

**YOUR CARBS ARE  
NAKED**

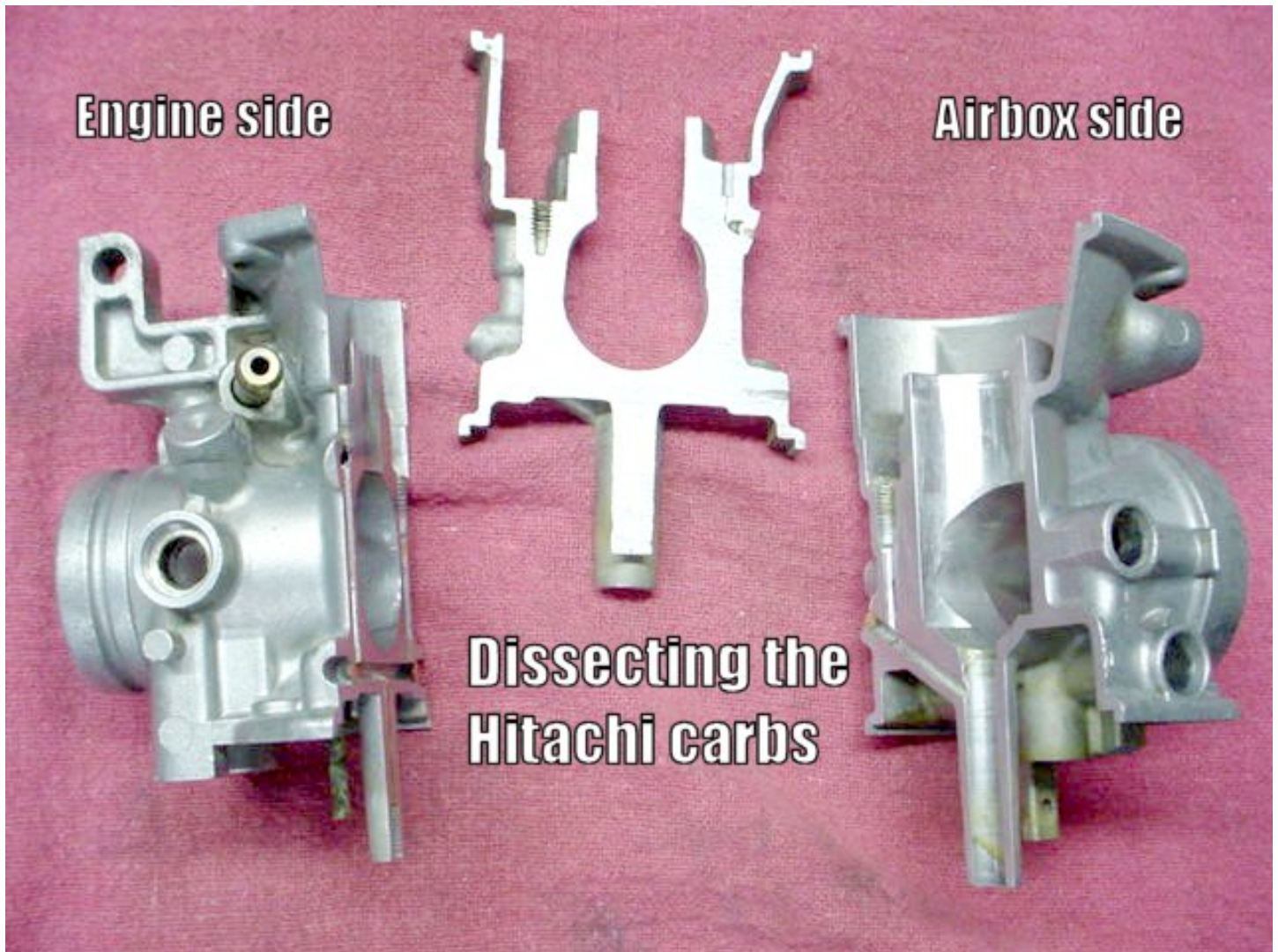
# Table of Contents

• Hitachi	Page 3
○ Pilot fuel	Page 4
○ Main fuel	Page 8
• Mikuni	Page 11
○ Pilot fuel	Page 13
○ Main fuel	Page 21
○ Starter/enrichment	Page 25

For clarity, all passages with air flowing through them are highlighted in **light blue**. Fuel flow through a circuit is **shown in red**. Where air and fuel have mixed, the color **changes to purple**.

Since both the Mikuni and Hitachi carbs used on the XJ-series bikes are similar in function and design, you may want to read through the whole document to get a better idea of what's going on. For example, as you can see above, there is no "starter/enrichment" section for the Hitachi carbs, but the pictures in the Mikuni section should help you get the idea.

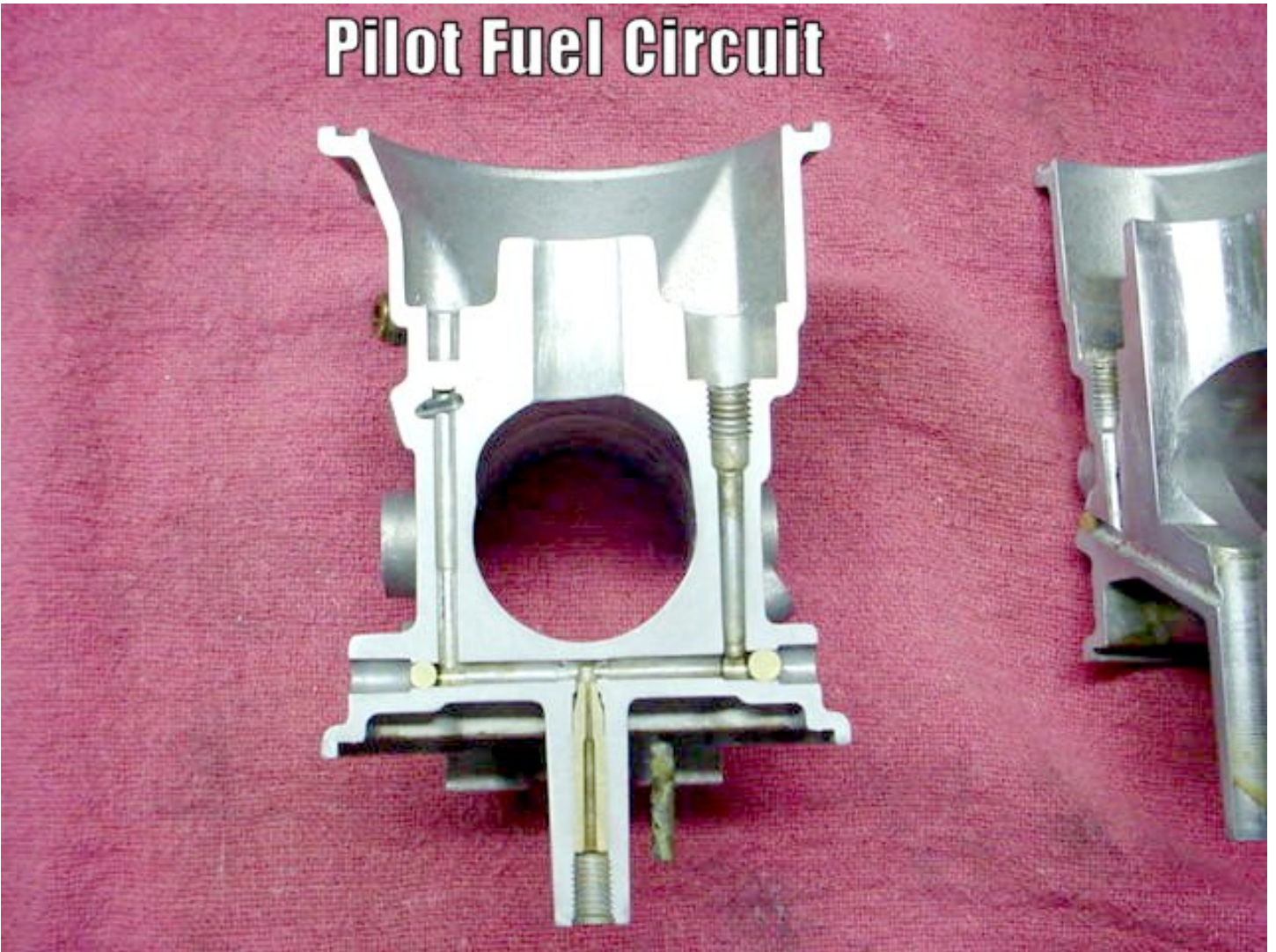
# HITACHI INSIDE



Ever wanted to see just exactly what's on the inside of your carbs? Here's your chance. We took a carb body that was beyond repair and sliced it open to reveal what's hidden inside. Let's take a look at this Hitachi HSC-33 from a California model 700 Maxim. This model is almost identical to the HSC-32 model used on most of the 650cc and 750cc aircooled engines.

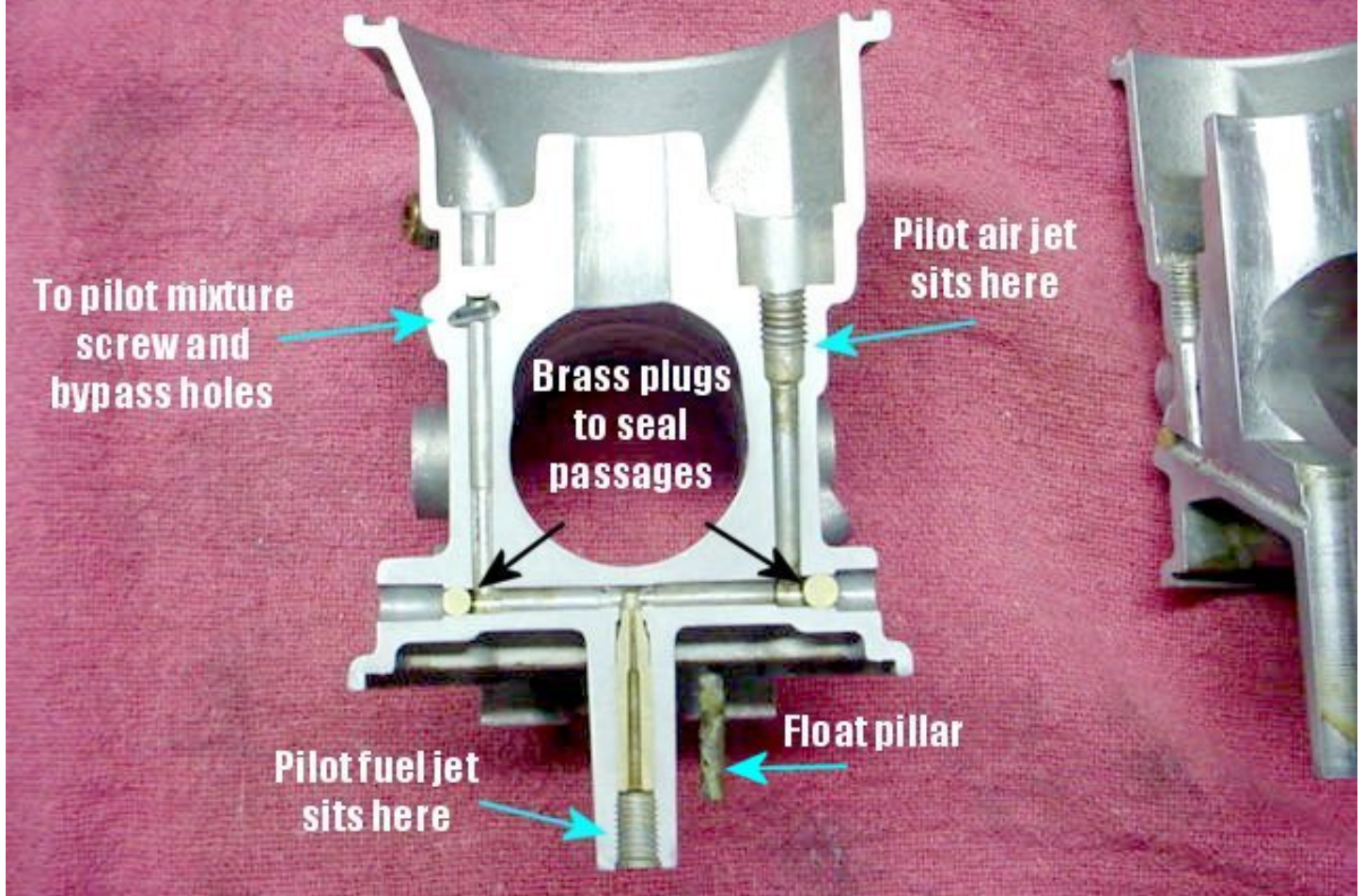


## Pilot Fuel Circuit



Oh, so that's how they put those passages in there... they drill them straight in. Where they don't need the passage to go, they block it off with a brass plug. Nifty!

