Rebuilding Yamaha Vacuum Operated Fuel Valves (Petcocks.)

THEORY of OPERATION: The way these things are supposed to work is this:

When the petcock is in the ON or RES positions, fuel flow is held "off" by a spring-loaded diaphragm seal. When vacuum from the intake manifold is applied to the smaller port (see pic below) the diaphragm lifts the valve seal off the seat and fuel flows (out the larger port.) When the valve is in the PRI position, fuel is free to flow all the time.

Problems develop when the spring-loaded diaphragm valve doesn't seal anymore, allowing fuel flow when it should be off; when the diapgragm gets a tear or hole in it and doesn't operate properly plus allows fuel to get into the vacuum line from the intake manifold; and/or when the valve itself becomes worn so that it leaks, either externally or internally.

The cure is to rebuild or replace. This is for those of you who wish to rebuild and have it actually work.

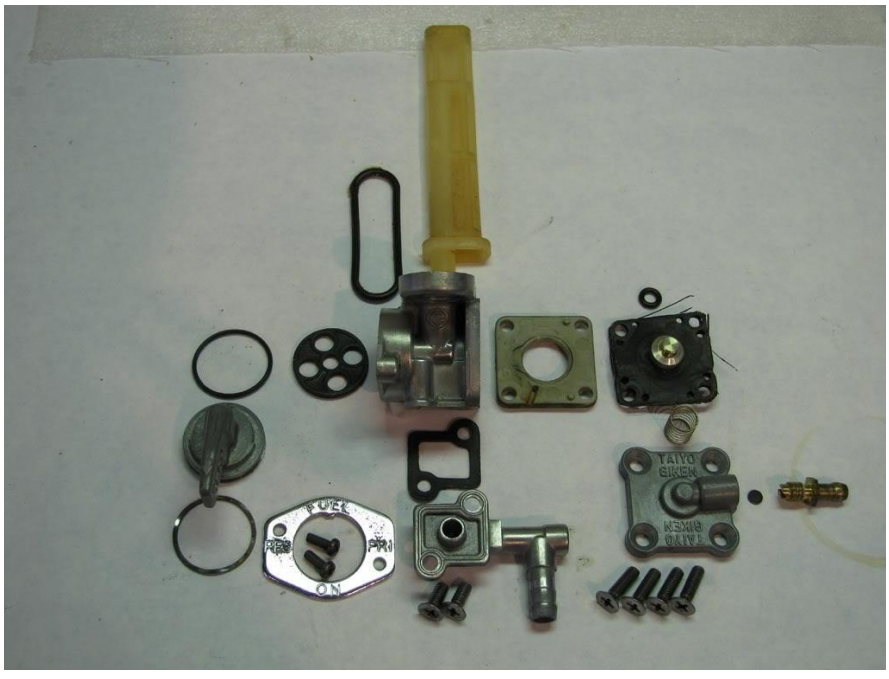
I bought this petcock off eBay for my 650:

It needs to be rebuilt.

Chacal sent me one of the larger ones from the 700s and 900s to rebuild at the same time. You will see both styles used in this article, differences and similarities will be obvious.

First thing we need to do is **disassemble it:**

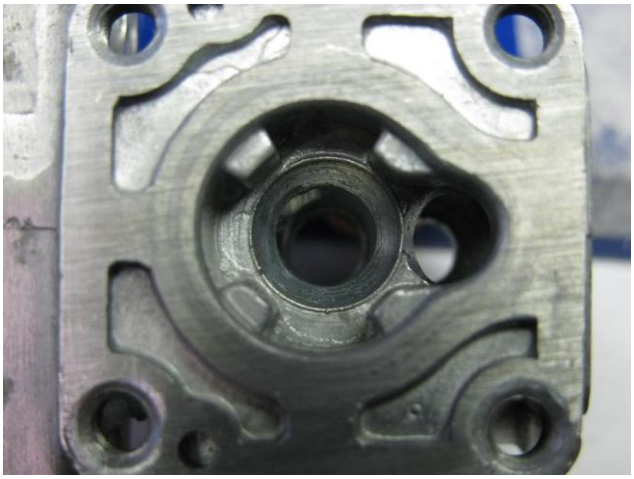
CLOCKWISE FROM TOP: Tank mount o-ring; In-tank filter; petcock body; diaphragm block; diaphragm (magic o-ring above it diaphragm spring; vacuum port/diaphragm chamber cover, with vacuum nipple and vacuum nipple check valve (tiny disc cover retaining screws (4 outlet pipe flange w/screws (2) and gasket; front plate w/ screws (2 wave washer; fuel lever; o-ring for lever; valve body seal.



The larger valve is substantially the same except its output pipe is integral:

Now that the valve is apart, we need to examine it carefully to **determine serviceability.** Close examination of the **valve seat** will tell us if the unit is rebuildable or toast.

