Zenith Stromberg Carburettor Repair Guide

Among the greatest mysteries about Zenith Stromberg carburettors is exactly: "where does the dashpot oil go"? Usually, the reason is a rotten, leaky O-ring in the needle metering screw used to adjust the fuel-air mixture. This article will show you how to replace the O-ring.

Updates:

- *Once you read this article, you might want to spend a few minutes reading the article's comments at the bottom of the page. There are some very interesting remarks there from folks who have contributed their knowledge. If you have any further insight, please make an entry so others might learn.*
- *If you are interested in getting the replacement O-ring necessary, please don't forget to read the "Comments" at the end of this article. There is a source listed to where you can find the O-Ring.*

Required Tools:

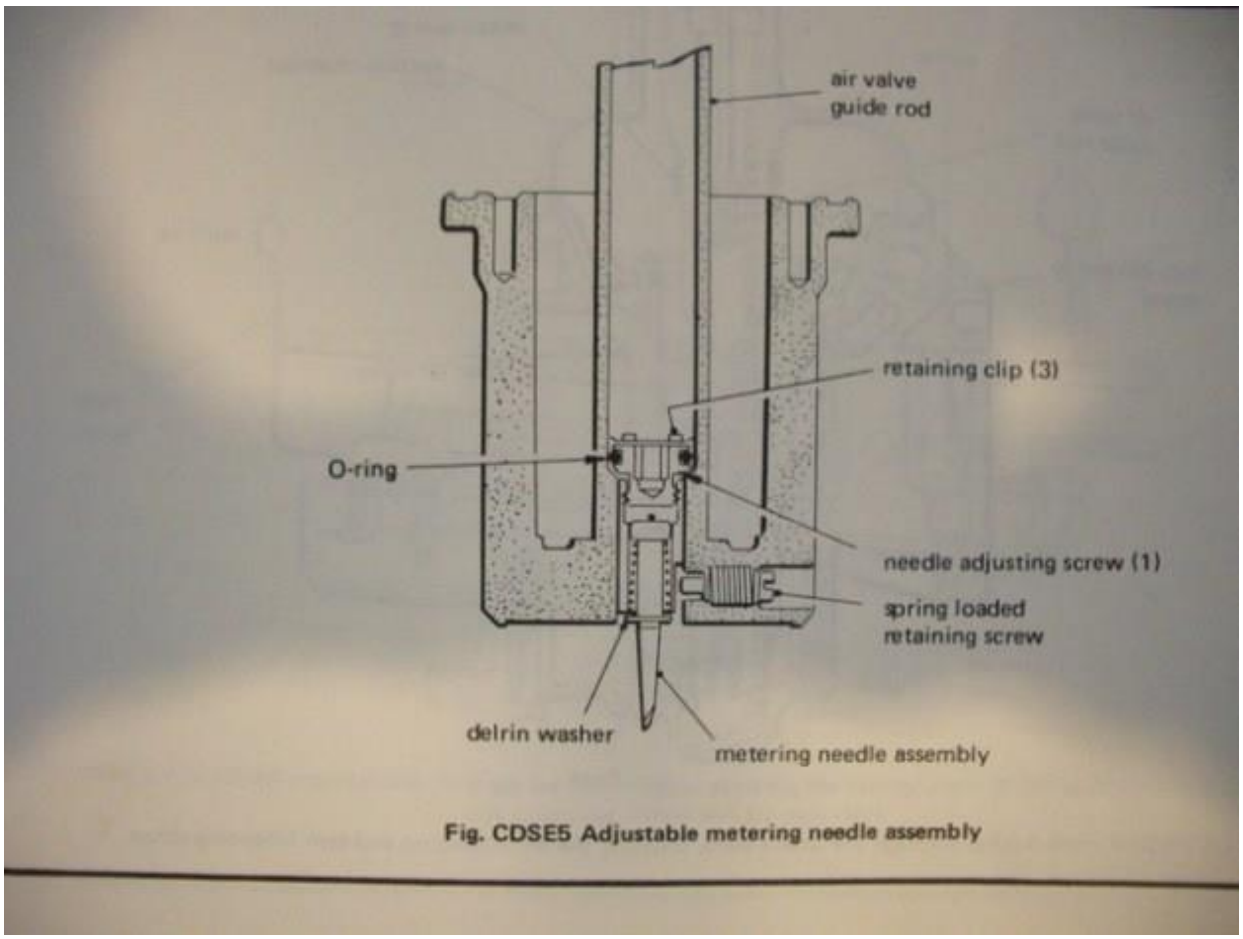
You will need to have several basic tools for this repair:

- A small flat-head screwdriver – to remove the retaining screw.
- A small Phillips screwdriver or better yet, a Pozidriv bit – to remove the four screws holding the diaphragm to the piston body.
- A Zenith Stromberg needle adjustment tool. If you don't have one, you can get by with a long hex head tool.
- Some spray carburettor cleaner and a few rags or paper towels.
- If you are using a vice, don't forget to get some soft jaw liners to keep from marring delicate surfaces.

