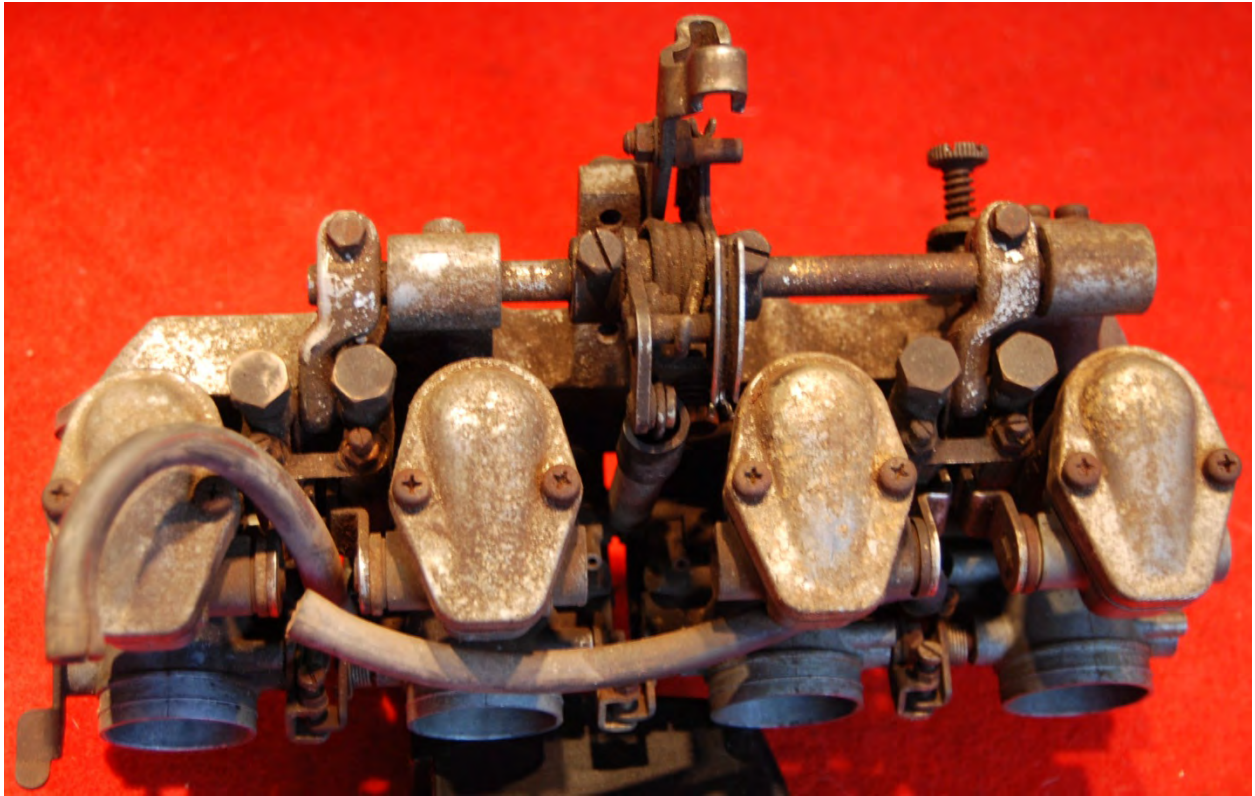


## REBUILDING KEIHIN CARBURETORS



**KEIHIN CARBURETORS (marked 087A and used on 1976 HONDA CB550) PRIOR TO RESTORATION**

There is a wonderful sense of satisfaction at the end of a carburetor re-building/restoration project. You step back and look at your work: the glitter of the polished brass, the soft reflections of the polished aluminum, the bluish hues of the anodized bodies, the perfect symmetry of the assembly, the stunning complexity and the freshly acquired knowledge of what all these things do and how they do it that seems to be worth all the time and expense. Do it.

However, before jumping ahead with all the necessary enthusiasm and dismantling all 300+ parts comprising the set shown above, the following may need to be given some thought:

**TIME:** If you are doing this for the first time and do not have all tools and materials, and can only work on weekends, it is likely a restoration project like this may take you up to a month to complete.

**MONEY:** Rebuilding a set of 4 carburetors is expensive. Parts alone will cost over \$200 (assuming you can re-use the jets but will be replacing gaskets and O-rings (\$15 per carb) and the valve seats (\$25 per carb) and all hoses and fasteners). Chemicals such as Carburetor Parts Cleaner, WD-40, gasoline, GUNK degreaser, etc. sand paper and polishing compounds will add another \$50-\$100 to the project's cost. If you do not have all necessary tools and some basic workshop tools such as a bench grinder, vise, drill, air compressor, etc., the task might be a little too big to undertake.

THE ALTERNATIVE: Should time and money become too much of an issue, an excellent alternative would be to purchase a set of rebuilt carbs from professionals who do this for a living. You will find some great choices on eBay. I'm very impressed by the work of *carburetorkeith* whose gorgeous looking and ready-to-install sets of carbs sell for \$550 - \$575. Take a look at his work. If you insist on having your bike's original carbs re-built and restored, you may want to consider looking up *harisuluv1* on eBay and look at his excellent work. In all cases, ask a professional rebuilder if their price includes new float valves and seats. If it does not, it's worth paying the additional \$100 or so. You don't want to get your carbs rebuilt and restored only to find gasoline pour out of the overflow tubes when you mount them on your bike.

Well, if you really wanted to do the job yourself, I hope the procedure below will be of some help. Let's take those puppies apart.

## DISASSEMBLY

### CLEANING:

Thoroughly clean the carbs' assembly using a stiff parts brush and gasoline or GUNK degreaser. Scrub as much of that 40-year old dirt away as possible. Try not to damage or scratch the carb bodies. Dry everything thoroughly using compressed air if available and spray WD-40 on all fasteners.

