

# Installing the HD Oiling Kit with the engine in the bike.

Please read the entire article before beginning.

By a contributing VMax rider.

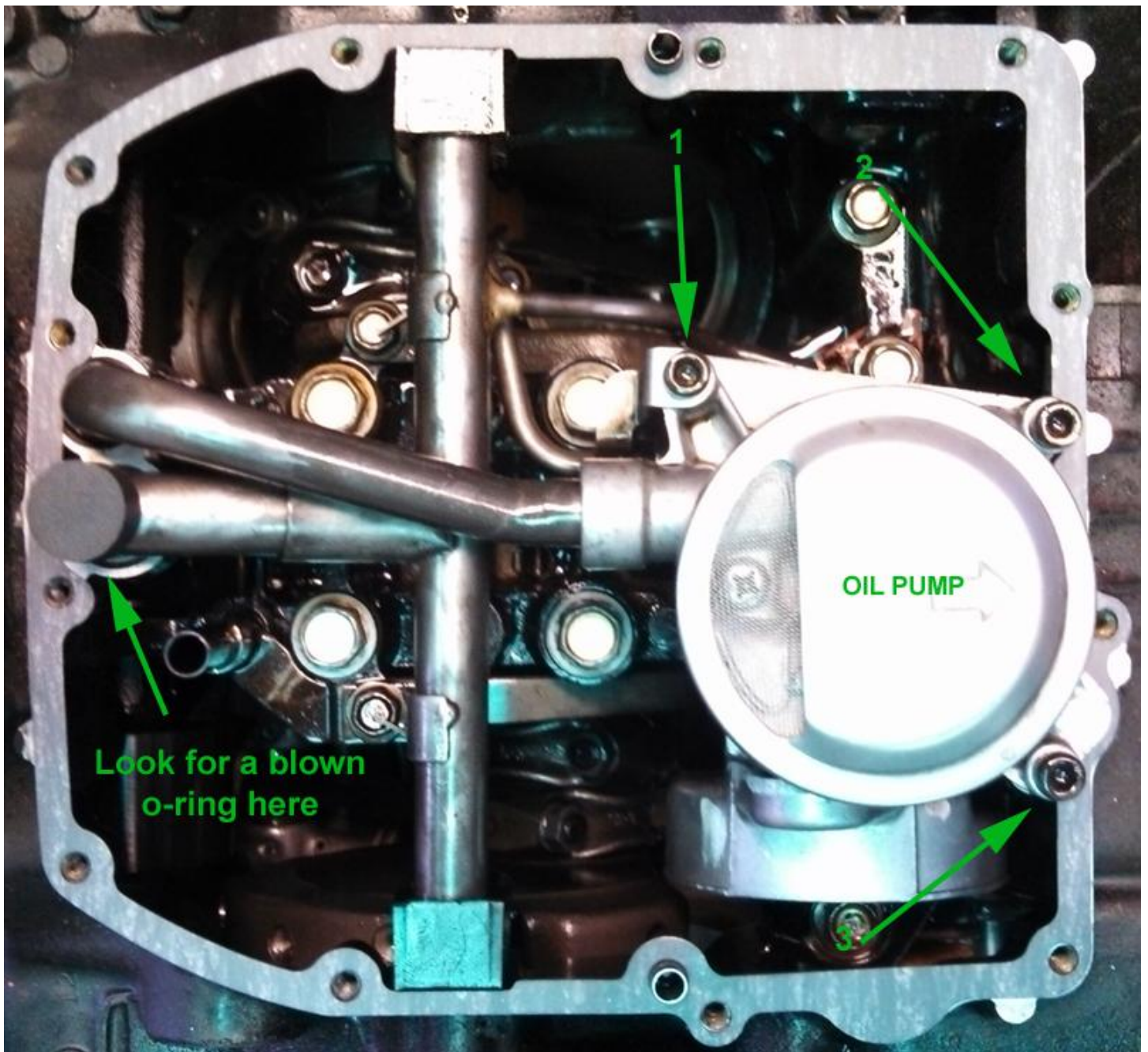
This author has seen the inside of many a small block Chevy and they actually ran better for it. But this is my first time to pull a case cover off a motorcycle. So this article is for more or less beginners. Installing the kit in the bike can be done but the first time can be intimidating unless you follow these instructions. The result is worth the effort. I would now not buy a VMax and then ride it without first installing one of these kits. They make that much difference. The engine runs and sounds quieter and neutral is easier to find...on my bike at least.

Sean usually installs these kits while the engine is on the bench but they can be installed while the engine is in the bike using some special tools and taking great care during certain steps. You can work with the bike on the center stand if you do not have a lift.

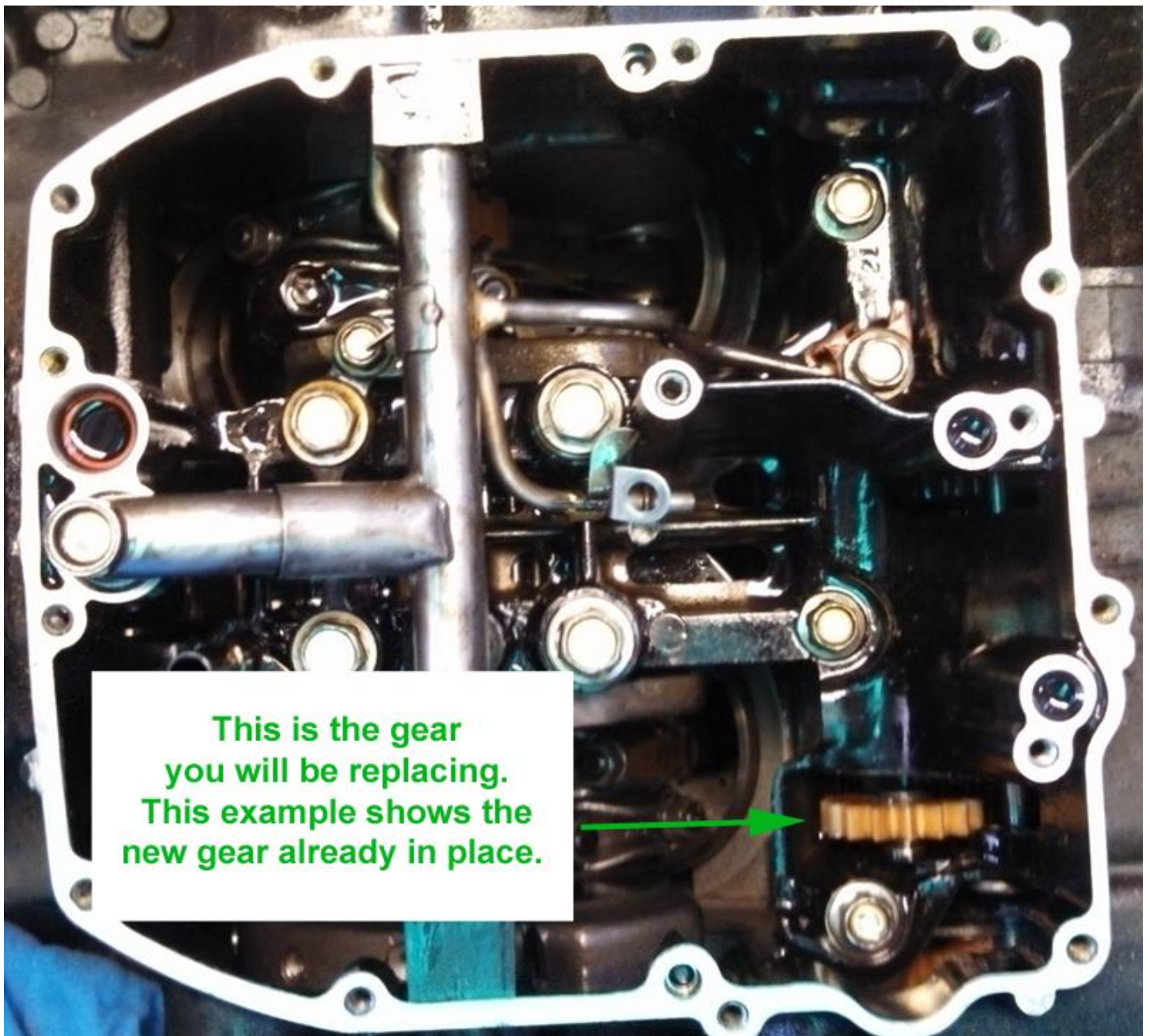
Before beginning you must remove the entire exhaust system, drain the oil, and completely remove the clutch basket assembly. Those processes are beyond the scope of this article. Please refer to the shop manual for instructions. You will need a 30mm ½ inch drive socket, a breaker bar if you don't have an air wrench, and a clutch basket tool during removal of the clutch basket.