Here is a picture of the tools we will need:

Tools, including a metering needle adjustment tool.

So we don't get our wires crossed, let me post a schematic of the carburettor. I will try to refer to all the pieces parts by the terms described in the following diagram:



Zenith Stromberg carburetor cutaway diagram.

The goal is to remove the needle adjusting screw pictured above. The needle adjusting screw has a rubber o-ring that deteriorates through the years and this is what causes the dashpot oil to disappear.

Before we begin taking things apart, please read this article completely and get familiar with all the parts and all the pictures. If you like, click on a picture for a larger image. This is far from rocket science, just keep in mind the pieces are very small and are easily dropped. So take your time.

Enough talk, let's get started…

Step 1 – Remove the Retaining Screw

Before attempting to remove the retaining screw, the needle adjusting screw must be backed out all the way out. To do this, introduce the Zenith Stromberg needle adjusting tool (or suitable hex wrench) and make sure the hex head is firmly seated. Now turn counterclockwise a few times.

Now lets work on the retaining screw:

The retaining screw is tiny. It is found on the orifice shown above on the side of the piston.

The retaining screw has to be removed to get the metering needle out. Using a small screwdriver, insert it in the small orifice on the side of the piston. The orifice is on the side of the piston, as shown above. This retaining screw machined from soft brass. If someone has previously attempted to remove this with the wrong screwdriver, it might be damaged. Take care not to make it worse!

Closeup of the metering needle still in the piston.

Before we start taking things apart, please note the small notch on the side of the base of the metering needle. Note that it points in the direction of the orifice (basically it points in the direction of the retaining screw). The screw has a taper and it fits inside that notch. This keeps the metering needle screw from turning and allows it to move up and down.

Even though the diagram above says the retaining screw is spring-loaded, I have yet to see one! All the carburetors I have taken apart have not had the spring. However your carburetor might have the spring, so just be aware of its possible existence. Take the screw all the way out.

Step 2 – Pull the Metering Needle Out

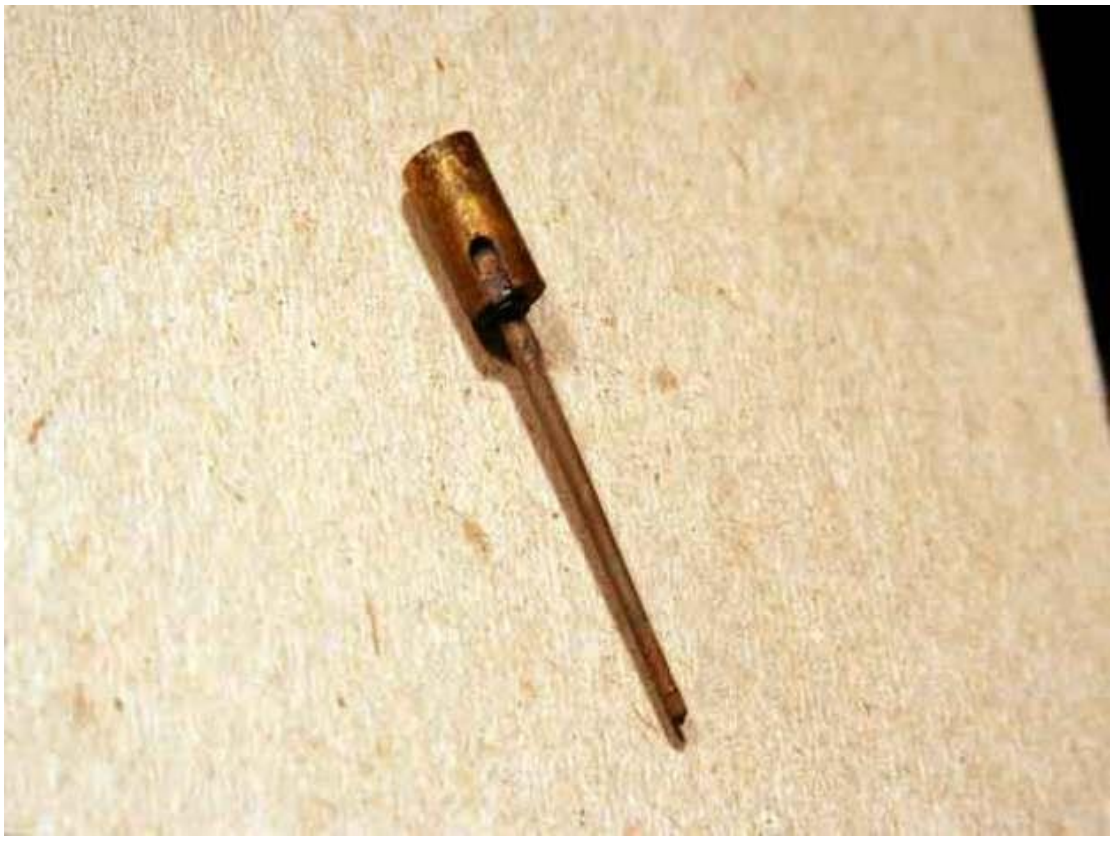
With the retaining screw out of the picture, gently pull the needle out. If it won't come out, you might have to use the needle adjusting tool and turn it counterclockwise some more. It is possible the threads of the seat are still in contact with the needle adjustment screw. Eventually the needle should come all the way out.