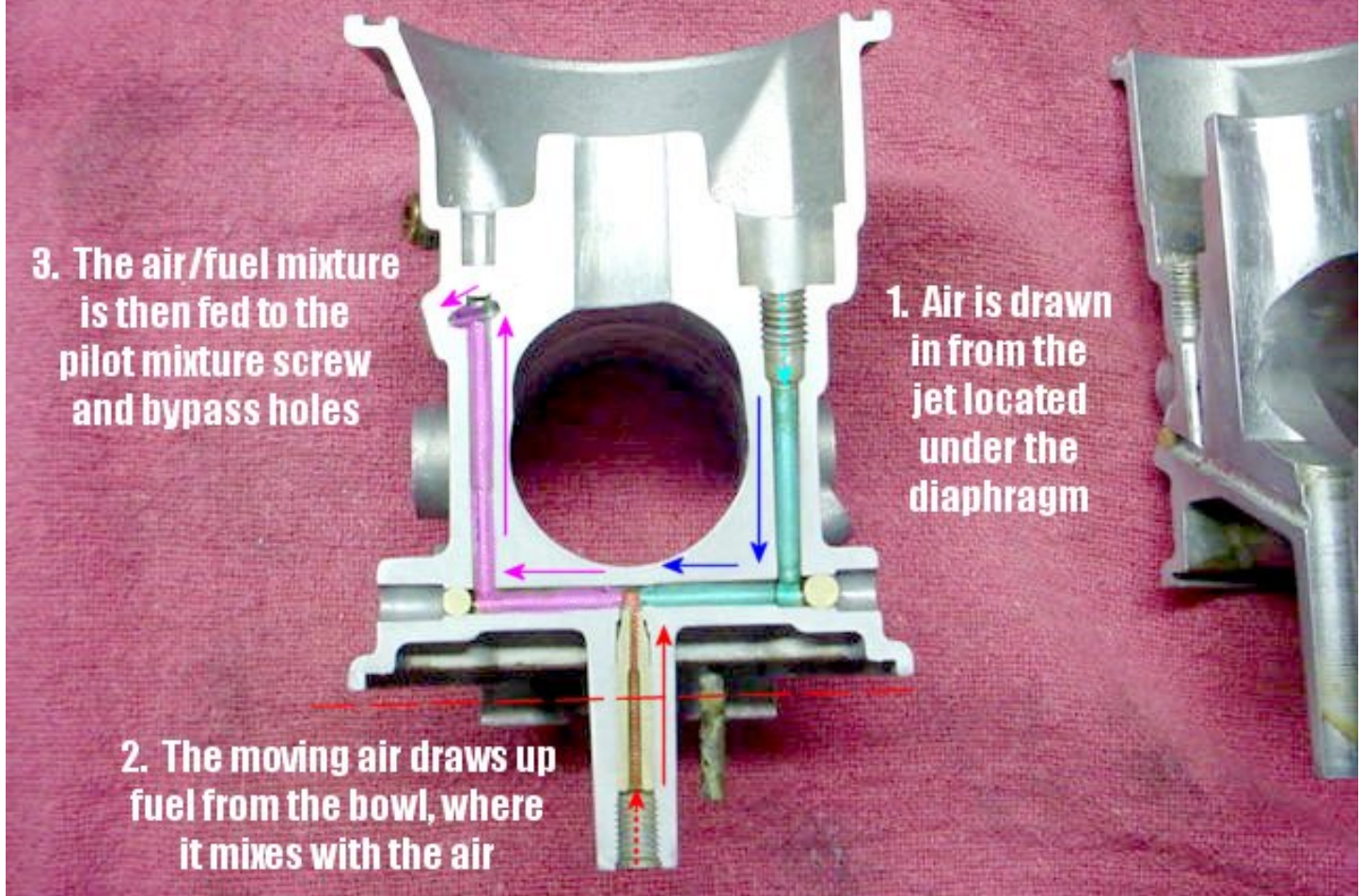
# Pilot Fuel Circuit



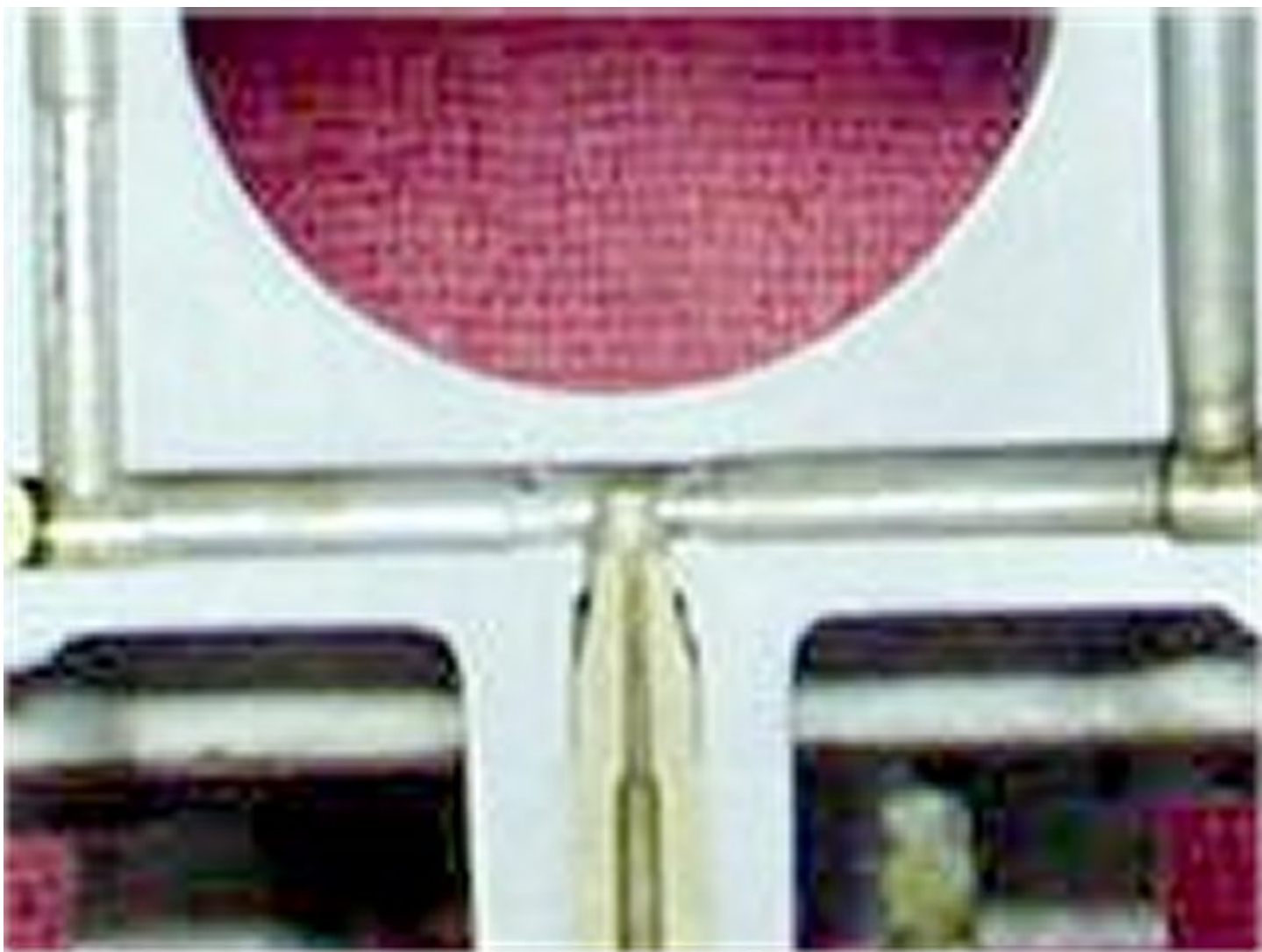
Those brass plugs, however, can pose a problem. They create a spot in the passage where dirt and/or varnish can accumulate, and can partially or even completely block off the passage.



