CHANGING YOUR HITACHI THROTTLE SHAFT SEALS

(Or, how I stopped worrying and learned to love my carbs)

PREFACE

This writeup deals with the Hitachi HSC-32 carbs only, seen on the XJ650 non-Turbo and the XJ750 models. I'm told the HSC-33 model is similar, but is different in the placement of the fuel rail tubes and such. If you're unsure which model of carb you have, check your manual.

Also, this writeup is not intended to provide detailed instructions on breaking down and cleaning the carbs; there's another article for that already. We're here just to change the throttle shaft seals (and the fuel rail o-rings while we're in there).

Speaking of cleaning, that brings me to another point. You'll be wanting to make sure you can identify which carb body is which; I've been advised repeatedly to mark the relevant parts (carb bodies, butterflies and such) with a scribe or some sort of etching tool. The reason for that is this: one can certainly use a Sharpie as I did, but the markings aren't as "permanent" as one would like to believe, especially if you do indeed decide to clean things while you've got the thing apart. One good blast from any decent carb cleaner, and you won't know which throttle shaft goes where. I didn't want to scratch mine up, so I settled for handling the parts carefully and keeping them segregated.

Things you will be wanting:

A set of good-fitting screwdrivers. Stripping the screw heads is a Bad Thing[tm].

Loctite for the bracket screws and butterfly screws when you reinstall them.

Anti-seize compound for the rest (carb hats and float bowls).

Lastly, you'll note that the carb sets look different about halfway through. I started with my spare set (seemingly from a Midnight Maxim) for the breakdown, and switched back to my working set for the reassembly.

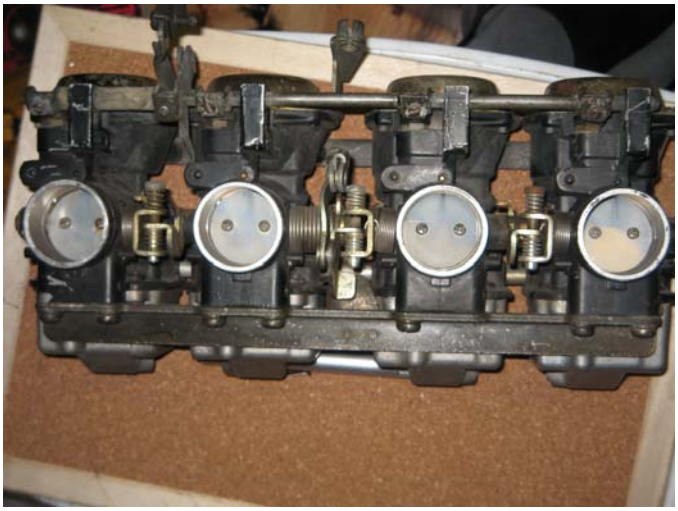
BREAKING THE RACK

Need to change out those pesky throttle shaft seals? You've read that taking it apart can be an adventure, not to mention putting it back together right? Rest easy; it's not nearly as difficult as it seems.

First, we'll start with the disassembly. Before you say anything, I know the float bowls are mounted wrong, some of the screws are missing, and the hats look like crap. This is a spare set I bought just for practicing on.

Airbox side of the carbs

Left-hand side of carb #1 (note the e-clip)



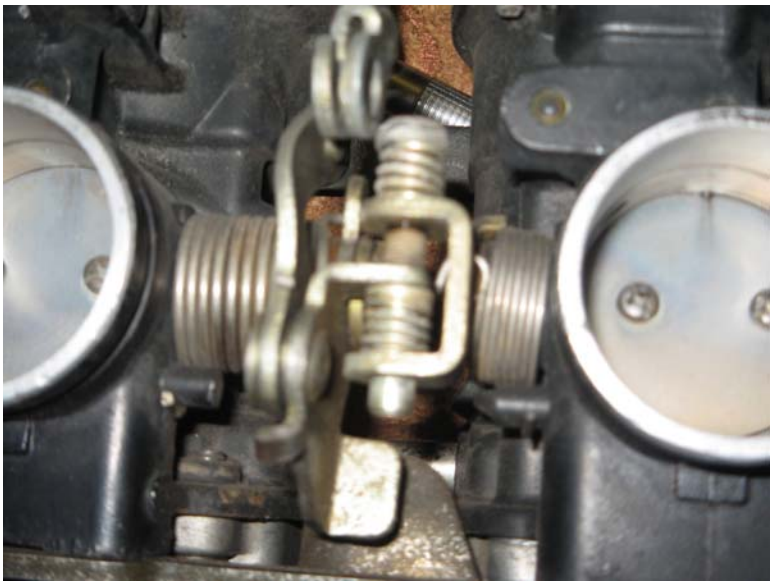
Manifold side of the carbs, showing the butterflies