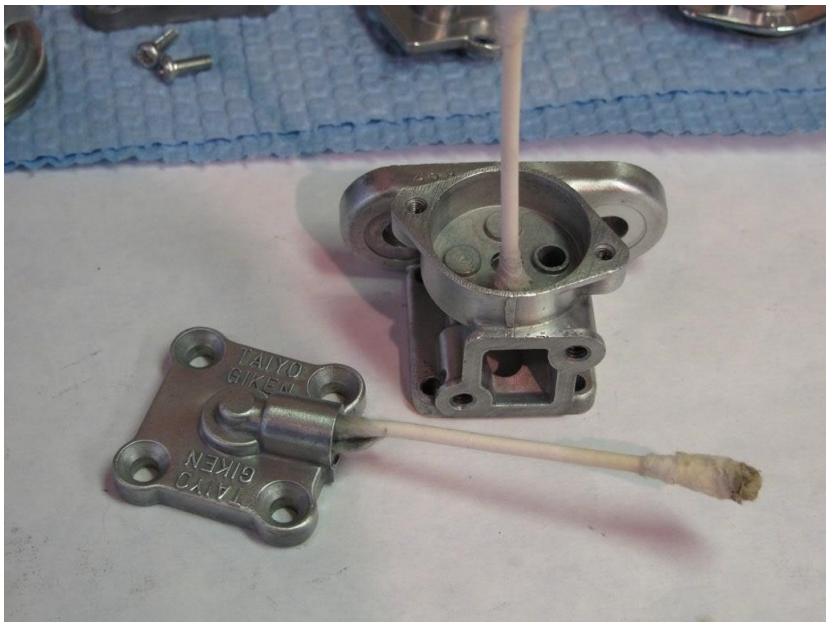
Salvageable seat:



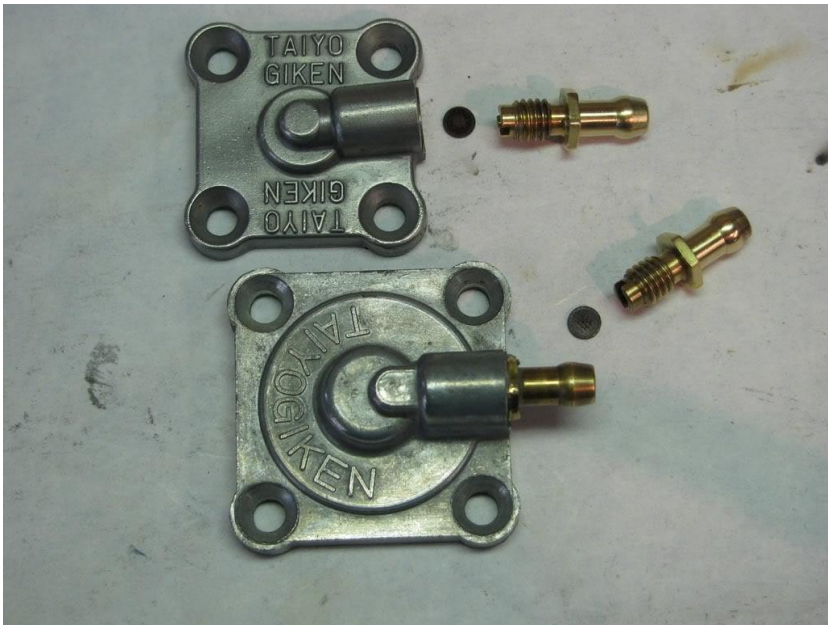
Although there is some minor pitting and wear, this seat can be polished out with no problem.

This one's junk:

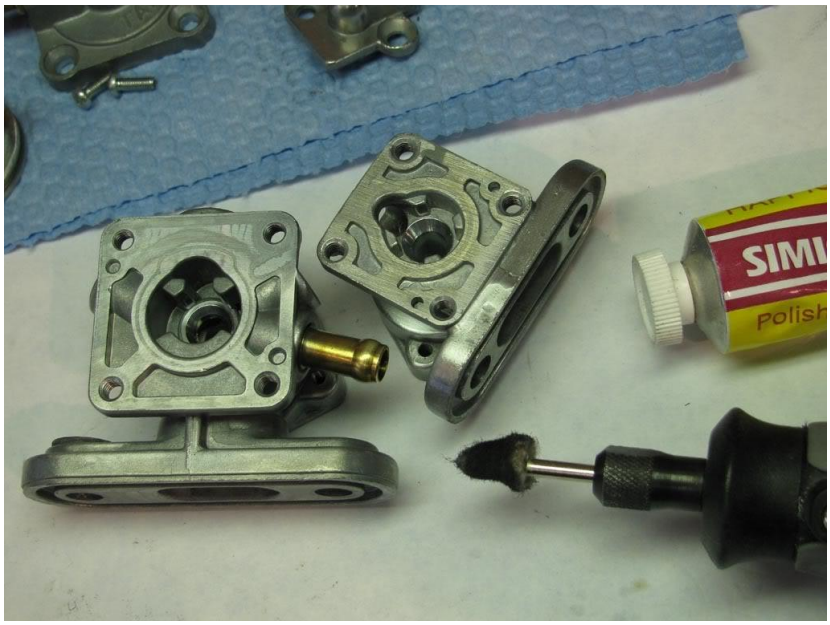
This valve seat is beyond any polishing. Deep pitting from corrosion has taken its toll, it's only useful as an example of a bad seat. Those craters aren't coming out.



