

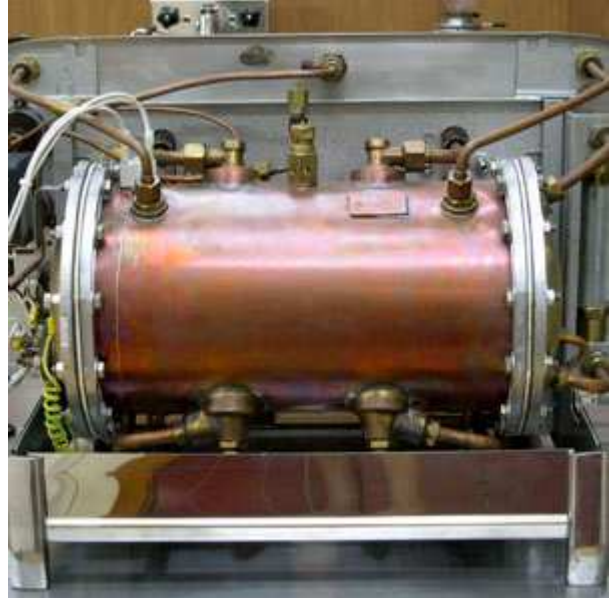
A Legend is Reborn - Faema E61 Restoration Part 2

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By now the hard work on the restoration should be over. To recap, I had dismantled the machine completely and started to clean up the frame. In this case I did not have it professionally powder-coated but preferred to do it myself using some rustproofing hammer-finish paint. As much as I like to do as much work as I can, it is important sometimes to know your limits and defer to outside experts. A few years ago I used to do all the stainless steel polishing myself, then I discovered a company here in Hong Kong that does amazing work polishing by hand.



I also found a great company to do all the chrome work on my machines. It is important to prepare the pieces for them and mark carefully which bits are to be plugged up, which bits require polishing and which do not. In the previous report I mentioned that I prefer to work on the components individually - for example I will work on a steam valve, or the sight glass assembly, and then the boiler. I do this so that I don't lose things, but when it comes to re chroming you have to be brave and put it all together. On this machine I dropped off a large box of parts which must have had more than 150 items. Fortunately my chrome place has a quick turnaround time so it may be just three or four days between dismantling something and rebuilding it again. If I had to wait a month or so I am sure I would forget where many components go.

During the time I am waiting on the other companies to do their work, I can finish the work on the boilers and copper pipes which have been soaking in their mild acid bath to remove mineral build-up. In order to clean up the outside of the boiler and the end plates I find that a wire brush attachment to the end of a drill does a great job. Not only does it remove all dirt and scale but brings out the original colour of the metal - be warned though this produces a lot of dust, and a mask and goggles must be worn at all times. You could use some Scotch-Brite pads as well but I find the wire brush to be the most effective. It is very important to remove all the old gasket material and perhaps Teflon tape that may be on some of the threading, otherwise this may cause trouble down the line and prevent a good seal.



Repainted frame with bottom steel panels on.



Frame with the electrical cable strain reliefs installed.



Frame with re-polished feet and steel side panels.

Before putting the boiler back into the frame it is a good idea to plan ahead and make sure that you do all you can to the frame whilst you have access. In this case I am using the machine as a daily runner. It is madness not to put safety first and do a full rewire using proper cables. As you can see in the picture, it is easy to mount the cable glands to the bare frame; if I were to do this after the machine had been assembled it would be a nightmare.

Restoration or Preservation

So that brings me nicely onto the issue of how far one should go in a restoration. I guess there are two distinct ways to go about this. The first would be a functional restoration - thereby basically doing the same work but stopping short of cosmetic detailing. An outsider would see the same machine at the end of the work, but it would function as a new machine. The other way is to do what I have done and that is to do both function and cosmetic work so that the machine is essentially the same as the day it left the factory. It is very much a personal choice and for me I like it this way - it is a real challenge to not only preserve the machine but to find that balance between restoration and "over-restoration".

At the end of the day machines such as this E61 are unique, but they were mass-produced and so to keep one in an un-restored state as a shrine to days gone by seems rather silly. Also it is important to bear in mind that these machines are filthy dirty when you find them and I like to know that a machine is clean inside and out before making coffee on it.

With regards to function, I like to have the best of both worlds in that I will use the machine for my own use but at the same time I don't want to destroy any original parts. With wiring, for example, I will replace the wiring and install safety thermostats but at the same time hang onto the old power cable and pressure switch for safe-keeping. Install a vacuum breaker and a modern safety valve? Sure, why not? *As long as I know what I have added, I can take it all off again and give the next owner the original spec machine.*



The rebuilt boiler being test-fitted onto the frame.