The float bowls and the bottom mounting bracket

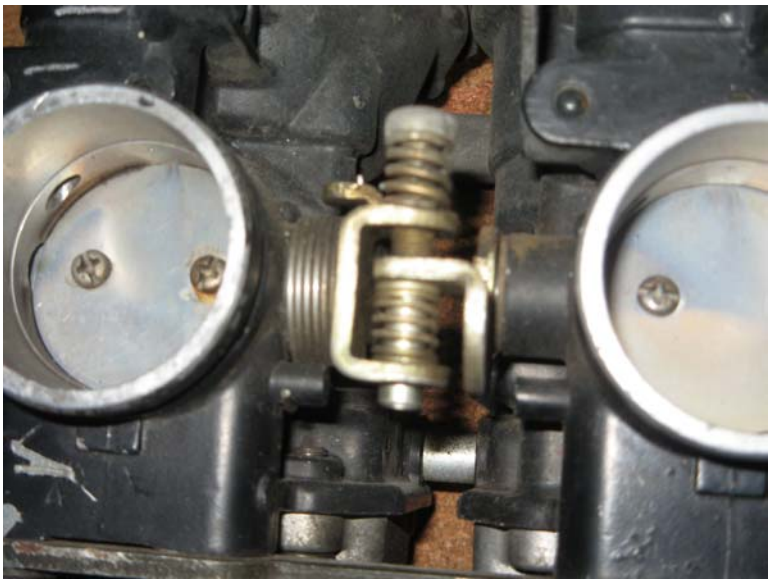
Right-hand side of the #4 carb, showing the other e-clip

The next three show how the carbs work together; the sync screws, the studs/springs, and the little arms that come off the throttle shafts. Knowing how they're mounted now will help you put them back together later.

1/2 sync screw



2/3 sync screw

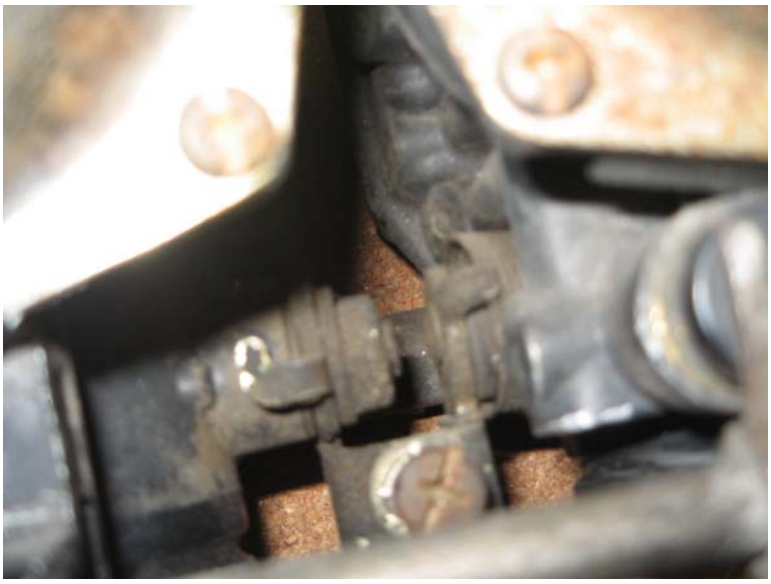


3/4 sync screw

Here we see how the throttle shaft spring hooks onto a little stud.

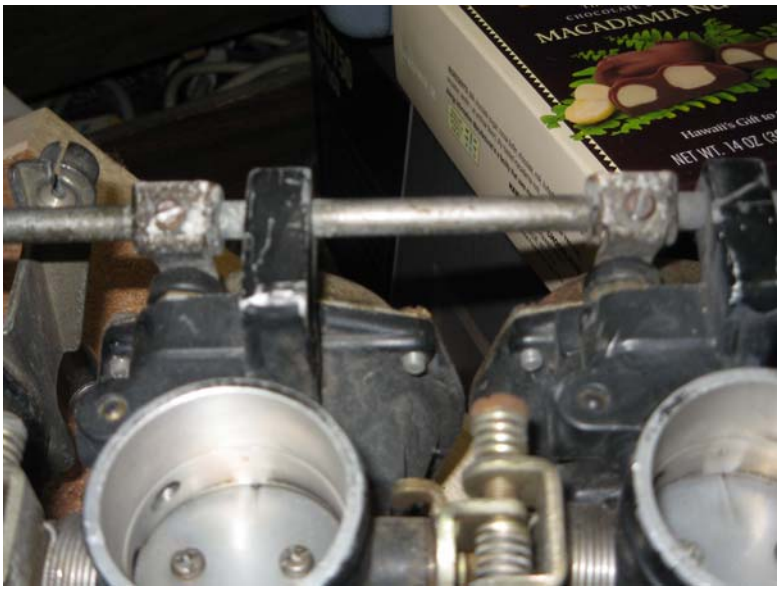
Here too – the #4 throttle spring shown here.

