Morris Minor Rib case gearbox re assembly guide.

This is my guide to re assembling the rib case gearbox, this is my way of putting it back together, which really is working between the original BMC workshop manual and the Haynes manual, with addition of some close up colour photos. There may be other and better ways of doing the job so this is only intended as a guide.

In my opinion it really is not a difficult job to do, as with anything you need to be ordered with your work, and mark and identify parts during disassembly. There are quite a few small parts and with mechanical things that have been running together it is always best to put them back exactly where they came from if they are being reused.

Cleanliness and attention to detail during reassembly are key, don't rush and take your time.

Oil parts on reassembly, engine oil and NOT hypoid gear oil. I put a wipe of grease in the bearings so as to provide some lubrication until the box gets fitted to the car and filled with oil.

Don't force anything on re assembling, nothing requires forcing, if something does not go then remove and find out why.

The bearings in my box had become noisy, especially the input one, hence the reason for the stripdown.

The picture below is the main contents of the box….

The first job is to make sure all the parts are clean, inspect for wear or damage and to source new parts where required. At a minimum it is suggested that the bearings be replaced, you'll need a set of gaskets, a tail seal and probably a layshaft.

This is a list of what you will require for reassembly, its going to vary as it depends on why you stripped the box down. If it's a bearing overhaul you'll need the parts below.

1st motion shaft bearing

3rd Motion shaft bearing

Laygear bearings 2 of

3rd Motion shaft nose bearing

Layshaft (probably)

Set of gaskets—the small lozenge shaped gasket on the back of the remote housing does not seem to come with kits from ESM or Bull Motif

3/8 id fibre washers 2 of - for the interlock plugs underneath (I had to purchase these from a washer supplier), yours may be fit for reuse

Tools wise….

General small workshop tools, small hammer, nylon faced hammer

Some small rods—3mm welding rods ideal

1/4" drive socket set

1/4 drive torque wrench—not essential but I have one so use it

Supply of 20/50 engine oil

Space to work

Main shaft or 3rd Motion shaft reassembly.

This is the bare 3rd motion shaft, anywhere a bearing fits (the land) I always like to polish up, I have the luxury of a lathe in the workshop so it's easy to mount the shaft to spin and polish with some fine paper. Make sure it's clean afterwards—Fig 1.

Fig 1—Main shaft

The bearing supplied now for the shaft comes with a shim that has to be fitted in the correct place. Originally the bearing inner race was longer than the outer race and hence no shim if you removed an original bearing—Fig 2.

Fig 2—Bearing and shim

If I don't have to I don't like knocking bearings on, that's when damage happens to the shaft and the bearing. My method is to wrap it in tin foil and heat it in the oven to about 110deg C or just under gas mark one for about 15 minutes. You have to work quickly but the bearing will just drop straight on, no hammering, use a welding glove or similar to hold it.

Fig 3—Bearing shim fitted

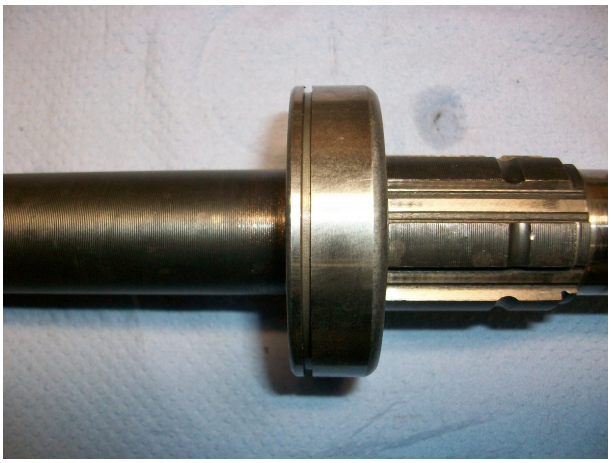


Fig 4—Bearing fitted, note groove position

First job is to fit the shim—Fig 3

And then the hot bearing, making sure the groove in the outer race is to the rear of the box—Fig 4

Fig 5—Distance tube, speedo drive, lock washer and nut

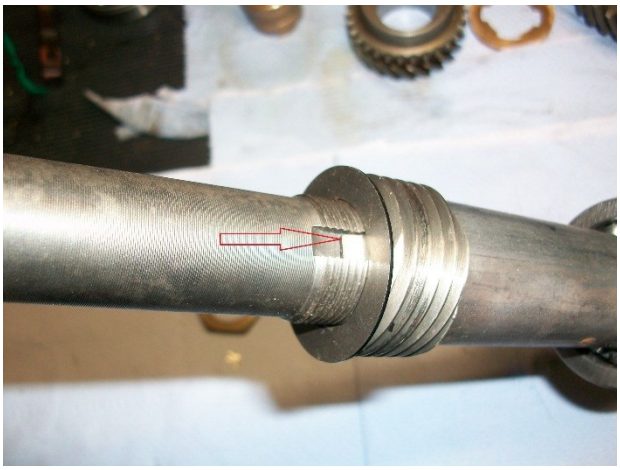


Fig 6—Lock washer tab

The distance tube and speedo wheel can go on. The lock washer tab faces towards the nut—Fig 6

Fig 7—nut fitted

The end of the shaft will look as per the picture - Fig 7.

The next part that needs fitting is the bearing housing and clip.

I decided to do the clip first and then fit the housing.

From the edge of the bearing where the groove is closest to push one end of the clip over the edge and into the groove, the clip will now run round the edge of the bearing and into the groove—Fig 8.

Next on is the housing, fitted from the front of the shaft. I warmed it up with a hot air gun and it will just fall on, make sure its up against the clip—Fig 9.

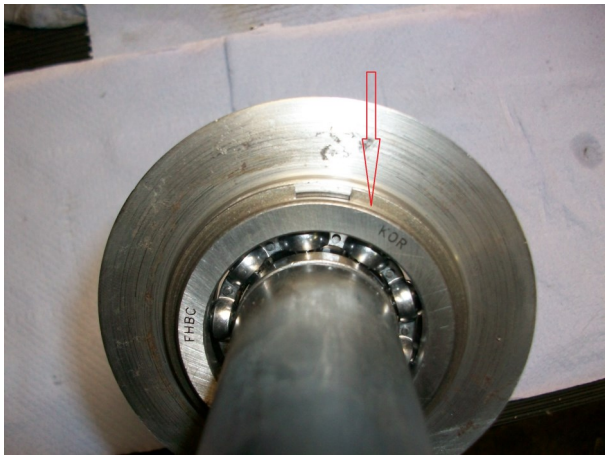


Fig 8—clip fitted

Fig 9—Bearing housing fitted

That's the bearing and housing fitted along with the speedo drive gear.

Now the gears can be put back onto the shaft.

First to be fitted is the 1st gear synchro hub.

Make sure the little slug is fitted as shown opposite in Fig 10.

Be careful fitting it as the outer gear ring will move quite easily, move it too far and the detent balls and springs will fly out never to be found again.

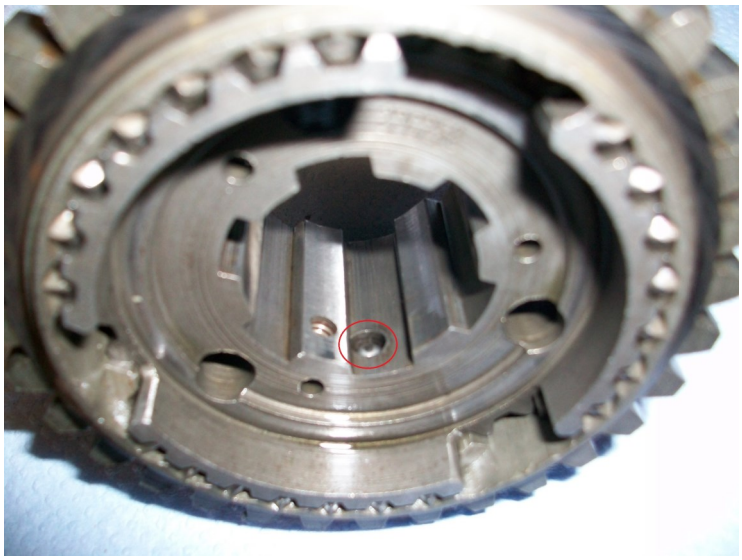


Fig 10—1st/2nd synchro hub slug

Slide the hub on from the front, make sure the recesses in the hub face the front—Fig 11.

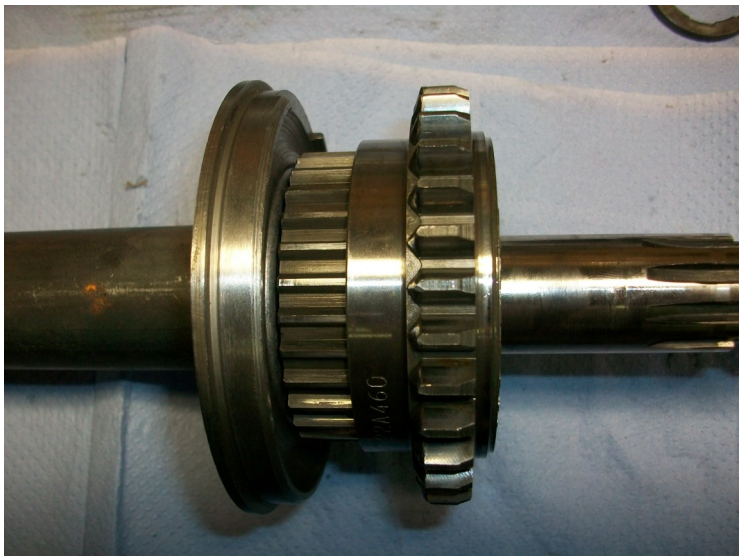


Fig 11—1st/2nd gear hub fitted

Next on is the thrust washer, making sure that its one the way it was removed from the shaft.

You will clearly see the outline of the splines on the washer on the side that faces the hub

Fig 12—Thrust washer fitted.

Fig 12—Thrust washer

The bush for 2nd gear goes on next, this is the plain one on the inside. The one for 3rd gear has internal splines.

Fig 13—2nd gear bush

Fig 13—2nd gear bush

Bush fitted to shaft—Fig 14.

Fig 14—2nd gear bush fitted

The baulk ring or synchro ring for 2nd is next. All of the baulk rings fit this way into their respective hubs, imaging the three nibs as arrows pointing the way in—Fig 15.

Fig 15—Baulk ring orientation

Fitted, they should all like this when fitted to their hubs—Fig 16.

Fig 16—Baulk ring fitted

And then slide 2nd gear on, remember to put some oil around things now.

The dog teeth, the small straight ones face the baulk ring—Fig 17.

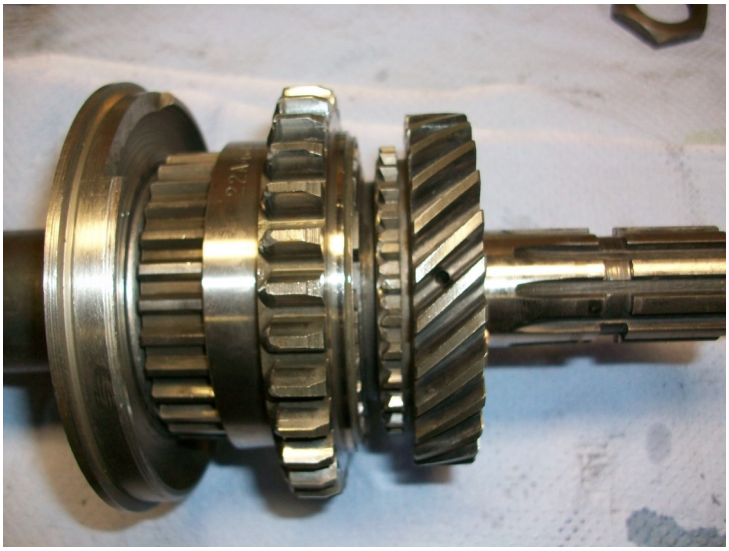


Fig 17—2nd gear fitted

Next on is the coupling washer between 2nd and 3rd gears, again some oil—Fig 18.

Fig 18—Coupling washer

Next on is the bush for 3d gear, this has splines that locate into the shaft, and it also has to locate into the coupling washer. You'll need to turn the washer & 2nd gear bush to achieve this—Fig 19.

Fig 19—3rd gear bush fitted

And then third gear goes on, again some oil required.

The next part of the assembly requires locking all of the these components to the shaft with the splined thrust washer and locking pin.

This is quite fiddly to do, and there are probably many methods to do this.

Fig 20—3rd gear

First put the spring into the hole followed by the pin, smaller end fits into the spring—Fig 21.

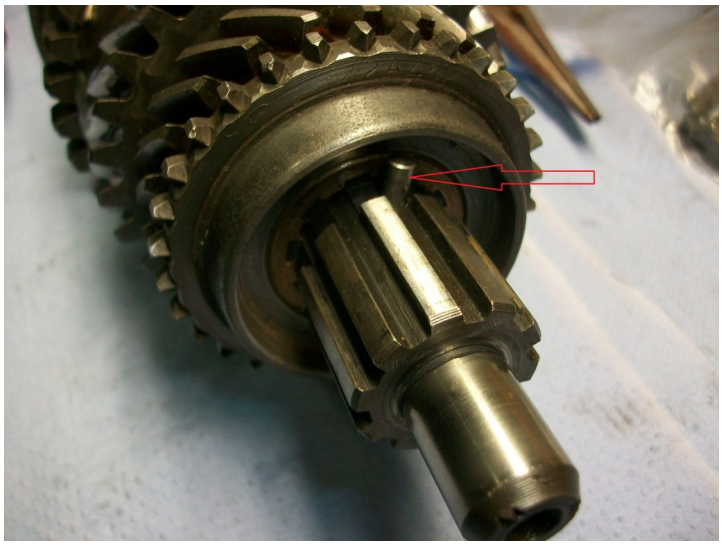


Fig 21—locking pin fitted to shaft

What happens here is the washer needs to go over the pin and then be turned so the pin pops out into the washer and locks it onto the shaft.

The pin has to be right down flush with the shaft for the washer to push on. There is not much room to do this as its in the recess in 3rd gear when the washer is pushed right up.

I used some garden tie to pull the pin in, smartly push the washer over the pin and remove the garden tie. It took several goes to get it—Fig 22.

I think a thick feeler gauge would also work to push the pin in.

Patience required !.