### PREPARATIONS FOR DISASSEMBLY:

While the WD-40 is soaking into the rusted screws, take the time to familiarize yourself with the carbs. Look at how things are held together, what each fastener is doing, if there is anything apparently broken or obviously missing (it may not be so obvious!) etc. This is the last chance to see how old, dirty and seemingly ugly the assembly is. You may want to remember that.

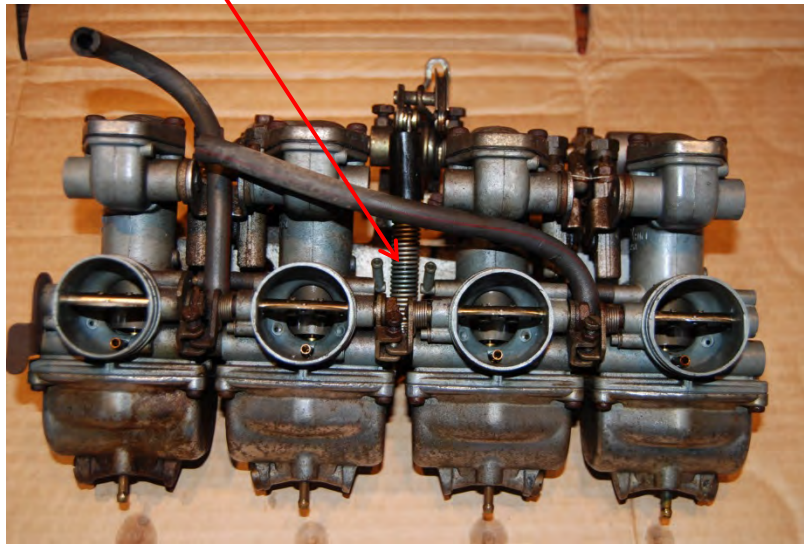
Take some pictures.

Make arrangements to put all the parts that are going to come off in safe storage. One big bucket is not going to do it. Many parts are interchangeable that should not be interchanged. Designate at least one container per carb and another one for the rack/stay and all of its components.

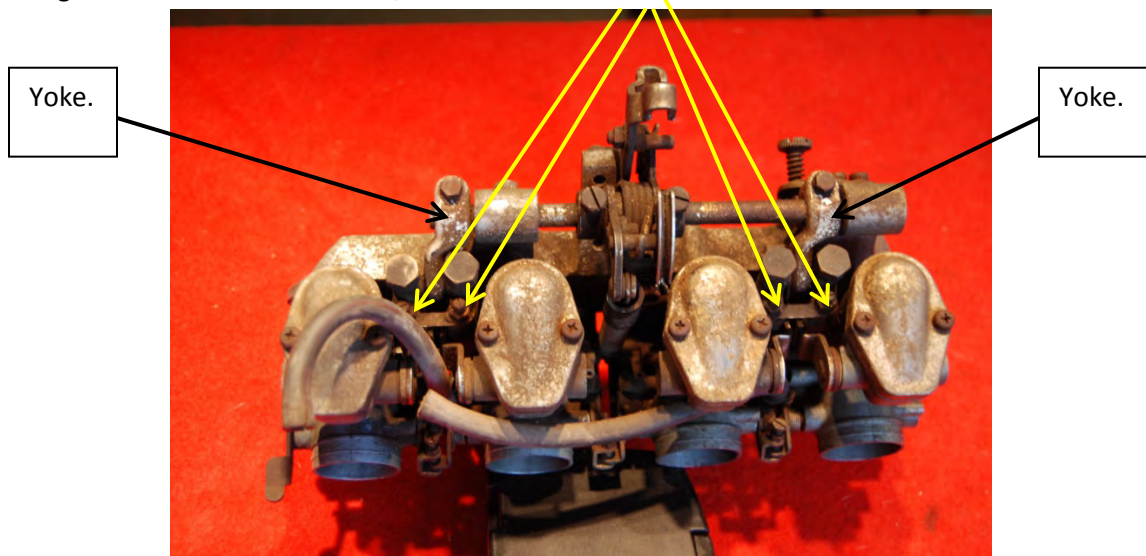
### LET'S DO IT:

In the following steps, you will be removing the carbs from the rack/stay (mounting bracket). The carbs are mounted to the rack using 8 screws, 2 yokes (identified below) which operate the throttle valves, and a throttle return spring connected to the throttle cables butterfly, and a pin between carb #2 and carb #3. All have to be removed or disconnected in order for the carbs to come off.

1. Unhook the **throttle return spring** and remove it.



2. Using an 8 mm wrench or socket, undo and remove **these nuts**:

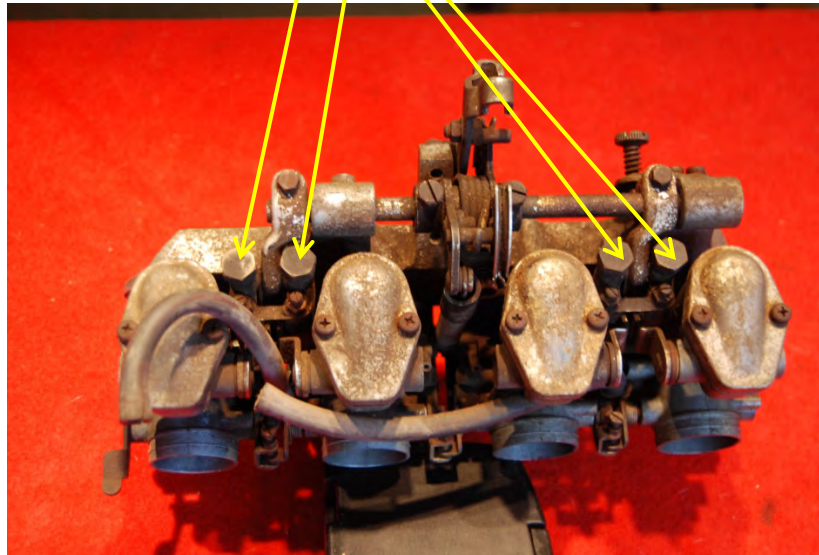


If the nuts are stuck, just keep turning both in each pair (a little bit at a time each) and remove the entire assembly as shown below:





3. Using a wire brush, clean everything as well as possible and carefully remove the nuts, the thin washer, the stay plate and the thick washer. Note and record the order of assembly. You can throw away the nut and thin washer, but keep the thick washer. A replacement in stainless steel or brass is not easy to find.
4. Using a 13 mm wrench or socket, undo **these caps**. Note: there is a spring underneath so prepare for the cap to pop up once unscrewed.



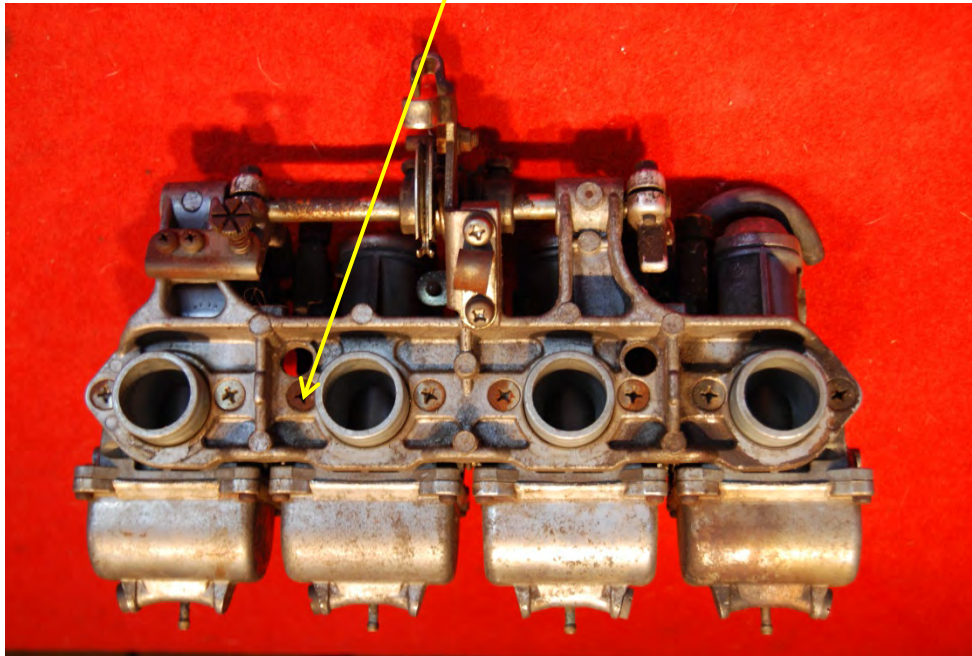
5. Remove the springs.



6. Then remove the spring seats. Do not lose these parts!



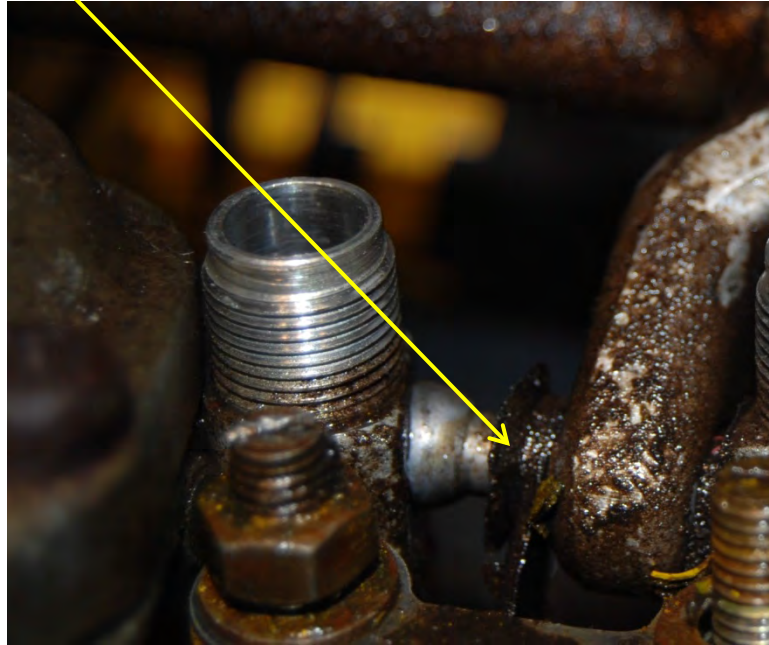
7. Using a Phillips #3 screwdriver, remove all 8 **screws** from the back of the rack. (The HONDA Service Manual does not tell you to do that seemingly implying that the next step can be carried out with the rack still fastened, but I have found that it is very difficult if not impossible.)