I tried to get some decent shots of the throttle shaft spring, plus the sync screws from above the rack.



Outside Sync screw

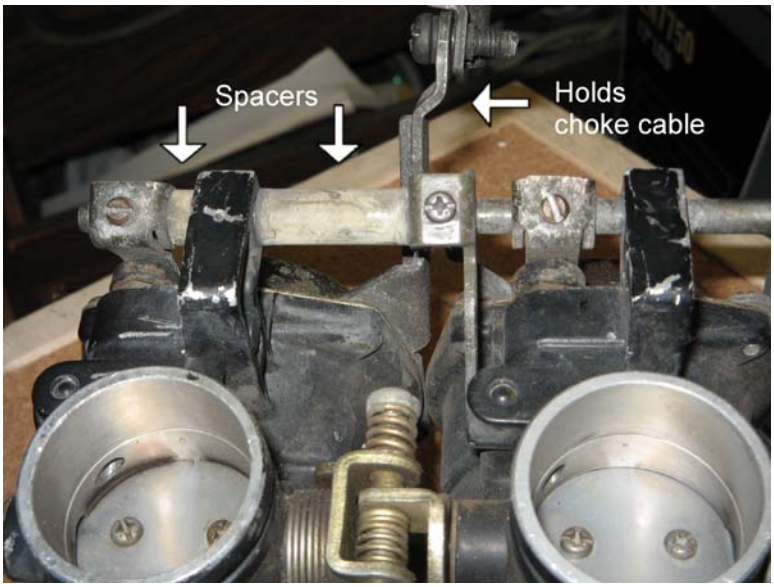
2/3 Sync Screw



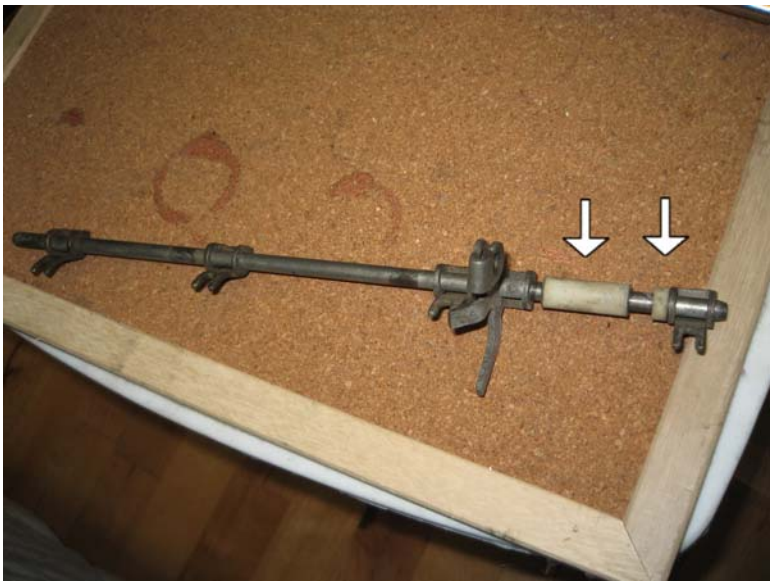
Starter plunger shaft. Four levers with their set screws, one screw that goes all the way through the shaft, two spacers, and the doohickey for holding the choke cable.

Over 1/2

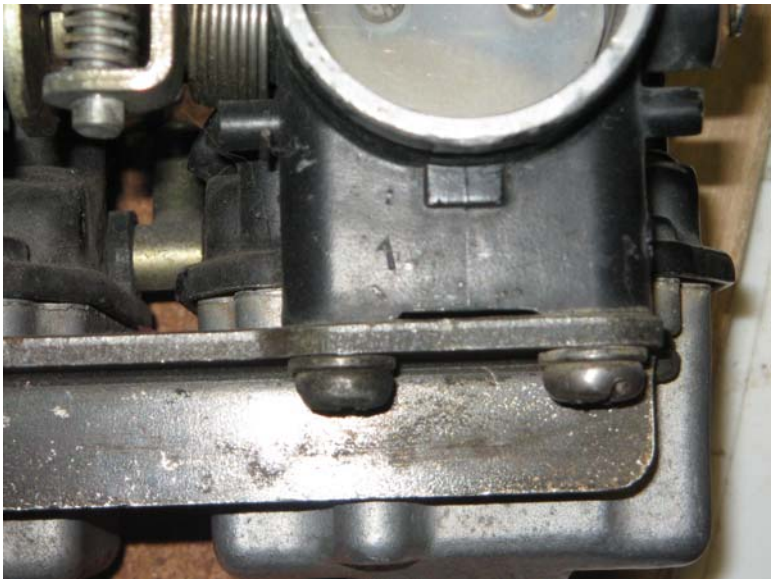
Over 2/3 (note the bracket up top that holds the throttle cable)



Over 3/4 (Note how the spacers and such are arranged)



Here's a shot of the shaft removed, #4 side on the right. Again, note the spacers.