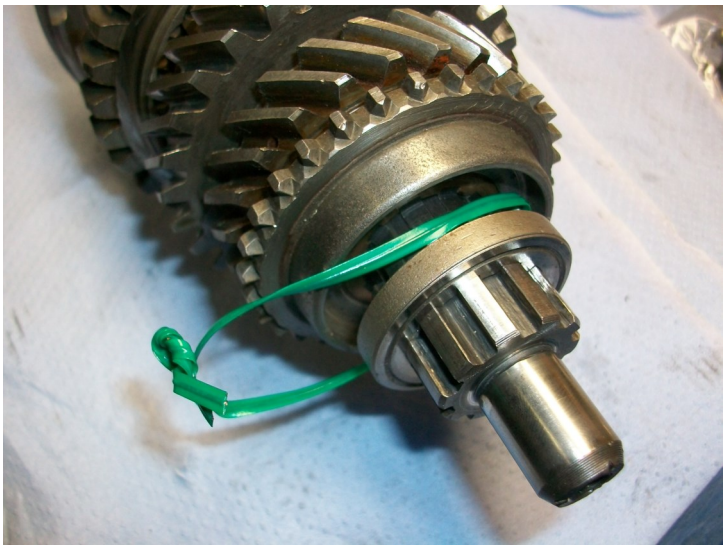


Fig 22—washer being fitted

Turn the washer, you will hear a click and the pin will be visible in one of the recesses in the washer, it is now locked to the shaft with all the other parts fitted so far—Fig 23.

Fig 23—Washer fitted and locked, note pin in splined washer locking it

The 3rd and 4th Synchro hub is still to be fitted and the nose bearing on the shaft, but they can wait.

Put the shaft aside safely.

Laygear endfloat checking

When fitted to the box the laygear has a specified endfloat, no more than 0.003”. The smaller rear thrust washer is available in varying thickness to set this.

If you are using the original laygear then its probably best to check this on dismantling so the correct washer can be obtained if indeed adjustment is required.

I was fitting a new (secondhand) gear so left it until later.

You’ll need to put the bearings in the laygear, if you removed old bearings from the laygear that had a clip at the outer end you don’t need the clips. The newer caged bearings are longer and sit against the thrust washers. Odds on you destroyed the clips to get them out anyway—Fig 1

Fig 1—Laygear bearing fitted

Fit the laygear to the case and measure the endfloat with a feeler gauge as shown below.

Large thrust washer with the large gear at the front of the box, small one at the rear—Fig 2

Measure the end float between the washer and the gear, in this instance it is 0.006” so out of spec.

My washer measures 0.123”, 0.006” float so to make it 0.003” I need a 0.126” washer.

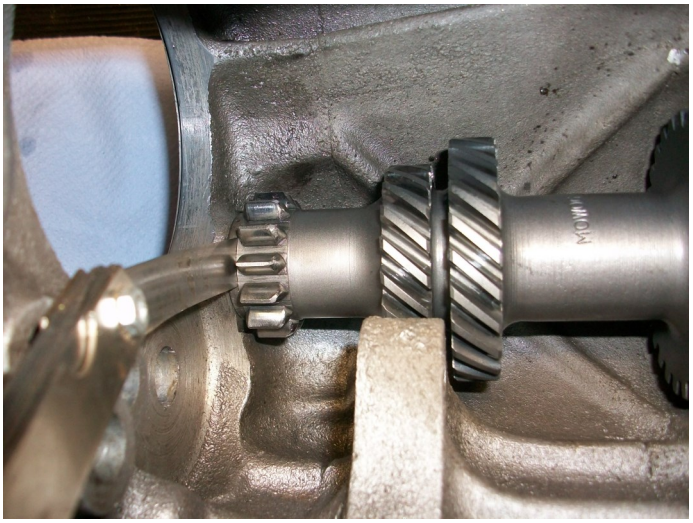


Fig 2—Laygear fitted and measuring end float

I had to gently and carefully stone my new thrust washer down a fraction, don’t go mad at it and make sure its clean of all traces of stone before fitting. It took a little while to do but I now have a tight 0.003” float.

Remove the gear from the case, it has to fitted out of the way on a small rod and the shaft introduced later.

1st Motion or Input shaft reassembly

The 1st motion or input shaft also required its bearing fitted, do this in the same was as the one for the 3rd motion shaft, heat it up and drop it onto the shaft, no hammering.

Note the groove to the splines, don't fit the clip yet as the shaft has to be fitted from the inside of the box, passing the bearing through fig—1.

Fig1—bearing fitted

Fit the lock washer, tab towards the nut fig—2

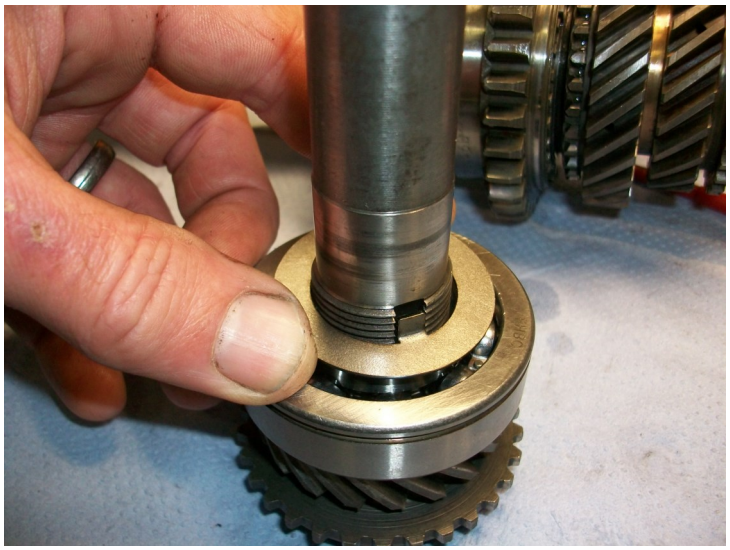


Fig 2—Lock washer fitting

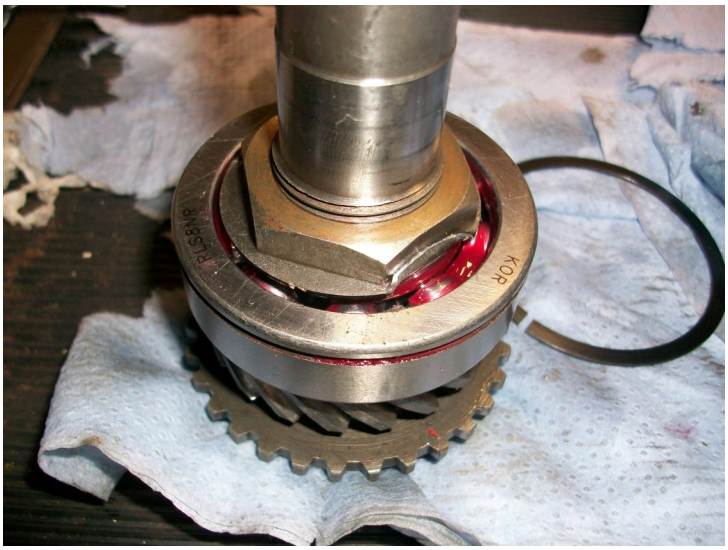


Fig 3—Nut fitted, tightened and washer bent up.

And then fit the nut, and tighten it up. No torque is specified for the nut so sensible nice and tight. Hold the shaft without damaging in a vice, or use an old clutch plate to hold it. Carefully bend the locktab up, I did this in two places opposite each other fig—3

The red is a wipe of grease as said before to lube the bearing until the box is filled with oil.

Put the assembly aside for the time being.

General re assembly of the Box

At this point you have done the preliminary assembly work ready to fit the key components back to the gearbox case.

- 3rd motion shaft assembly less the 3rd/4th hub and nose bearing
- 1st motion shaft assembly
- Fitted the laygear bearings and set the end float

Now replacing the components into the box can begin. Make sure its spotlessly clean inside—Fig 1.

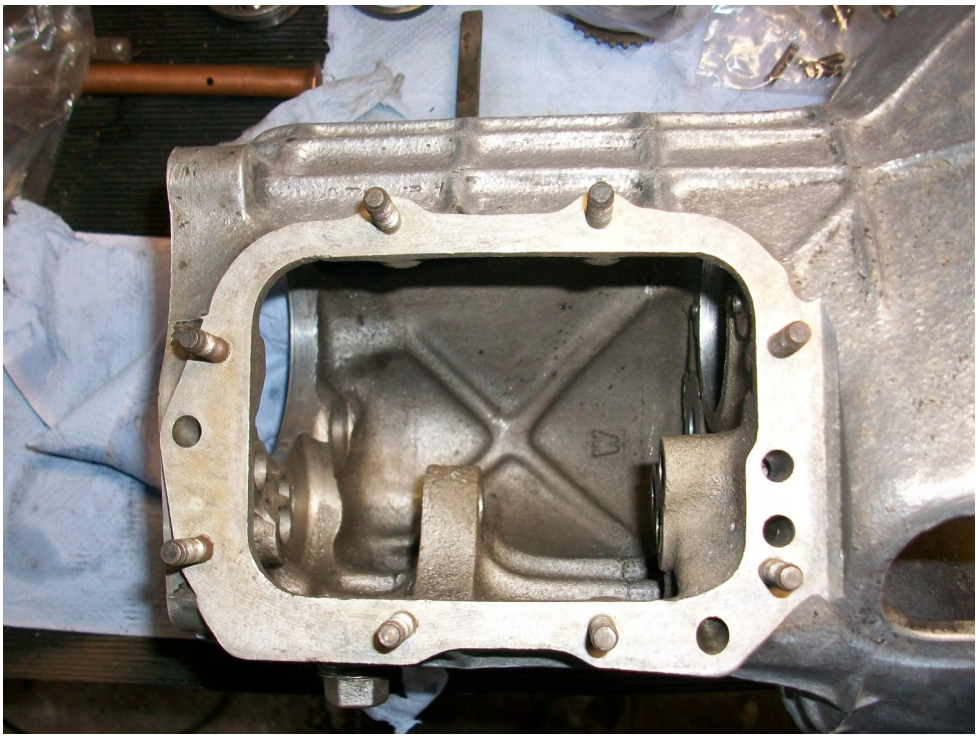


Fig 1—Empty casing

The first components in are the reverse gear idler, the components of which are show to the right—Fig 2.

Fig 2—Reverse gear components

Place the reverse gear shaft into the hole in the casing, the end of the shaft with the hole goes first, and ultimately the hole is towards the bottom of the box—Fig 3.

Fig 3—Reverse gear shaft

Place the reverse idler gear in and feed the shaft through, remember to oil it—Fig 4.

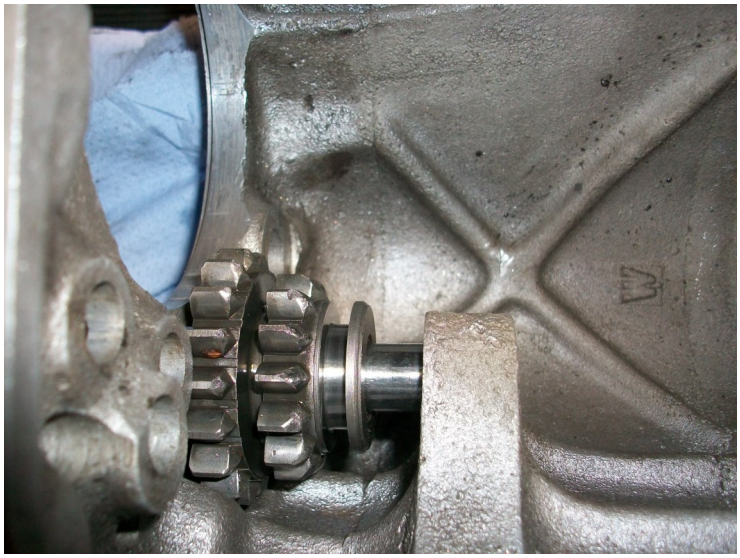


Fig 4—Reverse gear fitted

Line the hole in the shaft up with the hole in the bottom of the case, you can use the screwdriver slot in the end to turn it. Its an easy fit so don't force it in with a wrench, if it goes tight before the head is flush its not lined up—Fig 6.

Fig 5—Reverse gear securing screw

Next in is the laygear, but not using the layshaft, that's fitted later. The gear with bearing fitted and thrust washers need to suspended from a thin rod, the thinner the better as it gives more room to manoeuvre the 3rd motion shaft assembly in.

A 3mm welding rod works or a long thin screwdriver would be perfect—Fig 7.

The following procedures all work best if the side opening of the box is uppermost.

Fig 7—Use of a welding rod to support the laygear

Working from the front of the box feed the rod through the hole and hang the front thrust washer on—Fig 9.

Fig 8—Front thrust washer fitted

Feed the laygear in through the rear hole and onto the rod, and drop it into position—Fig 9.

Fig 9—Laygear being fed into the case

Slot the rear smaller thrust washer in, you will probably have to wiggle the gear around to facilitate this, remember the gear is not true and may bite the washer, it will go. When it does feed the rod right through so the gear and washers are hanging on it—Fig 10.

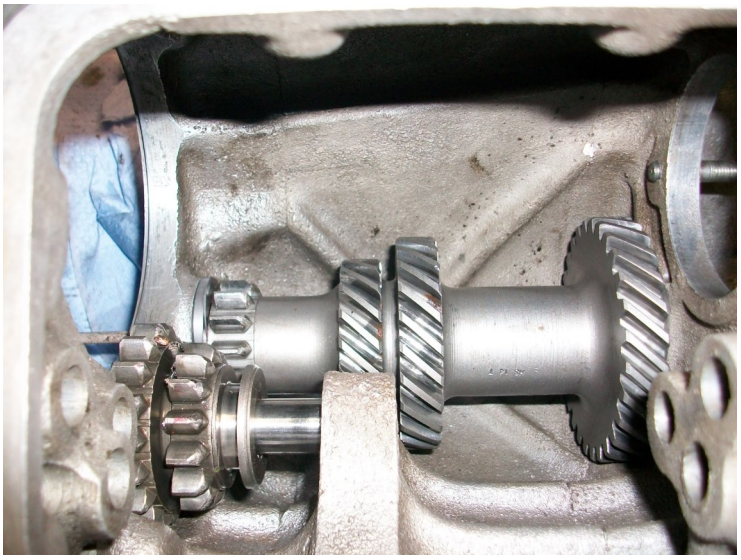


Fig 10—Laygear in case and rear thrust washer fitted

Now the 1st motion shaft as assembled earlier is fitted, from the inside of the box—Fig 11.