Put packing paper (you can obtain a box of it from U-Haul) under your bike. This is actually newspaper with no printing on it. It's almost white. If you use plain newspaper and drop a small part on it, you may lose it simply because you cannot see it on printed newspaper.

Remove the oil pan and set it and the bolts aside for later cleaning.



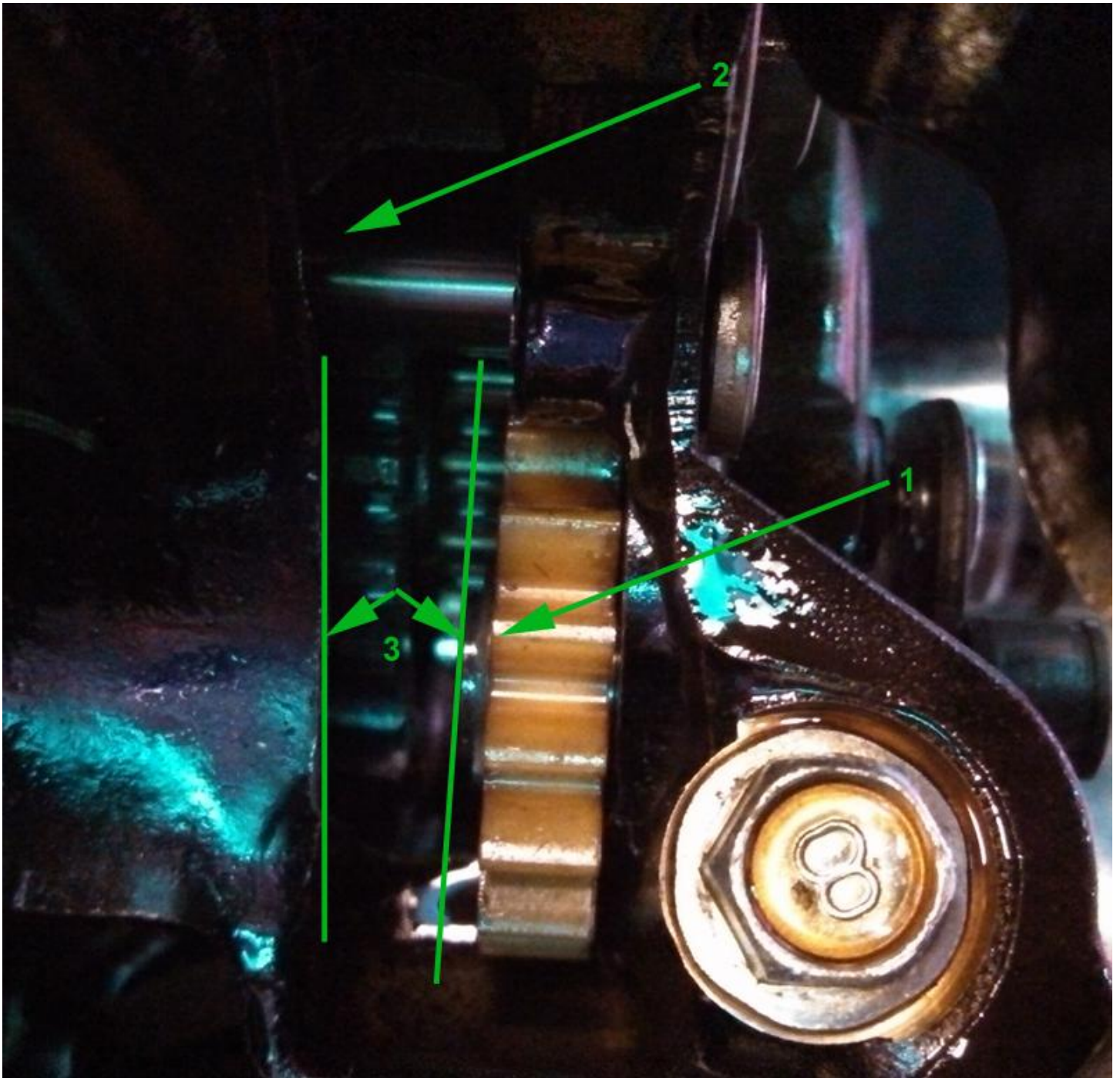
The picture above shows what you will see when the oil pan is removed. Note the arrow that points to where the o-ring that sometimes blows out is located. It will usually be bright orange. The other three arrows point to the three metric Allen bolts that retain the oil pump. Remove the oil pump and all its associated plumbing now.