So now let's begin rebuilding our petcock by getting **everything religiously clean,** using carb cleaner and some of my personal favorites:



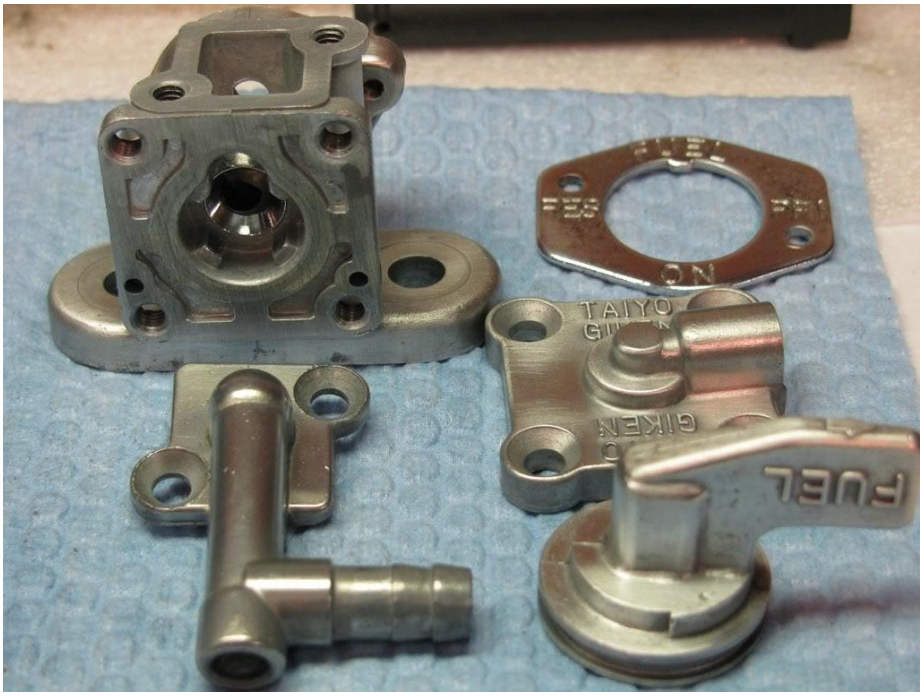
There's a **vacuum port check valve** (nothing more than a tiny bakelite disc) in the cover plate. If you can't unscrew the vacuum nipple, don't sweat it; just flush it out with carb cleaner from both directions, and make sure it's free in there. You can hear it rattle about, and test by blowing in the port.



Once we have everything clean, let's begin the refurbishment by **polishing the valve seat:**

I use my Dremel, but you could use a "button" in an electric drill, or do it by hand using an industrial-sized wooden stalk Q-tip.

Once our seats are polished and the parts all flushed clean, we need to **clean up all the mating surfaces.**



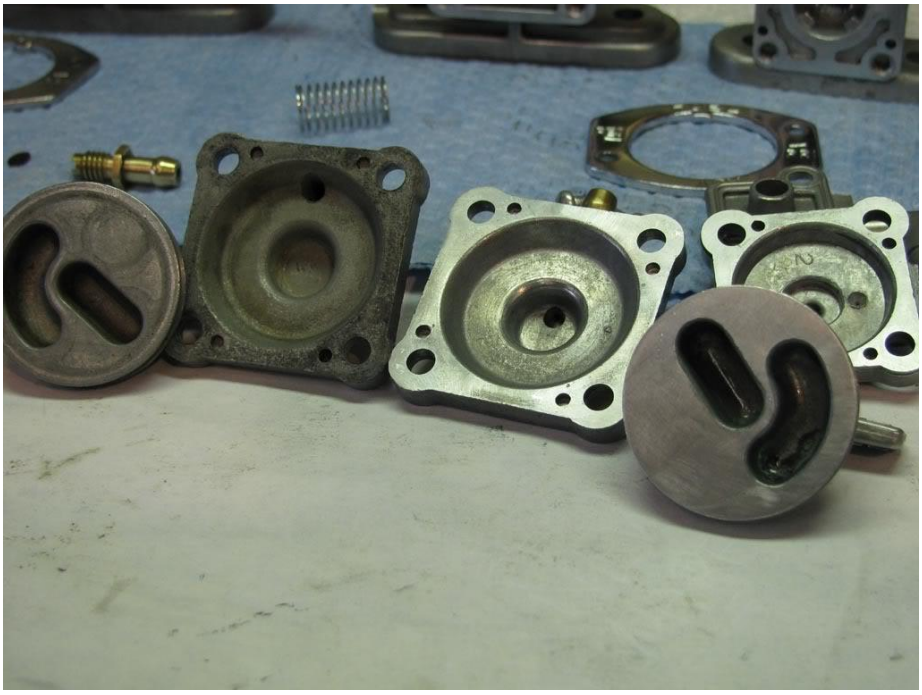
That includes the surfaces for the diaphragm block and cover; the outlet plate mating surface on the body (if so equipped the flat side of the fuel selector lever and the tank mounting flange.