Hot and cold is your friend again here—IN THE PICTURE TO THE RIGHT DO NOT BE TEMPTED TO PUT A DRIFT IN THE BACK AND HIT IT !.

You are not hitting the outer of the bearing doing that, you are hitting the shaft, on the inner of the bearing and transmitting that impact through the balls, you will wreck the bearing.

Wrap the shaft up in a plastic bag and pop it in the freezer for half an hour. Five minutes before you take it out, with a hot air gun warm up around the hole in the bell housing evenly, just until you cant quite keep your hand on it is fine. A quick wipe of oil around the hole and working quickly remove the shaft from the freezer and in one quick movement slide it in, you are aiming to get the groove in the outer race through the other side clear. It will go easily and will soon bite as the temperatures equalise.

You can see the bearing through the case with the groove visible—Fig 12.

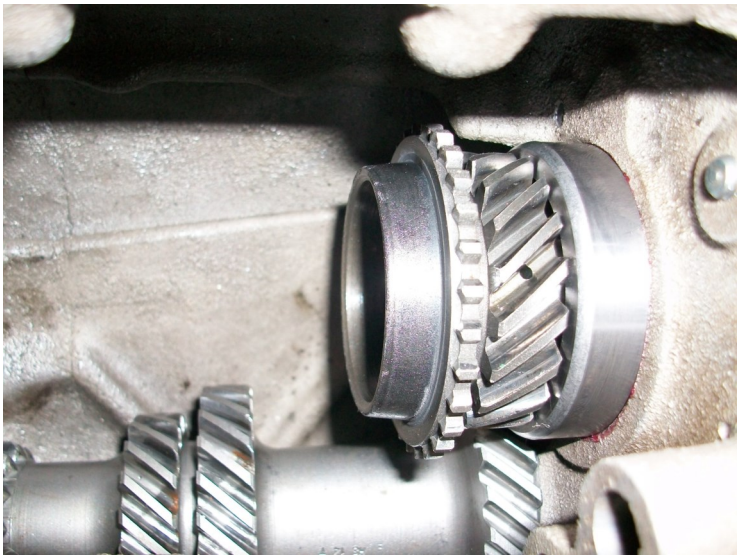


Fig 11—1st motion shaft is fitted from inside the case

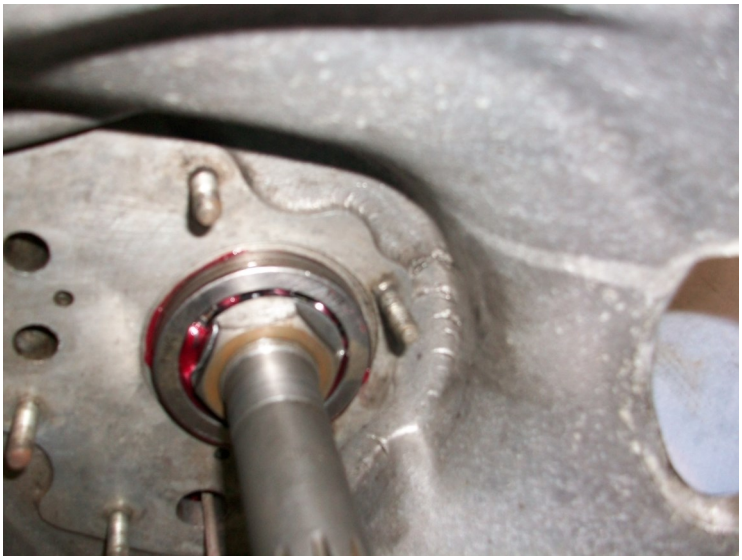


Fig 12—1st motion shaft in with groove visible in bell housing

Stand the box on end for this upright, remember the rod holding the laygear could fall through and the loose lay gear inside.

And fit the clip in the groove, as before push one end over the edge into the groove and run the clip round with a thumb—Fig 13.

Fig 13—Clip fitted to bearing

Drift the bearing back in now, tapping it gently and evenly all the way round with a soft drift a fraction at a time until the clip is flush—Fig 14.

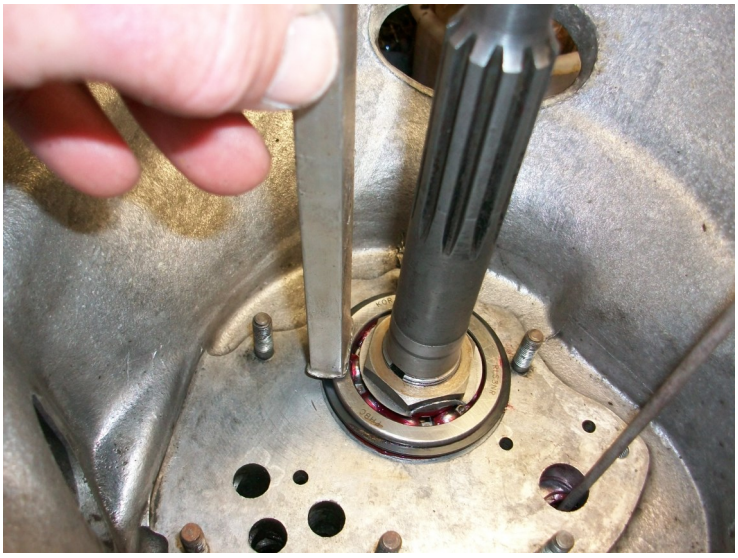


Fig 14—Drifting the bearing to its correct position

The 1st motion shaft is now fitted—Fig 15.

Turn the box back on its side, opening uppermost, remembering the lay gear.

You will need some room at the rear of the box now.

Fig 15—1st Motion shaft fitted

Its now time to finish the assembly of the 3rd motion shaft in preparation for refitting.

Put the baulk ring for 3rd gear into the 3rd side of the 3rd / 4th hub.

The 3rd gear side is this, the plain side—Fig 16.

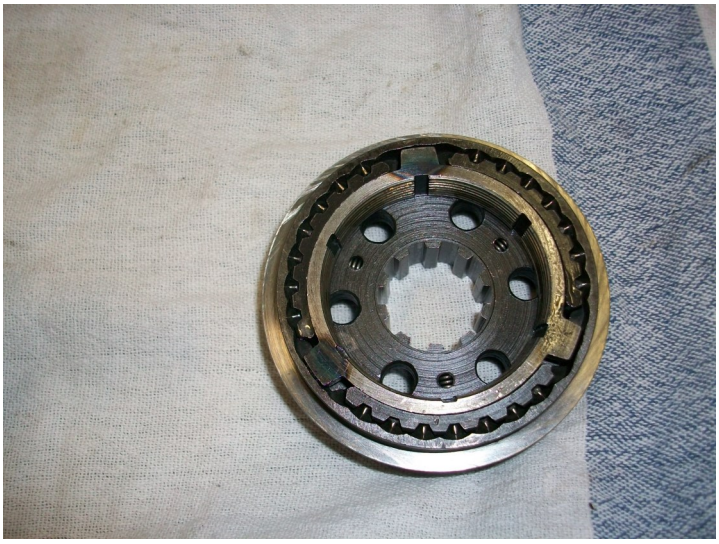


Fig 16—3rd & 4th gear hub, baulk ring fitted, this side is 3rd gear side

Carefully slide it on to the end of the shaft and fit the 4th gear baulk ring

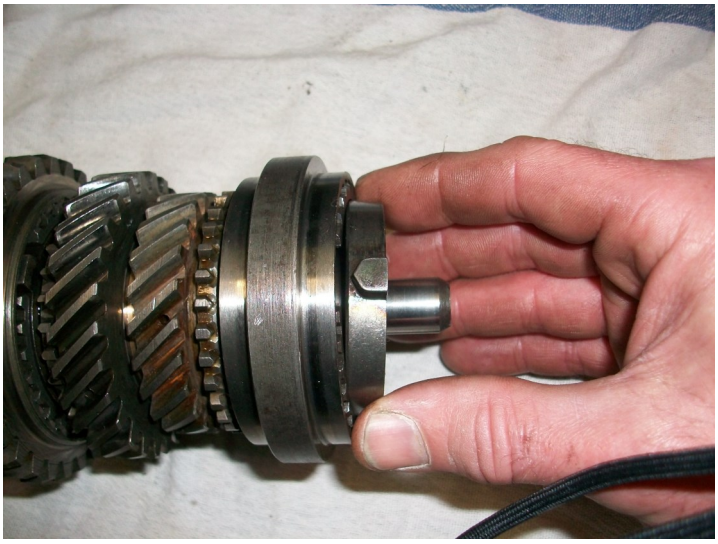


Fig 17—Hub fitted to shaft and baulk ring for 4th gear being fitted

Place the needle roller bearing onto the nose of the shaft, again a wipe of grease is prudent—Fig 18.

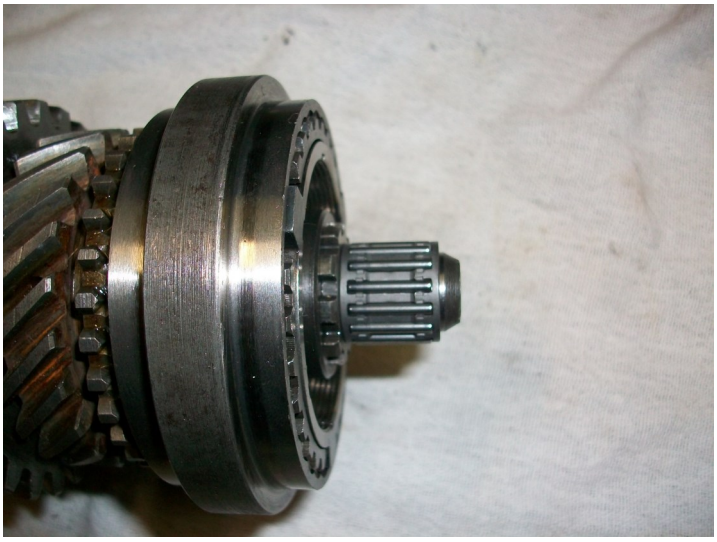


Fig 18—3rd motion shaft nose bearing fitted

Read through the next few steps before proceding, there is quite a lot to do here that if done like this makes it easy.

Note the cut out in the rear of the housing—Fig 19.

Fig 19—3rd motion shaft bearing carrier showing cut out

It is there so the housing clears the reverse gear idler, so must end up here when fitted.

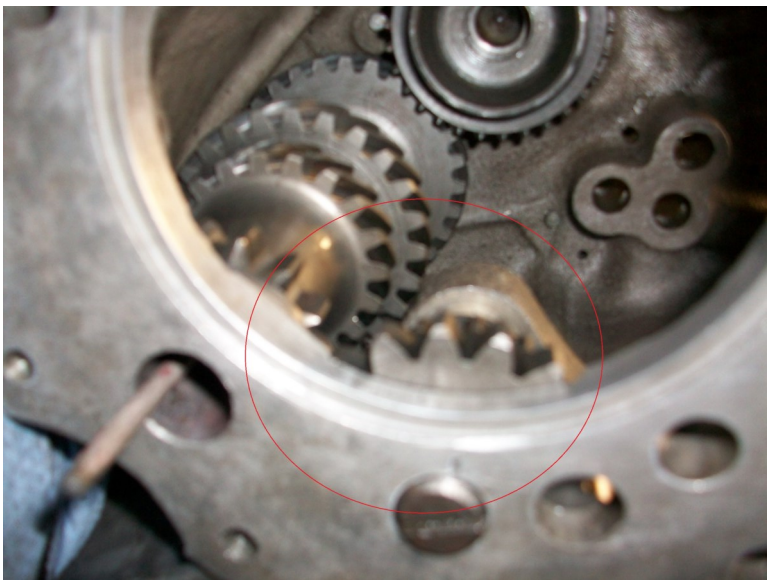


Fig 20—Reverse gear where the cut out must be in the bearing carrier

To ensure this happens there is a location peg in the tail casing and a hole in the bearing housing (inset) - Fig 21.

So the object here is to inset the 3rd motion shaft, and get the housing in the correct position, so the cut out clears reverse gear and the tail casing locates correctly so the holes line up for its screws.

Lots going on here at once.

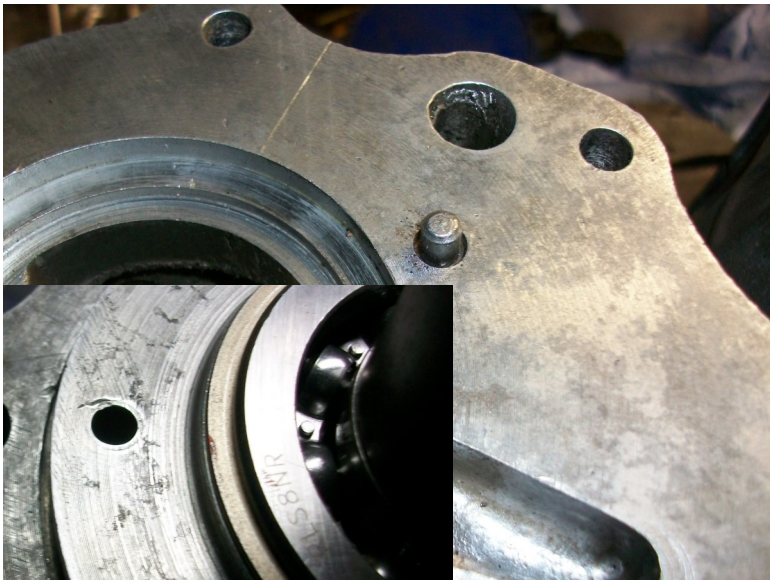


Fig 21—Locating peg in tail casing—inset—hole in bearing housing

With the box on its side carefully insert the 3rd motion shaft, making sure the 3rd / 4th hub, baulk ring and bearing do not fall off un noticed.

As first gear enters tip the shaft up and away from reverse gear and manoeuvre it in—Fig 22.

BE CAREFUL NOT TO CATCH THE FIRST GEAR RING AND PUSH IT BACK OFF OF THE HUB—SYNCRO BALLS AND SPRINGS FLYING EVERYWHERE !.