If the needle won't come out it might be because there is some gummed dashpot oil residue. You might consider using some spray carburetor solvent and let it soak. Remember to use eye protection when you spray that stuff – it is not very eye friendly.

If after all this effort, the needle still refuses to come out, then there might be another thing to consider: the hex shoulders on the needle adjustment screw might be rounded out. This happens a lot from previous owners using the wrong tools or over tightening things. Remember, brass is SOFT! If this is the case, that might be the reason you can't get your carburetor's adjusted properly.

At any rate, if you think the hex shoulders are rounded off there is another way to take the needle out and I have that procedure listed in "Step 6" below.

This is what it should look like once the needle is out:



Metering needle, showing the little machined slot where the retaining screw fits into. This keeps the needle from turning when being adjusted.

Step 3 – Remove the Needle Adjusting Screw

The needle adjusting screw is where the o-ring is. This is what we need to fix. Removing this is a little tricky because what holds the needle adjusting screw in place is a little star washer that grips the walls of air guide valve rod. The best way to remove it is by placing a drift or wooden dowel in a vise. Then place the piston on the dowel and very gently tap with a small hammer. Use a small block of wood between the piston and the hammer so you don't strike metal against metal.

IMPORTANT: Make sure you have the piston in the correct direction. You want to put the side where the needle was against the drift or dowel. You want to tap the piston down, thus forcing the needle adjusting screw upwards so it exits on the top of the piston.

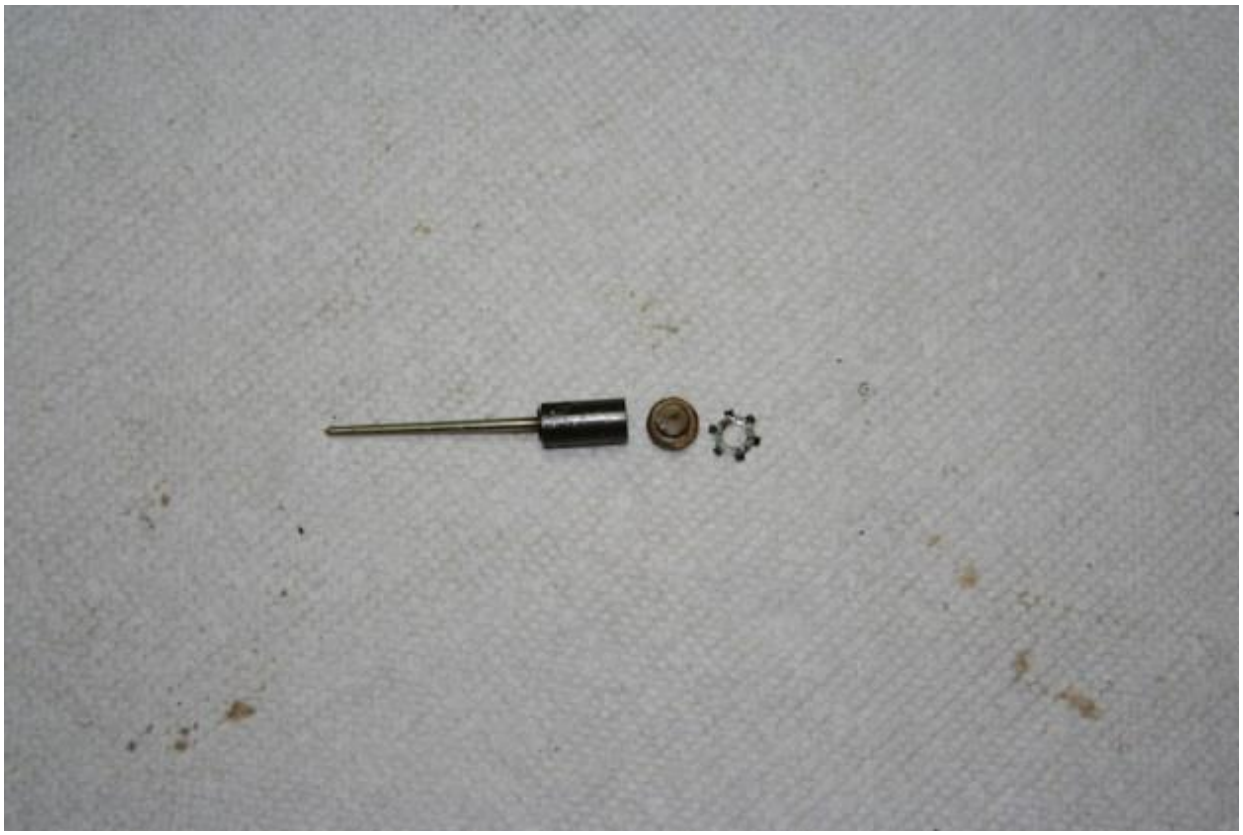
Here is what things should look like once the metering needle screw has been "tapped" out:

Closeup of the star washer with the metering needle adjustment screw below it.

As you can see, the little star washer is almost about to come out. Use care not to drop the thing, they are hard to find on the floor! With another small tap, the star washer and metering screw should come out. The needle adjusting screw should look like this:

The needle adjustment screw. NOTE: the O-ring.

Here it is! You can see the little rubber o-ring on the screw. The top part has the hex shaped recess where the wrench goes in. The bottom is basically the threads that go into the metering needle. This is how it looks like:



Metering needle assembly; needle on the left, needle adjustment screw in the center and the star washer on the right.

The little star washer and the retaining screw keep the assembly from coming out. Once the nut, washer and metering needle are removed the piston is pretty much hollow inside, as shown in the following picture.

Brass housing for the metering needle

Step 4 – Replacing the O-Ring

As seen in the earlier pictures, the o-ring has flattened and does not fit tight. This one is in decent shape, however I have seen some that literally fall apart when the metering needle screw is taken out. The replacement o-ring should be made of Viton. Viton will hold up better to oil and fuel fumes. Unfortunately, I do not know of a source for an o-ring this small. If you know of one please let me know and I can update this paragraph.

This is also a good time to thoroughly clean the piston and make sure it is free of any carbon buildup. Finally a little Marvel Mystery Oil should be used inside the shaft so the new o-ring can slide easily – no point in messing up the o-ring during assembly after all this effort.

Step 5 – Assembly

Installing the metering needle screw with a new o-ring will take a little patience. Place it at the top of the guide rod and gently push on it. You want to make sure it is level.

Insert the needle adjustment screw like this…

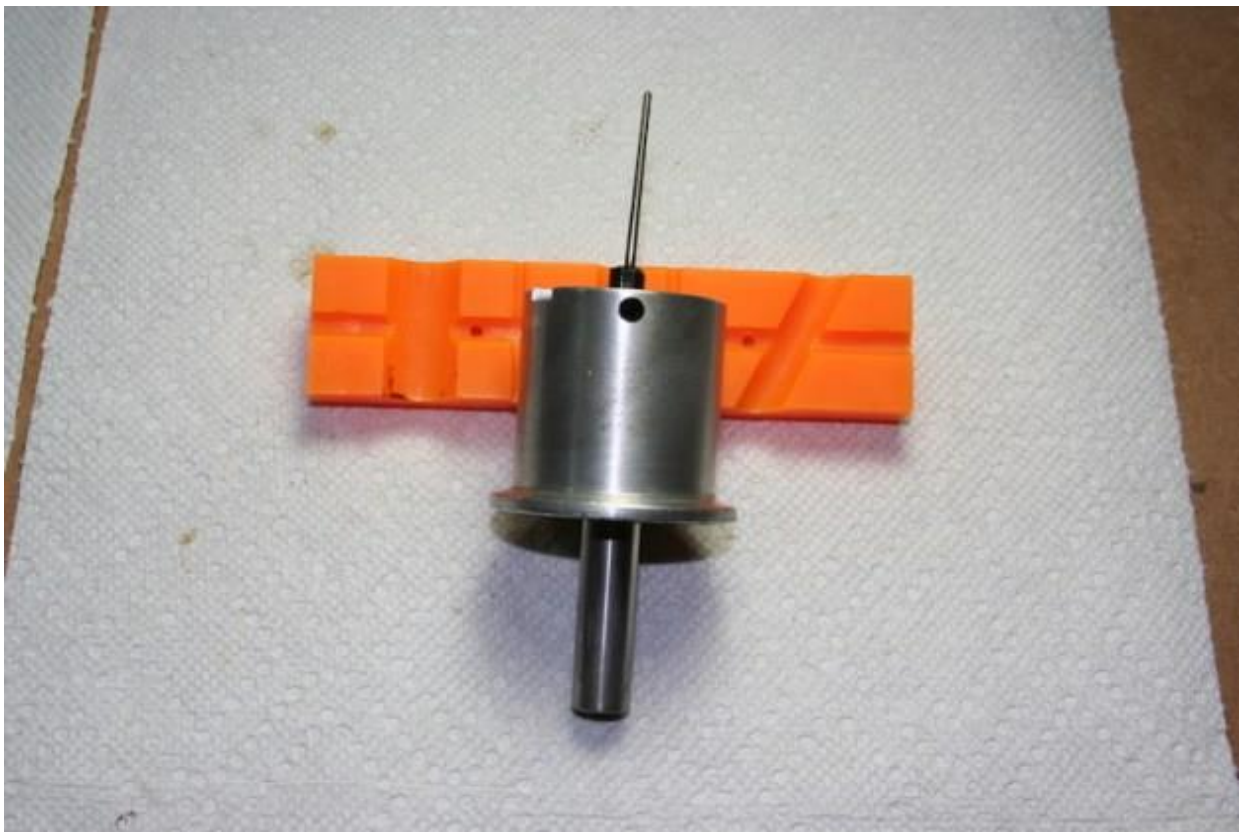
Once you have the needle adjustment screw started, add the star washer:

Star washer in place; note the washer is slightly "cupped"…

Now use a 5mm deep socket and gently (very gently) tap with a hammer. This should get the needle adjustment screw and star washer traveling in the proper direction.

Using a 5mm deep socket to seat the metering needle screw and star washer…

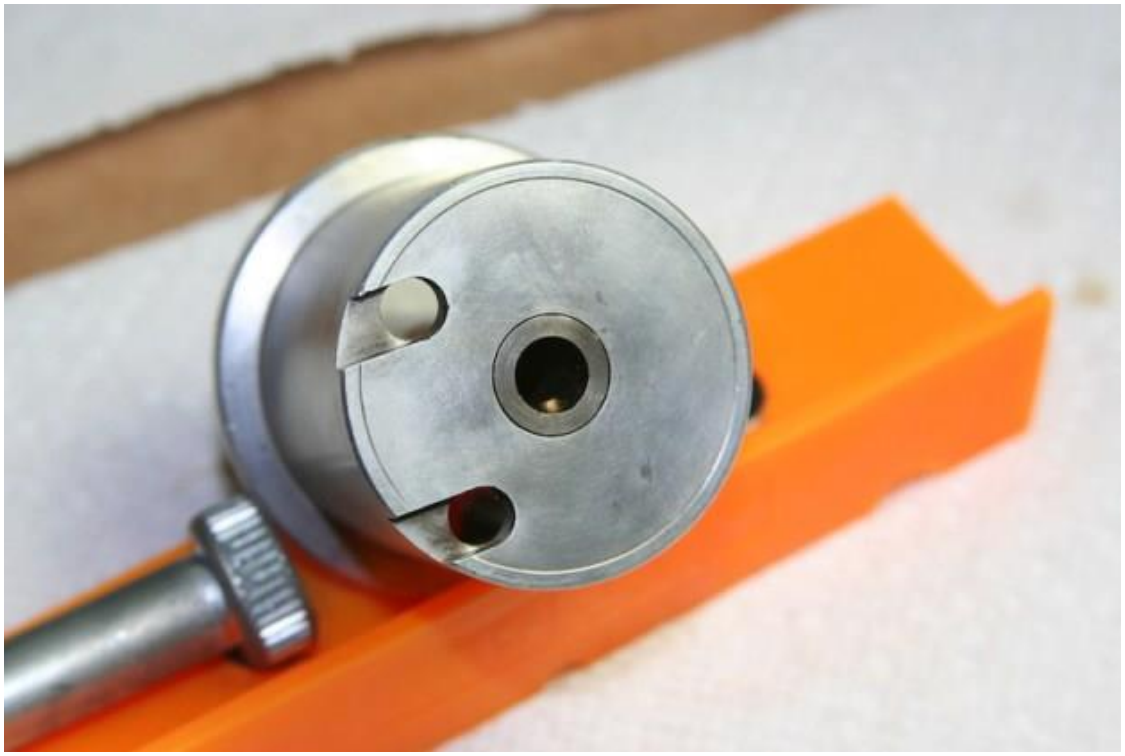
Since the socket will bottom out (it is not long enough) use a drift or dowel to gently drive the components down. A blunt pencil would be a suitable drift. Just tap and eventually you will feel the metering screw bottom out. The last step will be to insert the metering needle back in. Might want to coat the assembly with just a drop of oil so it will slide in easily.