The real beauty of this kind of work is that even though this machine will have modern features and be safe to use, I can also remove them all within 30 minutes and have the machine back to the original "death-trap" condition with mercury pressure switch if need be. Therefore I do have the best of both worlds - I can keep myself happy with a machine that I can actually use (safely) and enjoy and with some minor work keep the purists happy.

Back to the assembly. So with the main cable clamp installed and the main cable in place, the boiler can go back in. I usually don't pressure-test boilers outside the frame unless they have had work done to repair welding. This stage in the rebuild is when all your hard work starts to pay off and you can begin to see the results. It is also when you should have all your new parts in stock and have back any parts you sent out for re-chroming or polishing. In the earlier pictures you can see that I had put the four corner feet back on which I had previously polished, and put in place the stainless steel panels that had come back from the polishing company.



A modern Teflon gasket to replace the old paper one.



More test fitting of the pipes and components.



More test fitting of the pipes and components.



Final fitting of the sight glass and other pipes.

using new locking collars and new Teflon gaskets which are still available from most parts wholesalers. The original heating element was reused. I also like to put all pipes back on (but not tight) to make sure they all fit and line up correctly. It is important when you receive parts back from re-chroming that you check for any mistakes. Take for example the part of the upper group chamber known as the mushroom, which had been chromed by mistake. That had to be stripped off - and you need to make sure all threads are clean so that parts can screw back together.

One of my pet peeves with any kind of maintenance work is not changing parts all in one go. So on this machine all gaskets and seals were changed. These kinds of parts are inexpensive and it is foolish not to change them all at the same time.



Chrome parts back from the plating company. The Group looks amazing.

Starting the rebuild the group, note new Teflon gaskets.

The back of the group.

Pressure gauges connected up.

This also brings me neatly onto the subject of replacement parts. Some modern replacement parts are not very good at all. Take for example the steam valve knobs and the portafilter handles - the originals were Bakelite and the modern ones are a shiny plastic that look out of place. Therefore I did some research and found out a way to polish them without burning them.



Repolishing the original Bakelite proved tricky but worthwhile. Steam valve knobs before left and after right.

Steam valve knobs.

Brew lever Bakelite knob.

The reassembly on this machine was very straightforward. I was amazed that all of the copper pipes lined up perfectly and didn't require any manipulation at all. Another testament to the build quality.

A common topic that I get emailed about no end about is the use of sealants and tapes on boiler fittings. So let me run through what I have found over the years and what I do.

Compression Fittings

These are designed not to use any sealants or tapes of any kind, in fact if you use tape on these there is a good chance you will not get a seal. These are very reliable and you really needn't tighten them too much - the key is to get the ball shape lined up correctly and you can probably get a good seal finger-tight.

Fittings With Washers

The washer seals both parts together, for example a pressure safety valve, a vacuum breaker or a probe. It is not necessary to use tape on the fittings and I never do. As long as the washer is in good shape and the fitting on the boiler is clean, then tightening the component will be sufficient to get a good seal. You may use a dab or two of liquid sealant.

Fittings Without Washers

These are the fittings that cause the most trouble, such as the elbow fittings on boilers and solenoid valves and the heat exchanger fittings. They don't use any washers. I think that this is one of the only times Teflon tape may be used and even then I think it must be used in such a way that it is not visible.

A question I often get asked is "I have an elbow fitting on my boiler that must face towards 12 o'clock to line up with the pipe to the pressure switch, but when I tighten it fully it faces 3 o'clock. What is going on?"

In this case tightening it is the mistake - the factory would have used liquid sealant or possibly some Teflon tape. What I do is use the liquid sealant and screw in the fitting until it is close to the end but I will stop it at the desired position. Don't worry too much if "it feels loose," because the pipe it connects to will hold it in place and the liquid sealant will get harder.



A fitting that uses sealant to seal it.



Inside the machine. Note the new safety valve.



The boiler data plate.



The completed machine without the main body. The two free-floating wires connect to the fluorescent light on the main body.



The completed machine, note the reset thermostat strapped to the boiler.



The completed machine.

The Big Switch-On!

After reassembling a machine it is important to take a step back and even come back to it the next day to double-check the wiring. The E61 is very simple with regards to wiring but still, mistakes can happen. I always check everything at least two or three times if it has been rewired from scratch. Filling the boiler with the manual lever also gives me an opportunity to check for leaks without the electricity being on. With the boiler full it was time...