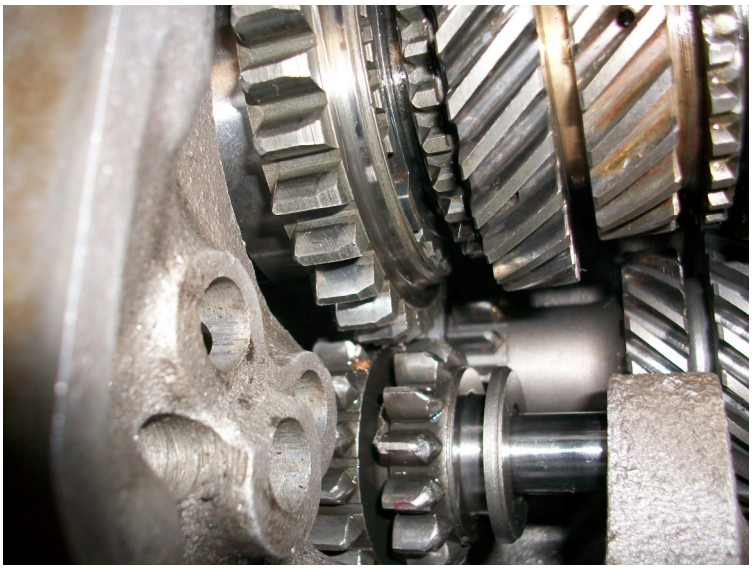


Fig 22—3rd motion shaft being fitted, note it being tilted to clear reverse gear

Feed the shaft in, lower it back to line with the 1st motion shaft and just catch the nose bearing in the hole in the rear of the 1st motion shaft.

DON'T PUSH THE REAR BEARING HOUSING ALL THE WAY HOME IF IT WILL GO

The shaft is fully home in this picture, just for showing where it should be Fig 23.

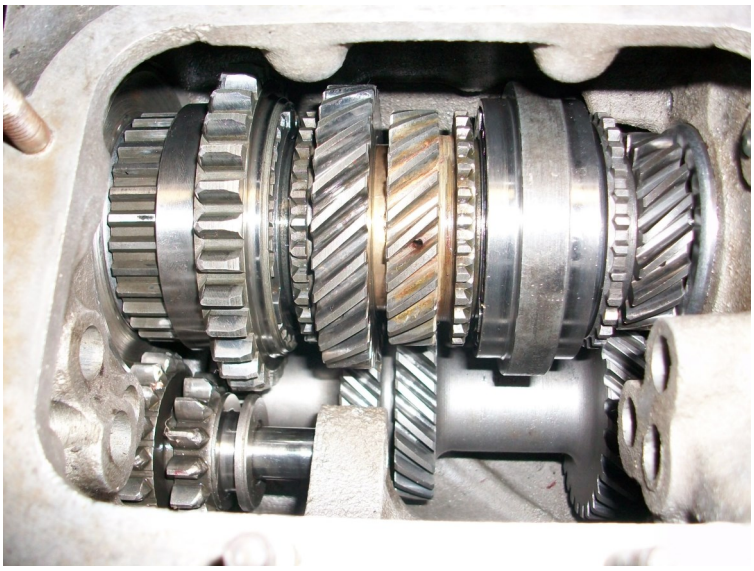


Fig 23—3rd motion shaft fitted

Get a couple of pieces of wood, space them apart and stand the box upright on them, the 1st motion shaft protrudes beyond the bell housing face and needs to be clear of the bench.

Remember the lay gear and its rod at this point which will still fall out as the box is up turned.

The bearing housing is sitting proud—Fig 24.

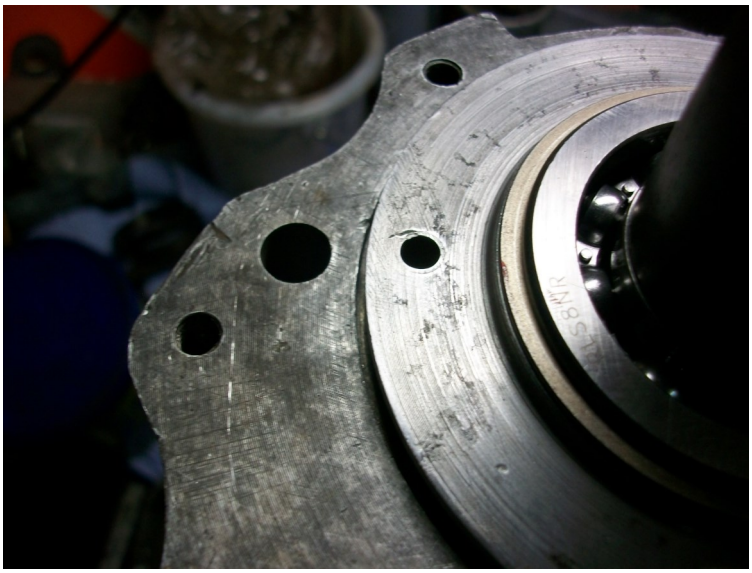


Fig 24—Bearing housing gently fitted

Lower the rear tail casing on so the peg locates in the hole in the housing.

Twist the casing as appropriate to line the holes up where it screws to the main casing—Fig 25.

Check it, lift it away and carefully and evenly tap the bearing housing fully home.

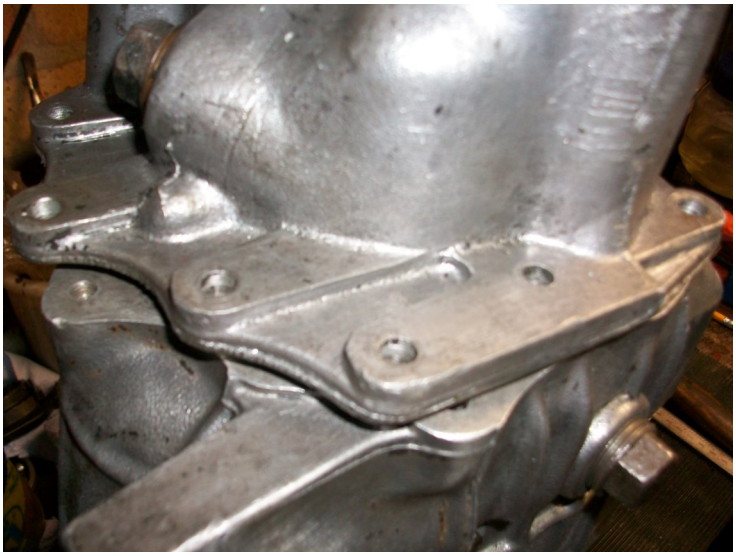


Fig 25—Tail casing lowered on and pin located into bearing housing

The bearing housing should appear like this when correctly fitted—Fig 26.

Make sure the bearing clip is against the housing, some gentle even taps with the drift on the bearing outer will achieve this, DON'T HIT THE END OF THE TAILSHAFT AND DON'T FORCE THE BEARING HOSUING BY HITTING IT HARDER IF IT WONT GO.

Turn the box back on its side, hole uppermost.

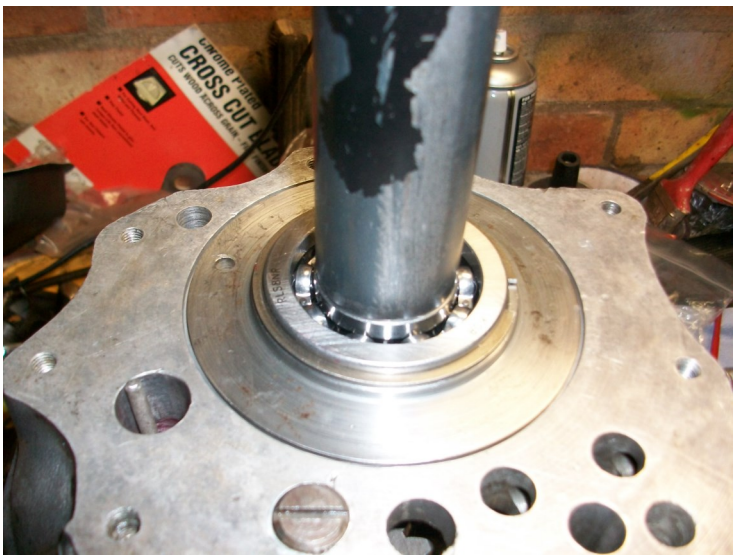


Fig 26—Bearing housing fitted and home

The inside of the box will now look like this.

Now the lay gear has to be brought up into mesh with the gears and the layshaft slid in from one end—Fig 27.

It can be a fiddle, and its up to you which end of the box you fit the shaft from.

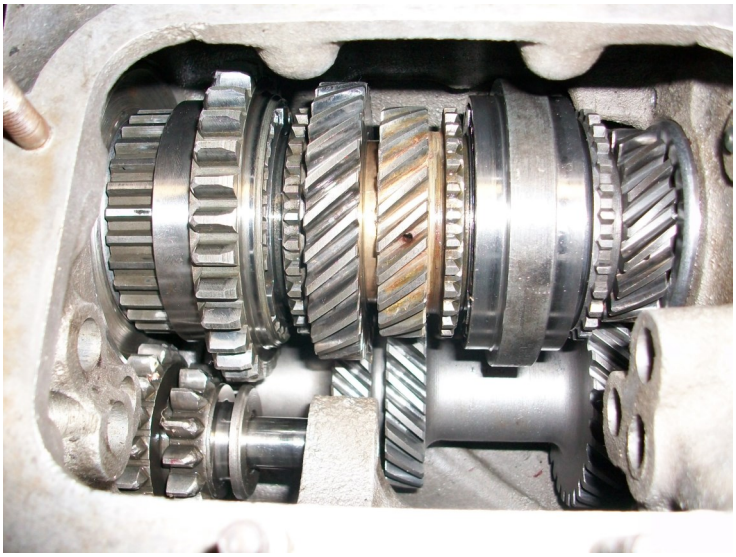


Fig 27—Laygear being brought up into mesh

The end of the shaft that's cut out need to end up in the bell housing.

You need to slide the shaft in and push the rod out that's holding the assembly.

I fed it in from the rear of the box with one hand inside lifting and wiggling the laygear up and into mesh. Remember the thrust washers are at each end and you have to coax these over the shaft.

You may need to lift these up and centralise them using the rod first as best as possible. Don't force it or hit it, it will glide through when everything is in line Fig 28.

Remember some oil on it.

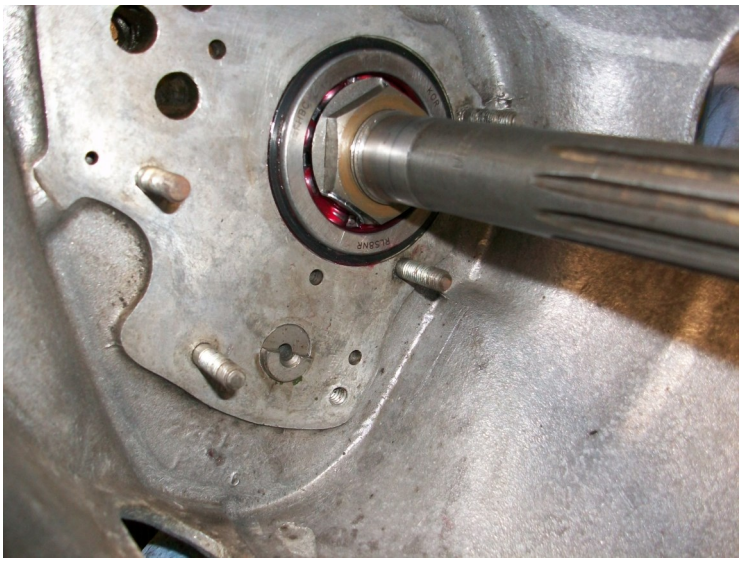


Fig 28—Layshaft located correctly (there is a stud missing from the front in this picture just to the right of the layshaft)

You now have all the shaft and gears fitted back to the box. As you have fitted them all of the gear are in the neutral position.

Using the oil can oil the gears, down into the synchro rings and any other moving parts you can see.

The 1st and 3rd motion shaft should rotate smoothly and independently of each other.

I would suggest that now is a good time to test the gears can be selected, the hubs are quite tight but should be able to be engaged in the gears, one at a time as in the drawing below. Be careful not to push 1st gear too far—balls and springs flying. Turn the 1st motion shaft and observe the 3rd motion shaft.

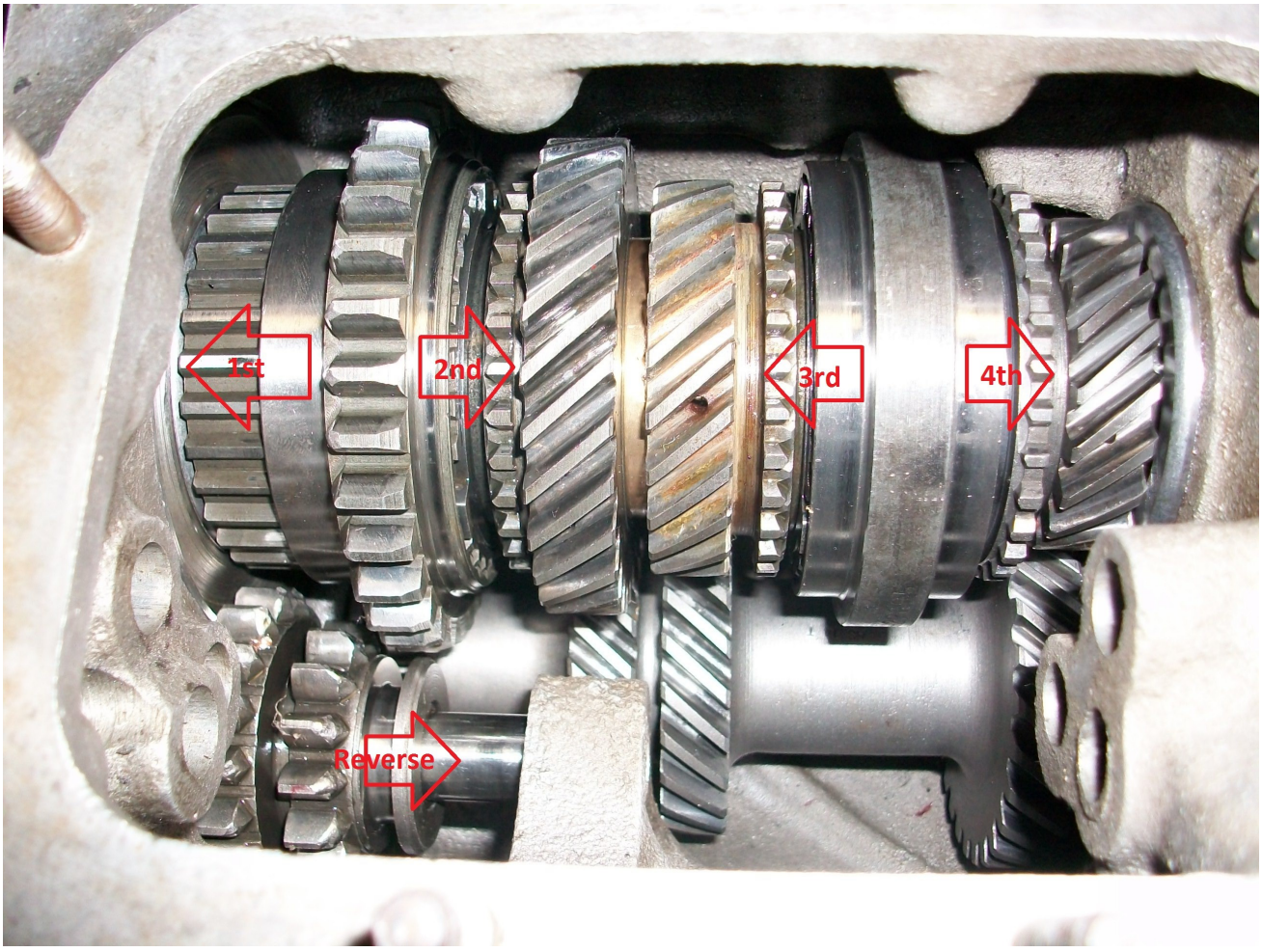


Fig 29—Gears assembled and showing gear positions on selectors

Everything should work as expected, there is no reason why not.