# Pilot Fuel Circuit



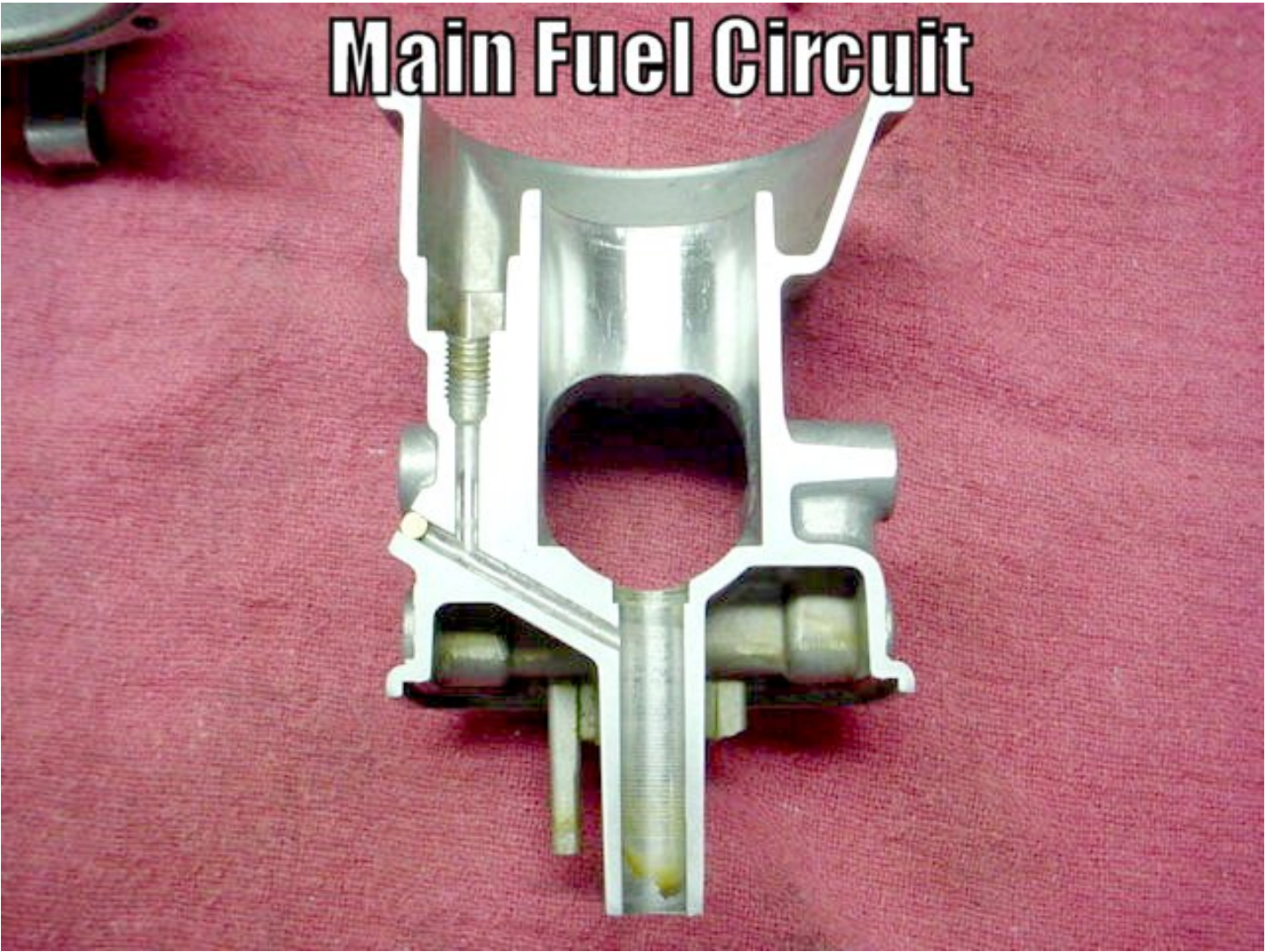
Here we see the path the air and fuel take through the circuit. Helpfully color-coded, of course. Red dashed line shows the normal fuel level.



Here's a closeup of where the fuel from the pilot jet mixes with the air stream. See how tiny that hole is? That right there demonstrates why you need to keep your jets and passages "zestfully clean".

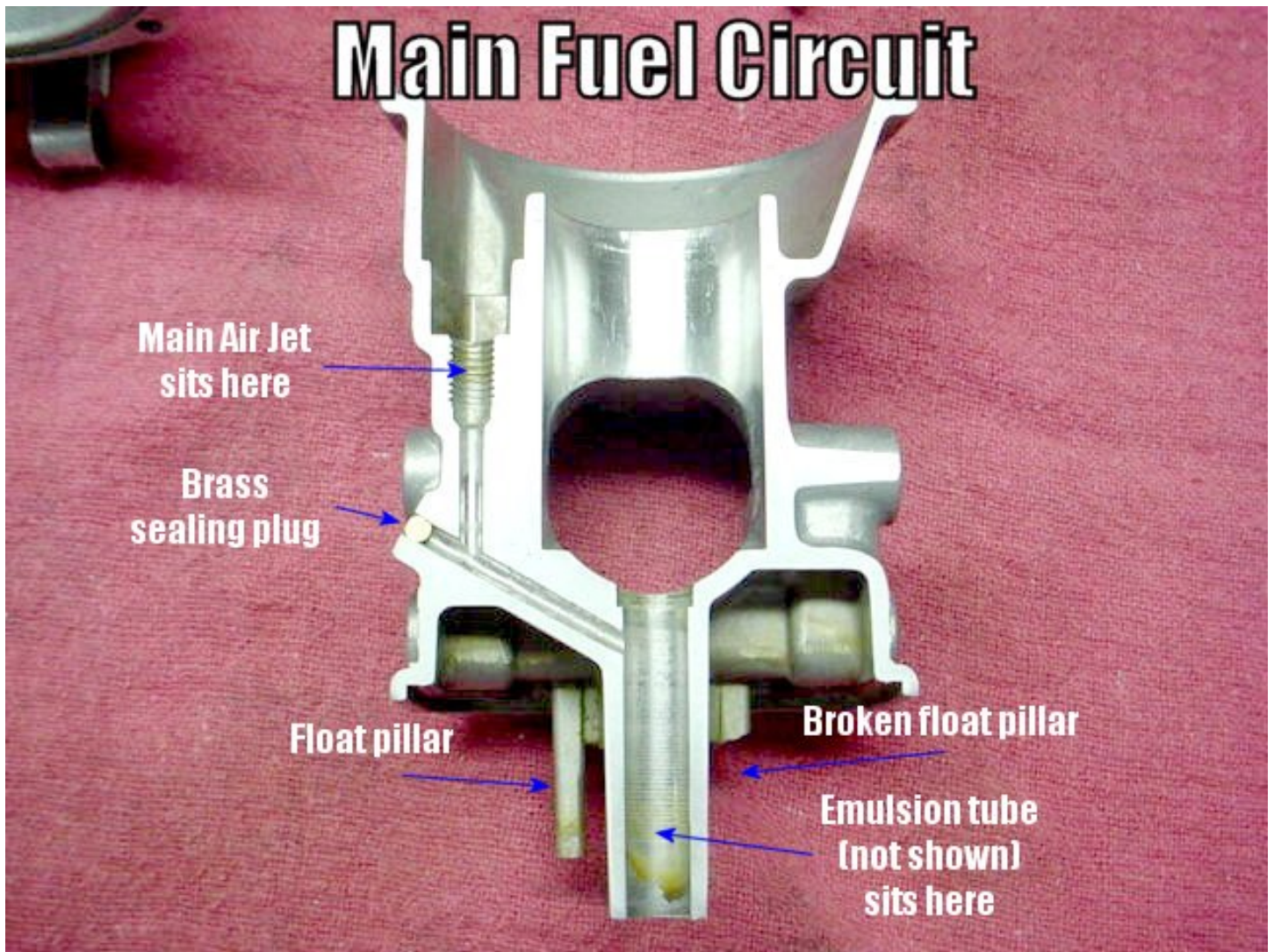


# Main Fuel Circuit



Here's the other side of the equation – the main fuel circuit.





Again, we don't have the air or fuel jets visible, nor the emulsion tube. As before, there's a brass plug – this time sealing the hole drilled to link the air jet passage to the emulsion tube cavity.

# Main Fuel Circuit

1. Air is drawn in through the main air jet located beneath the diaphragm

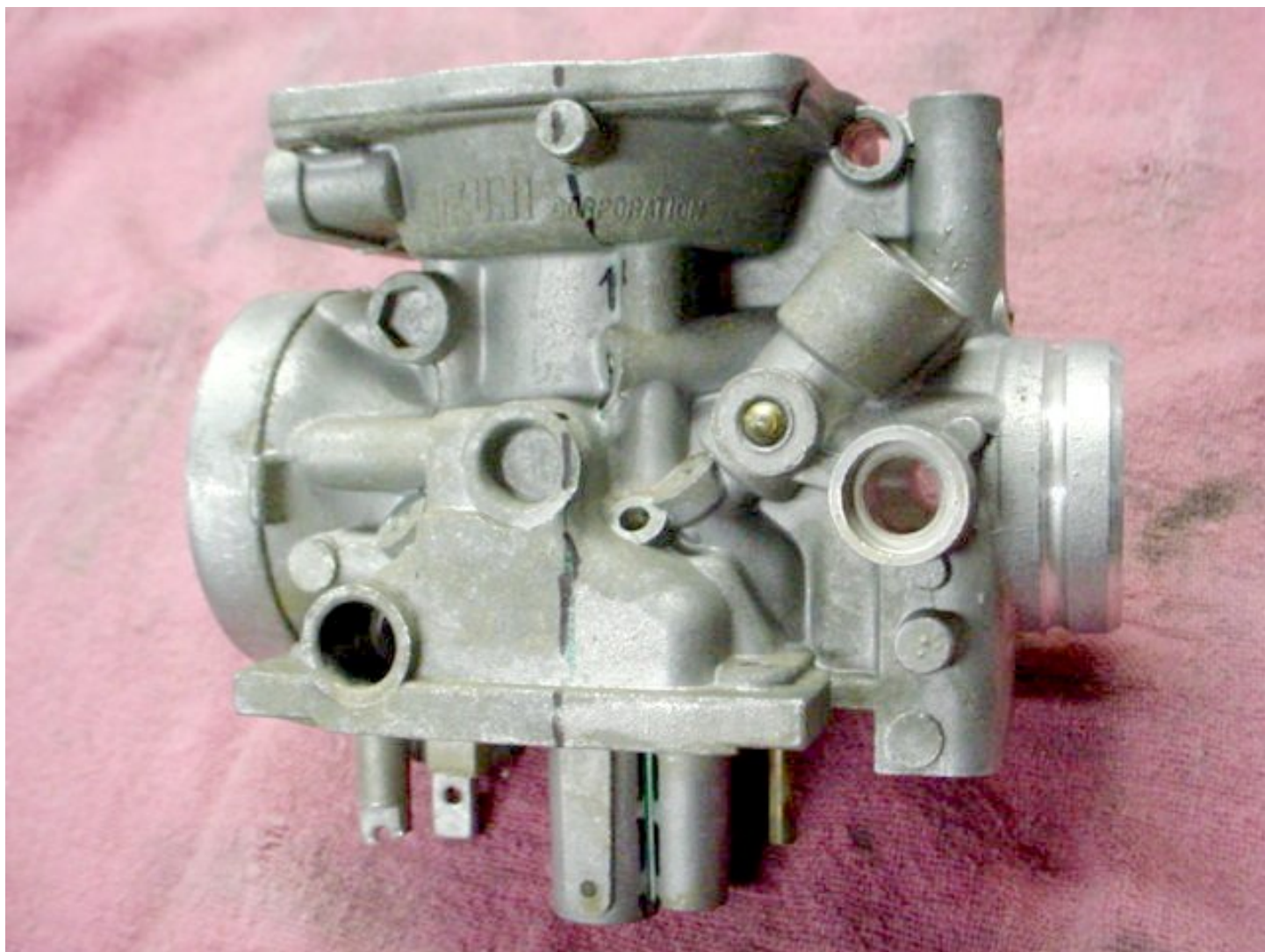
2. Fuel is drawn in through the main fuel jet located in the bowl. The jet screws into the bottom of the emulsion tube, and holds it in place

3. The fuel mixture is drawn out the top of the emulsion tube by the airflow coming from the airbox. It then travels past the butterfly and is fed into the engine