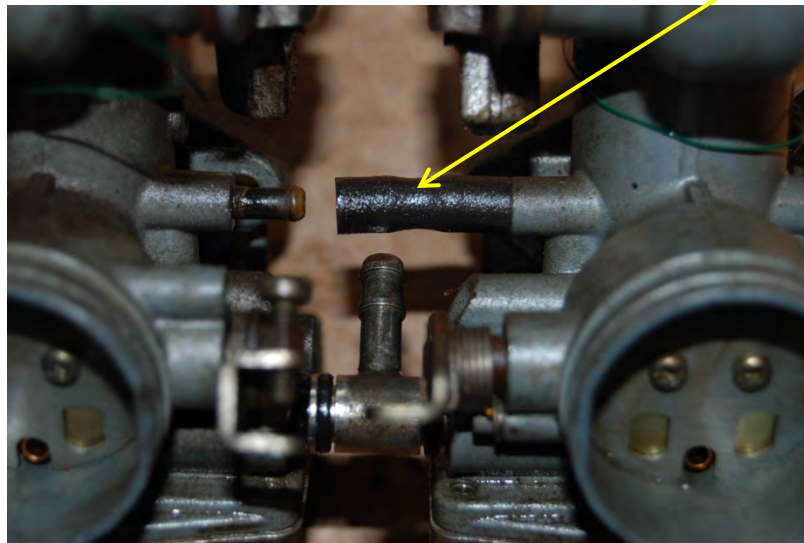
8. Perform the next two steps carefully. You will be removing a rubber piece which is unique in its design and construction and is no longer available from HONDA! As a matter of fact, other than a gasket set and O-rings set, and a few jets, no other genuine spare parts are available.



9. Carefully, pull one of the adjusters (the piece that you removed the cap from) to the side until it is free from the yoke. Then free the other adjuster from the yoke. (I am re-using a picture here so please ignore the fact that one of the nuts is still shown mounted to the adjuster.) Spray WD-40 on **the rubber piece** and the yoke's ball joint. Very carefully slide the rubber piece through and free it from the yoke. Repeat on the other side.



10. Repeat step 9 for the other set of 2 carbs.
11. Free the carbs from the rack. You'll have two pairs of carbs (and the pin that the throttle spring you removed in step 1 was mounted on will have fallen on your work surface. Do not lose it. ) Then carefully pull the carbs in each pair apart. Use a screwdriver to push **the hose** shown below free if necessary.



12. All the parts removed so far belong to the rack assembly and so put them safely away in that designated container.
13. Using a Phillips #2 screwdriver, remove the screws holding the bowl to the carb body noting that there is a leaf spring inside that applies tension to the screws. If the screws are stuck, use a drill with an adjustable torque, set the torque to minimum, ensure it will turn in a counterclockwise direction and let it just “vibrate” the screw for a few seconds. Increase the torque a little if the screws did not come loose. If no reasonable amount of torque can get the job done, stop. You do not want to break these screws. I would caution against using an impact driver, which could apply 200 lbs. of torque and snap the screws. Keep applying WD-40 and/or soak the carbs in carburetor cleaner overnight if necessary.
14. Remove the bowl. Note that it is numbered either 1 or 2 inside. The only difference between them is the orientation of the drain plug. On carbs #1 and #2 (counting from left to right with the rider on the machine) the drain plugs face left and the drain plugs on carbs #3 and #4 face right. This is by design so you can easily access the drain plugs with the carbs mounted on the bike. I number every component on every carb so everything can be re-assembled exactly as it was. The green wire wound 3 times around the overflow pipe means this is the fuel bowl from carb #3. Remove the drain plug noting that there is an O-ring on it. Discard the O-ring. The kits you will have purchased contain a replacement.



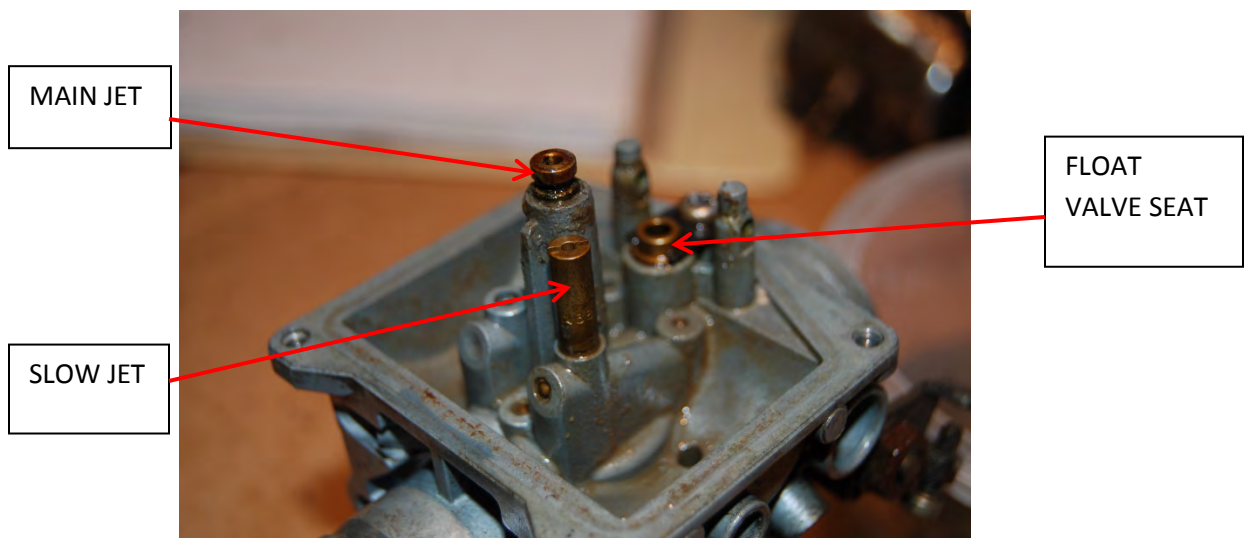
15. Using a pin or a needle, clean the plug on the inside and then clean the 4 holes in it. It may not be very easy since 40 years of neglect will have clogged them completely. Here is an example:



16. Apply very slight finger pressure to the floats and see if they move up and down freely. If the carbs have been sitting for a long time, the floats can get stuck and will not move. Do not force them. Spray liberally with WD-40. Very carefully, remove the float arm pin. I use a 1/8" rivet and a small hammer. Do not hit too hard! The posts holding the float arm pin can bend or break. Once the pins are out, remove the floats and then using tweezers remove the float valve. Do not forget to do this or the float valve will fall out and will get lost.