Its now time to refit the selector forks, rods and all the little interlock balls and slugs.

The purpose of the interlocks is to prevent the selection of more than one gear at a time by preventing the two rod not use from moving. eg 1st gear is selected—then the selector rod for 3rd/4th and reverse will not move.

More than one gear selected at a time would be catastrophic for the gearbox as it effectively locks it solid.

This is not difficult, but you need to pay attention to what hole the balls and slugs are fitted to, and that they are pushed home fully.

There are holes in the side of the gearbox around the cover hole, and two underneath that have hex head plugs in them.

Make sure the selector rods are clean, undamaged and are not showing excessive wear where the indents are that the interlocks work in.

When securing the forks to them ensure that the screw enters the hole in the rod.

Turn the box so the hole is at the side, bottom on the bench as it would be in the car.

Fit the reverse gear fork, the screw faces the oil drain plug hole—Fig 30

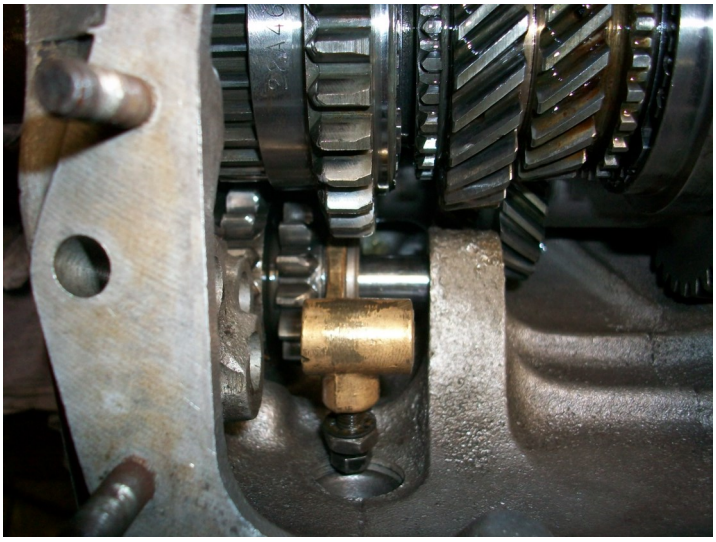


Fig 30—Reverse gear fork in position

Fit the 3rd/4th selector fork—Fig 31.

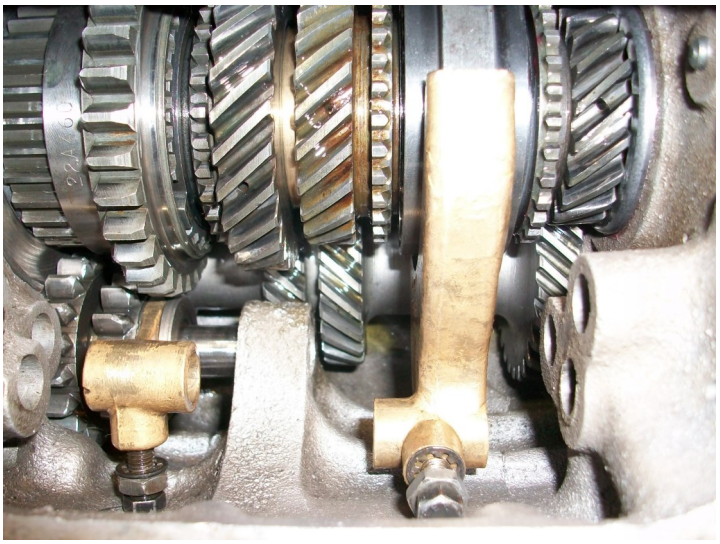


Fig 31—3rd/4th selector fork in position

Lastly fit the 1st/2nd selector fork—Fig 32.

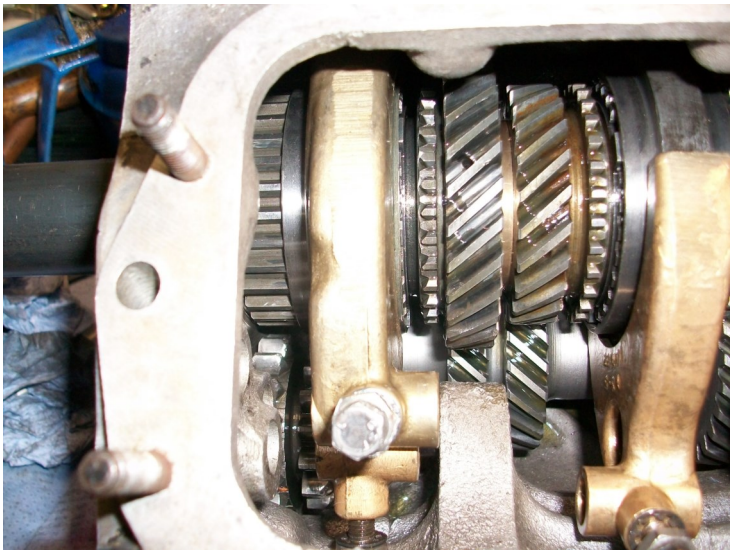


Fig 32—1st/2nd selector fork in position

The first selector rod to fit is the one for reverse—Fig 33.

Fig 33—Reverse gear selector rod

Into this hole—Fig 34.

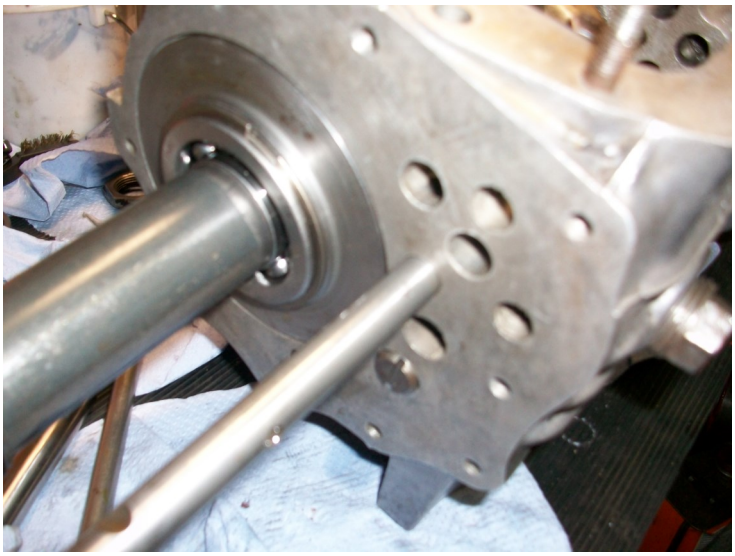


Fig 34—Reverse gear selector rod being fitted

Remove the screw from the reverse fork, pass the rod though the hole in the reverse fork, feed it through the clearance hole in the 3rd/4th fork and into the front of the casing—Fig 35.

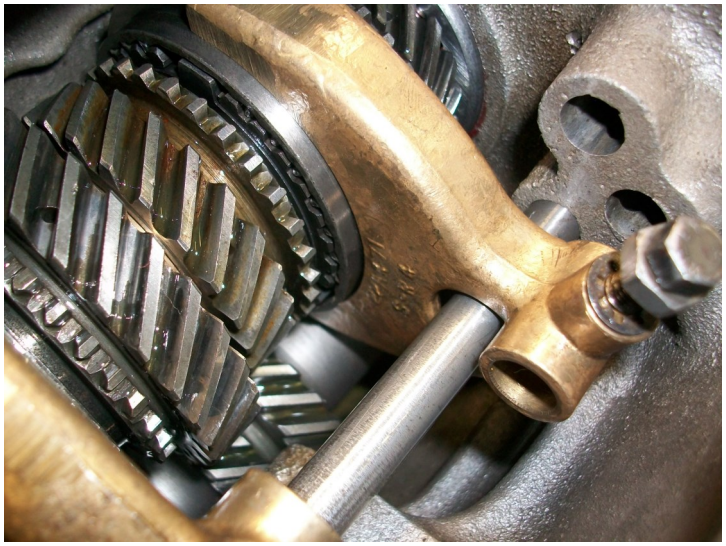


Fig 35—Reverse rod fitted through 3rd/4th fork

Its easier now just to roll the box so you can see the bottom. If the oil drain plug is fitted remove it.

You need to make sure the screw in the fork locates in the hole in the rod. If you have not already done so take the screw out, and use a scriber or similar to locate it, or simply look up the hole while sliding the rod back and forth—Fig 36.

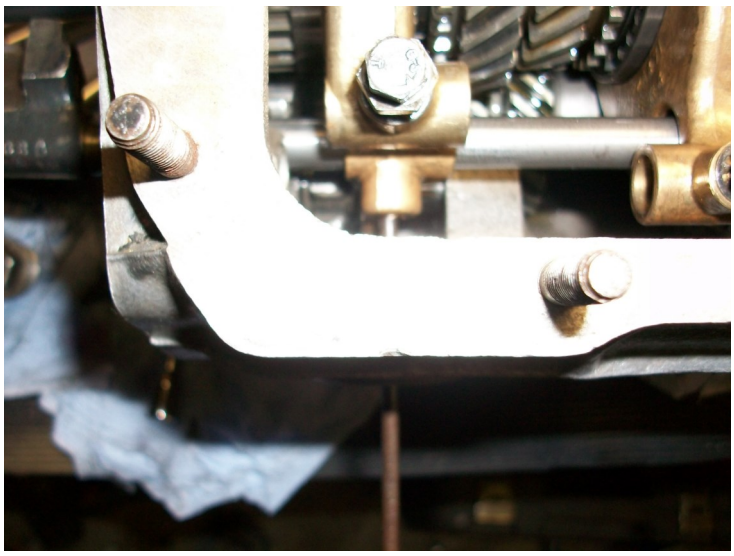


Fig 36—Scriber being used to locate detent in rod

Insert the screw, making sure the locknut is there and the shake proof washer, between the nut and fork—Fig 37.

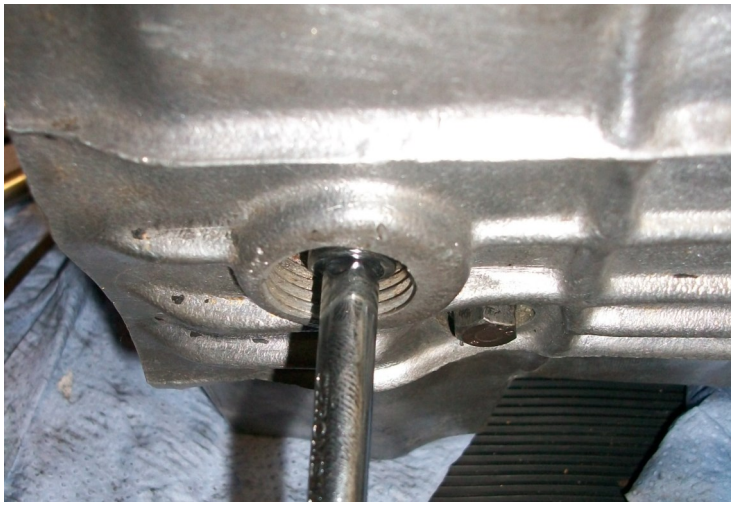


Fig 37—Tightening the screw and lock nut

Now the double ended slug needs to be fitted—Fig 38.

Fig 38—Double ended slug

Into this hole here at the rear of the side opening—Fig 39.

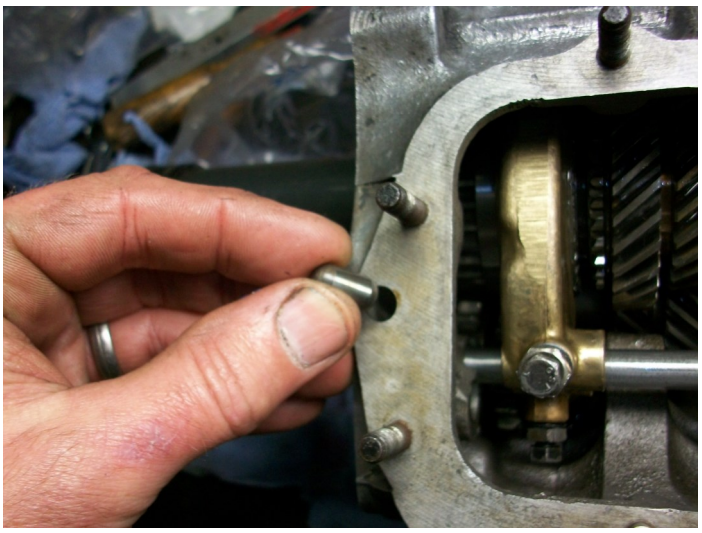


Fig 39—Inserting the slug

Use a tool to push it right home, this applies for all the interlock parts. Make sure they are where they are supposed to be, and have not rolled off to the side or not quite home.

If there is an indent in the rods where they enter the ends of the case then something is supposed to be there, observe them as you fit them and you have an idea of what you achieving.