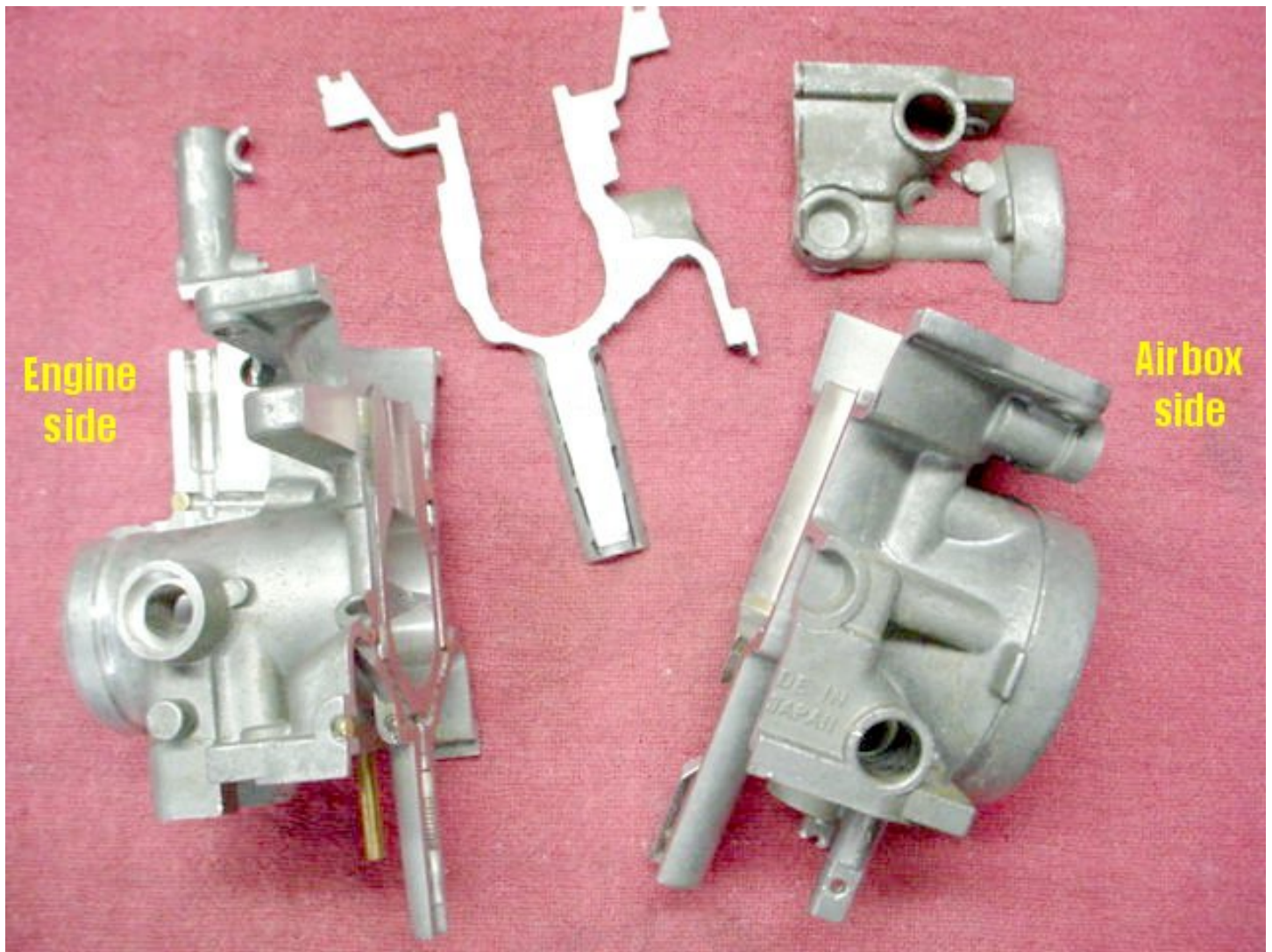
We can't let you forget how high the fuel sits, can we? That or we just really like dashed red lines.



# MIKUNI INSIDE

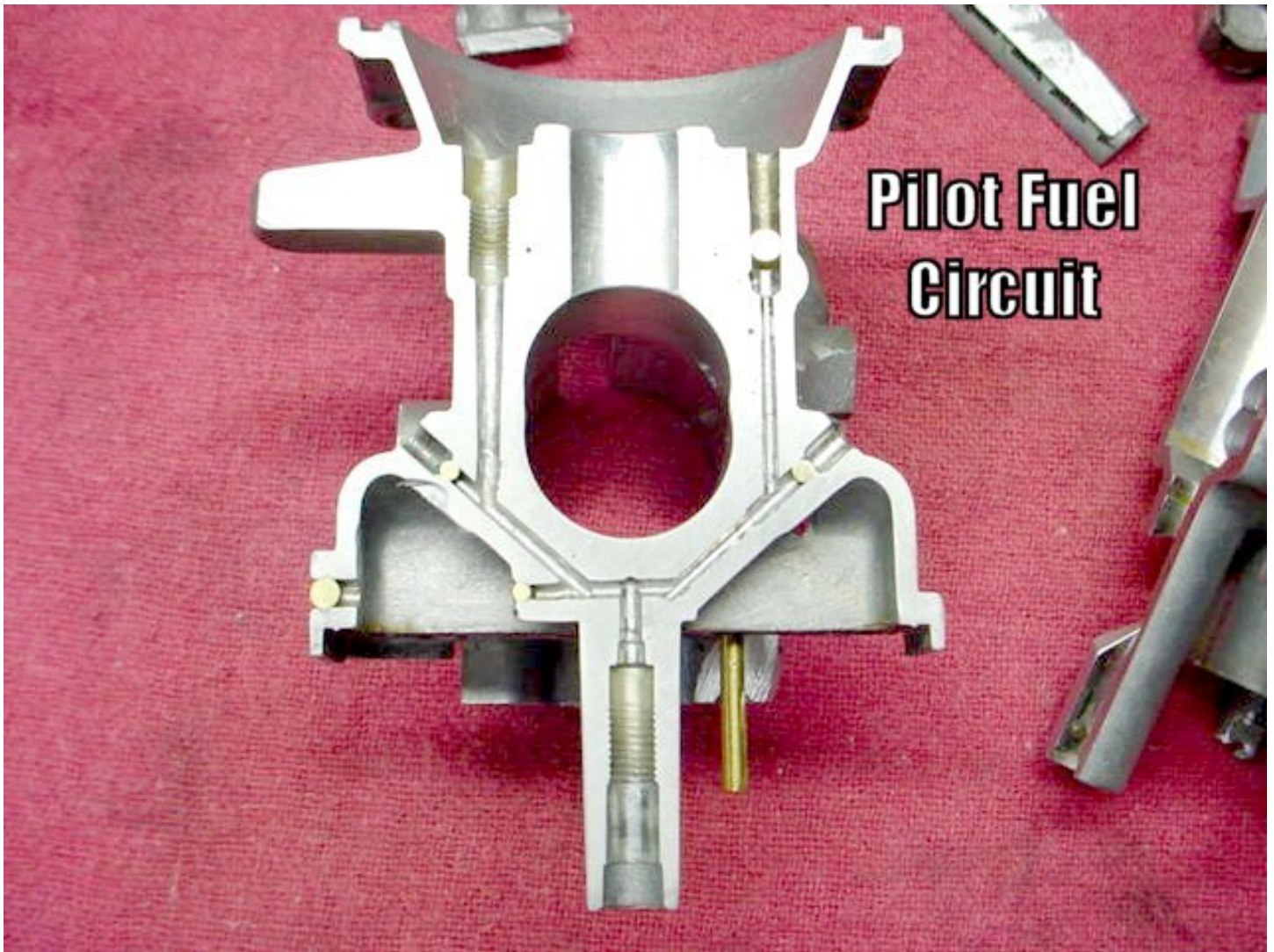


Now we look at the other brand of carb in use on our bikes – Mikuni. This BS28 model came off a 550 Seca. You can see the cut lines above.

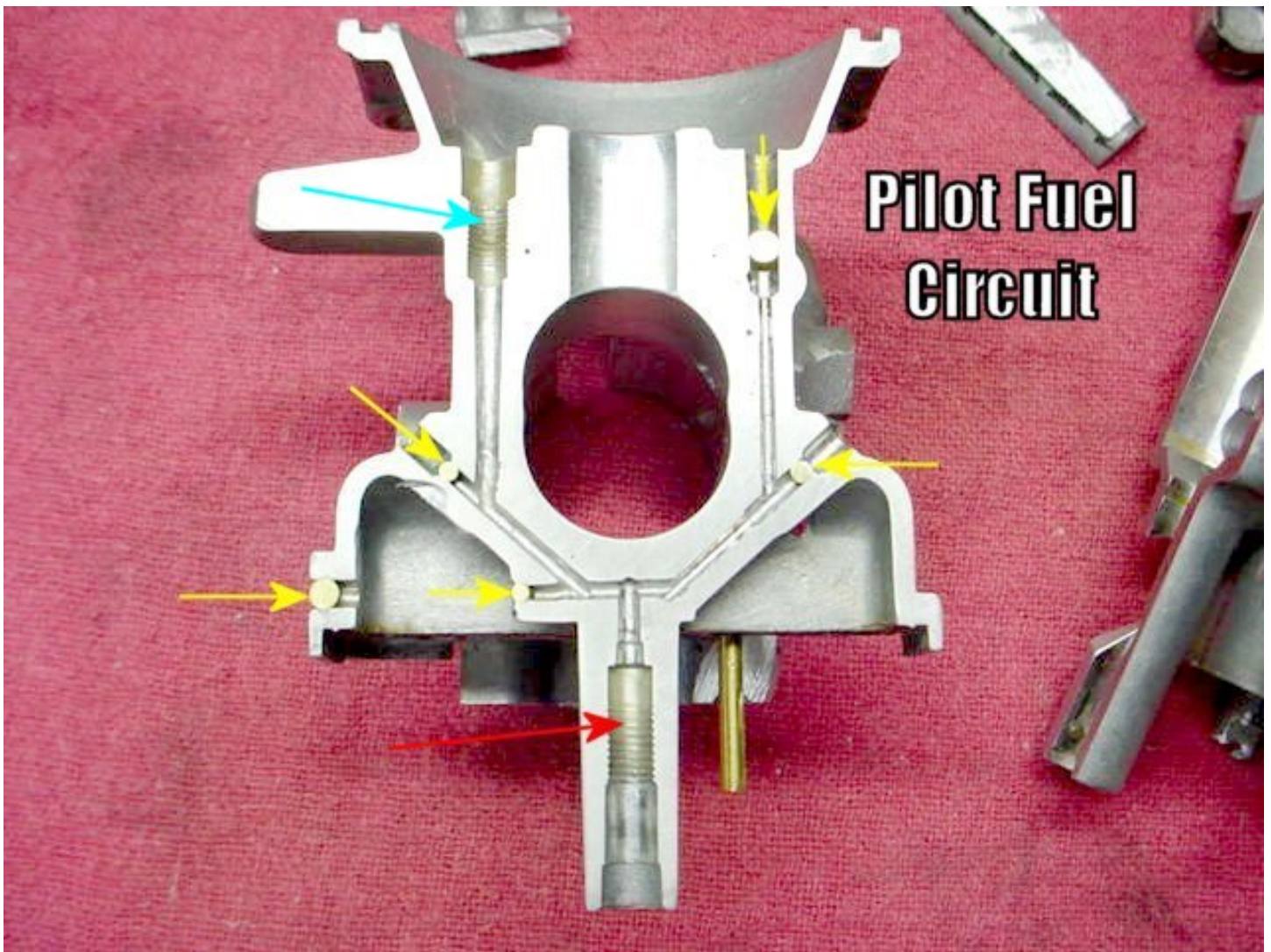


Another hapless carb body with a broken float pillar sacrificed in the name of knowledge. The observant reader will note the pilot circuit and choke/enrichment circuits on the left, as well as the exposed mixture screw area. The right section contains the main fuel circuit.





Here we see the Mikuni pilot fuel circuit in all its naked glory. Very similar to the Hitachi in how it's laid out.



In the picture above, the blue arrow shows where the pilot air jet would sit. The red arrow points to where the pilot fuel jet goes. The yellow arrows point out the ever-present brass sealing plugs.