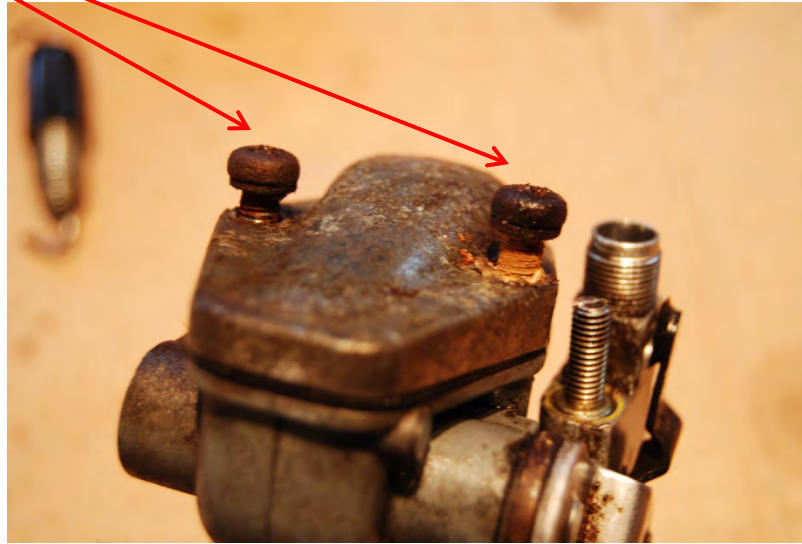


17. When the float has been removed, here is what you are going to see. Spray the main jet with WD-40 and very carefully twist it loose and then remove it by pulling it out. It is not screwed in. Discard the O-ring. Unscrew the Phillips head screw next to the float valve seat, remove the clip and then remove the valve seat. Discard the O-ring. Unscrew the slow jet. There is no need to replace the jets. A good cleaning is all that is needed. The main jet rarely gets clogged, but the slow jet sometimes can. The slow jet's bore is only 0.38 mm and you will need a very thin strong wire for the job. Using a wire thicker than 0.38 mm is not going to accomplish anything.





18. That's as much as we can do at the bottom of the carb, so let's go to the top. Remove the two **screws** holding the top cap. If the screws are stuck, use the techniques and cautions mentioned in step 12 above. Carefully remove the cap. It may be stuck and you may have to carefully pry it out.



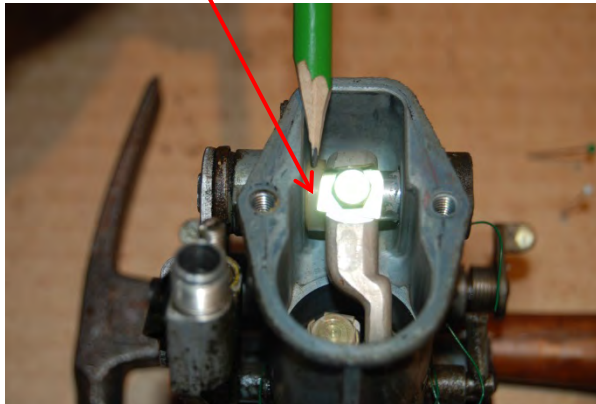
19. Remove the gasket being very careful not to damage the cap and particularly the ridge. Clean thoroughly using acetone to remove the red gasket maker.



20. Note that on the carb body there is a groove corresponding to the ridge on the cap. Clean thoroughly using acetone if necessary. Acetone is the perfect chemical for removing any gasket making material like Locktite and others. This is tedious work, no doubt, but it must be done and it must be done well.

21. In the next few steps, you will be removing the link arm that operates the throttle valve and the throttle valve itself. There are some 20 components here, so prepare yourself and when doing the disassembly, take notes of the order of assembly.

22. Note the position of the **thick plastic washer**.



23. Bend the tab on the tonged washer away from the bolt's head and using a 7 mm wrench unscrew and remove the bolt, the lock washer and tonged washer.



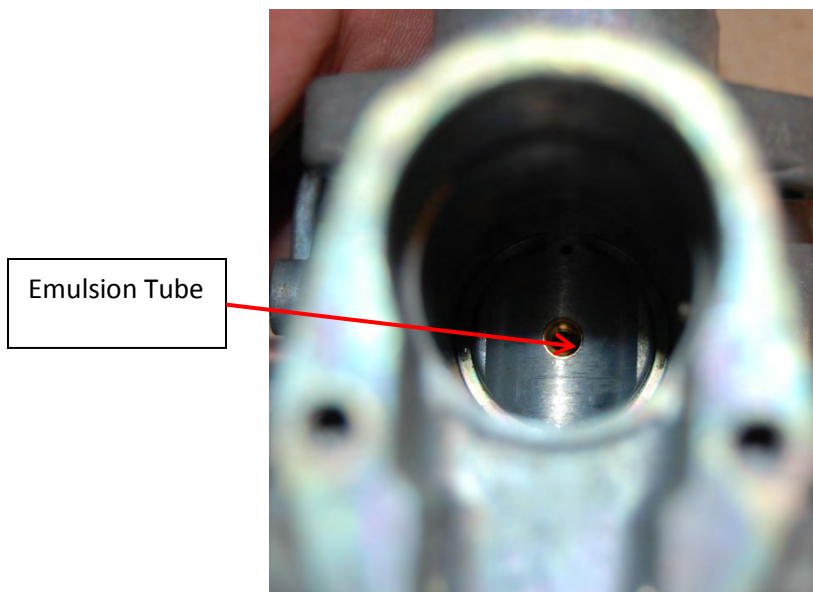
24. You can now slide the link arm and the adjuster out of the carb's body.