The rod can be seen here arrowed pushing the slug home. Correct assembly of the fork locking screw can also be seen—Fig 40.

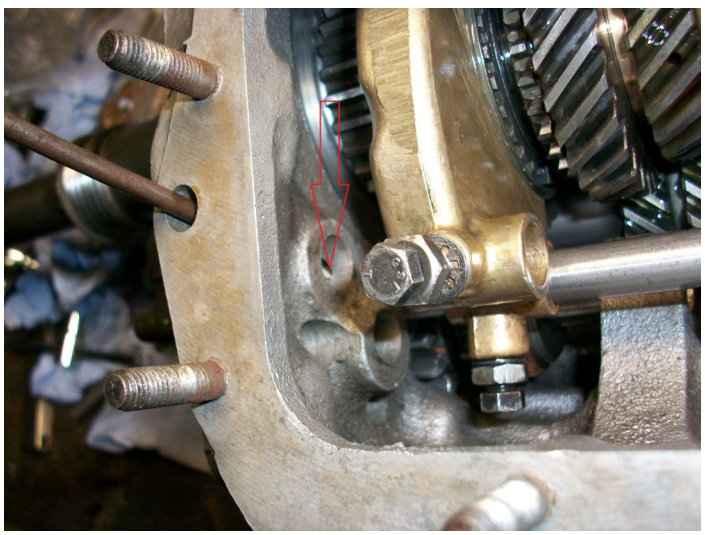


Fig 40—Pushing the slug home

Next in is the selector rod for 1st and 2nd gear—Fig 41.

Fig 41—1st/2nd selector rod

Into this hole in the casing—Fig 42

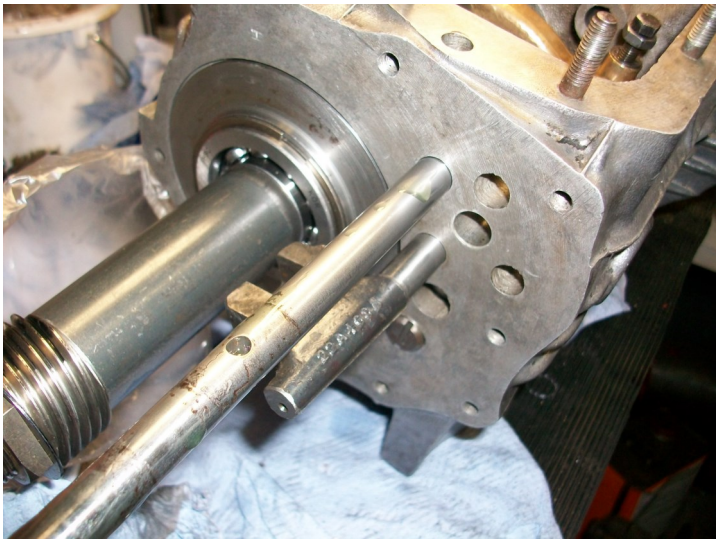


Fig 42—1st/2nd selector rod goes here

Feed it through the selector fork, removing the screw allows you to easily see the indent for the fork screw—Fig 43.

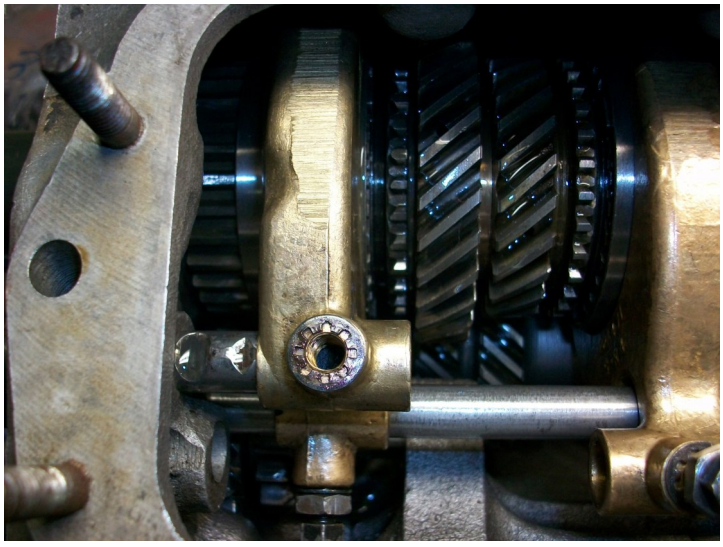


Fig 43—Feeding the rod through the 1st/2nd fork

Slide the rod right in, and fir the screw. Nip it up hand tight for now—Fig 44.

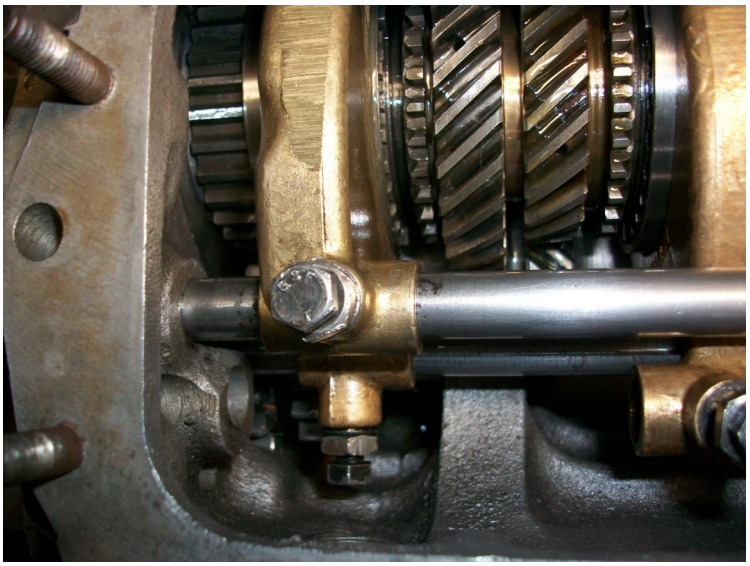


Fig 44—Locking screw in position

Lastly the rod for 3rd and 4th is fitted—Fig 45.

Fig 45—3rd/4th selector rod

Into the hole here. Push the rod into the hole but don't push it all the way home yet—Fig 46.

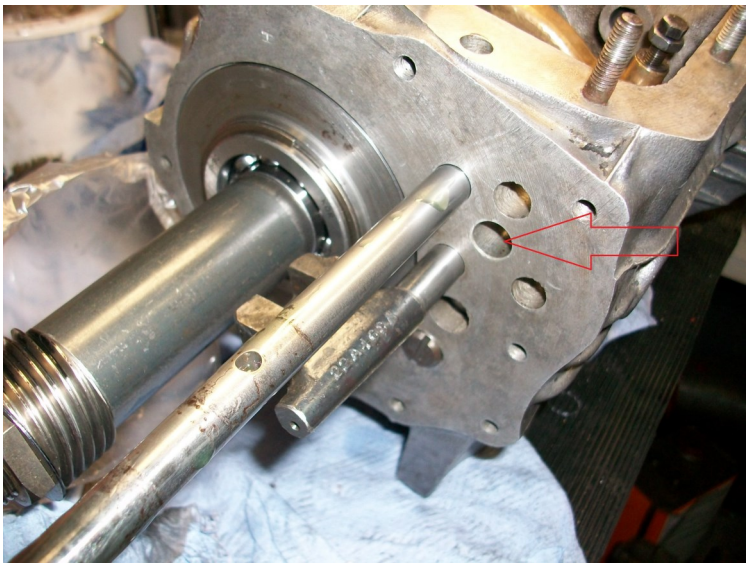


Fig 46—3rd/4th selector rod goes here

Drop an interlock ball into this hole and make sure its pushed home, use a thin rod—Fig 47.

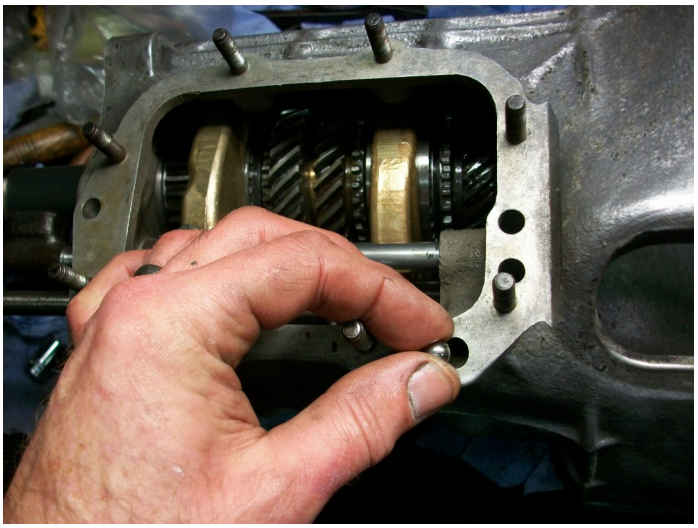


Fig 47—An interlock ball goes here

Roll the box over so these holes in the bottom are upper most, drop a ball into this hole and make sure its home. The rear of the box is to the left of the picture—Fig 48.

Fig 48—And another interlock ball here

Carefully roll the box, and feed the 3rd/4th selector rod fully home. Locate the fork screw and nip it up.

This is what the inside of the box should look like now.

Now you need to carefully roll it back over so you can get to the bottom.

The two plugs / interlock / retainer need to be fitted now.

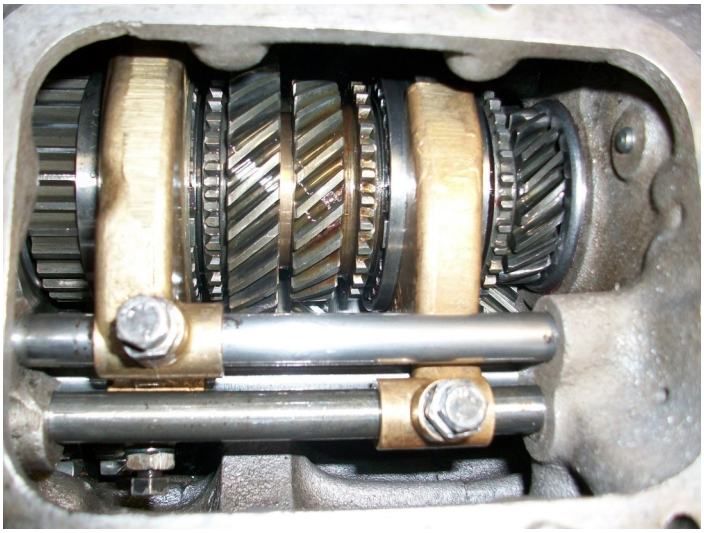


Fig 49—3rd/4th selector rod fitted and fork retaining screw fitted

The fist of the plugs to be fitted is this one, in addition you will need a 3/8 fibre washer if the one removed was no good, I would recommend a new one is fitted—Fig 50

Fig 50—Interlock plug parts

It goes in the lower of the two holes, rounded end first, followed by the spring and the cap. Again the rear of the box is to the left of the picture—Fig 51.

Fig 51—It goes in here

The plain retaining pin, again with a 3/8 fibre washer user it—Fig 52.

Fig 52—Plain retaining pin

Goes into this hole—Fig 53.

Fig 53—Plain retaining pin goes here

Both plugs fitted.

There are no torque specs for the gearbox, its either what you think is sensible bearing in mind its aluminium, or use the standard torques for the size into aluminium.

3/8 fine in aluminium is specified as 157 in/lb, there's a fibre washer underneath as well but that's what I did them up to.

The reverse gear pin is 1/4" so that's tightened to 57 in/lb.

None of these are critical, as long as they are tight and you don't over do it they will be fine—Fig 54.

Fig 54—Underside interlock and pin fitted

And now is a good time to tighten all three selector forks. These are 1/4" into brass, specified as 77 in/lb—Fig 55.

Make sure the fork is correctly located, tighten the screw first, and then the locknut.

Remember the one for reverse is done via the drain plug.

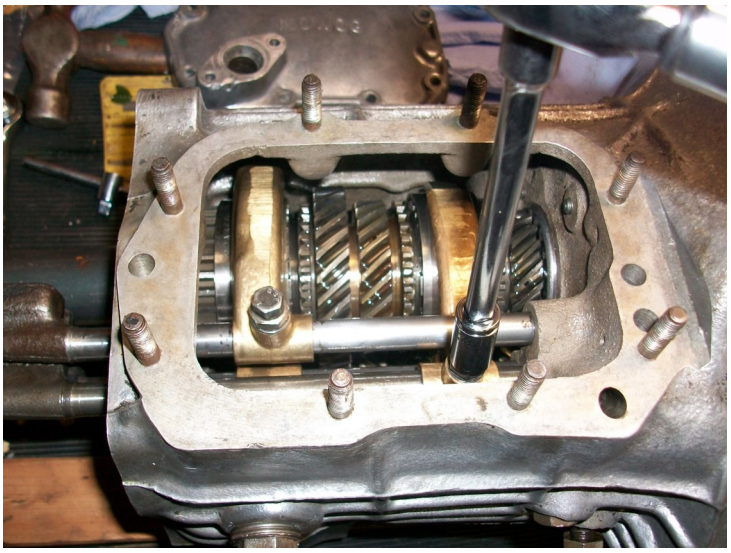


Fig 55—Tightening up the selector forks

Now is probably a good time to test everything works as expected, if something is wrong or simply you are not happy with something now is the time to find it.

The most obvious test is that by way of the selector rods which are now in, is that all the gears can be selected, and when a rod is moved from neutral position the others are locked. They can be quite stiff to move but they will go. You may have to line synchromesh up so the gears will engage.

First has no synchomesh, and you may just need to rotate the input shaft to get it to engage. Be as gentle as you can with it, if first goes slamming over too fast it is possible to move it too far, expose the detent balls in the hub and jam the box in first gear. If this happens just coax it back over the balls, don't force anything.

Apparently pushing the gear lever too far in the car when rolling in 1st can cause this and it's a known issue with these boxes, its not happened to me on the road yet.