Getting the metering needle re-inserted; note it is not a perfect 90 degree. Instead it has a slight angle

– read more about this in the comments section…

Now, get the hex adjusting tool and turn the metering needle screw as you push the needle in. Do this until it catches the threads on the needle. Of course, the needle will want to move around a little and this is where that detent will need to line up perfectly with the hole where the screw goes in. Put the screw back in and tighten it a little. The following picture shows what the screw looks like fully seated:



This is what the screw looks like all the way in without the metering needle.

Now you see why the little notch has to line up in the exact place where the screw is. You should now be able to turn the hex tool and the needle should not turn anymore. At this point you should see the needle start to walk back into the piston. This of course is the way you adjust the mixture in your carburetors.

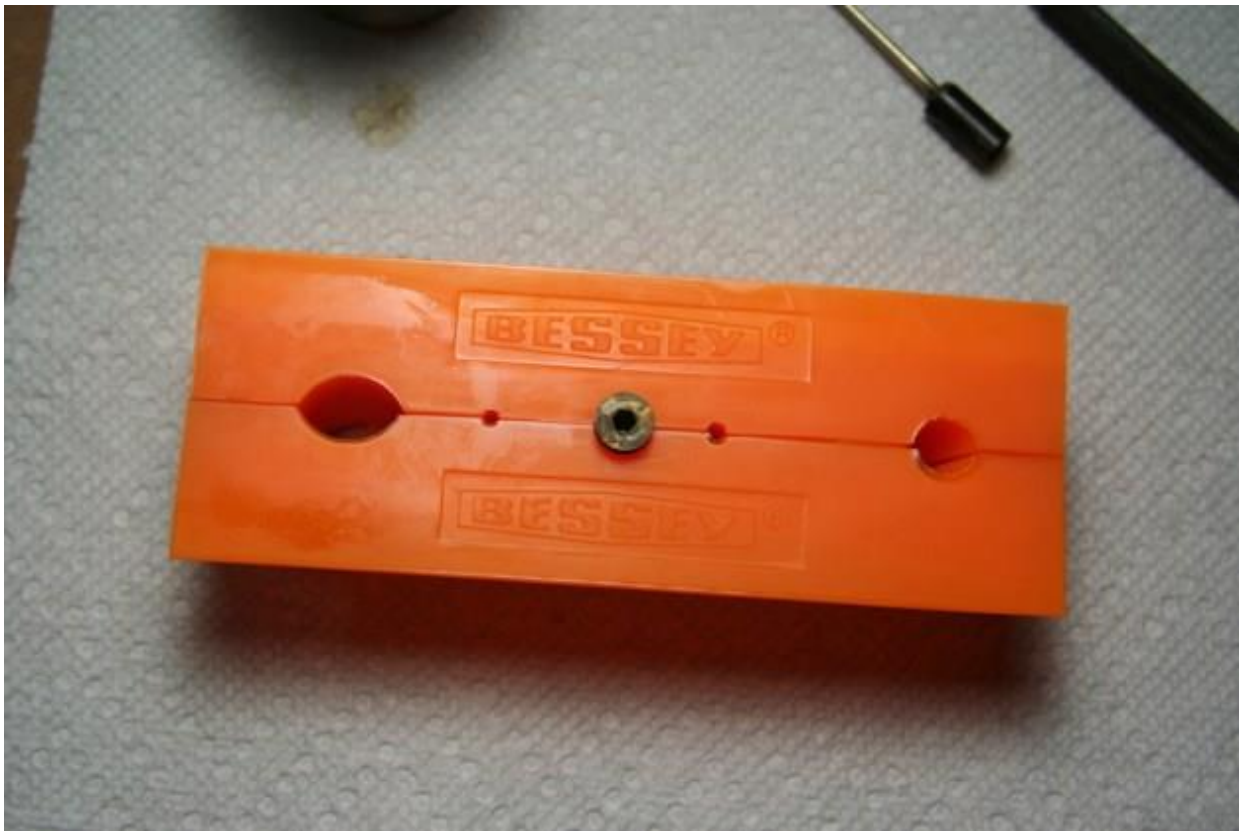
Step 6 – Alternate Needle Extraction Procedure

If the needle refuses to come out gently, there is another way to get the needle out. No, it does not mean we get medieval on it! I tried this on a spare carburetor and it worked. The needle can be pushed out from the bottom of the piston and this is done as follows. Mount the piston with the needle facing up like this:

Now, carefully place a 4mm deep socket over the needle like this:

Gently, very gently tap the socket with a hammer. You should see it start to move. Remember you will be tapping *against* the star washer, so this is going to have a little resistance. As this starts to move down, you will run out of travel on the socket. You will need to insert a slender, longer rod to gently tap the assembly out. Eventually it should come out.