Some carb bodies might already be stamped with their number

The other two (Fig 19) aren't. We'll have to come up with some way to tell them apart.

Now we get down to business. Let's start taking stuff apart.

Hey, Ma, there's a slinky in my carb!

Here's some more!

The springs and diaphragm/pistons are out

...and the starter plunger shaft is off. It's not necessary to completely take the set screw out; the better to keep track of.

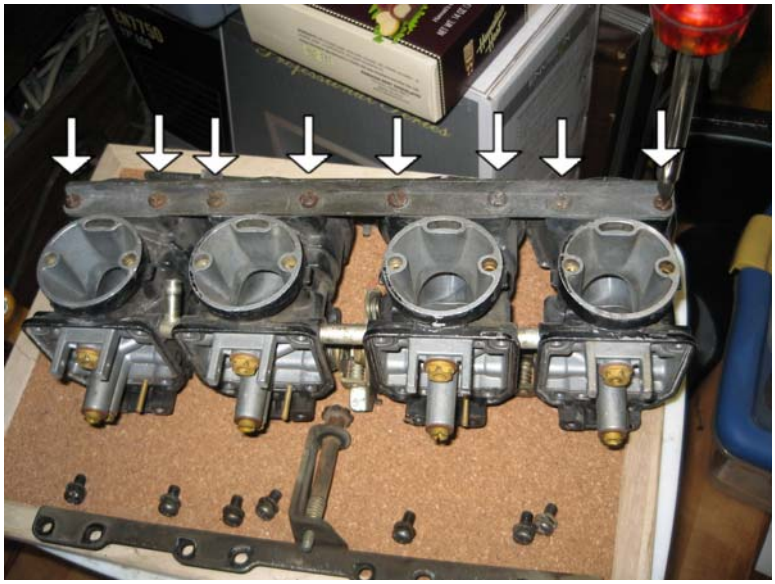
A better view of the sync screws and springs

Removing the bowls, floats, and needles is next. You probably don't want them flopping around while you're trying to separate the carb bodies. (Actually, we probably don't really need to remove the pistons either, but Paranoia Pays, right?)

Back off the tension from the sync springs; the easier to pull them apart later

Remove the mounting screws from the bottom bracket

Bottom bracket removed. Note the idle adjusting screw.



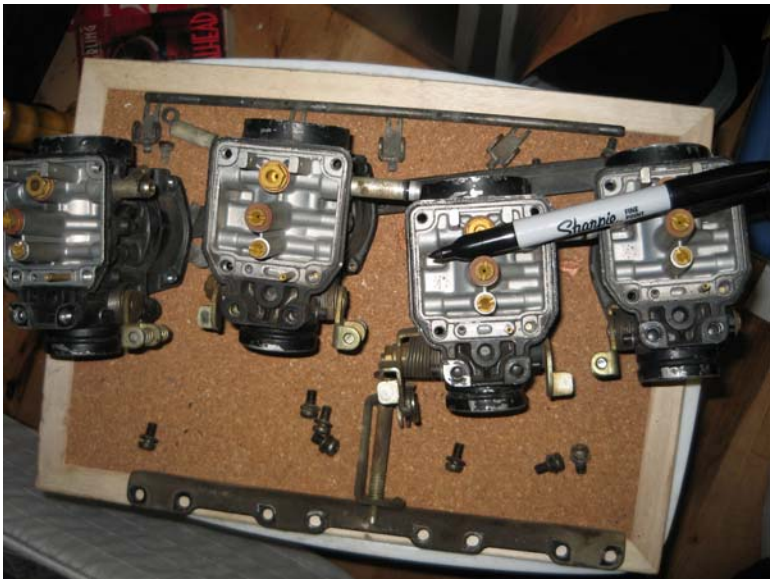
Next, the upper mounting bracket

The upper bracket is off. Boy, we're making a mess, aren't we?