This simply won't seal well if reassembled as is:

This needs to be "dressed" as well, even though it looks "OK."

Use anything from **800 to 1200 grit wet-or-dry sandpaper on a flat surface.**

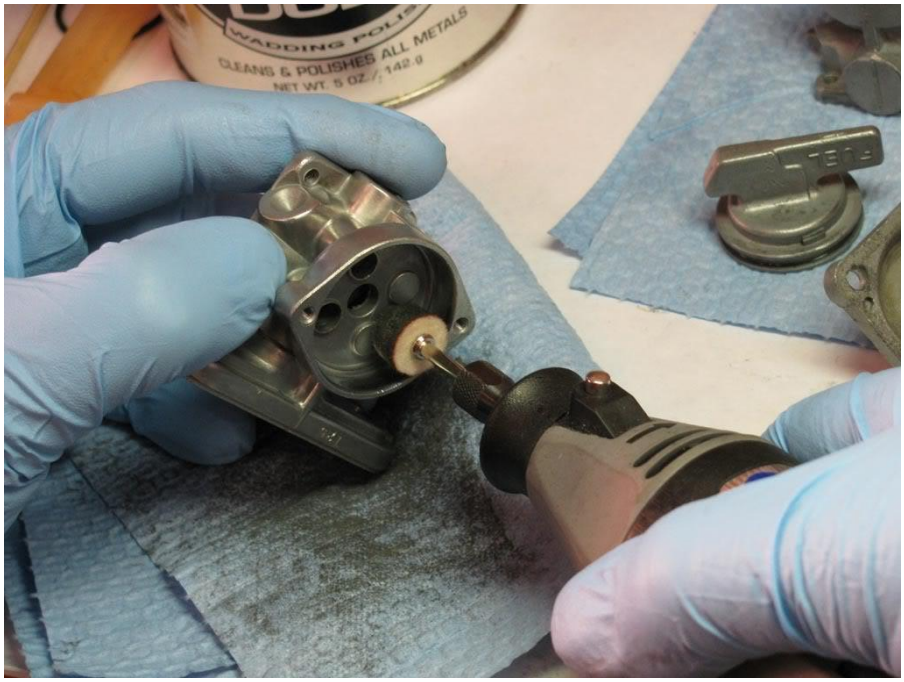
You can tape a hunk to a small piece of glass; I use the little surface plate on the back of my bench vise:



Here's a "before and after" of dressed versus untouched mating surfaces; the parts that have been cleaned up will seal much better than the unsanded ones.

See how nicely the valve I'm holding in the pic a couple pics above turned out?

Now we need to **polish the o-ring seating surface** to remove any "wear rings" that might be present, and give the new o-ring a nice smooth seat:

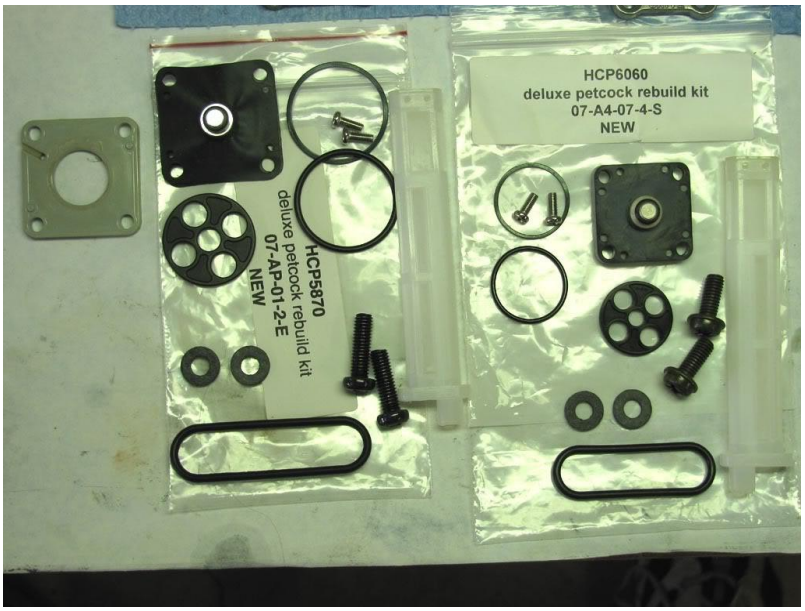


Once again, I used my Dremel but I also did one by hand. Either way was equally effective, doing it by hand just took longer is all.