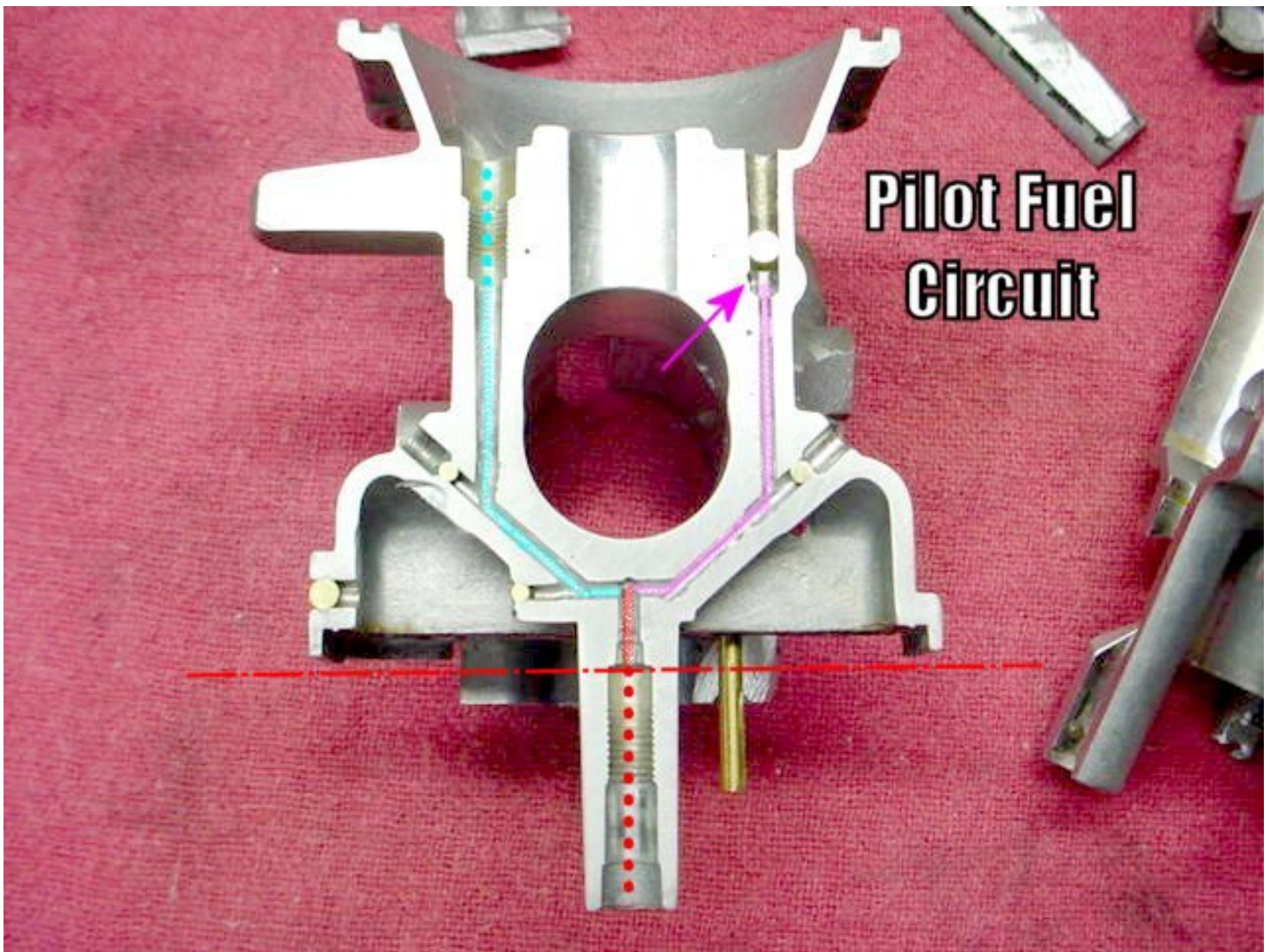


(Helpful picture of what a pilot air jet might look like.)

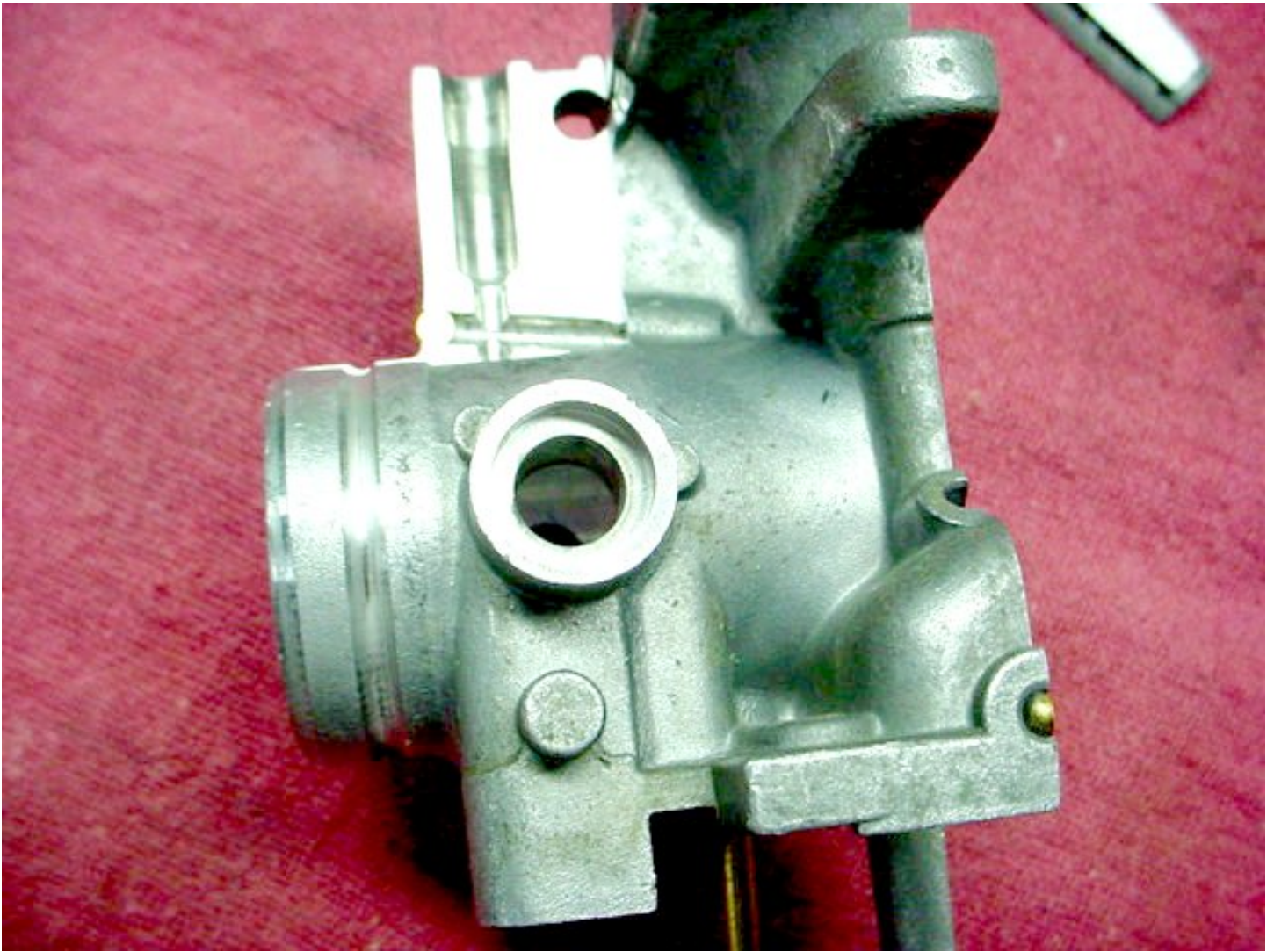


Other Mikuni models, like this BS33 from a Maxim-X, move the pilot air jet from under the diaphragm to a passage located in the left side of the carb throat.



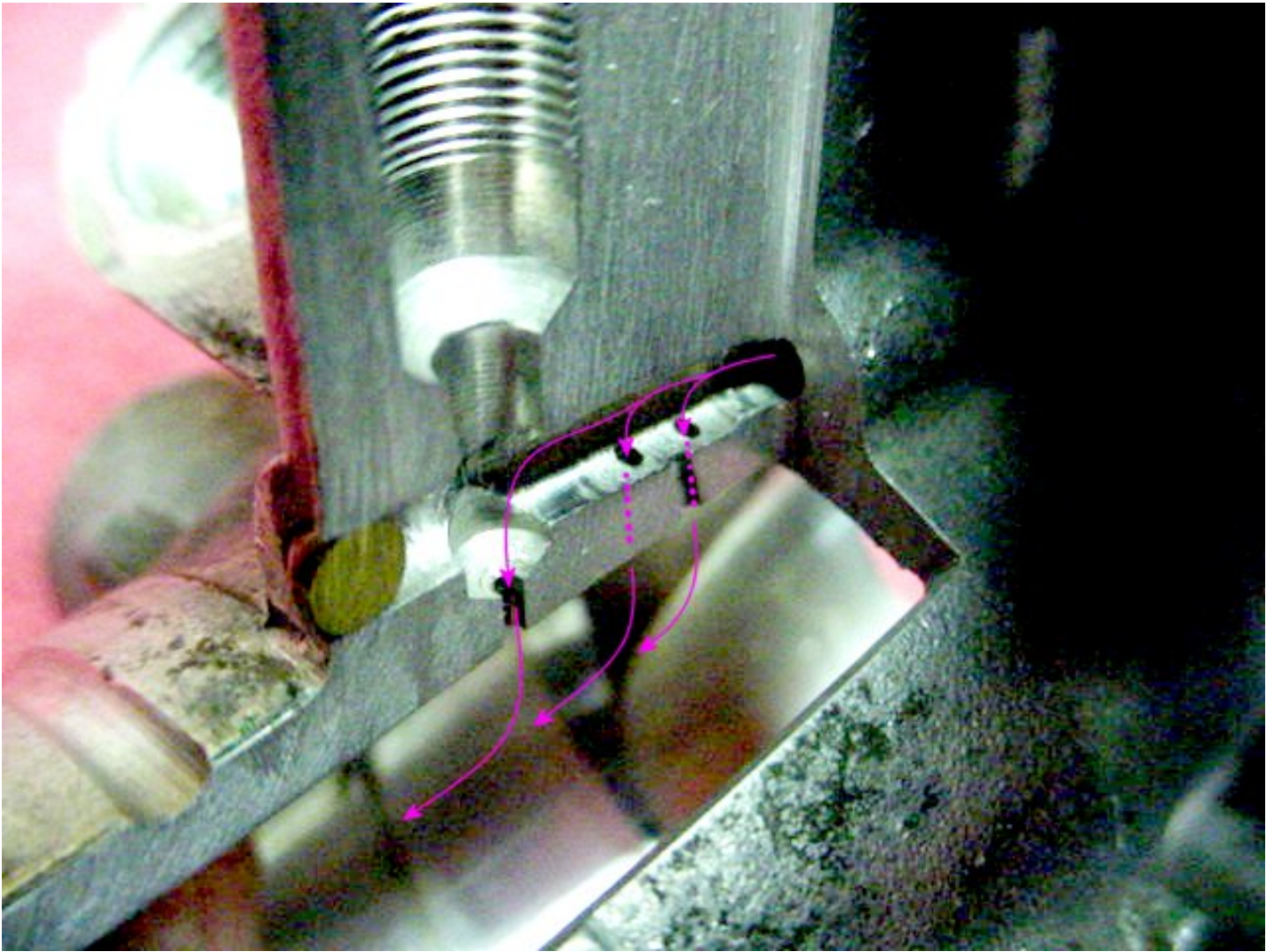


Air enters on the left, travels down and across. The vacuum created by the air movement draws up fuel through the pilot fuel jet, where it mixes with the air. The air/fuel mixture then travels up, and the purple arrow shows where it feeds into the passage going to the pilot/idle mixture screw and bypass holes (shown on the next page). Red horizontal dashed/dotted line indicates where the fuel level in the bowl should normally be.