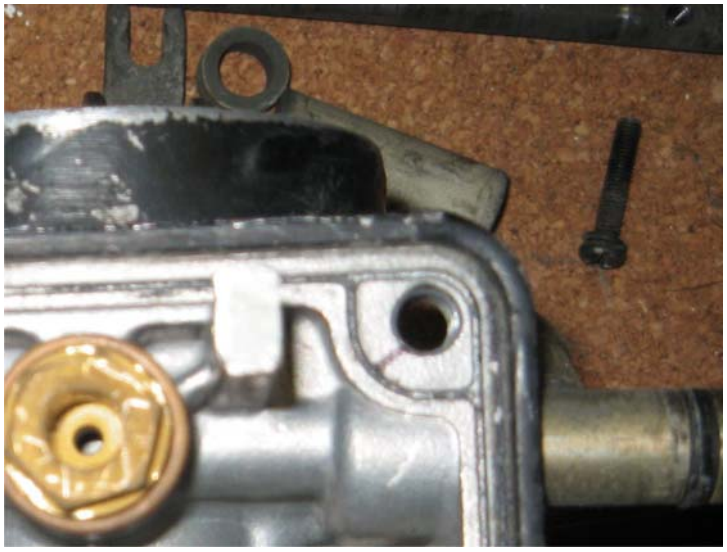
Grab your carb by the hand...

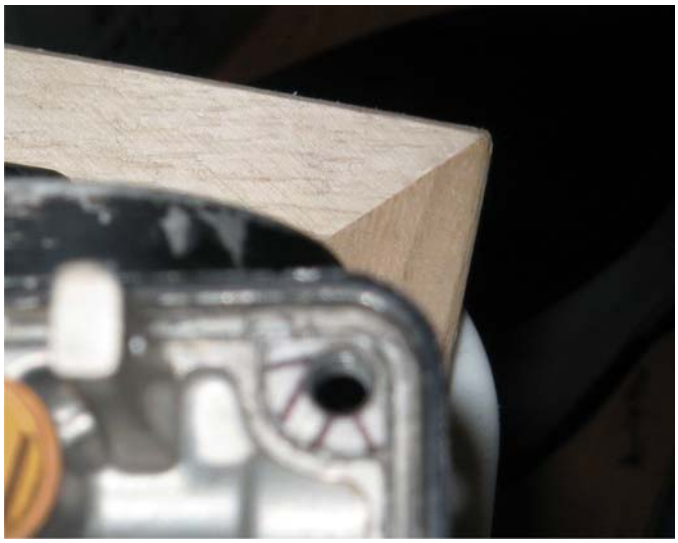
... do-si-do and promenaaaaade... er, twist and pull sideways.

All apart!



Did we mark our carb bodies yet?

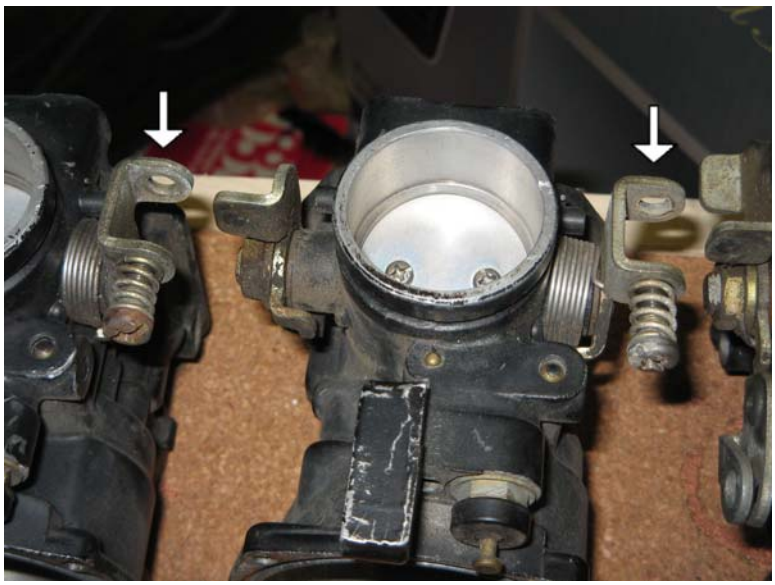




Here's how we'll tell them apart. Another way might be to mark the tube extending down that the main float jet bolts into.

The fuel rail tubes (with o-rings) and the little studs/springs from the bottom part of the sync screws. Don't lose them!

Closeup of the fuel rail tubes. Remember: the long one goes between 2 and 3.



The holes that those little studs go into

Remember that e-clip on the end of the #1 carb body?