Now that we have our valve seats and o-ring sealing surfaces polished and our mating surfaces dressed, **flush everything thoroughly with carb cleaner,** scrub with an old toothbrush, Scotchbrite, or whatever you want to get everything *sparkling clean*.

Now we're gonna need some PARTS: I know this seems like a shameless plug, but **chacal** is the best source out there for this stuff; a lot of the other kits on the market simply don't work.

The big-body petcock kit is on the left (NOTE it DOES NOT include the diaphragm block, you will need to re-use the original) and the "standard" kit on the right (its diaphragm includes the block.)

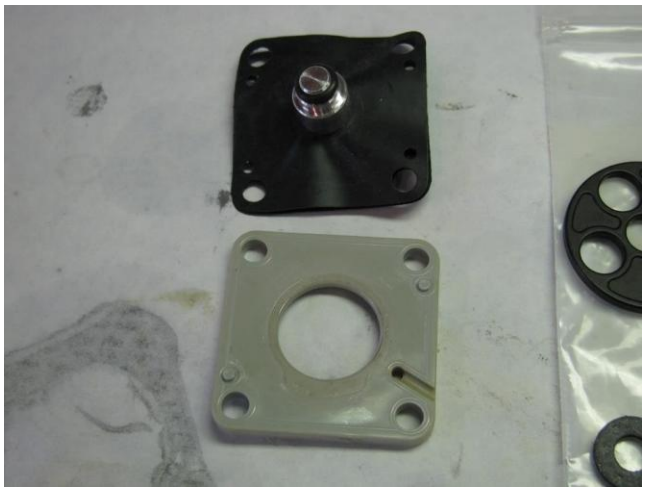


REASSEMBLY TIP: When you put the vacuum check valve and vacuum nipple back in the diaphragm cover (if you took it apart,) put a dab of RTV on the threads of the nipple just in case. *A TINY DAB and just on the threads we don't want to glue the little valve flap in place.*

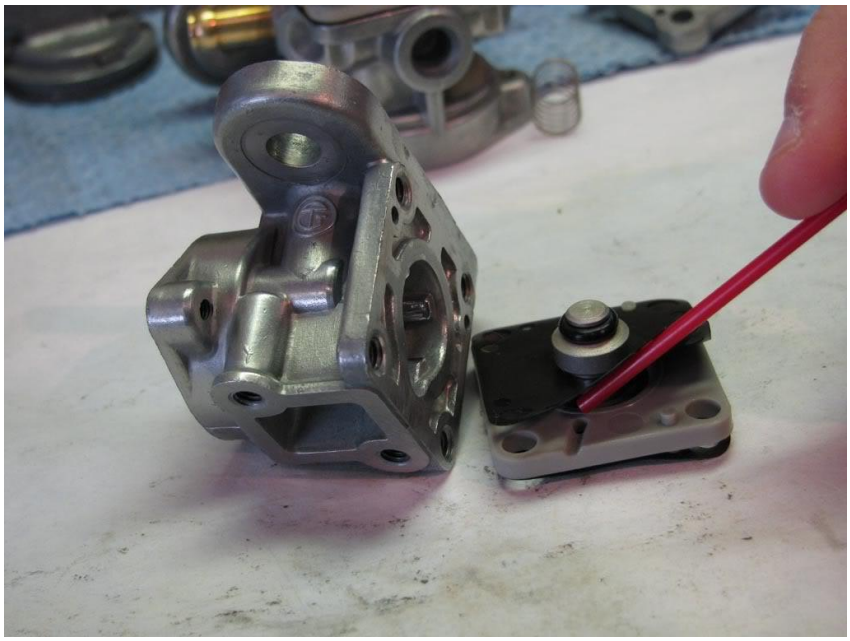
Now let's start by giving all the rubber parts a sparing wipe with silicone grease, and let's get the diaphragm ready to go on.

DIAPHRAGM ORIENTATION:

The "business" (valve) side of the diaphragm assembly

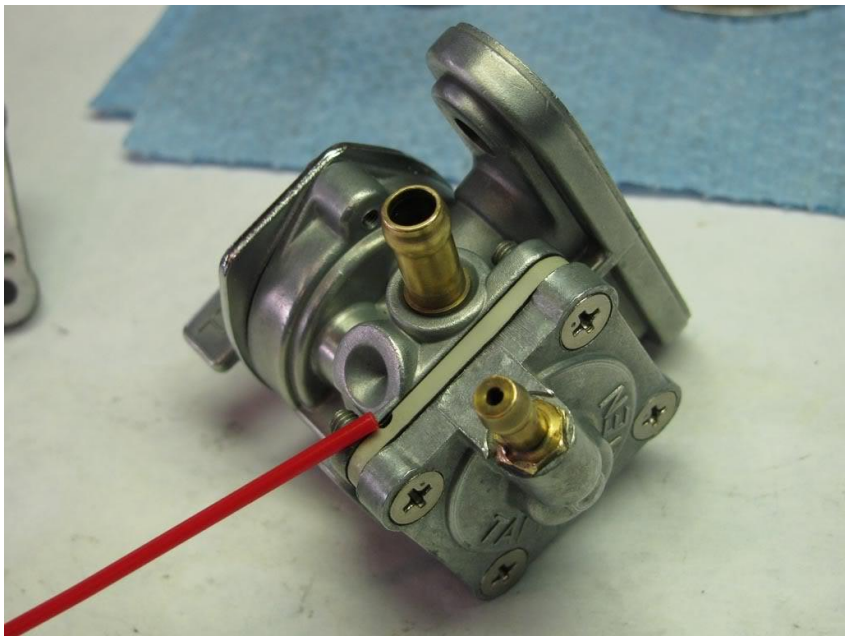


The backside (spring side) of the diaphragm:



Note **this passage** on the valve side of the block:

You can see it in the pic of the big-body diaphragm block above; both styles have it.

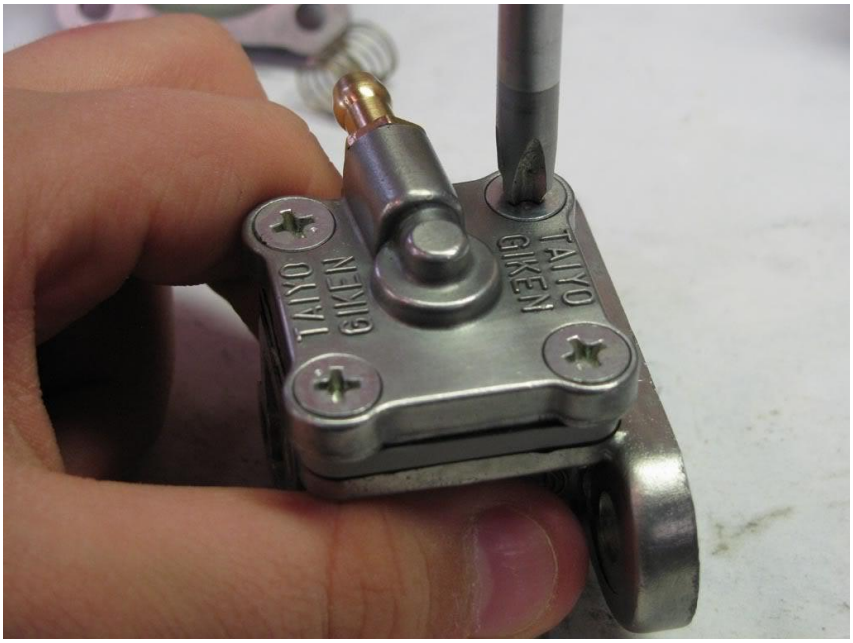


The passage goes pointing down and toward the rear when the petcock is on the bike: The orientation is the same on both styles:

A word about **diaphragm springs:** Both styles of replacement springs are slightly longer than the originals:

In both pairs, the replacement springs are on the left. You can also use a **washer** as shown to increase spring tension and improve sealing; but if your seat is in good shape it should not be required.

Set the spring in place; and go ahead and install the cover.



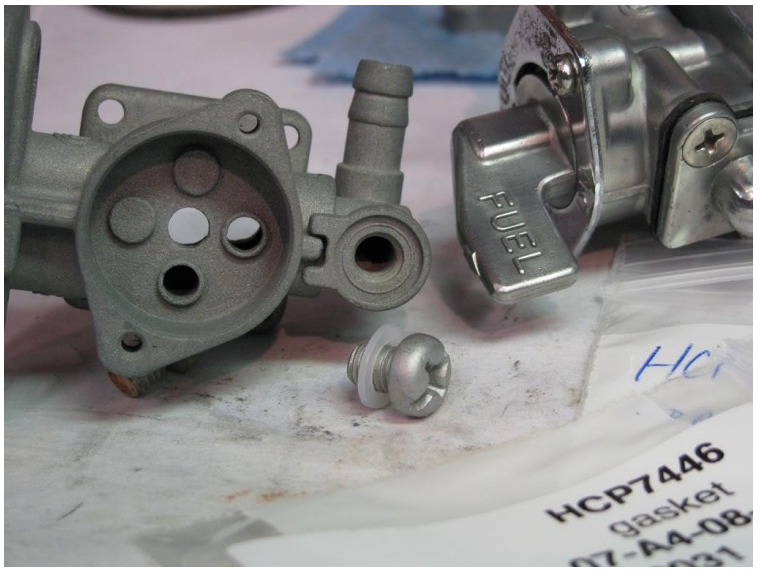
Snug down the screws; then gently poke the stem of one of your q-tips in from the front and lift the valve off the seat and let it return a couple of times; "orbit" the cover/diaphragm assembly around a little bit so it all seats nicely.

Then tighten up your screws. **Be sure you have the passage in the diaphragm block positioned correctly.** (See above and below.)