I had to remove the metering needle on this carburetor to take all these pictures. It took a little patience but eventually the needle came out. And, sure enough the hex shoulders had been rounded off. This is what the metering needle nut looked like:

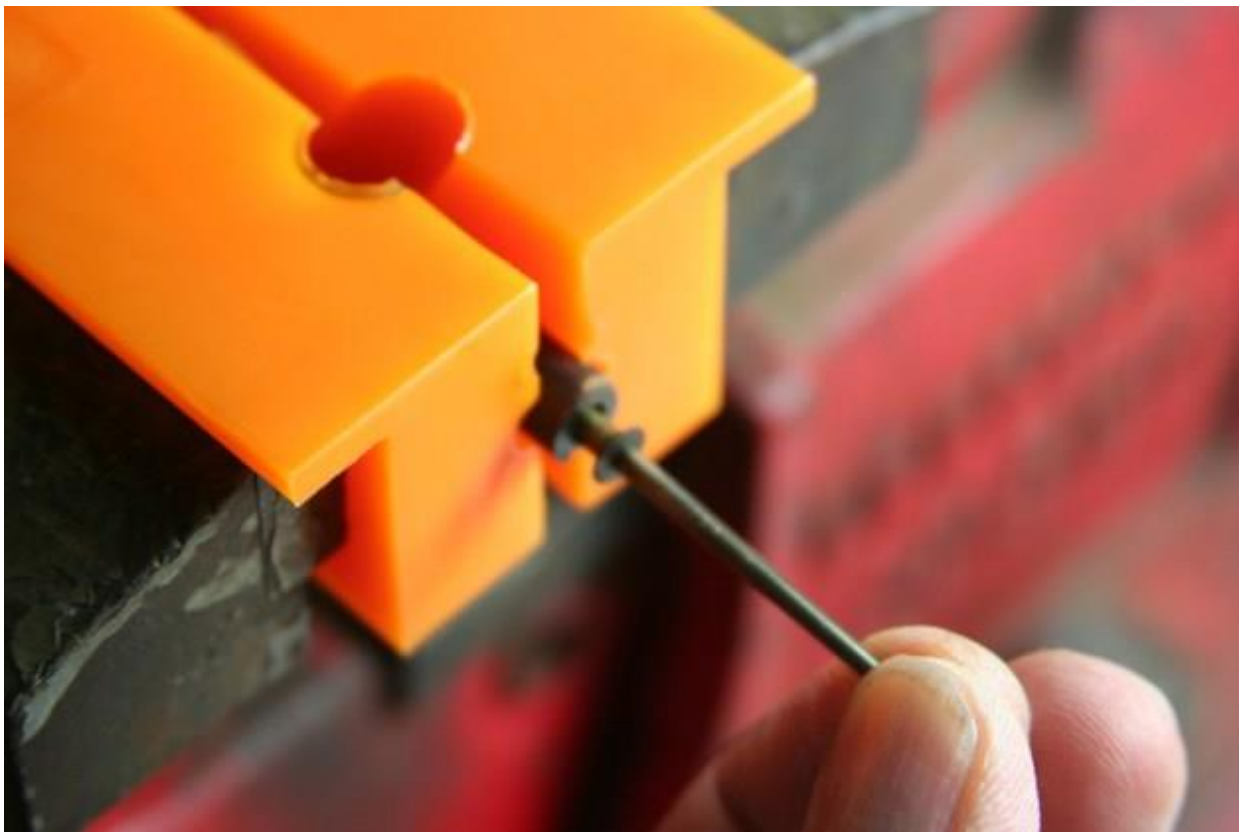


This metering needle screw had the hex shoulders rounded off.

It goes without saying that a metering needle screw with rounded hex shoulders is pretty much toast. This is not going to allow you to adjust the needle. You'll have to buy a new one.

The "Delrin" Washer

If you read the comments below that other readers have left you will notice there is a discussion about the "Delrin" washer. As best I can tell, this picture shows this "Delrin" washer.



The little round disc is the Delrin washer.

Basically I gently clamped the metering needle in the soft jaws on my vise. Once I had that clamped I tugged on the needle. Since this is a spring-loaded affair, you can see the little black washer comes out with the needle.

Diaphragm Alignment

I have been asked how to align the rubber diaphragm. Well, there are a couple of alignment tabs on the diaphragm that must align with a matching grove. This is what the alignment tab and groove look like on the carburetor bowl:

Alignment tab and groove on the carburetor bowl.

Look on the right edge on the carburetor bowl. There is a small groove. Now look on the diaphragm, there is a matching tab. Of course, the diaphragm is upside down here – I did that to show the tab.