Here's the other end of the pilot circuit. Up top you can see where the threaded hole where pilot/idle mixture screw sits. The horizontal passage has the requisite sealing plug.





A closeup of the pilot circuit feed holes.

The hole nearest the brass plug is where the tip of the pilot mixture screw goes (shown on the next page). It sits on the engine side of the butterfly valve and supplies fuel from the pilot circuit even when the throttle is closed.

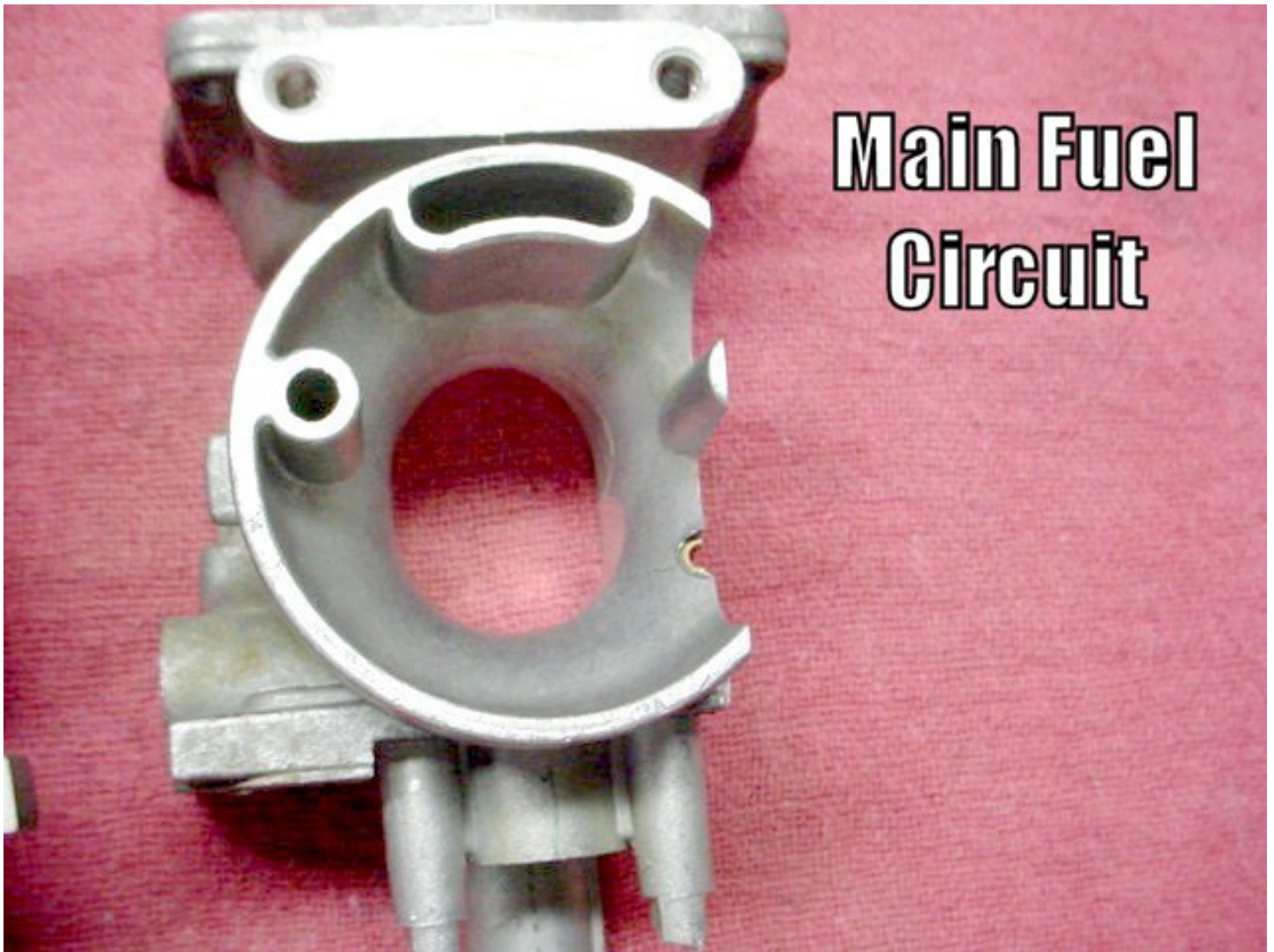
The other feed holes (there are anywhere between two and four of them, depending on make and model) sit on or behind the butterfly when it is closed. Because of this, they don't really provide much in the way of fuel at idle; however, when one twists the throttle and opens the butterfly, these holes are exposed to engine vacuum. This pulls in more fuel mixture from the pilot circuit, and causes your four cylinders of metric mechanical goodness to roar to life. This is the equivalent of a subsystem on other carburetor models known as an accelerator pump.

The purple arrows indicate direction of travel for the air/fuel mixture coming from the pilot fuel circuit.

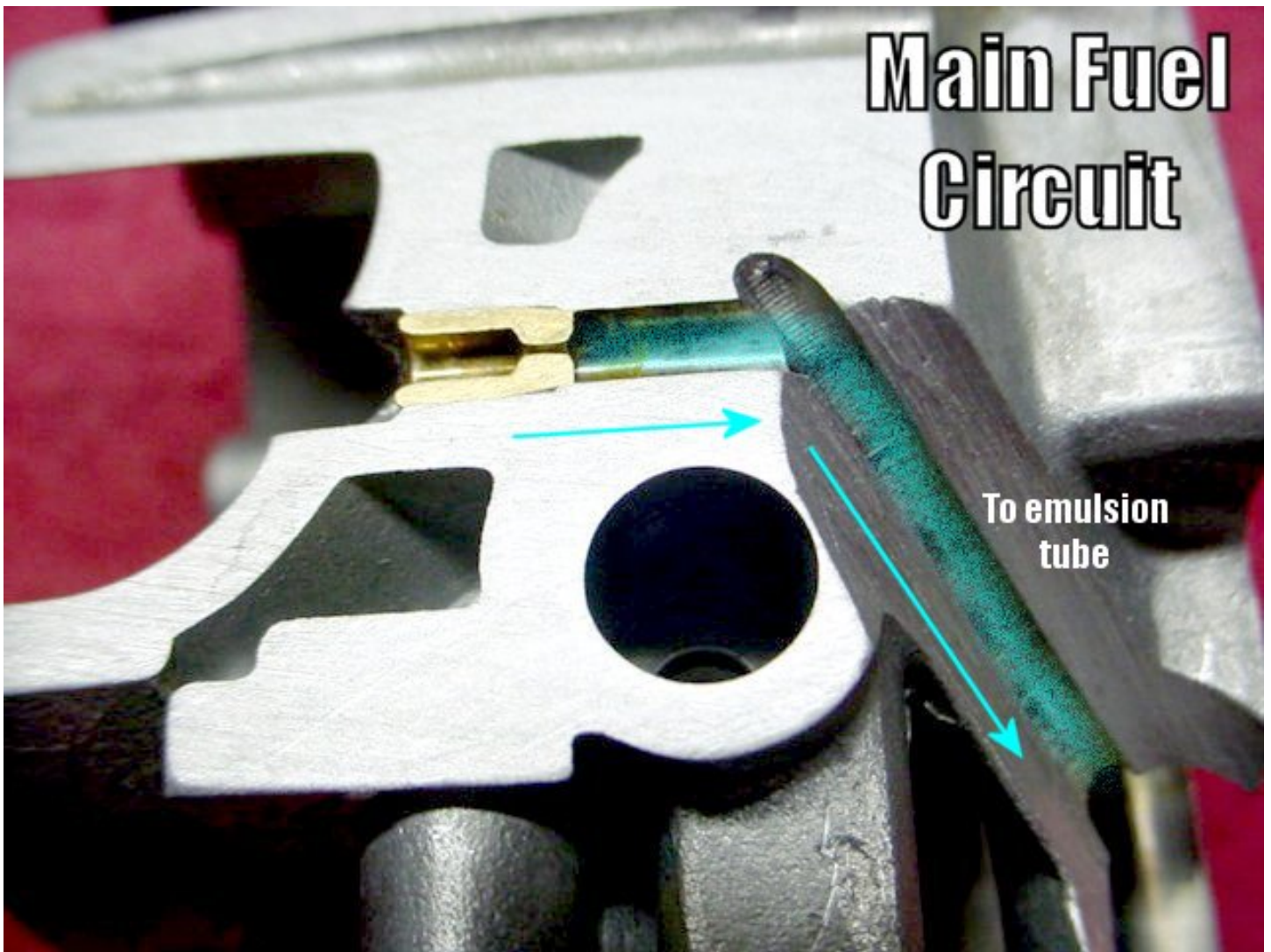


Here with the mixture screw in place.