25. Finally, you can remove the throttle valve by pulling it straight up and out. Once removed, the throttle valve will look like this:



26. There is really no need to disassemble the throttle valve. All that is needed is for the needle to be cleaned properly. BRASSO does an excellent job. If the needle must be removed for whatever reason, it should be easy to figure it out: there are just two screws that need to be removed. The screws are not peened and can be removed and reused.
27. Okay. One more final step. The last piece that can be removed is the “emulsion tube”. If you look down the bore from which the throttle valve came out you will see this:





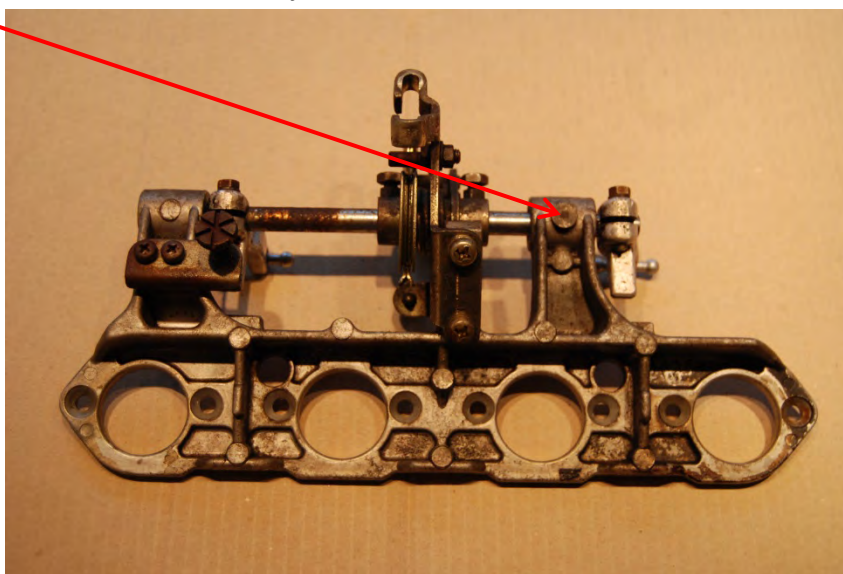
28. Using a 3/16" or 1/4" dowel, gently push/hammer the emulsion tube out. It is not pressed-fitted so it should come out easily. If it does not, it's most likely stuck by gunk that has accumulated over the years. Soak in carburetor parts cleaner overnight.

29. Once the emulsion tube is out, it will look like this.

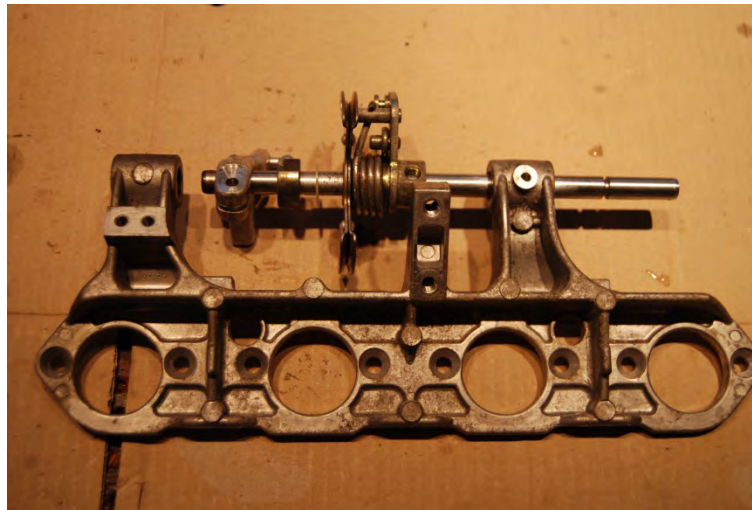


30. Soak all carburetor parts overnight in carburetor parts cleaner. Brush away any dirt using a small soft brush. The longer you soak the parts the cleaner they will get. If you are lucky, the carb bodies will come out looking nice and clean in the gorgeous bluish hue of their original finish.

31. Now, let's take the rack (mount bracket) apart. It should be relatively simple to figure out how to disassemble it. To remove the shaft and all components mounted to it, you will have to drill out this pin. 1/8" drill bit will do the job.



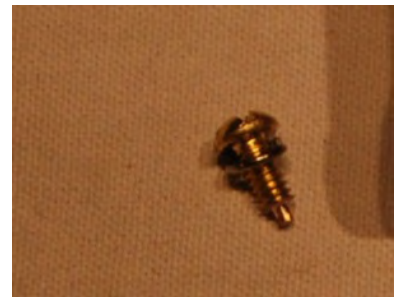
32. Once you've drilled the pin out, you can pull the shaft and all components mounted to it out. As you do so, note the Woodruff (half-moon) keys which secure the yokes in place, and also the plastic washers in the throttle cables butterfly assembly.