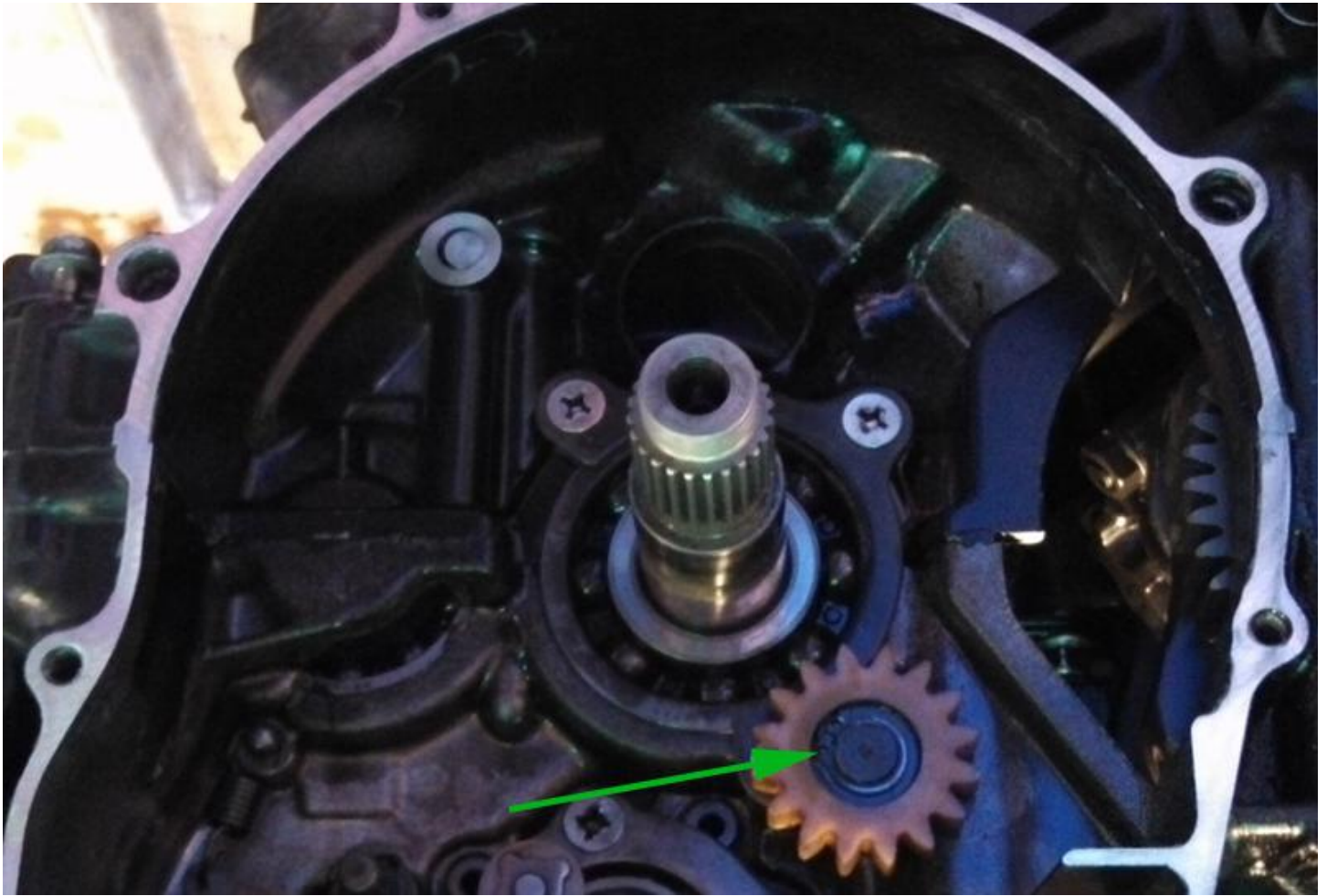
This is the gear  
you will be replacing.  
This example shows the  
new gear already in place.

In the picture above, the oil pump has been removed and you can see the gear that you will need to replace. This engine already has a new gear in it. The particular gear is excellent condition used so it has turned a bit orange due to immersion in normally hot engine oil. Your gear may be white. It will be identical to the gear outside the case that engages the drive gear on the back of the clutch basket. The gear you remove will be slightly smaller.



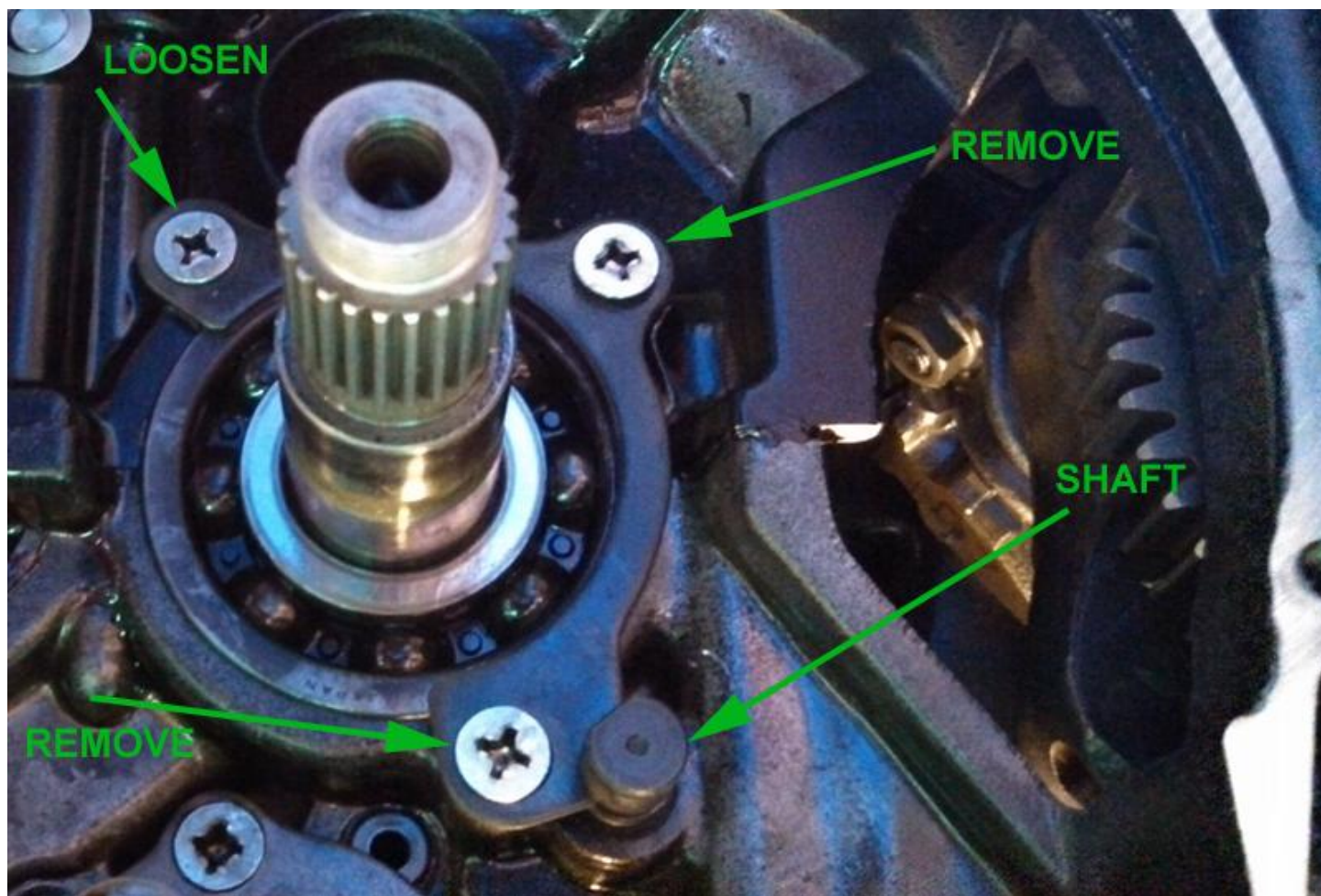


Above we see a close-up of the inner oil pump drive gear drive gear area. There is not much room here as you can see and this one operation is where care and patience must be exercised in order to prevent the loss of a washer or snap ring...as in flying up in the engine...which is not desirable. This author knows. Arrow #1 points to the snap ring that must be removed and replaced. Arrow #2 points to a deep well that should be completely shielded before beginning. Crook your finger and put it down in there and imagine trying to pull a snap ring out. Arrow #3 shows how narrow the working area is. It is NARROW. Spend time placing cardboard pieces, paper towels, typing paper or whatever in all areas that look like they could grab a flying snap ring or washer. Remember to put the White Newspaper from U-Haul on the floor and wear a white t-shirt when working on this one task.