The piston has an alignment tab and groove too. They look like this:

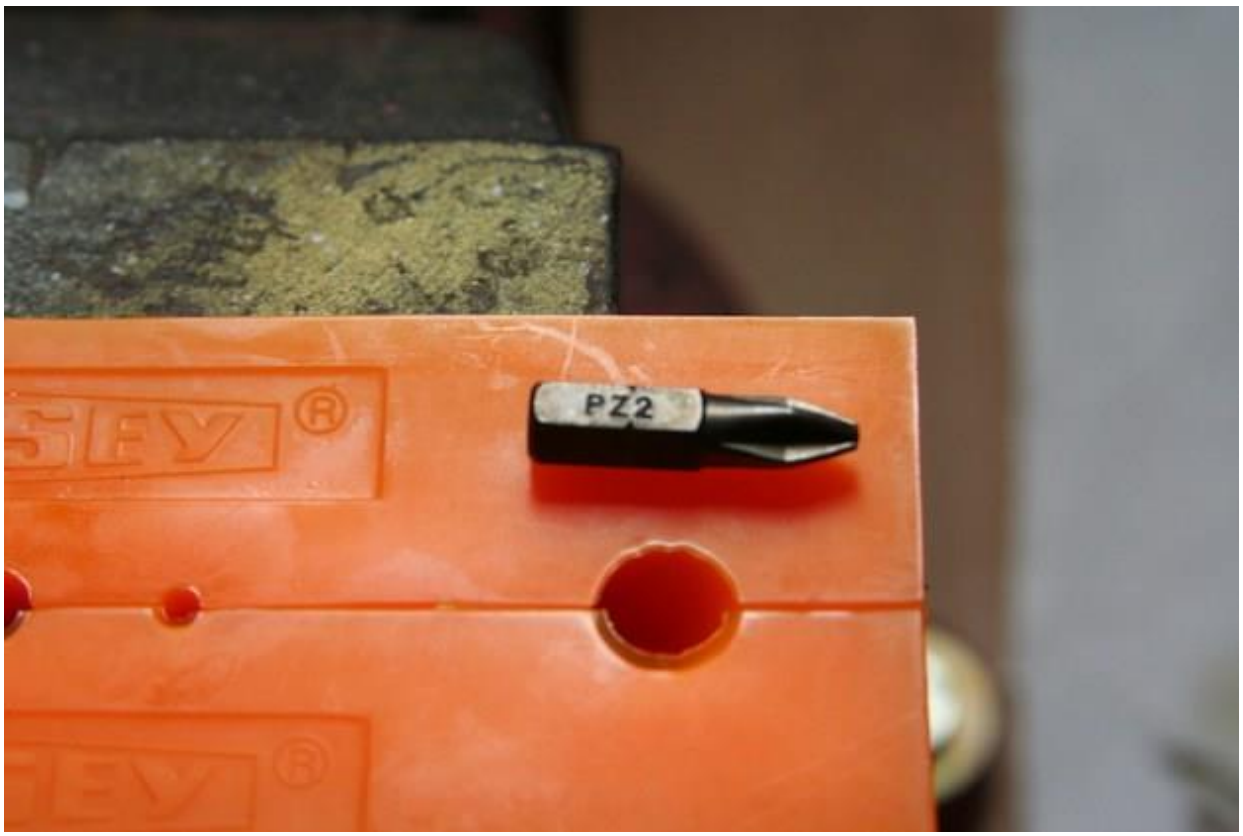
Alignment tab and groove, this time on the piston.

You can see the piston has a groove (to the right of the two screw holes). The inside rim of the diaphragm has the matching tab. Again, the diaphragm is upside down. If you line all these indents the diaphragm will be correctly seated and should seal properly.

You must align everything up before you securely screw the rubber diaphragm to the piston.

About the Phillips Screws…

For some strange reason I have yet to figure out, the Brits made things complicated when it came to fasteners (after all, we have to thank them for Whitworth). I don't know if you have ever noticed that a Phillips head screwdriver doesn't fit right on the Phillips head screws on the carburetors. Well… That is because those screws need a special bit.



Pozidriv size #2 bit

Do yourself a favor: go to your local hardware store, auto store, Sears, or whatever you have near and get a set of special Pozidriv bits for these screws. I picked up a handy three-pack which includes the #2 bit as well as the smaller one and larger one. These will fit the Phillips screws perfectly and you won't be rounding off those heads. They also work perfectly on the four screws that hold the carburetor lids in place. They can be really handy and no toolbox should be without them.

Conclusion

I hope all these pictures and my explanations are of some help to you. I don't claim to be an expert in Zenith Stromberg carburetors (not even close!) – in fact I really dislike them. This is the reason I like fuel injections so much. However these were tricks I learned when I owned a Spitfire. I hope you find this article of interest and it can help you solve your dashpot oil consumption problem.

Comments are Very Welcome!

As always, any suggestions, clarifications or questions are very welcome. Like I said before, I am no Zenith Stromberg expert. However, this page has been read by many, many folks and if you have any other info that might come in handy for anyone with these relics of automotive engineering then please let me know. That is what the comments section below are for.

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