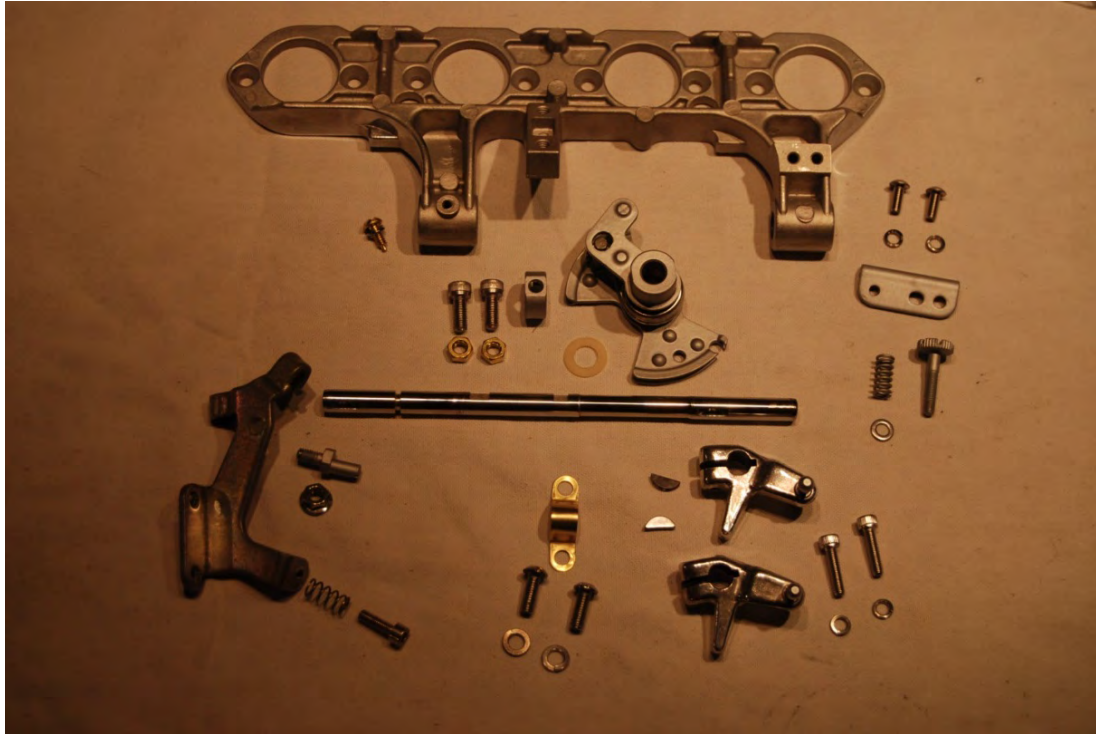
33. Once the throttle cables butterfly assembly is out, carefully pull it apart. The spring will disengage and you'll end up with 4 components one of which is a plastic washer.
34. The rack itself is made from aluminum or some aluminum alloy and it is common that after 40 years it may have pitted. The only good way to get it looking clean and nice again is to have it bead blasted. This is the one and only thing you cannot do yourself so you will need to take it to somebody who provides such a service in your area. Surely, you can clean it thoroughly and paint it if you like that kind of look. I personally avoid painting anything.
35. Since the pin you drilled out is not available as a spare part, you may want to replace it with a screw. You will need to tap a thread in the hole you drilled and use either a 8-32, or 10-24 or 10-32 screw 1/2" long. You'll need to grind the screw's end to make sure it fits in the groove in the shaft once installed.



Note the profile at the bottom of the screw:



36. Once you have cleaned and polished everything you'll end up with something that looks like this. 40 parts comprising the rack alone!



### REASSEMBLY

If you have done all the disassembly and cleaning yourself, it should be a piece of cake to put everything back together.

The HONDA manual gives a good description of how to ensure all floats are at the same height. This is pretty important (to ensure the same amount of fuel is drawn into each cylinder) so it should be done accurately.

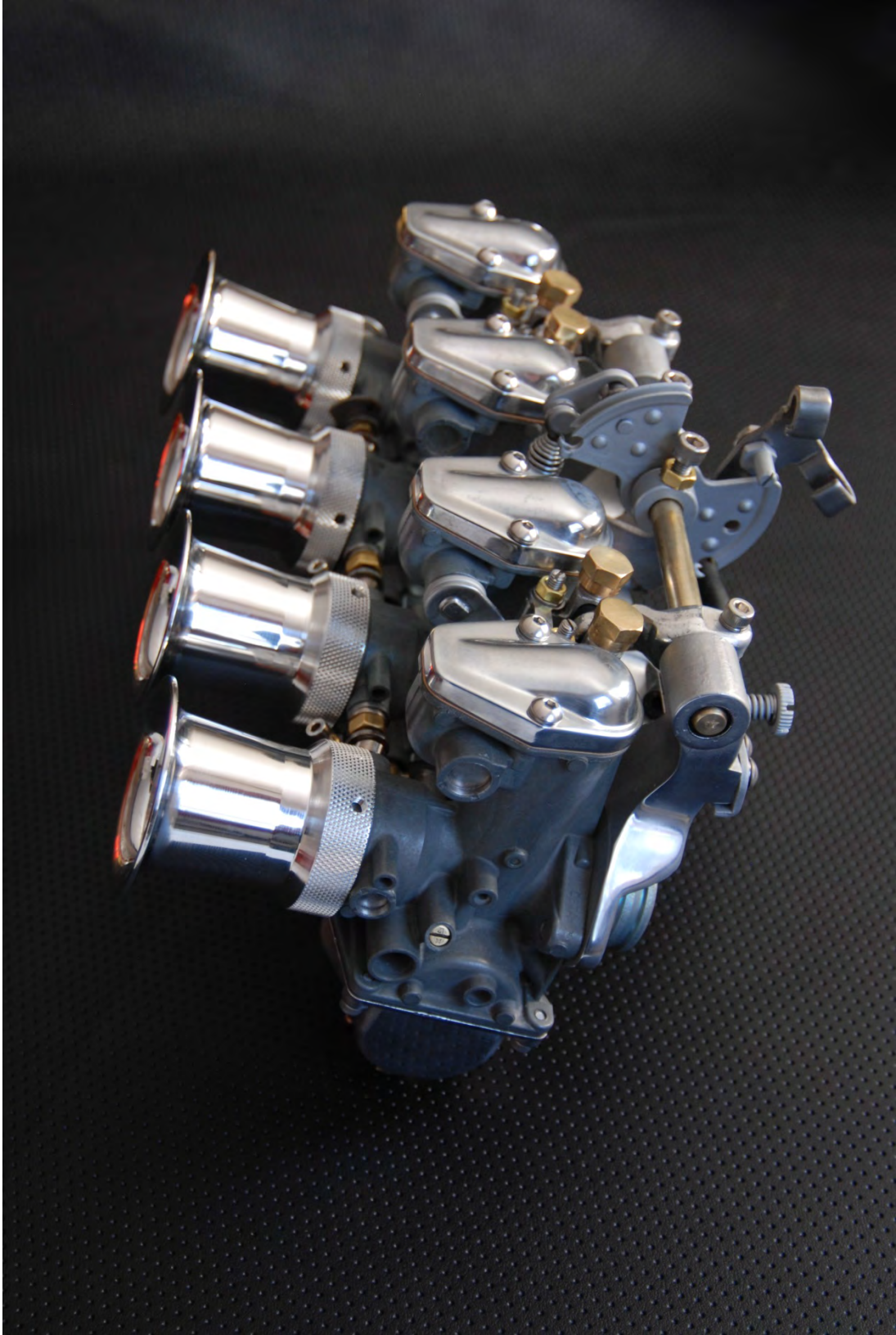
If possible, re-use the original jets (see notes below).