The photo above shows the right side of the engine with the clutch basket completely removed. The arrow points to the outer oil pump drive gear that engages a gear on the back of the clutch basket. You can see the snap ring. Remove the snap ring with normal horizontal snap ring pliers. This is the easy part but take care not to let ANY snap ring get away from you. Put the gear and a new snap ring aside in a safe place for re-installation later. Remember that the orange color in no way affects the hardness or serviceability of the plastic gear. My 1986 gear was dark orange but the teeth showed no wear and there was not a scratch on it anywhere.





The photo above shows the orange drive gear removed.

It's now time to remove the inner oil pump drive gear on the other side of that shaft shown below.

Take all precautions to cover all areas that a snap ring might fly into as previously instructed. Use 45 DEGREE snap ring pliers to very carefully remove the snap ring from the inner drive gear. The gear will probably be metal and you will probably have enough room to put your finger on top of the shaft to catch the snap ring if it gets away from you. Take your time and don't lose the confounded thing. Once the snap ring is removed get out from under the bike and back to the clutch basket area as shown below. Loosen and remove screws as indicated and move the locking plate out of the way so that the shaft will come out. Pull the shaft out and the inner metal gear will fall on the floor. You can throw it away.

NOW...VERY IMPORTANT. You have the shaft in your hand. Wipe it clean and set it down. There are two washers in the HD Oiler kit. Get them both and remember that color is not the way to tell which one goes with the new gear. Also remember that neither one is magnetic. Pick up the shaft and try to SLIDE EACH OF THEM ON THE SHAFT. ONE WILL FIT PERFECTLY OVER THE SHAFT AND THE OTHER ONE WILL HAVE AN INSIDE DIAMETER THAT WILL BE TOO SMALL AND WILL SIMPLY NOT ALLOW THE WASHER TO SLIDE OVER THE SHAFT, PERIOD. The washer that does not fit is used later to shim the oil pump relief valve spring. Put it back in the plastic bag for later use.

Now for a custom tool to make installation of the new gear and placement of the new snap ring as easy as possible.

Obtain a good set of forged 90 degree snap ring pliers. Get up under the bike and put the shaft in place and slide the new inner gear onto the shaft. Refer to the picture above that shows how little room there is between the gear and no-man's land, so to speak. You must grind down the pliers until they fit in there easily and then regrind the tips so that they fit the holes in the snap ring EXACTLY. Not too tight and certainly not too loose. You are going to have to use those pliers alone to put the snap ring in place and you will not be able to use any tools to keep it flat related to the shaft. So the snap ring must fit the pliers and be held precisely horizontal and stable even when you spread it apart.

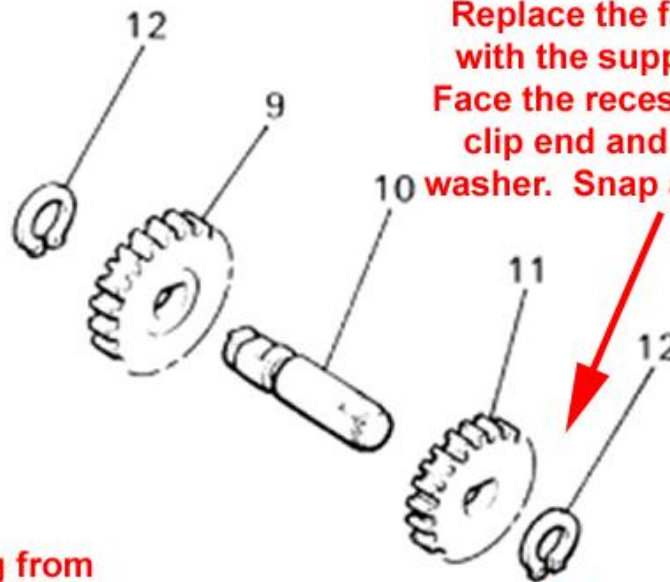
Now position the correct washer inside the new gear and hold the gear and washer with one hand while sitting outside the bike. Insert the shaft until it slides into the gear and the flat on the shaft lines up. Slide the locking plate into place but leave it loose. You may have to move the plate and withdraw the shaft a bit. But in the end, the locking plate should be in place before you put the snap ring on.

Now get under the bike and put the snap ring on the custom pliers. Holding your breath and holding your mouth just right, gently squeeze the pliers so that the snap ring separates just enough to put it over the end of the shaft and down into the groove. Let it loose and make sure it rotates freely and does not appear to be stretched. You may stretch the first one and ruin it so this is where it's smart to have ordered several spares. Use Yamaha parts. Auto Zone snap rings are not up to the task.

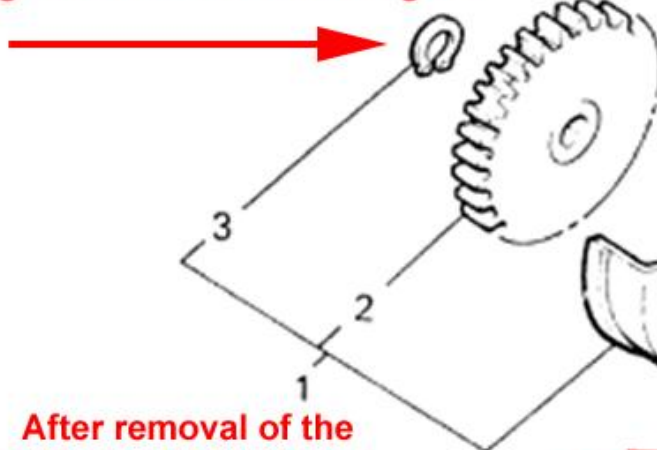
When you have successfully installed the snap ring on the inner drive gear and it's not bent or damaged in any way, it's all easy and downhill from here! Congratulations. You can breathe now. Get out from under the bike and then tighten and replace the screws that retain the locking plate and replace the outer drive gear using a new snap ring.

#### TIME TO MODIFY THE OIL PUMP

Replace the factory metal gear with the supplied plastic gear. Face the recess toward the inner clip end and insert the proper washer. Snap a new clip in place.