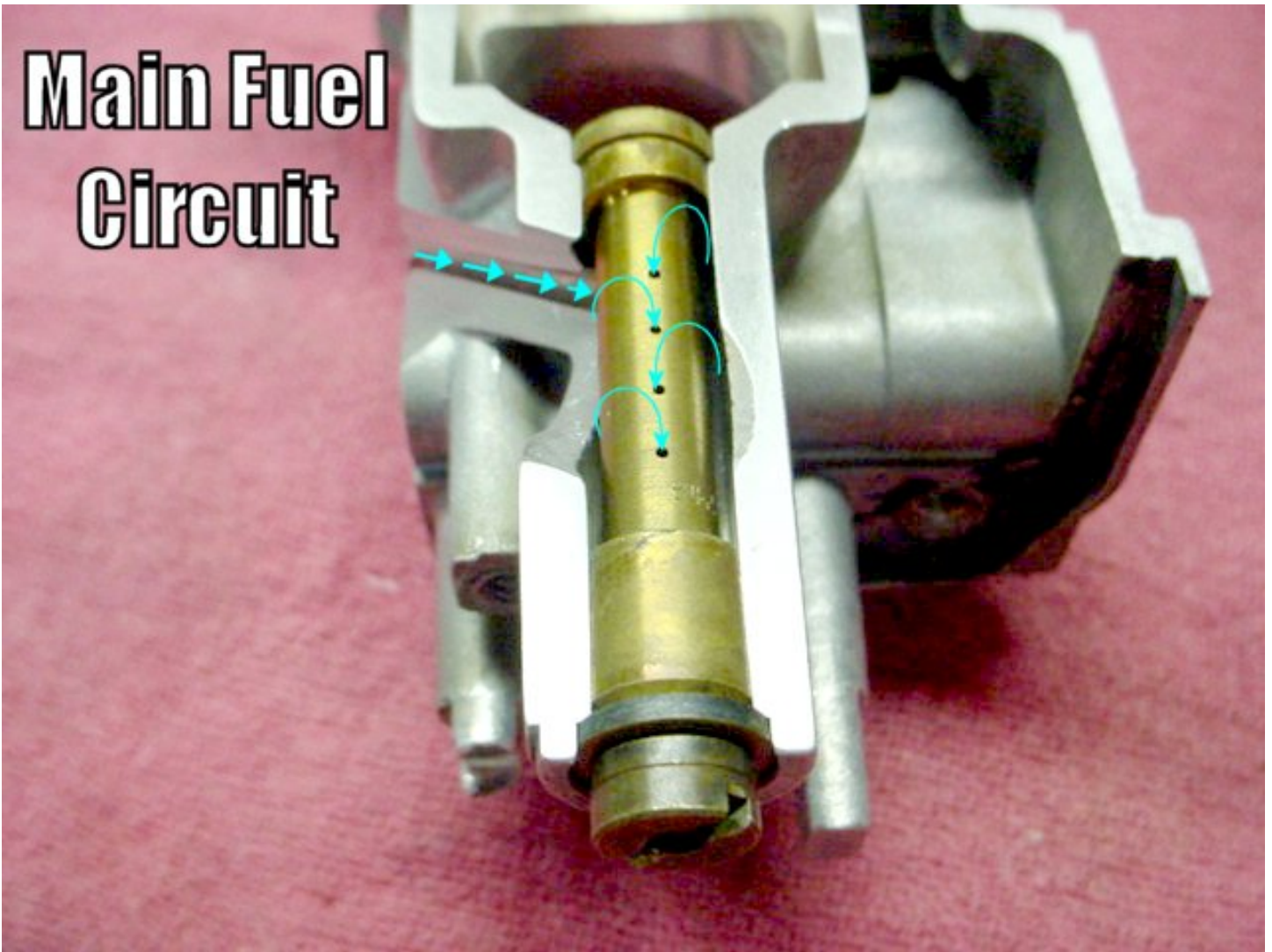
The airbox side of the carb body, with the main air jet on the right, neatly sliced in half.



Main air jet, from the side. Teensy little hole, ain't it? Good thing it's an air jet, so it's unlikely to get clogged up by gas varnish.

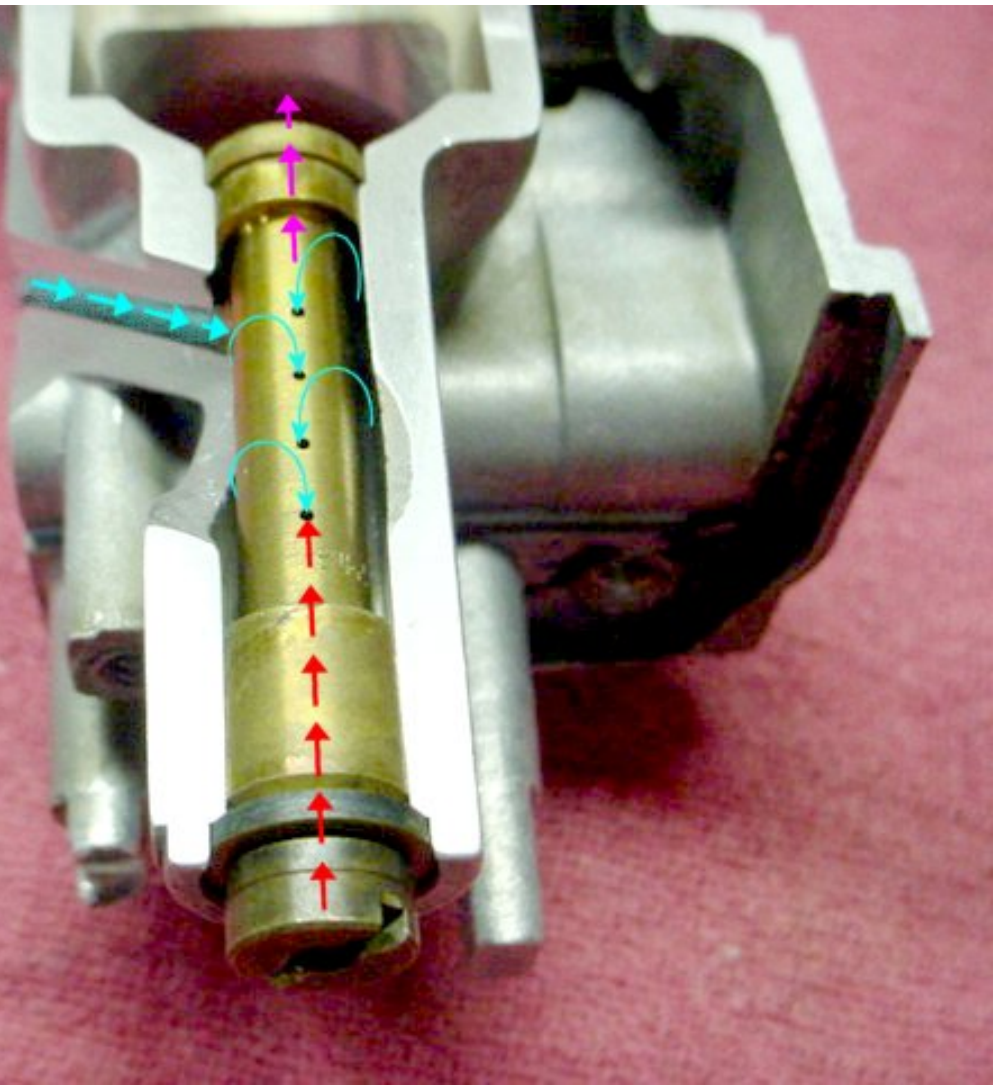


# Main Fuel Circuit



After making its way through the main jet, the air comes down that sloping passage, swirls around the emulsion tube and enters through those tiny holes.

# Main Fuel Circuit



The fuel is drawn up through the main jet at the bottom (which holds the emulsion tube in place) and mixes with the air. The mixture exits the top of the emulsion tube and feeds your hungry, hungry engine.



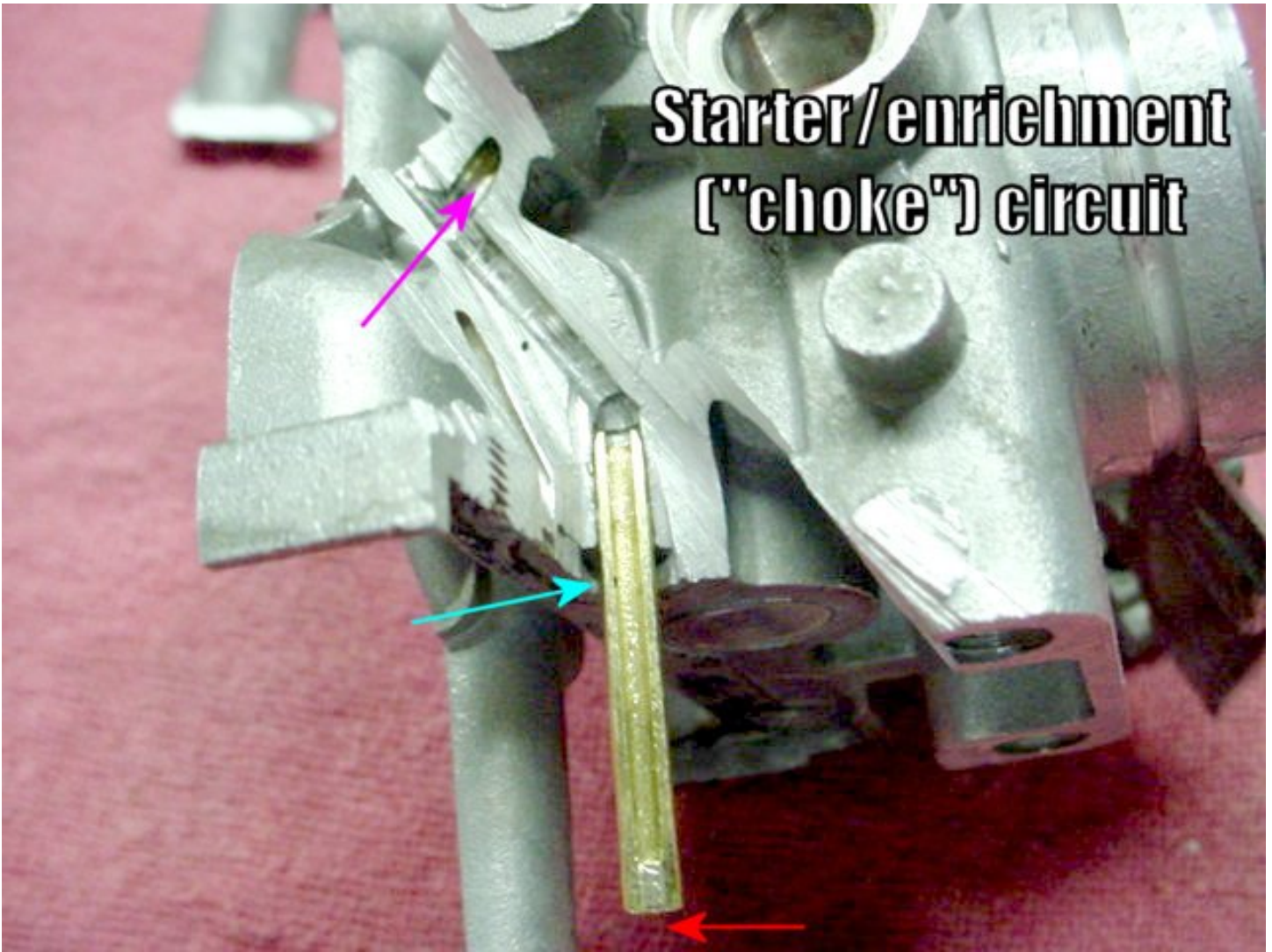
A close-up photograph of a carburetor's internal components, specifically the starter/enrichment circuit. A yellow fuel jet is visible, extending from a metal body. The background is a red surface.

## Starter/enrichment ("choke") circuit

Now let's take a peek at the enrichment fuel circuit. We're looking at the Mikuni here, but it works the same way on the Hitachis as well.

You know that dinky little fuel jet that sits waaaaaaaay down in the bowl that's a bear to open up if it ever gets clogged? Here's where the fuel goes after it gets sucked up through that jet.