For the petcocks so equipped, **fit a new output pipe flange gasket,**

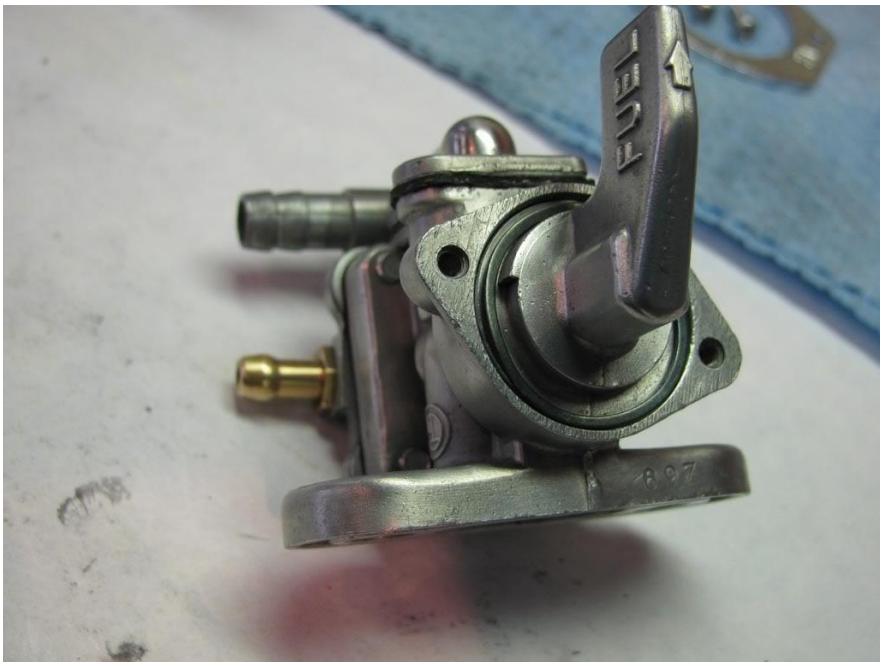
And **install the output pipe flange;**

Some styles of petcock have a non-removable outlet pipe; some of the "standard" petcocks have a drain screw rather than a removable pipe; a new gasket here would be a good idea (and a new screw if corroded.)



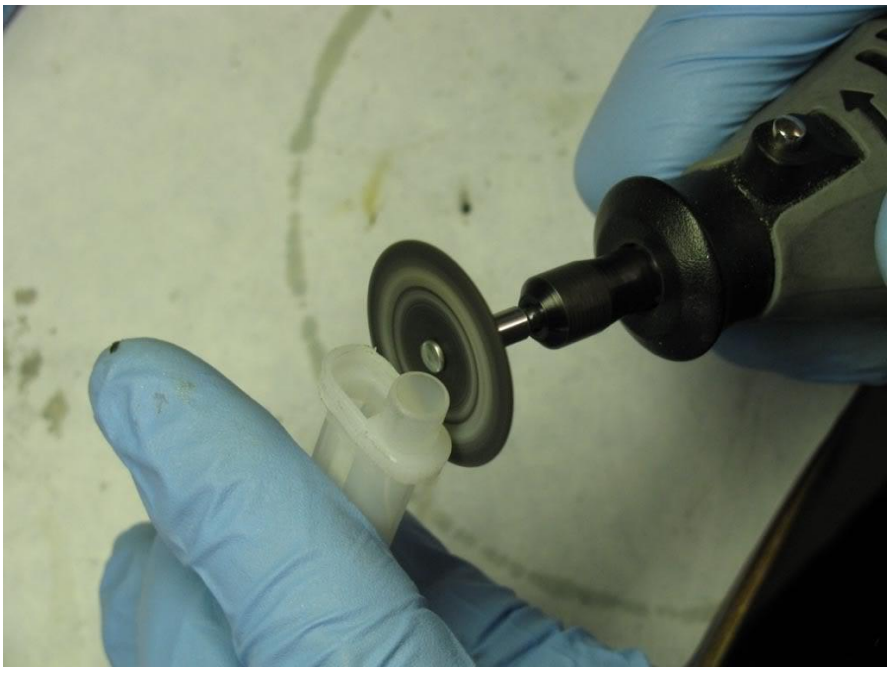
Now let's **install the valve body seal** be sure to smear it *sparingly* with silicone grease too:

The bigger petcock is the same; be sure you **install the new o-ring** on the valve lever flange;



And go ahead and **install the lever** (be sure you lubed the o-ring) by rotating it into place;