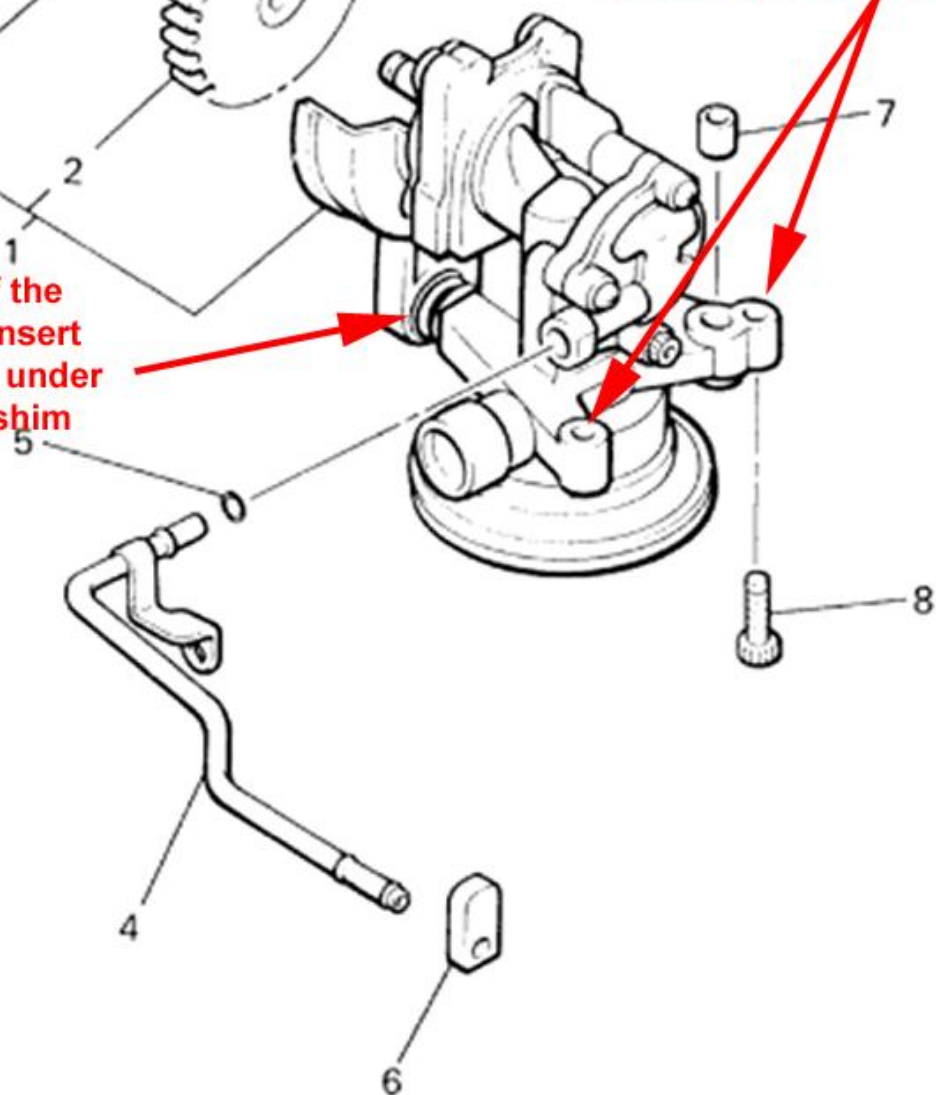


Remove the snap ring from gear #2 and remove the gear



The spacer from the kit goes under these holes you can reuse the bolts or use the next longer size

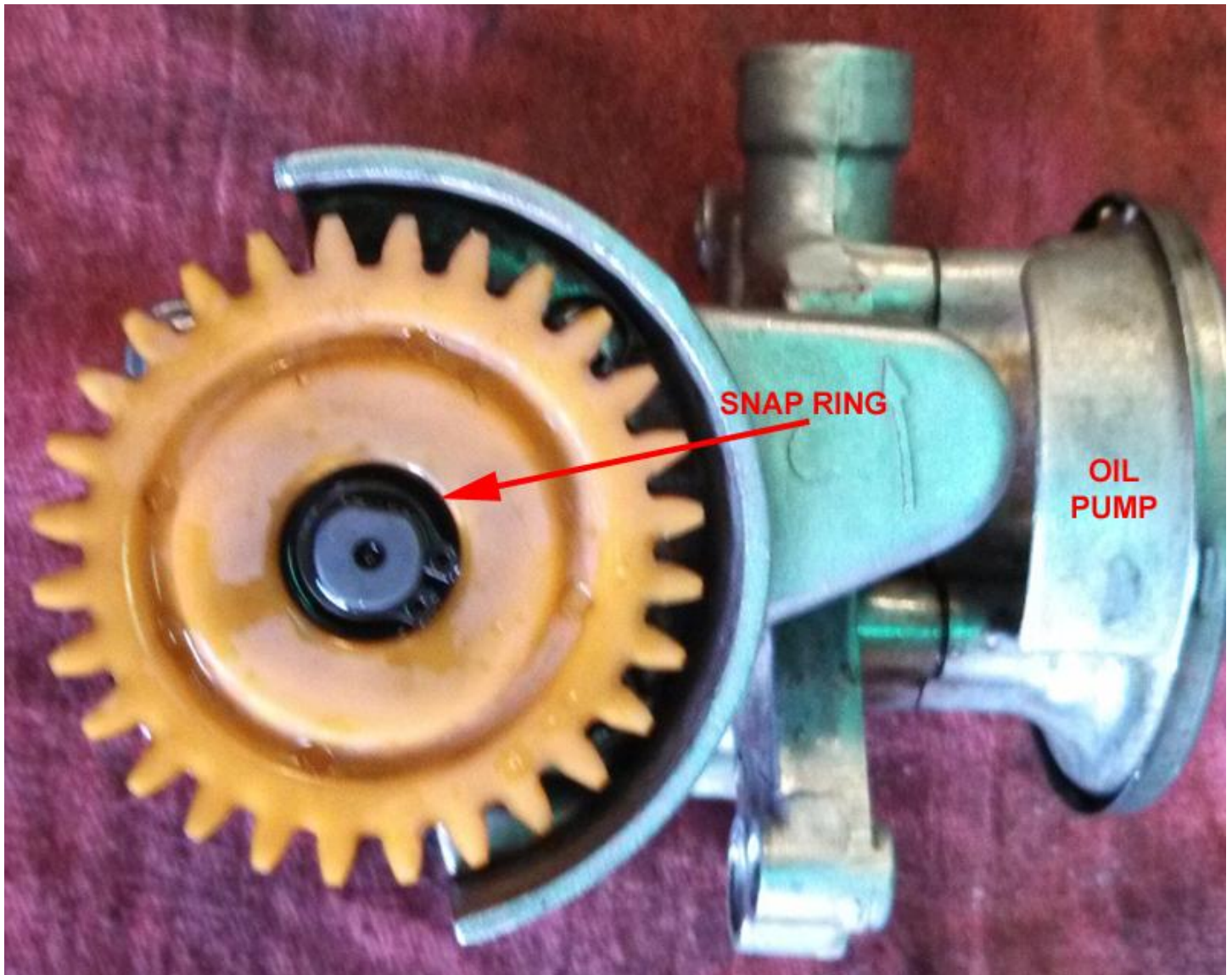
After removal of the oil intake cover, insert the proper washer under this spring as a shim