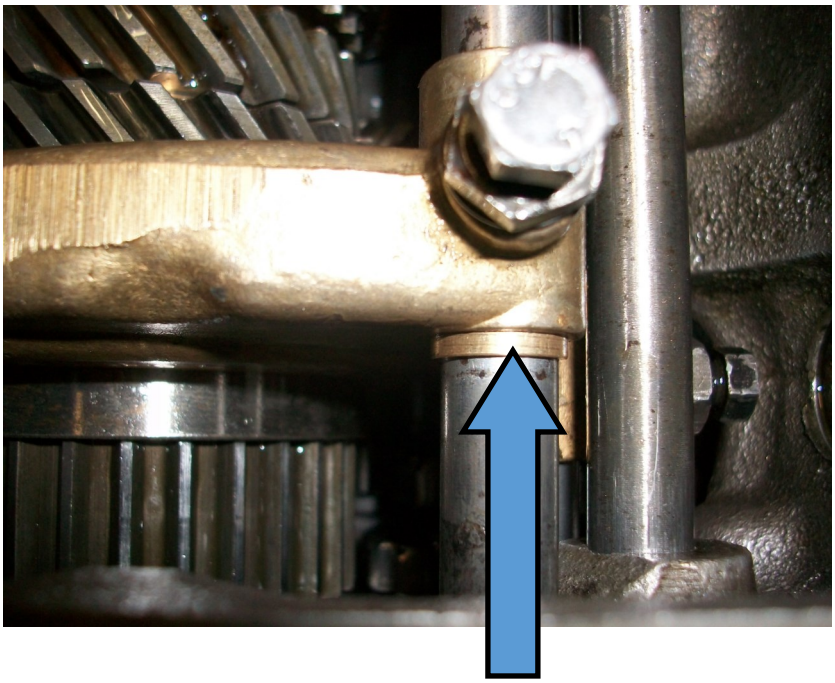
There are a few suggestions as to how to prevent it, the main one is being gentle with the box anyway and not ramming it into 1st, and don't continue pushing the lever once its in gear, bad practice anyway as it wear the forks quickly.

There are a couple of prevention measures which involve putting a stop between the 1st/2nd fork and the rear of the case, to limit the travel going into 1st. Either a piece of metal, bent at right angles, with a hole and fixed under the fork retaining screw. Needs to be about 2mm thick.

The other option is to remove the rod, and effectively place a washer on it. I chose to do this, turning up a brass ring, with a 11mm hole in which is a tight fit on the rod, and 1.9mm thick, so once in gear it's a fraction off of the case in the detent position.

Whatever option you choose, you need to make sure that you are not limiting the travel so much as to not allowing the detent to position the fork / rod. The picture below shows the brass ring that I turned up, this stops it being pushed too far but allows the detent to set the position of the fork when in 1st gear so there is no loading on the fork, prematurely wearing it out.

At this point the detents have not been fitted, they are the two remaining that are under the front end of the side cover.



Assuming that everything is working as expected its now time to start putting the front cover and the tail housing on.

Front cover fitting and rear extension fitting.

The front cover is the one in the bell housing, that has the clutch fork pivot on it. There is a scroll seal in the cover where the 1st motion shaft comes through, the idea being that any excess oil here gets wound back into the gearbox by way of this scroll, look inside the hole and you will see it.

If the hole looks damaged or you can see wear on it then it will never seal, if the 1st motion shaft bearing has become severely worn in conjunction with the bush in back of the crankshaft it will most likely be damaged.

Mine had a crack in it, running from the hole down !, probably from uneven tightening of the nuts.

Look at the drawing in the manual and you will see there are circular shims between the end of the outer race of the bearing and the recess inside the cover. These are also on the rear bearing and the tail case.

My box had none when stripping it down, which either meant it didn't need them or whoever built it couldn't be bothered to fit them, the latter being the most likely. That said the box was fine other then noisy bearings.

They are available in varying thickness's with the manual stating that 0.006” is probably OK, however they are select on build and you will need an accurate measuring device.

In simple terms you need to….

- Measure how much the bearing protrudes from the face of the box (not the clip) - Fig1
- Measure the thickness of the gasket when it has been compressed by fitting
- Measure the depth of the recess in the cover

Add the figure obtained for the depth pf the cover recess to the thickness of the gasket, from this subtract the amount the bearing protrudes, and this is the figure for shimming.

I ended up needing 0.010 at the front, and 0.006 at the rear was fine.

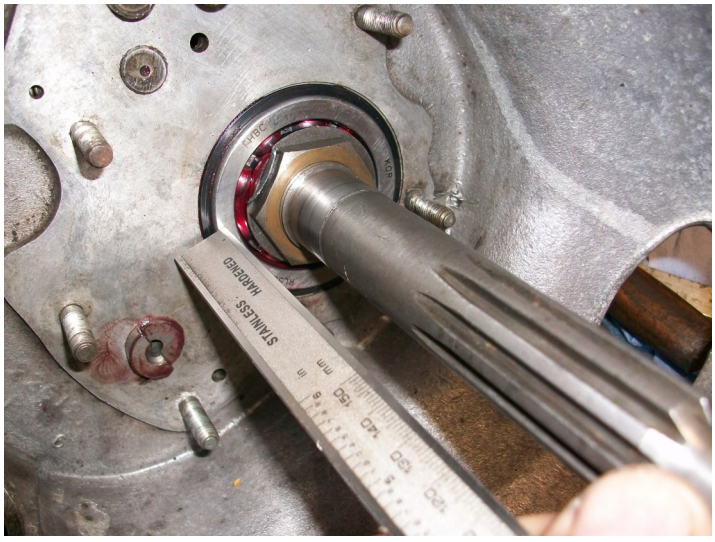


Fig 1—measuring the amount the bearing protrudes

Fig 2—measuring depth of recess in cover

Note the orientation of the layshaft, the raised half needs to be to the studs and roughly in line with them, there is a recess in the front cover for it—Fig 3

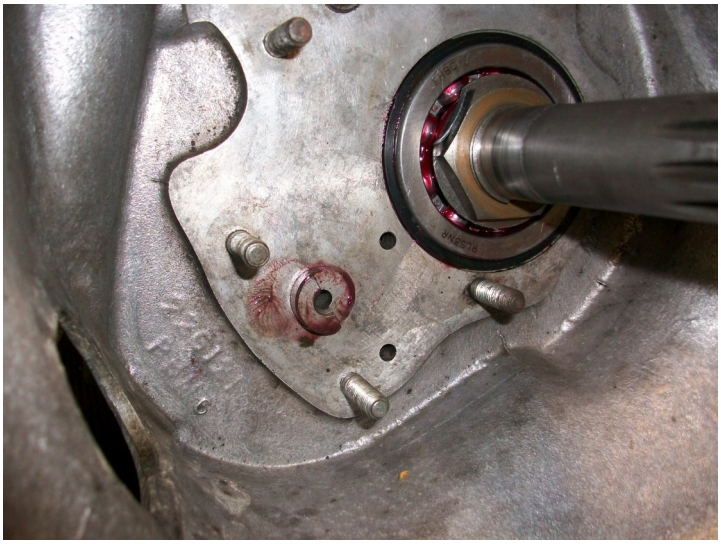


Fig 3—Correct position of layshaft

Carefully fit the gasket, they are thin and quite fragile, and if you did not get the shaft in the correct position above the gasket reminds you—Fig 4.

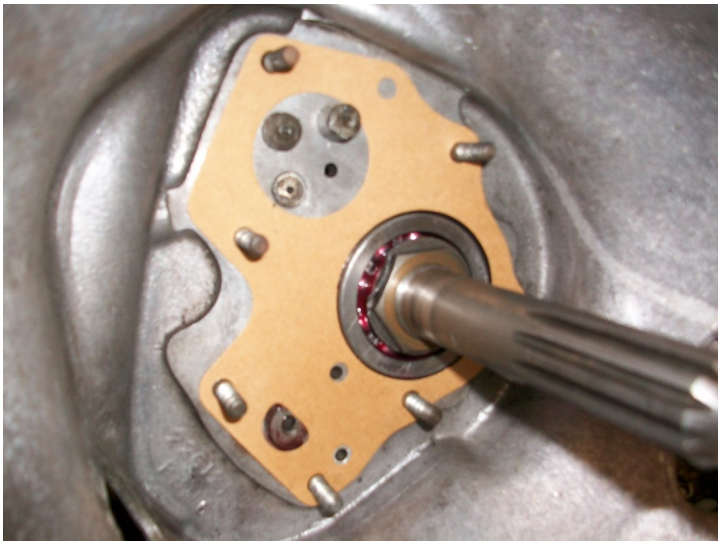


Fig 4—Gasket fitted

These are the shims that you did the calculations for, in this case a 0.006 and 0.004 Fig 5.

Wipe them with grease so they stick together and in the cover.

Fig 5—Bearing shims

Place them into the cover—Fig 6.

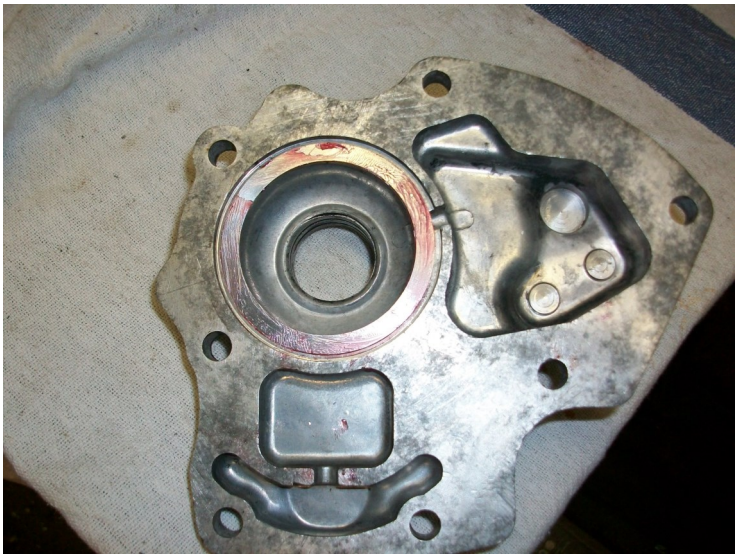


Fig 6—Bearing shims fitted to cover, note the grease

Carefully fit the front cover, put the spring washers and nuts on, and tighten them up, evenly and diagonally. I went for 47 in/lb on these—Fig 7.

Fig 7—Front cover fitted

That's the front cover done, now attention can be turned to the rear, and the tail casing.

As part of the tail casing overhaul I had to fit a new bronze bush at the rear where the propshaft yoke fits, there was just too much slop in it to be ignored.

The old bush is extremely tight in the housing, I had to turn a mandrel up and draw the bush out, I think its realistic to say that to try and knock it out from the inside would be impossible and certainly runs the risk of a damaged casting.

The new bush requires reaming to size after fitting as well to match the prop yoke.

This is probably a job that you could hand to a local engineering shop, unless you have a very well equipped workshop.

The first job to be done at the tail is to tighten the lock nut and fold the lock washer over.

I held the shaft with the yoke of the propshaft with a bar through where the universal joint bearing goes, being careful not to damage it, as I had to dismantle the joint for repair anyway.

No torques on this one, tight is the best suggestion, you know how tight it was coming undone. Too loose and you run the risk of the speedo drive slipping.

The lock washer I used was quite large and I decided to fold it against all of the flats Fig 8.

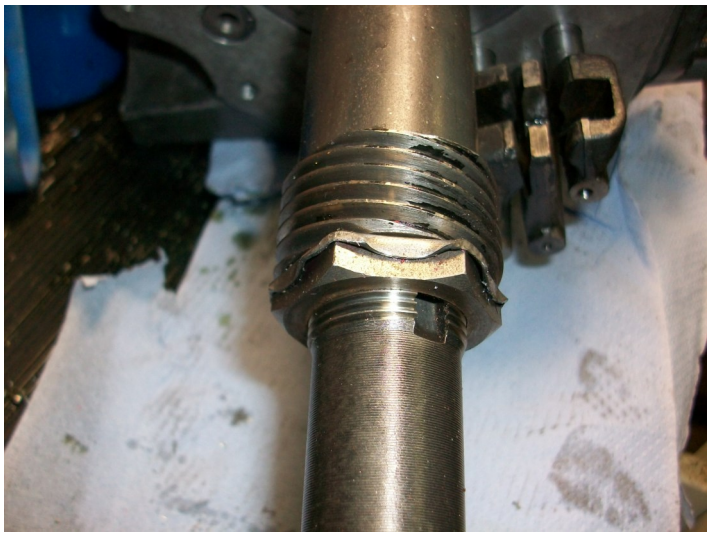


Fig 8—Nut tightened and lock washer bent over

Again you need to measure up for the shims as per the front cover and do the same maths to get the thickness required Fig 9 and Fig 10.

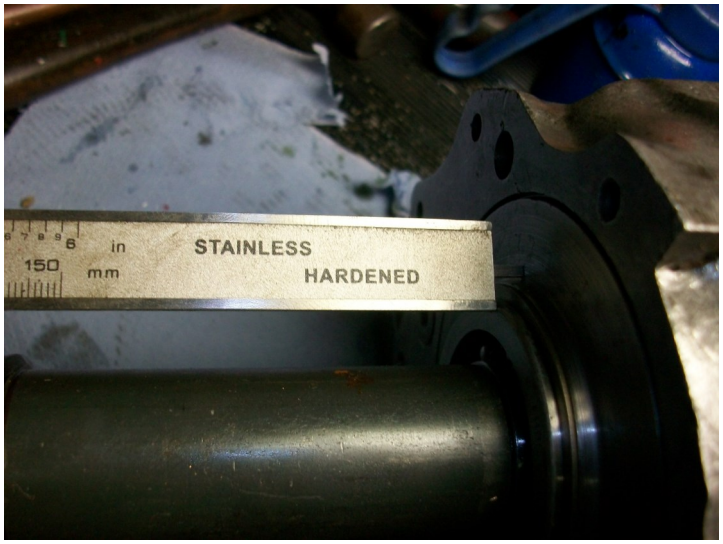


Fig 9—Measure the protrusion of the bearing

Fig 10—And measure the depth of the recess in the tail housing

Coat the shim with grease and place it into the tail housing.

Note the pin which locates into the rear bearing carrier.

Make sure the casing is clean and lubricate the selector shaft with some oil.

The gearbox is best stood up on end for this bit, securely, place a couple of bits of wood under the front so you are not bearing down on the input shaft.

The selector finger has to be located into the forks, to do this the casing needs to be slightly twisted as its lowered on, locate the selector and twist the casing on and into position. If the bottom of the gearbox is 6 o'clock, lower the tail on so its bottom is at about 5 o'clock, locate the finger in the forks and fit into position.

The easiest method I found was one hand holding the casing near the rear, the other on the selector allowing it to be wiggled as the case is lowered and twisted.

