back from another special that was sold. The owner later complained that his car was now slower around Silverstone with the Lagonda G10 and a more powerful engine. I think WO had a V12 fitted with a french Cotal box. Anyway best of luck and when you get to know the box you could try clutchless gear changes if you go racing.

Regards,

Eddie.

Re: G9 gearbox

Written by Julian at Jun 16, 2011 3:02 pm

Hi Eddy,

Due to the design of the gears and their locations, it is not possible to "just convert" to straight cut or single helical, if you did there would be nothing locating the input gears or third gear on either the T8 or G9. You would need to re-engineer the complete box! or at the minimum 3rd and inputs along with selectors. Doable without a big problem but nowadays massively more expensive than having a gear or two made as standard! Even herringbone gears! I don't think there is a design fault with the G9 or T8, as Bill says, they have lasted 70 years of use and abuse. Shame to change unless you have a good reason! They work wonderfully well when in tip top condition.

Very best regards,

Julian.

PS.

We do change some boxes reluctantly for customers, and I do understand where you are coming from! It is certainly easier to change a preselector or Alvis box, but personally "I wouldn't swap" especially if you have a powerful engine as the Alvis boxes do tend to be more fragile!

Re: G9 gearbox

Written by eddie bourke at Jun 16, 2011 11:14 pm

Hi Julian,

Yes, I agree, converting & changing gears & ratios etc was never easy. I would not change an original box today when you can get new internals etc from specialists. Just pointing out what one had to do 30 or 40 years ago. I remember converting my Riley 9 special big ends to shells and after some research found that I could use 2 sets of "Fiesta" shells with some work 25 years ago. This is the type of thing you had to do then, today I would just buy a new Crank & Rods. Now with the clubs and the likes of LMB we can all get most parts off the shelf. I seem to remember "Rover or Volvo" pistons could be made fit the Meadows and "Hillman Hunter" shell bearings for the big ends. As my own LG is a special built from a pile of spares I am using the ENV as I am not interested in the value of the car.

Now if LMB were to add the chassis & axles to their parts list!

Regards,

Eddie.

Re: G9 gearbox

Written by Julian at Jun 17, 2011 10:09 am

Morning Eddie,

"If only"

Maybe one day!

For now though we have to rely on the ingenuity of people like yourself who found all this info out for them selves and were kind enough to pass it on to us youngsters!

Parts books and spare, what I call "Toilet time" are invaluable assets to all restorers! (only Men would understand that one though I suspect)

Best regards,

Julian