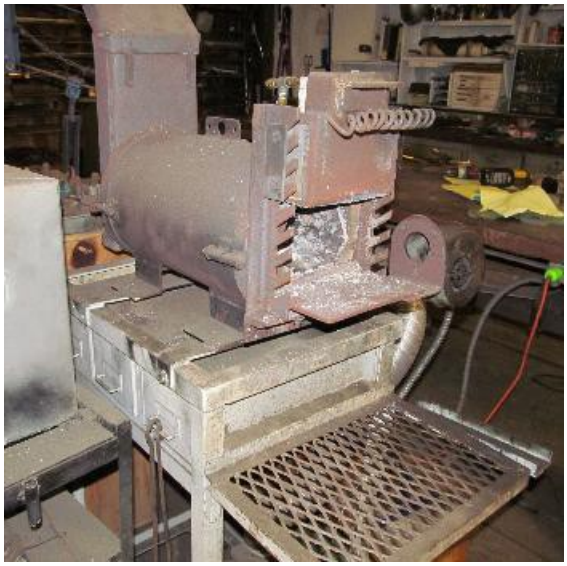
Damascus Forge

Steve Bloom, IronFlower Forge

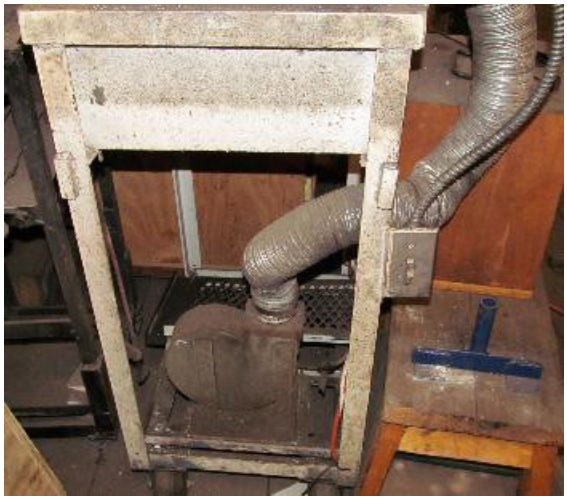


The forge was purpose built for Damascus (pattern-welded) steel production. The body is a 12” diameter pipe (sheet steel would have sufficed but I had the pipe) with a rear flue allowing pass through, a very clever door which is almost never used, a removable front work area (expanded metal), a lateral blower to tame the dragon's breath, and dual burners on the right side. 3000 F bricks line the pipe and there is a mizzou floor. Interior measurements are approximately 18” x 5” in diameter.

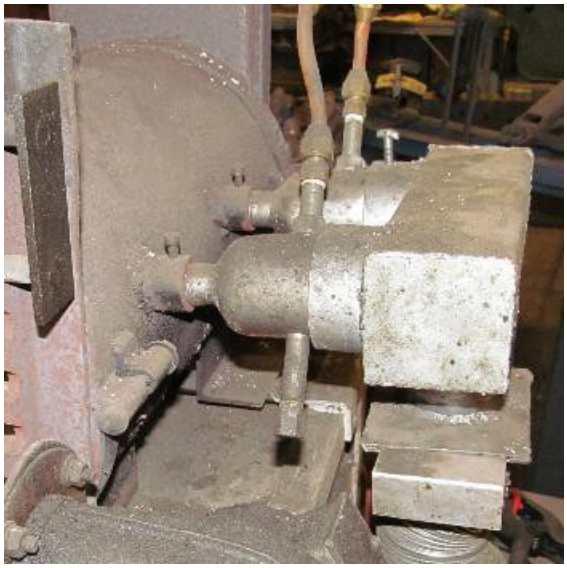
The unit is on a wheeled cart and the lower deck is the site of the blower used for boosting the temperature.

The burners are typical venturi units with 0.040 orifices and can run from 5 to 15 psi of LP pressure. They are inserted in the wall so as to project the flame towards the upper right side of the fire space.

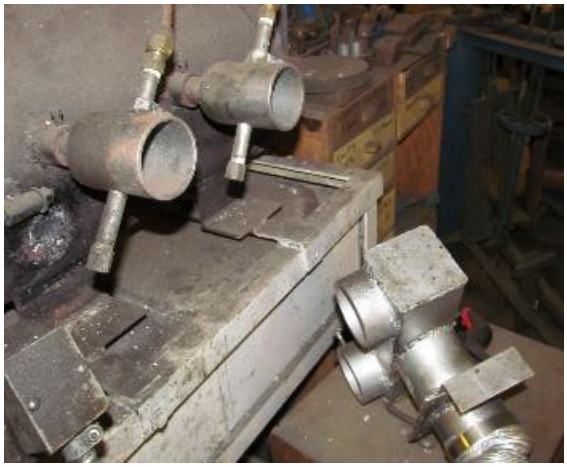
The blower is a 120V squirrel cage from the Surplus Center and is not particularly powerful. It talks to the manifold through a aluminum dryer hose. The switch on the leg controls both the main and the lateral blowers.



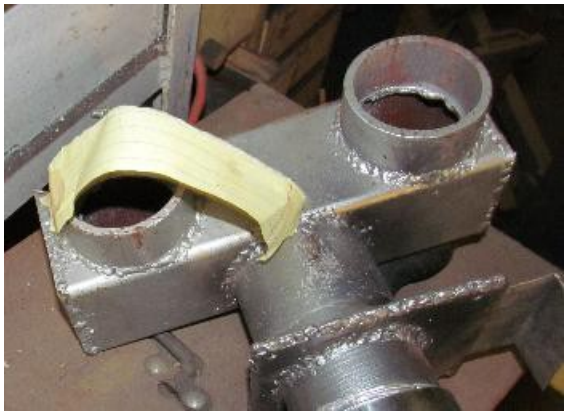
The manifold is a piece of box tubing with a couple of pipe sections that slide over the burners. Note the set screw at the rear. The connection to the flex pipe is through a slide gate. When first fired without the gate, the 3000 F refractory started to melt, so having the ability to choke off the flow is a good thing,



This shows the manifold removed from the burners.



And since I don't have a flow meter, this ought to give an idea of the usual flow. The strip of paper was barely moving and the flow was insufficient to lift it off the opening.



My typical billet is O1/L6/203E 13 layer setup and runs about 4 pounds at the start (1” x 6” x ~2.5”). Five welds (initial, 3 bifolds and then a trifold) gives a 312 layer bar about 1.25” x 1/4” x 60” for an average loss of about 20 to 30%. The gate allows some control over a reducing atmosphere.

I have a similar unit for my usual shop forge. The squirrel cage is about the size of a cooling fan from a computer and talks through a pipe and a right-angle connector that slides over the front burner. At 15 psi, the little blower is sufficient to generate mild-steel welding temperatures.

There is a PDF on my website (http://www.ironflower.com/tips/shop equipment/gas forges 2012.pdf) which is supporting document for a talk I gave on gas forges. The shop forge is shown there.