We wiggle it off with a flat blade screwdriver

The shim comes off next

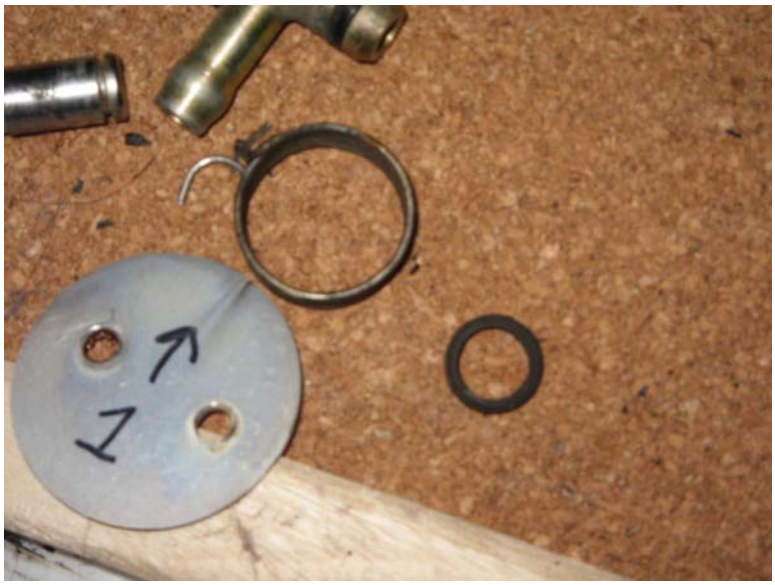
Mark your butterflies; where they go and which way is up

Unhook the spring from the throttle shaft

Remove the two screws holding the butterfly to the shaft

...and slide out sideways

Probably a good idea to mark the throttle shaft, too. Note the other shim and seal still on the shaft



The butterfly, throttle shaft spring, and outer seal

For the inner two bodies, the nut holding the shaft in wants a 12mm wrench/socket

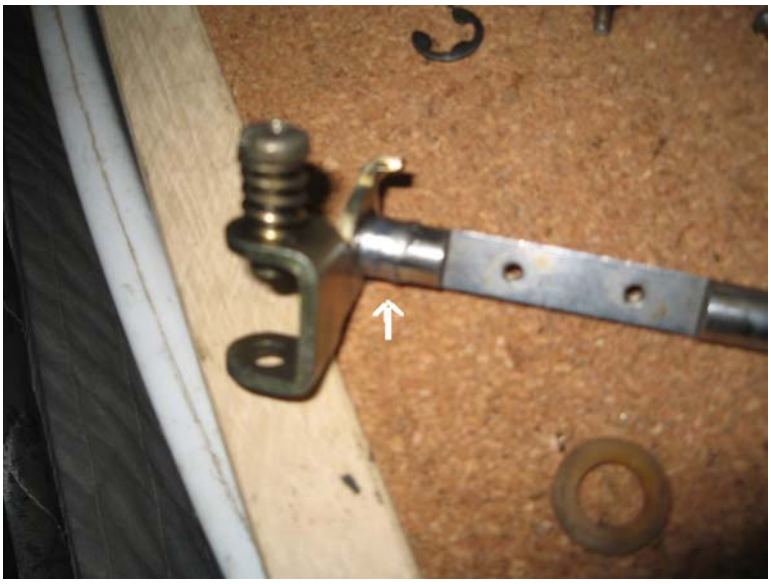
Off they come. Removing the bits (and the shaft) might take a bit of... well... “ convincing".

Out comes the seal (which is the reason we’re doing this in the first place, right?)

Voila.

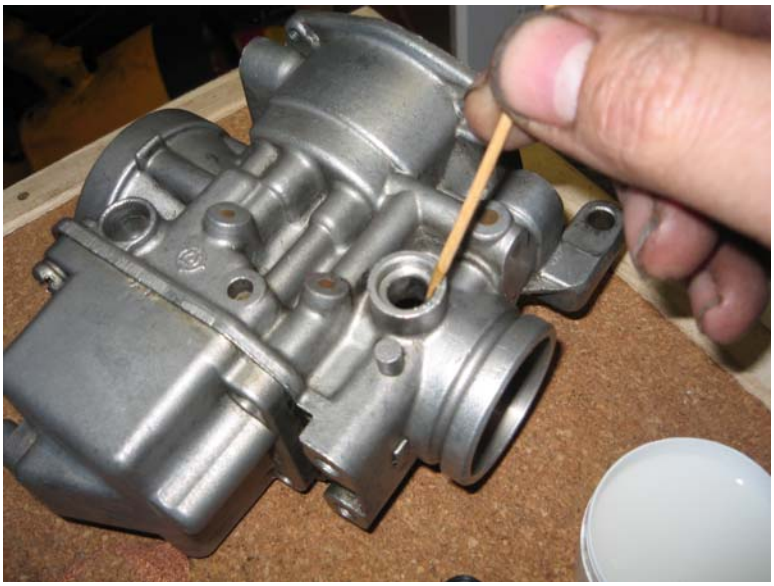
Switching back to my (somewhat cleaned up) working set now. Note that I've reinstalled the float bowl; it's been suggested to keep it bolted on to protect the float pillars from damage.