Replace all fasteners with stainless steel equivalents (see notes below) and or brass depending on preferred looks. Always use anti-seize.

Do not forget to synchronize the carburetors as described in the HONDA manuals.

The reward from that work will look something like this:





BLACKSQAURE'S spare set of Keihin carburetors with Steel Dragon Performance velocity stacks.

## HARDWARE:

Opinions differ widely on replacing the original HONDA screws and nuts with stainless steel fasteners. Some (Mike Nixon of The Motorcycle Project, for example) advise strongly against it citing electrolysis as the main reason and asserting that this will result in serious thread damage. I happen to disagree. If coated with ANTI-SEIZE and properly torqued, stainless steel fasteners are the better choice. Use of ANTI-SEIZE is always advisable and an absolute must if threading a stainless steel screw into aluminum.

If you decide to go with stainless steel and brass, here are some good sources:

ALLOYBOLTZ [www.alloyboltz.com](http://www.alloyboltz.com) is an excellent source of quality polished stainless steel screws, bolts, nuts and washers at great prices. They offer show quality kits for a great number of engines. Check them out. Unfortunately, they do not carry any brass fasteners.

Mr. Metric [www.mrmetric.com](http://www.mrmetric.com) is another excellent source. They carry brass fasteners as well, but their stainless steel fasteners are, for the most part, not polished. You'll need to do this yourself if you prefer that look. Their packaging is superb and everything comes perfectly labeled.

Neither of them carries M7 size nuts and washers that are used on the choke linkage on your carbs.

McMaster-Carr [www.mcmaster.com](http://www.mcmaster.com) is the ultimate source. They carry everything. The problem is that sometimes you may need to buy quantities bigger than those you need.

## PARTS:

I buy the majority of my parts from SERVICE HONDA [www.servicehonda.com](http://www.servicehonda.com) whose website is very user-friendly and they carry a great selection at excellent prices. It takes a few days to get your parts and their shipping and handling cost are on the high end. But you know you are getting quality genuine parts from a reputable dealer.

BIKE BANDIT, DIME CITY CYCLE, 4 INTO 1, and many others are good sources as well. They do offer some genuine parts as well as a great variety of aftermarket parts.

## VELOCITY STACKS:

This is another topic on which opinions vary widely. A quick look at pros and cons will follow, but if you like the velocity stack look (who doesn't?!), check out STEEL DRAGON PERFORMANCE at [www.steeldragonperformance.com](http://www.steeldragonperformance.com). The quality of their work is stunning and they offer a variety of different shapes and materials.

Velocity Stacks look great. I think all agree on that. Their major disadvantages are 1) they cannot filter out dust and other very small debris in a way that an air filter can and 2) they may actually restrict the amount of air going into the engine because of the metal mesh (which takes up some of the cross-sectional area and therefore restricts the volume of air moving through) that can stop some debris from getting into your engine. As a result, your engine will most likely run a little richer. Purists say that using

velocity stacks equipped with a metal mesh defeats the whole idea behind velocity stacks. They may have a point. Again, the carburetor's perhaps top priority is pulling in the right amount of air. But, in the end, a compromise is always necessary and a richer-running engine is far better than a lean one. Arguments on whether to re-jet if you are using velocity stacks will probably never end. I happen to agree with the school of thought that HONDA designers and engineers did a good job of selecting jets' sizes and settings that will allow the motorcycle to operate anywhere in the world under different road conditions, temperatures, elevations, etc. and so the carbs and the engine can tolerate a relatively wide range of change in such factors. Jumping straight ahead to re-jetting is premature. Everything else that affects engine performance must be checked and verified to be exactly as it should before making the decision to re-jet.

This said, I ended up re-jetting my carbs. I noticed a minor engine hesitation at low to mid-range throttle with the original jets in the carbs (#98 main and #38 slow). I replaced them with #100 main and #40 slow. The engine performs seemingly better and the hesitation at mid-range is now gone. The bike runs very smoothly. NOTE: The re-jetting I did may not have been necessitated by the velocity stacks. The original bike was a 1977 CB550F which came with a 4 into 1 exhaust. I switched to 4 into 4 and the new exhaust system may have contributed to the need to re-jet.