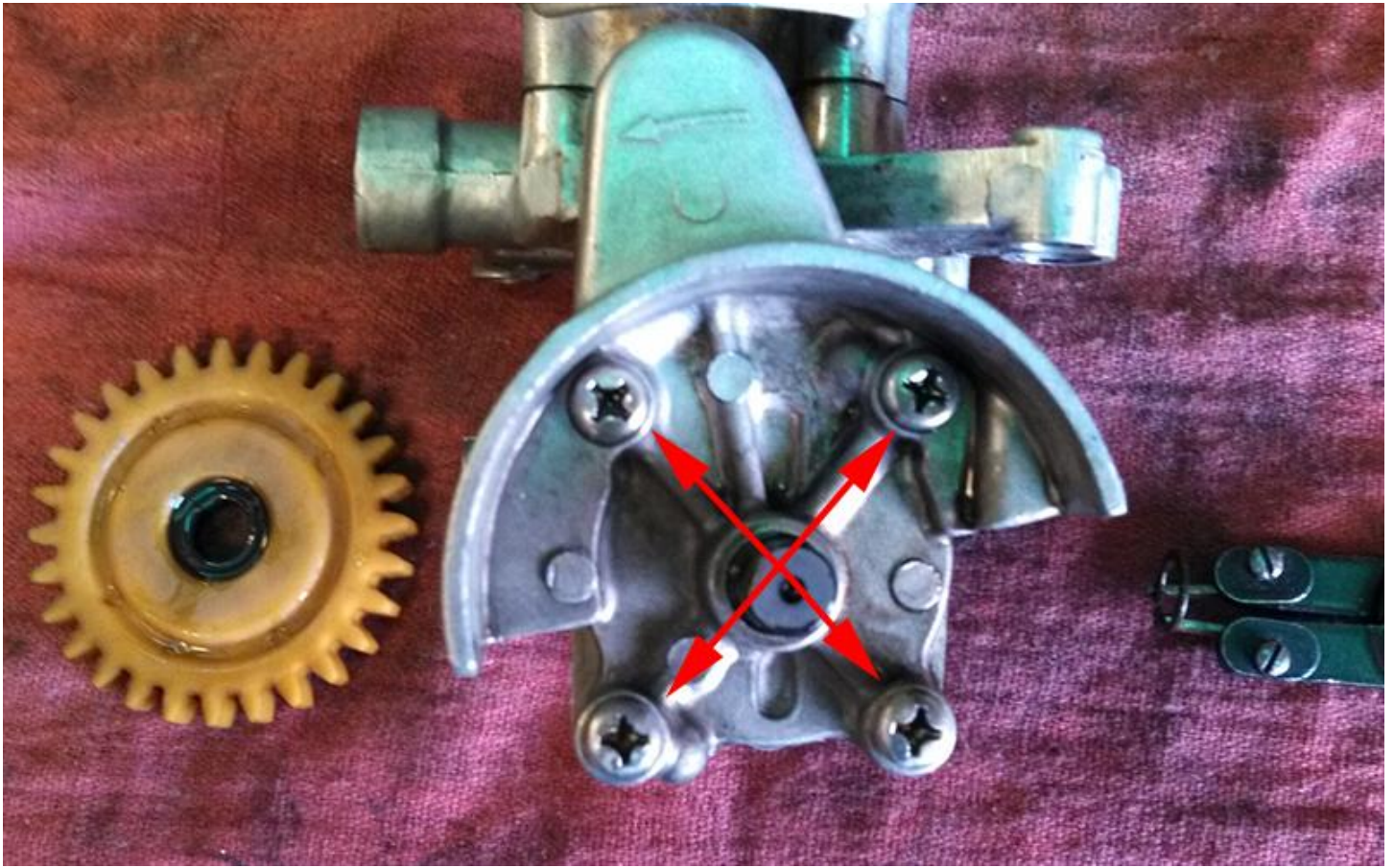




Look at the line drawing above. You should have already noted that the replacement gear is flat on one side and has a recess on the other. That recess is where the shaft spacer washer that you located earlier should go. It should already be there. When you begin to modify the oil pump, note that the OTHER washer which did not fit over the gear drive shaft is used as a shim for the oil pressure relief valve. As the picture notes you can reuse the oil pump retainer bolts but this author purchased the next longer size just to make sure.

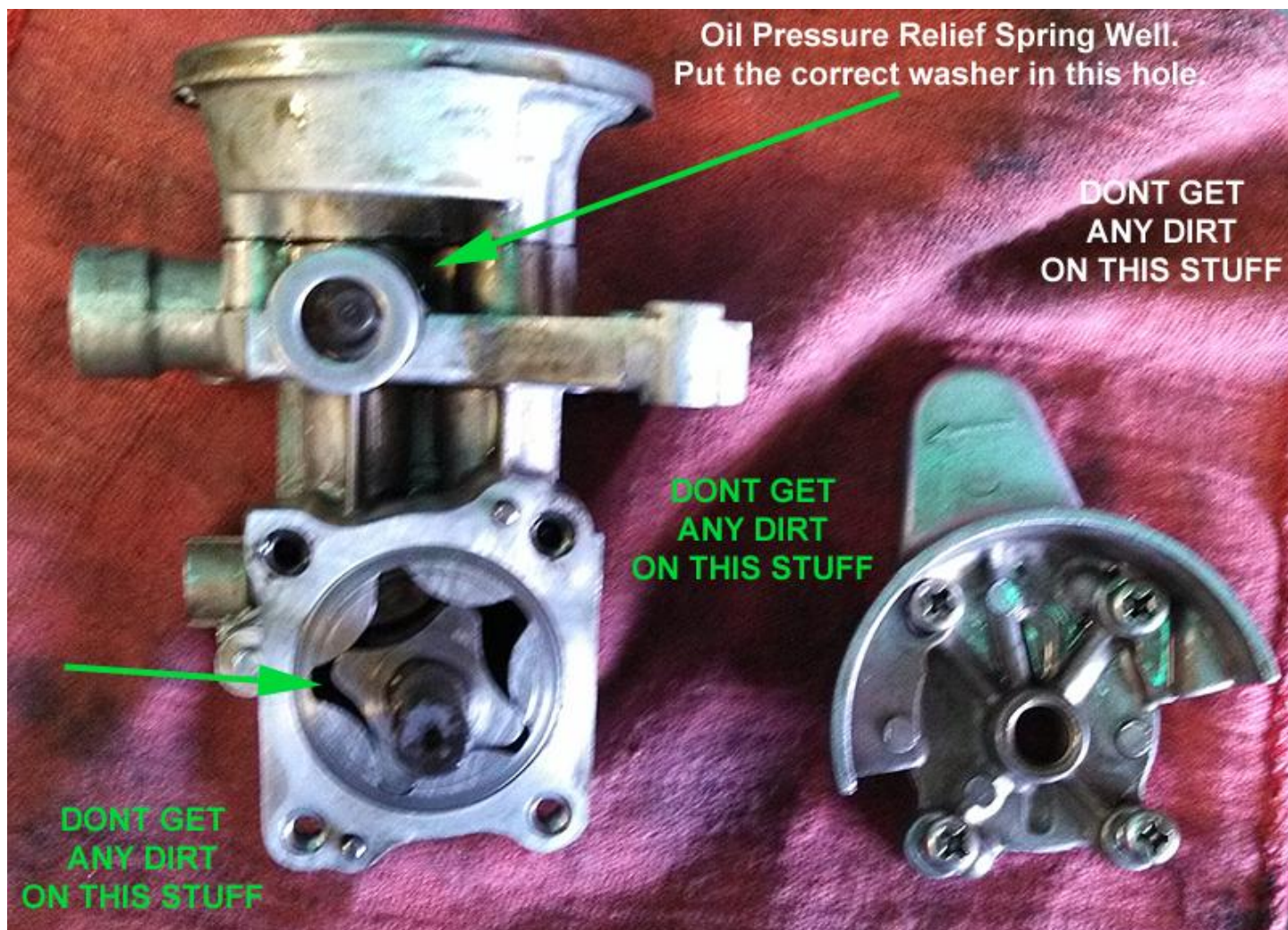
First, remove the snap ring on the gear attached to the oil pump and remove the gear as shown below. Put the gear and a new snap ring aside.