All the bits ready to go back in. Note the little tub of silicone grease.



We put a thin layer of grease on the shaft...

...shim first, then the new seal



Add a thin coat to the seat on the other side

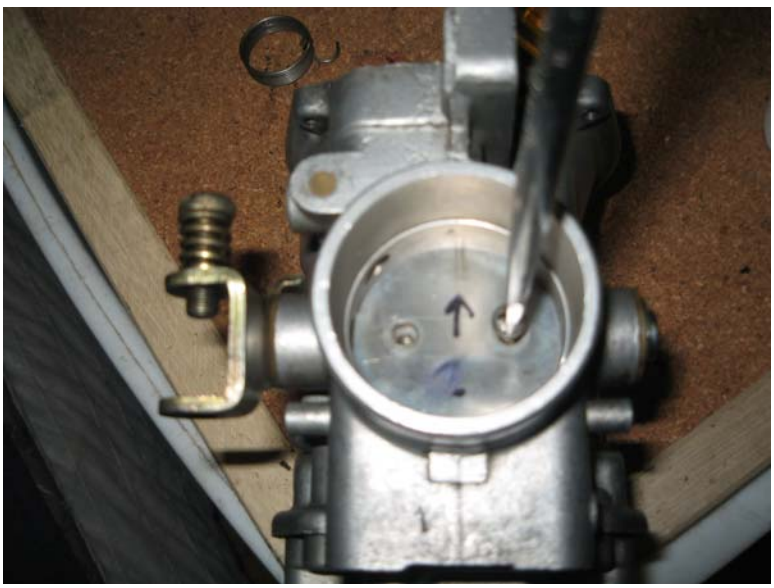
Insert the shaft, then add a thin film of silicone grease to the shaft

Other seal goes on. Press it down so that it sits flush with the body.

Shim goes back on next

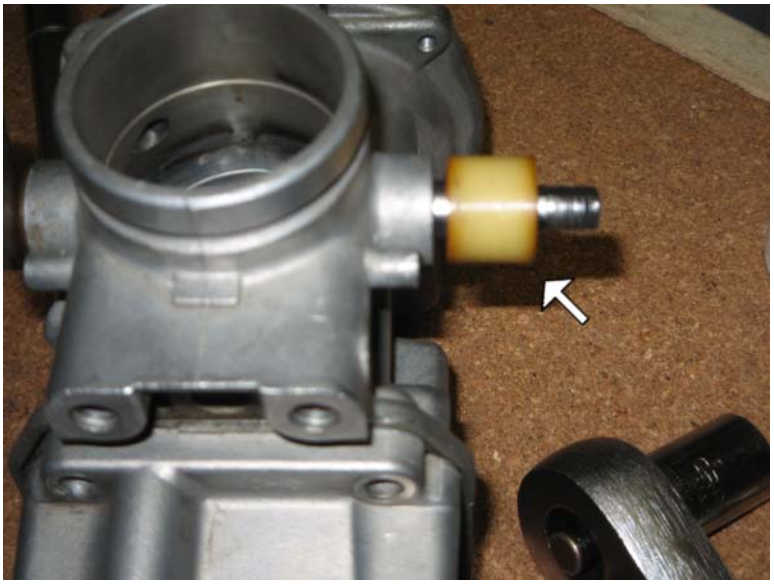
Finally, the E-clip.

Put the butterfly back in



Reinstall the screws (remember that Loctite?)

Then we pull the %$@*! thing back apart because I forgot to put the blasted spring on



When you get to the #3 carb, don't forget that instead of a shim on the one side, it uses a largish spacer

