Wheelhorse; producer-gas fueled garden tractor

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Good luck,

Jeff

Abstract: A Wheelhorse garden tractor was re-powered with a Honda clone engine and fueled with producer-gas from the Gas-of-Fire 2013.

Links:

Email
Youtube
Bioenergy

Photo 1

The filter and engine is detailed in the “Plastic Bucket Filter” and “Honda Clone;fueled by producer-gas” document, respectively.

The bottom portion of the gas-producer is an inverted 20lbs propane tank. A hole was cut in the bottom (now the top) of the tank and a tube was welded to this hole. All the propane was properly removed before any operations were performed to the tank. The hole was cut by making a circle of 1/8” diameter holes with a drill and bit. A larger diameter tube would have allowed a longer run time but this tube was in my stock. The tube was cut short enough to allow my arm and hand access to the inside bottom of the gas-producer.

The lid was made from plate steel and the gasket is silicone bathroom caulking.

The gas cooler was assembled from exhaust elbows that were bolted together and sealed with the same silicone as the lid seal was made from. Except for the first elbow, they were not welded so that they could be removed and cleaned or reused on another design. See Photos 1 and 2.

Photo 2

Photo 3

Photo 4

Photo 5

Air enters through the propane outlet port that is now the bottom of the gas-producer. The bottom of the gas-producer is lined with a refractory material that can be seen in Photo 3. This surface of the propane tank must be throughly cleaned of any residue. I do not know the proper method for bonding the refractory to the tank but I first applied a layer of the black stove repair material (bonds to steel) to this surface then the refractory.

The bottom pot, Photos 4 and 5, serve several purposes. The water added to the pot humidifies the incoming air. The pot retains and the water extinguishes any hot ambers, and such, falling out of the air intake. Assists during shut down because it's easy to shut the air off. It acts like a mirror with a dark bottom and clean water allowing one to view the glowing charcoal, Photo 4. A spring is used between the sheet metal floor and the pot to fasten it to the bottom of the gas-producer.

Photo 6

Photo 7

Photo 8

Photo 9

The filter and gas-producer can slide forward to allow opening of the hood, Photos 7 and 8. Four fingers were welded to the gas-producer, they set in notches of the upright angle irons. In other words the gas-producer is suspended from these fingers providing an easy means for removal. A block of wood is used to protect the plastic filter from the 260° F heat radiating from the gas-producer, Photos 8 and 10.

The black tubing is 1 1/4” sub-pump hose. It costs about 0.30 cents a foot.

Photo 10

Photo 11

Photo 12

Photo 13

The handle of the bucket filter is used to retain the filter, red strap in Photos 11 and 12. The original plastic cap on the bucket (bottom of filter) can be removed to drain any pooled water. To date it's only moist but I do remove both caps to allow some drying when not in use. The white PVC cap located at the top of the filter can be a future gas outlet to fuel some other device. Being a nice clean white surface it's easy to see how well the filter is performing.

You can see in Photo 12 the humidifier pot, it's resting on the sheet metal floor. If you look carefully there is a shinny silver bolt that keeps the removable sheet metal floor from sliding toward the other side of the tractor. The other side of the removable sheet metal floor is bend downwards keeping the floor from sliding toward the camera. When the floor is removed the pot drops down onto the ground.

To be continued.