Don't force it, it will fit without force and hitting.

When its there fit the screws, Fig 12, and again tighten them up evenly. Note the three larger screws at the bottom where the plate goes for the steady wire, I have drilled and tapped these out to 5/16 UNF as was suggested to me. The cable and bracket was missing when I purchased the car, when fitting it I found out why, that the threads were almost torn out, I did get it to fit, just and got the screws to go tight with the aid of Loctite.

When the box came out this mod was on the list to do

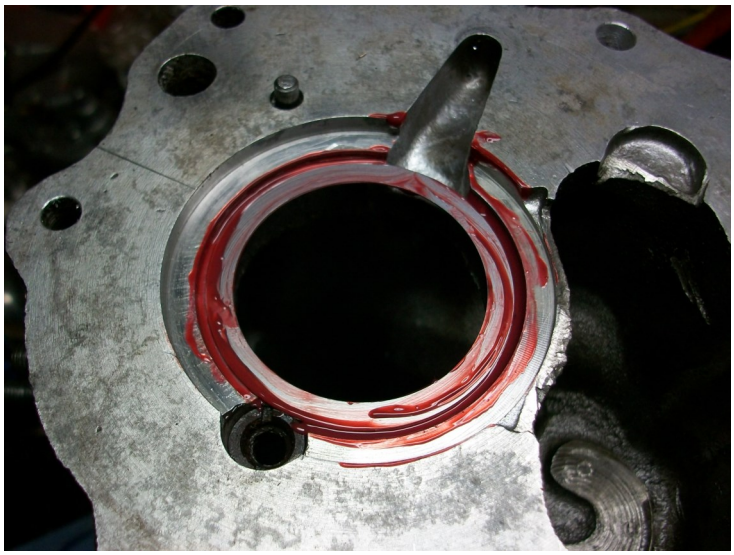


Fig 11—Shim coated with grease and placed in recess

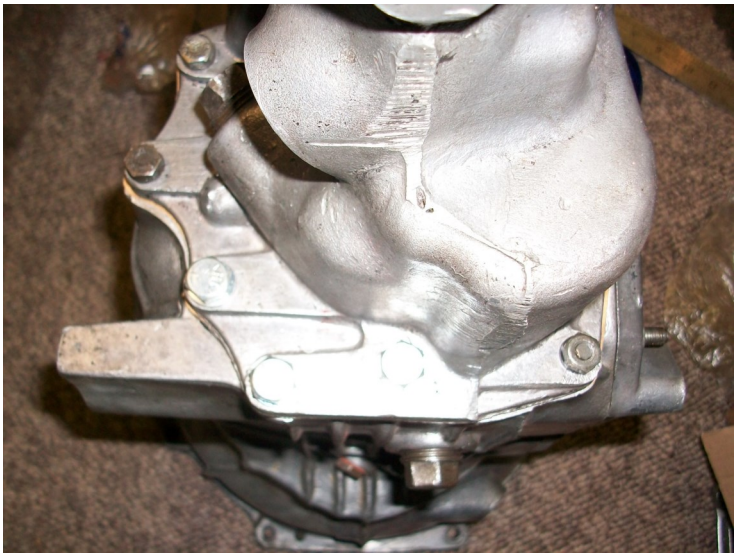


Fig 12—Rear extension fitted

Side cover

There are two of these detents under the side cover front edge, they engage into the selector rods for 1st/2nd and 3rd/4th gears.

The rounded end goes in first followed by the spring Fig 1.

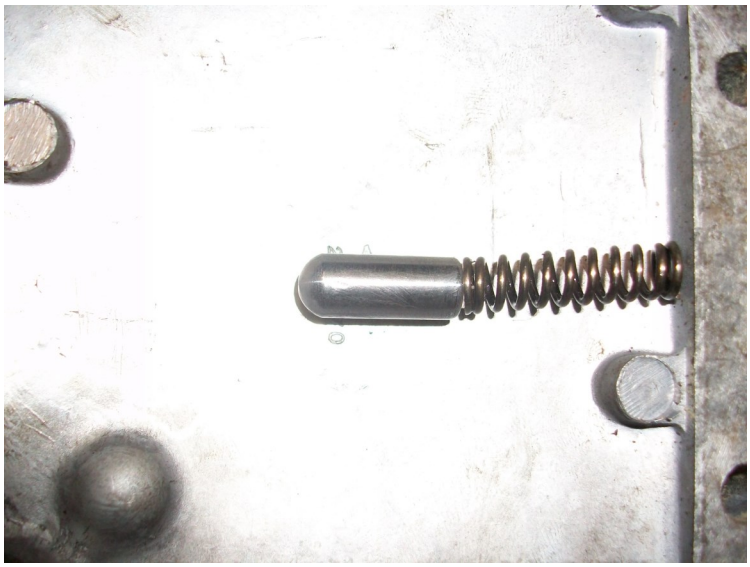


Fig 1—Detent plunger

One here Fig 2.

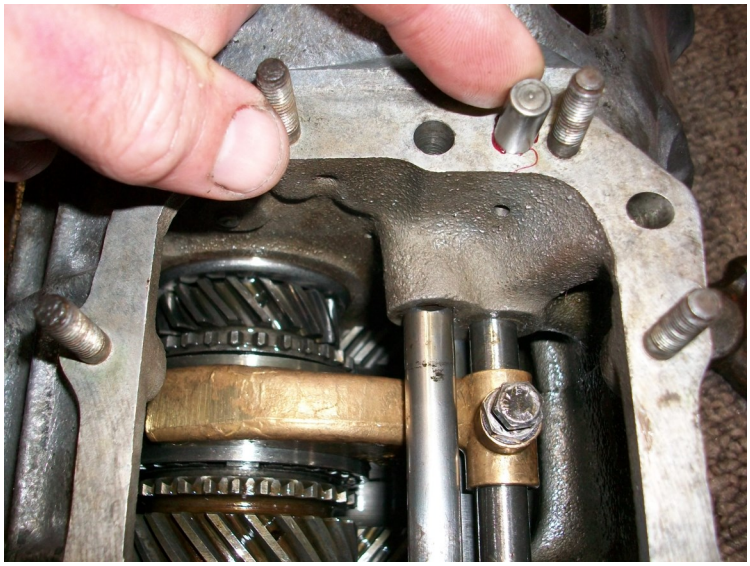


Fig 2—One detent plunger fits here

And the other in the hole above Fig 3.

Don't worry about the different height of the springs, the cover allows for that.

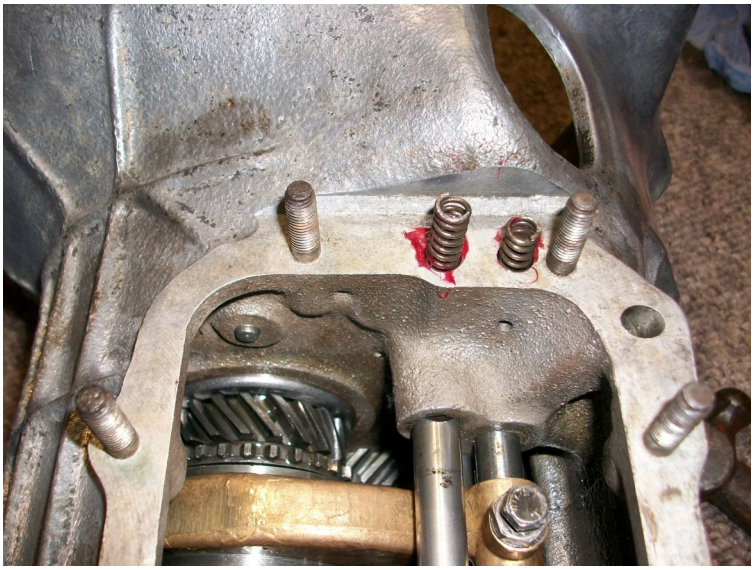


Fig 3—The other plunger fits here

This is the allowance for the spring, carefully fit the gasket and then the cover Fig 4.

Fit the spring washers and nuts, and tighten them down evenly and carefully.

47 in/lbs again.

Fig 4—Side cover showing where plunger springs fit

Side cover fitted Fig 5.

Now rotate the gearbox so that its sitting the correct way up, as you need to fit the remote control assembly back on.

Fig 5—Side cover fitted

Fit the two gaskets where the remote control assembly sits, Fig 6, and carefully place it over the studs. Fit the spring washers and nuts, and tighten them up. Not torques critical these so sensible tight.

Put a wipe of grease in the selector socket and make sure the nylon bush that mates with it on the end of the remote control is there, and that it is in good order.

Make sure that the remote control unit is clean of any old hardened grease and oil, and lubricate the rod that travels through it.

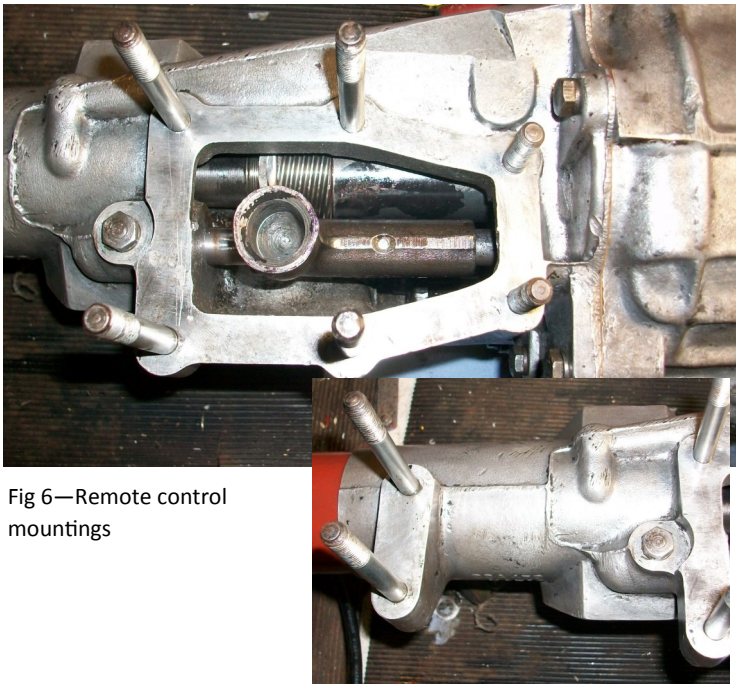
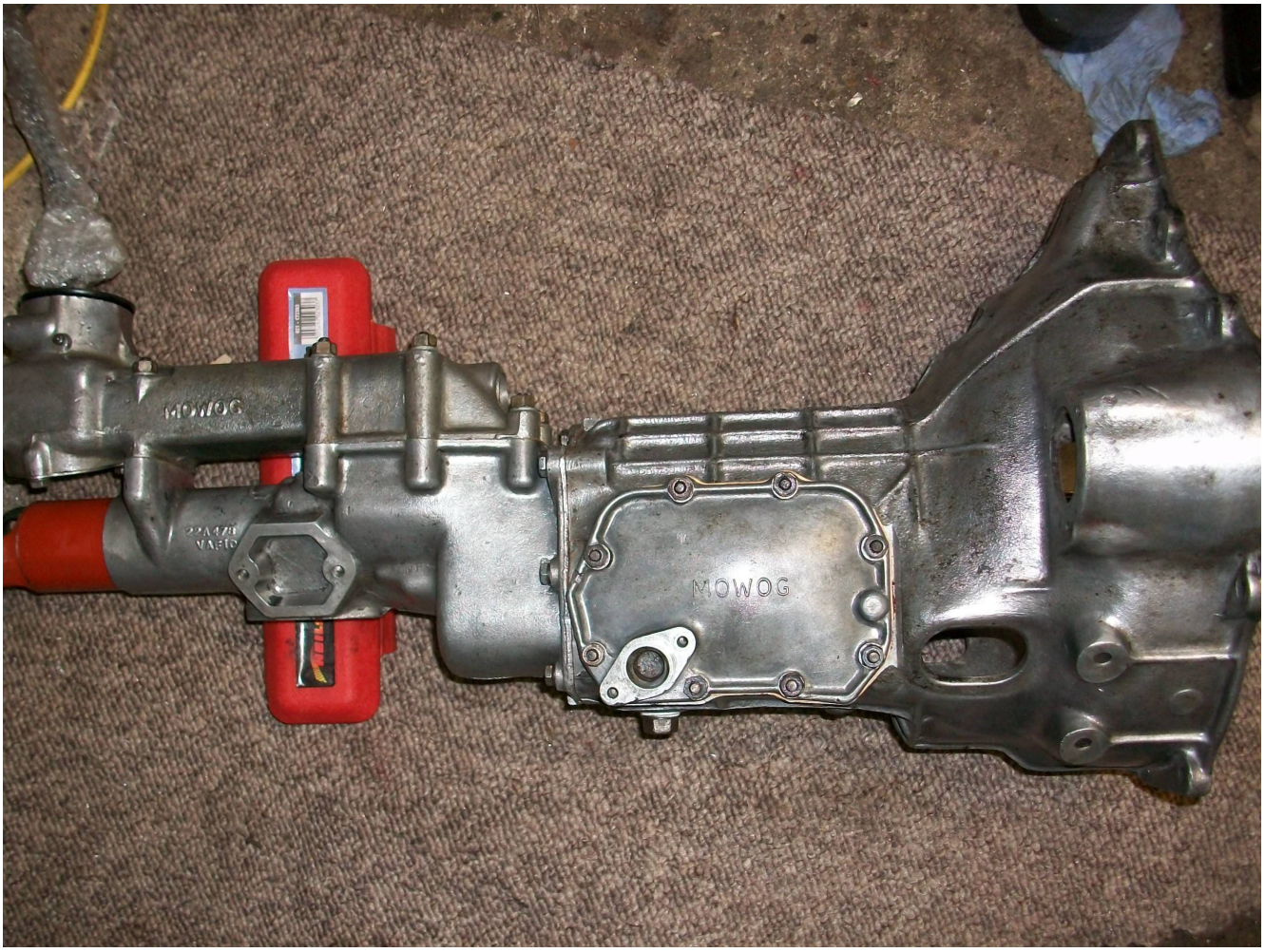


Fig 6—Remote control mountings



You should now have something that resembles this.

The cover that fits over the starter pinion is missing, and I have temporarily fitted the gear lever for testing in this photo. The prop yoke is also fitted here.

It should be possible to select all the gears now, and its worth testing and satisfying yourself as much as you can that everything is fine. Once fitted to the car a simple oversight is a lot more awkward and time consuming to remedy.