## Starter/enrichment ("choke") circuit



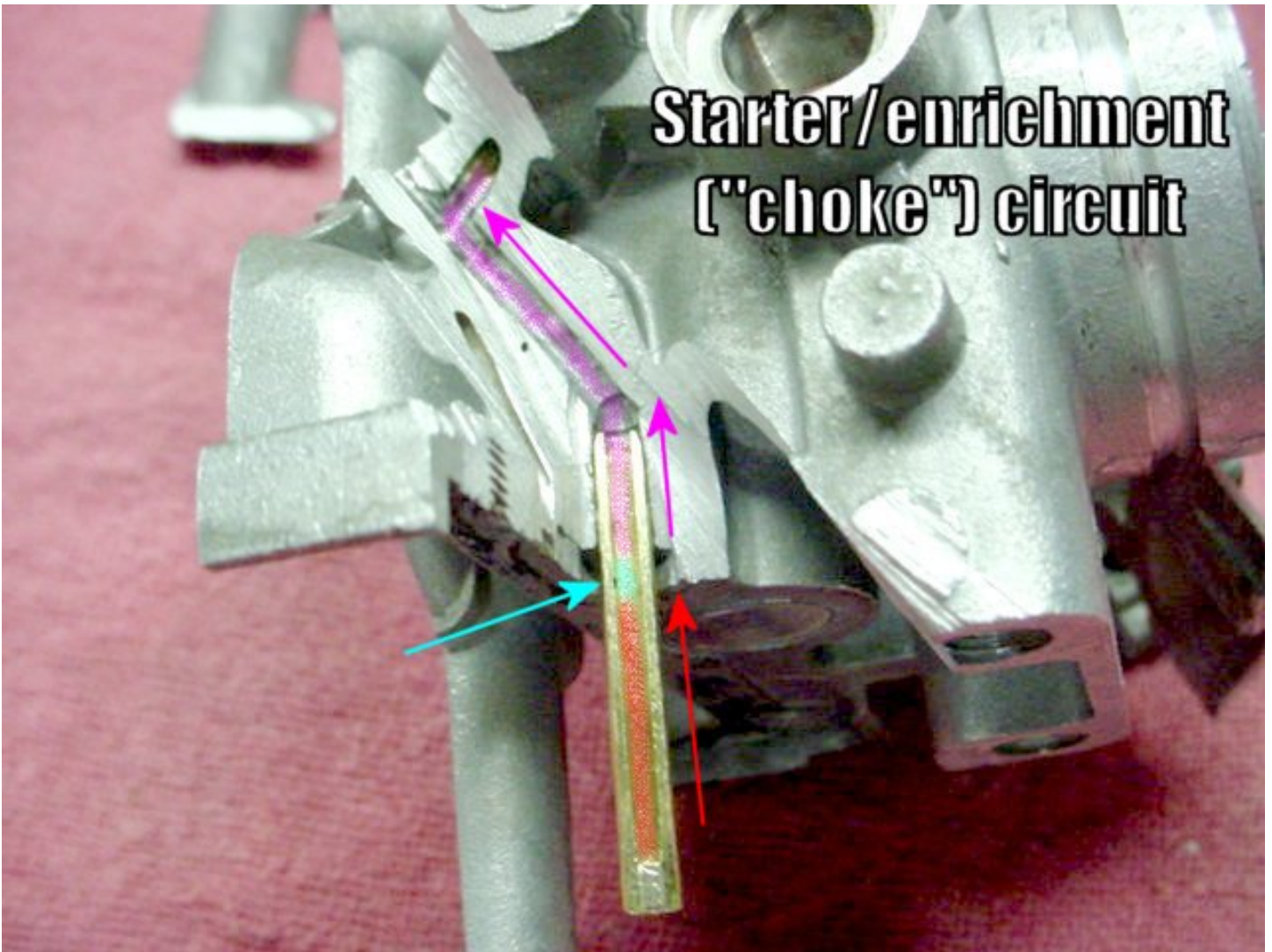
Red arrow: Where the fuel gets drawn into the enrichment tube.

Blue arrow: Air enters the tube and mixes with the fuel.

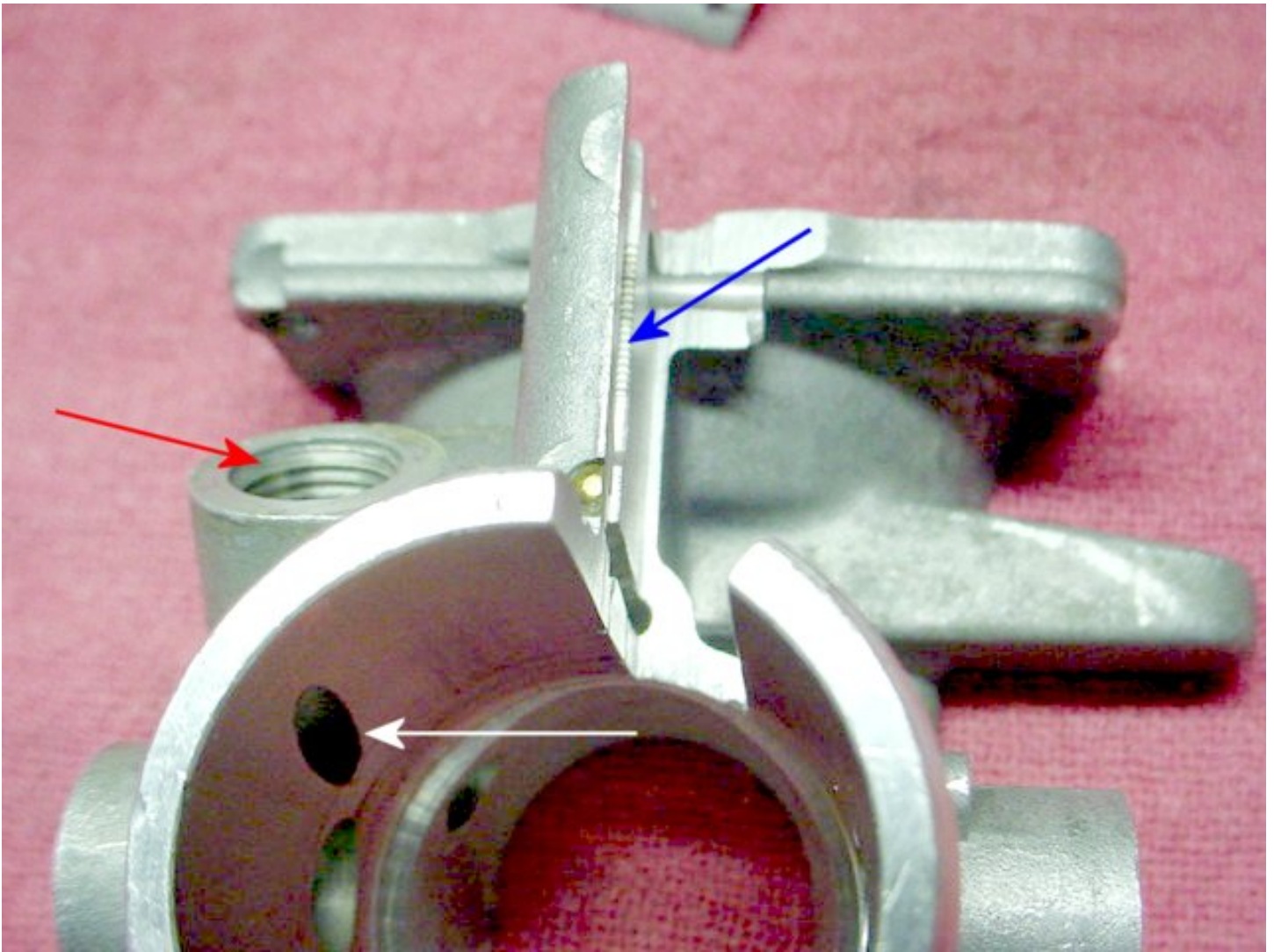
Purple arrow: The passage leading to the starter plunger.



**Starter/enrichment  
("choke") circuit**



Now colorized for your viewing pleasure.



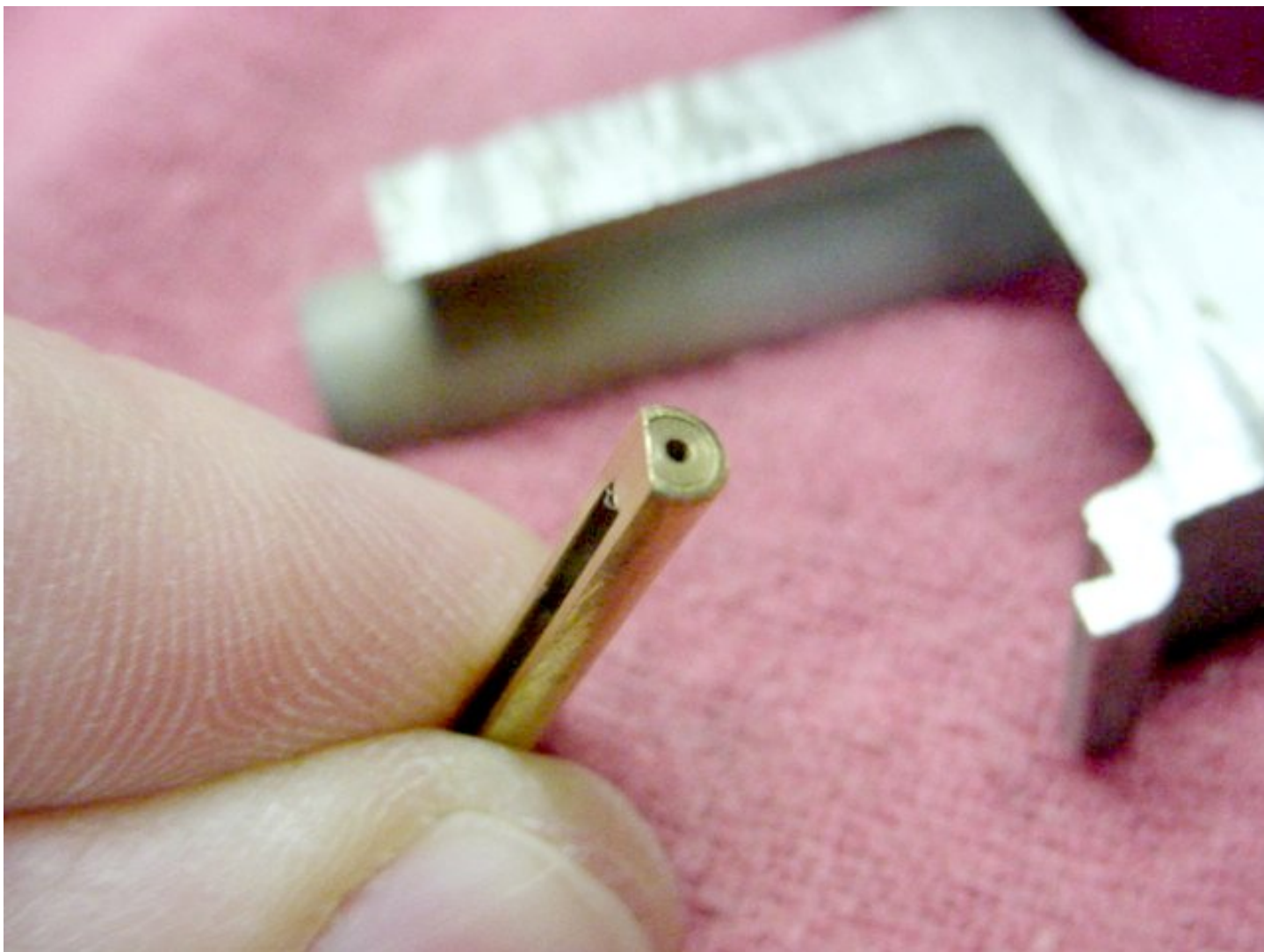
Here's the other end of the circuit.

Red arrow: Home of the starter plunger.

White arrow: exit point for the enrichment circuit, just past the butterfly. Air/fuel comes out here when the starter plunger is opened.

Blue arrow (hey, we're being patriotic here!): where the pilot mixture screw lives. (That was back on pages 18-20.)





That's the bottom of the enrichment tube. If that's not an advertisement for keeping your passages and jets open and "zestfully" clean, I don't know what is.

And with that, we end our x-ray tour of your carbs. Go forth, be fruitful, and colortune.