The photo above shows the snap ring and gear removed from the oil pump and what you will find behind the gear. These 4 Phillips screws should be removed. Though not necessary, you can obtain Japanese Standard Phillips Screwdrivers (usually on E-Bay) that will fit much better than SAE tools and will lessen the likelihood that you will strip a head. This author replaced these screws with Allen head screws but don't do that unless you are very familiar with the feel of torque. Phillips head screws were used here for a reason. They will fail and strip before you over tighten them and the threads strip. Oil pumps are expensive.





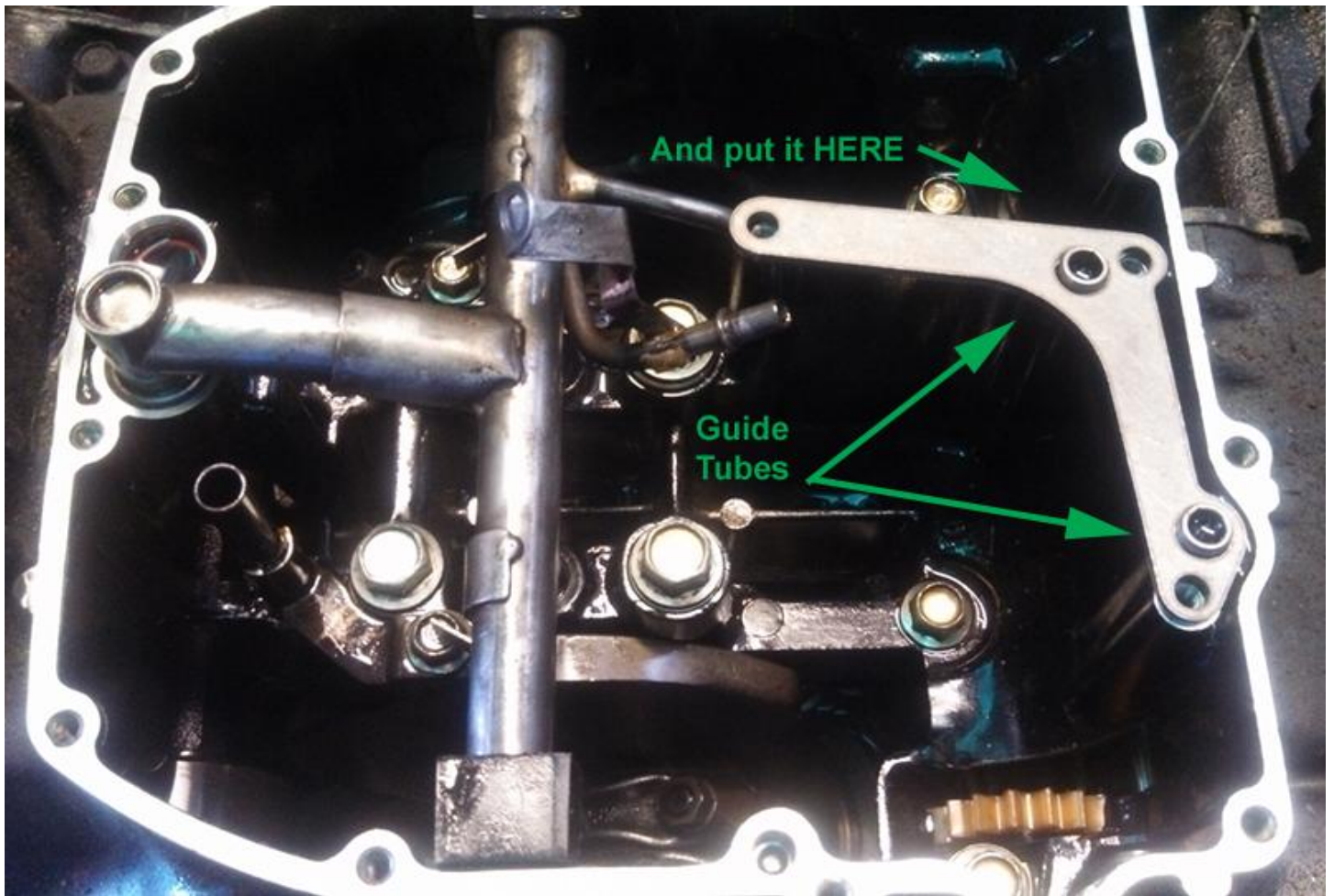
The picture above shows the pump cover removed. You do that by carefully twisting it sideways and pulling it out after removing the 4 screws. Watch out and don't lose the pressure valve relief spring while you are doing this. It is under tension. Don't get any dirt on this stuff. Everything in here fits tightly. Clearances are in the low thousandths. You can see where that shim washer that wouldn't fit over the oil pump drive shaft goes. Put it in there and replace the cover shown at the right very carefully. Then be very careful when you retighten the 4 screws. You might want to use some blue lock-tite on those screws but be careful not to get it anywhere else. You can now replace the gear and snap ring. I used a new snap ring. You probably should also.

And don't get any dirt on any of this stuff.