I found no problems at all with the original heating elements so it was just a case of waiting for it to get up to temp. The machine could probably do with new, more powerful elements, but because this was for my use and not to be used in a commercial setting, for now it is fine.



Note the pressure gauges! We have pressure!

A quick lift of the lever confirms that the pump works and water is flowing through the groups. The gauge for the brew pressure works! To me there is something magical about seeing the gauge move for the first time in years. I think maybe I am too used to modern machines having rubbish components, but when you see a pressure gauge older than I am still function as intended it is quite something. This machine has no vacuum breaker so I left one of the steam valves open; as soon as a bit of steam comes out you close it and watch the steam pressure gauge climb. It is also at this point you should be on your toes for steam leaks - I had a loose fitting on the back of the gauge which required tightening.



The completed machine front view.

Another front view.

A quick word about the front glass and the back light. The adhesive logo for the front glass is still available but fitting is not easy. Thankfully I had the foresight to order more than one, and the second attempt was pretty damn good! I did a bit of research and believe the original tubes to be neon, however I am using a more modern and safe low-voltage tube with the transformer hidden away. It looks amazing and makes me wonder why we don't see these anymore.



The front panel light on.

The side shot with panel light on.

The money shot!

So at this point we finally get to make some coffee. I have to be honest and say that the groups required a bit more work, because they leaked the first time the machine came up to operating temperature. It appeared that some of the springs from the modern E61 clones were not straight swaps and under pressure the group brewing chamber would open. Again it is important to note that these reproduction spares aren't 100% accurate and may require a bit of fiddling.

Pulling Shots

Pulling shots on the machine is an absolute joy. After locking in the portafilter and lifting the brew lever (which opens the brew valve and turns the pump on) there can be up to 10 seconds of pre-infusion until the first drips of coffee appear. During that time you can actually hear the water entering and filling up the pre-infusion chamber and that is confirmed by the slow climb of the pressure gauge.

Most coffee geeks will know the usual ways around this such as running water through the groups to bring the temperature down. If the machine is left idle it is not uncommon to see the first 10-20 seconds of water well over 104 deg. C but it soon comes down. You must bear in mind that this is a commercial machine and it comes into its own with a constant stream of customers to prevent the water inside the heat exchangers overheating. It wasn't really intended for the occasional shot to be made every few hours or so.



Pulling shots (note coffee is very fresh hence the thick pour)

Crema by the bucket load (tamping is a little uneven)

Temps can creep up a little bit when left idle!

There are quite a few other ways that we can tune the machine, such as adjusting the pressure switch which I set quite low down at 0.6 bar. The other method which I briefly experimented with was adjusting the thermosyphon loop on each group. The theory is that by installing restrictors (small brass discs that fit into the end of the copper pipes) on the thermosyphon pipes, we can alter the group temperature. The restrictors are typically 2mm or 3mm in size and will slow down the radiator effect of the thermosyphon. Although I haven't had too much time to experiment with this I did install 2mm restrictors on one group only and the group was a lower temperature than the other. It needs more work. The E61 Legend, the modern replica that has been around for a few years now, actually has an adjustable valve instead of brass discs.

The coffee quality is very good provided you work on getting the group temperatures under control. I have always found the E61 group to be a very forgiving system in that they produce buckets of crema and shots with great crema. I am actually not the sort of person to sit and data log for hours about brew temps, so I haven't played around with flushing times to get any flat brew temp profiles.

Steaming milk is also easy with her, and in fact the somewhat awkward fixed steam wand is rather good at getting the milk swirling for latte art.

What Does the Future Hold for This and Other Restored Classics?

In its current configuration it would be foolish to put this into use in a cafe or restaurant only because it does not have an auto fill function. Fitting one wouldn't be too difficult, and with that it would be good to go. Seriously. The fixed steam wand isn't that big of a deal, it just takes a little getting used to. But it is probably more fitting that the machine be used in a gallery or a small arty cafe where it could hold it's own as a piece of modern art - it is simply stunning to look at.



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While the coffee making abilities in this machine may not be of the same consistency as some modern machines, good coffee is possible with a lot of work and input from the barista. To criticise anything about this machine seems a little inappropriate - the design is 45 years old and deserves a lot of respect. Besides - she can be forgiven for the minor indiscretion of a high brew temperature here and there - the E61 is a thing of beauty and a design classic.

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