The spring goes over top of that

Followed by the throttle cable linkage

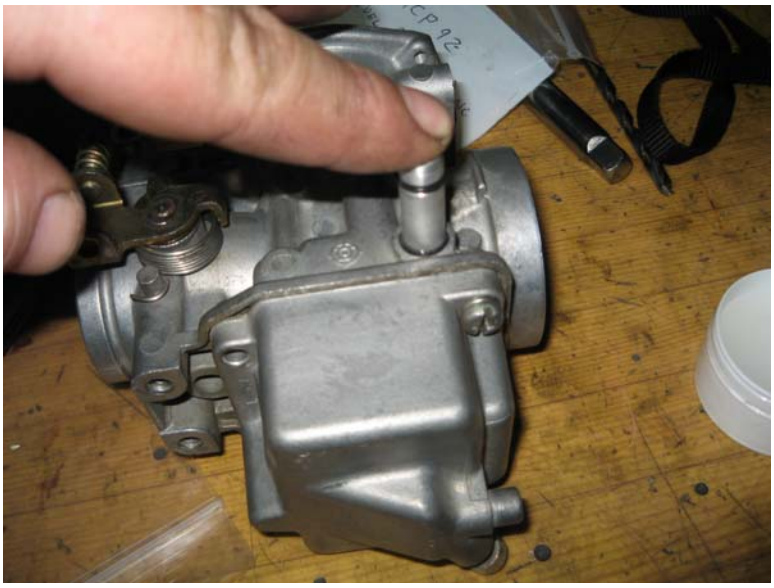
Next up: fuel rail

A light coat of silicone grease in the groove that the o-ring goes into

Press the o-ring onto the tube

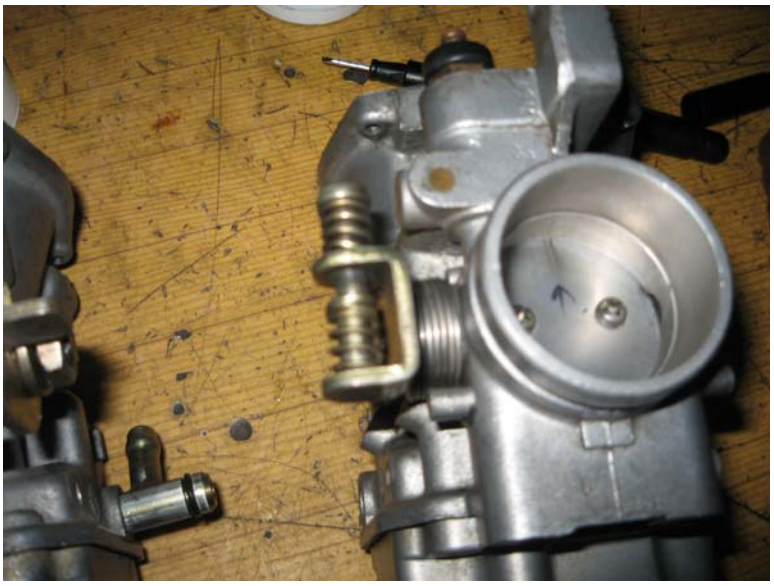
Task complete.

A thin coat in the hole where the tube goes...



...and press in the tube

Ready to go



Stick the stud and spring back in the hole and put some tension on it

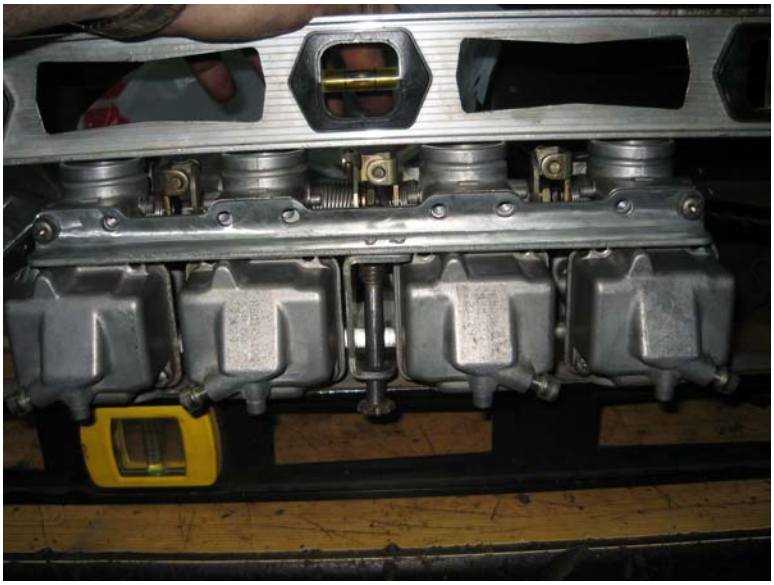
Slide the tab from the neighboring throttle shaft between the adjusting screw and the stud

Press the other side of the fuel rail tube into the other hole

Once they're all together, now we get to line them up. We don't want the carbs pointing in different directions, so the idea is to put the mouths on something flat while we put on the mounting brackets.

You can use a pane of glass, or if you don't happen to have any lying around, the edge of a level should suffice.

Line up the lower mounting bracket like so



Use something (a block of wood or another level) to gently press down on the other side of the carb bodies and start adding screws from the outside in (and there's that Loctite thing again)

Flip the assembly over and repeat with the top bracket... and you're done!

Congratulations - the hard part's over. Just finish bolting everything else back together, bench sync and reinstall. Have fun!