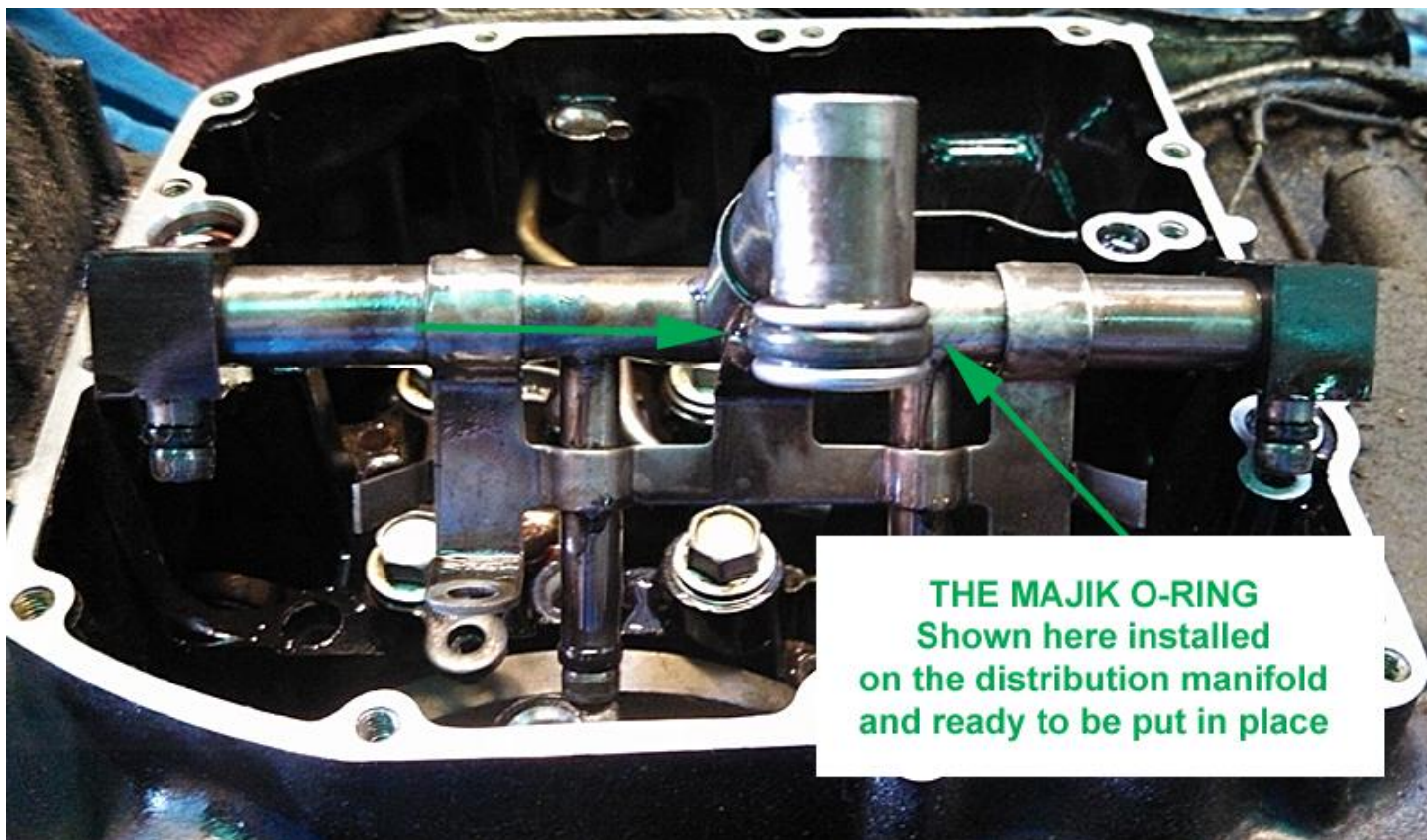




Find the piece in the kit pictured above. This is the oil pump spacer. Without it, the oil pump will not go back on because of the larger drive gear you so carefully installed while holding your breath.

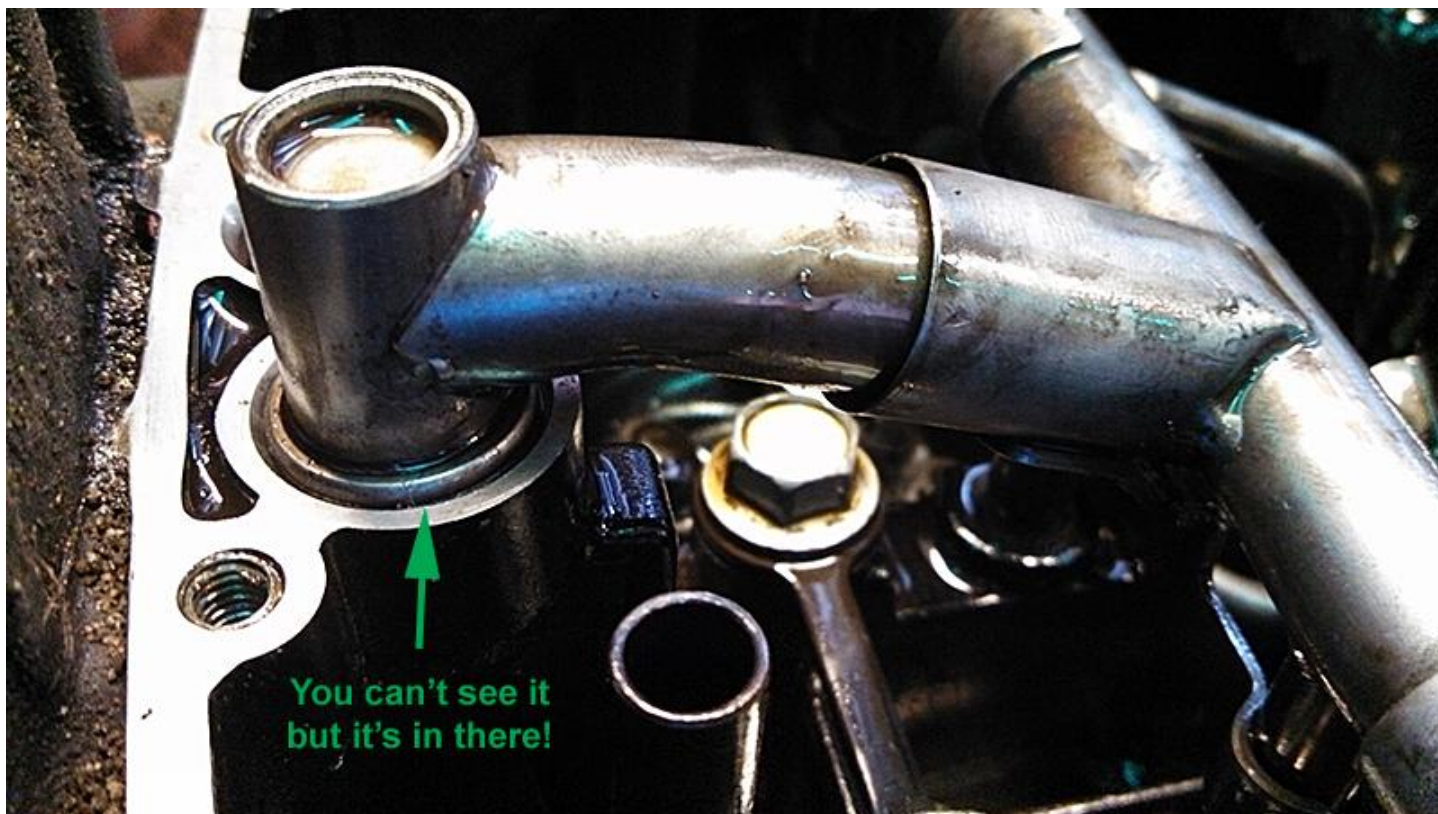


Put the spacer here as shown. Note the tube guides that keep it aligned properly to facilitate re-installing the oil pump assembly. And now you should re-install the oil pump assembly. Do not over tighten Allen screws. Some blue lock-tite might not hurt if you can de grease the bolt holes and the bolts without removing too much oil from around the area. Be sure to get all the pipes in the right place.



The photo above shows the oil distribution manifold removed, the old o-ring removed, and the oval cross section black Kawasaki o-ring installed. This one won't blow but be sure to oil it well before attempting to install it. Also make sure that the end of the pipe that it will be installed over is completely free of burrs so that it won't be scratched...or worse...cut. Carefully re-install the oil distribution manifold.





The photo above shows the oil distribution manifold re installed. Be sure to put the rubber bumper back on top of the tube the o-ring is sealing...or it won't seal anything. That bumper pushes against the oil pan when it is re installed and keeps the entire pipe from blowing out.

Check everything one last time and then replace the oil pan. Now it's time to re-install the clutch basket and the exhaust.

As I said, I really noticed a difference in the sound of the engine when I started it and when I rode it.

You won't be sorry you installed this kit!

Optional Shopping List:

You don't NEED any of this stuff, but I went to the trouble of removing the exhaust, the clutch basket, and the oil pan. My bike is a 1986 and I decided not to leave any old rubber o-rings in there after taking all that trouble.

1. 2 extra tabbed lock washers for the 30mm nut that retains the clutch basket. (You can reuse the one that is on there but I would never do such a thing. I built my Chevy's to drag race and you don't get sloppy in that arena.
2. 2 or 3 extra snap rings in all sizes that you will encounter. You can reuse a snap ring that is not bent by being removed but why would you take a chance on a piece that will be locked up inside the engine when you are done?
3. Extra o-rings for both ends of every pipe that you will remove and replace, except for the oval o-ring that comes in the kit.
4. The shift segment upgrade from Sean if your bike has the old style segment.
5. New square rubber grommets for the ends of the oil distribution manifold.