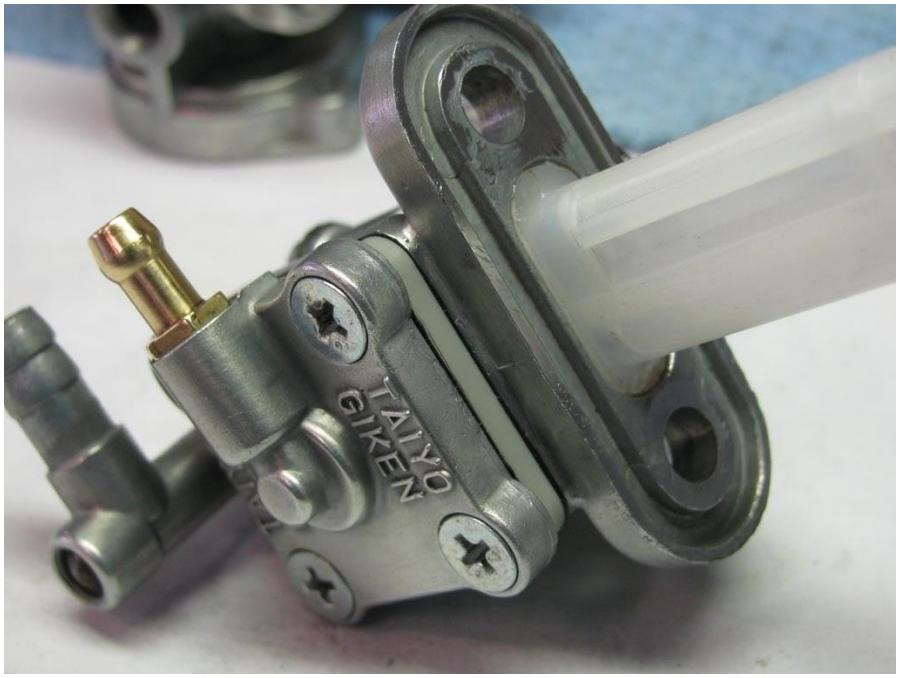
Don't forget the **wave washer** on the front; then go ahead and **install the face plate** as well.



Now we need to **install the in-tank filter standpipe.** The base flange of this part will need to be filed or ground down slightly to be able to fit flush. Once again, I enlisted the trusty Dremel:

This can be accomplished with a sharp fine flat file as well.

The **filter pipe MUST fit flush** or even slightly below the surface of the petcock body, to avoid interfering with the installation of the petcock on the tank.



Place the petcock body on your bench and press the (now recontoured) standpipe down into the petcock by pressing on both sides of the oval; it will "seat" fully and fit as pictured.

COMPLETED. **Be sure to use new sealing washers** (they are a special steel-mesh/composite) when refitting the petcock to the tank.

It's a good idea to fit an **in-line fuel filter** ASAP, the in-tank unit you just replaced is only effective down to a certain size particle.

Chacal offers these fuel filters and clips; seeing your choices always helps decide what will fit your bike the best.

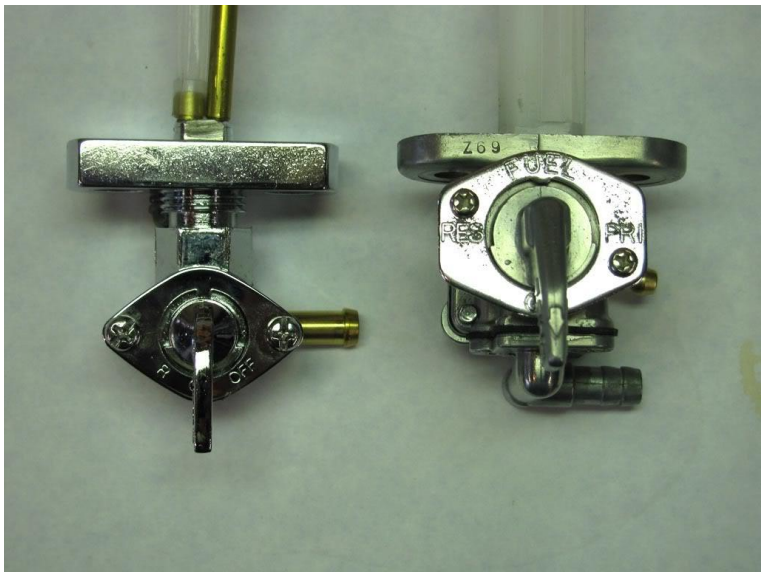
Different color fuel and vacuum lines are also available if you want to personalize your bike.

ALTERNATIVES TO REBUILDING: You can replace the petcock with a modern, vacuum operated unit (these are the same replacements offered by Yamaha) or eliminate it altogether by installing a simple on-off fuel valve:

L-R, BACK ROW: Stock valve (we just rebuilt "short" Aftermarket/Yamaha unit HCP625; tall modern unit HCP626.
FRONT ROW: On/off replacement fuel valve kit contents; "tall" stock "drain plug style" unit for comparison.

I have the HCP625 on my Black '83 since I was not all that concerned about stock appearance but wanted to retain the vacuum-operated feature.

Side by side comparisons of the (non vacuum) simple ON/OFF replacement valve and the stock valve:



I'm not advocating replacing the vacuum operated petcock that came on your bike; I just wanted you to see the alternatives that are available.

AS ALWAYS, THIS POST IS A "WORK IN PROGRESS." Suggestions and comments are welcome; if there is anything you would like me to add or expand on please say so.

Ride safe--- Fitz

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