biogas

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AD,
After about five years in the biogas tech extension arena back in the 70's (somehow that could be worded more aromatically) , we had evolved a similar design for a very similar expanding drum idea simplified as your design suggests. We had a different configuration for the inlet (feed stock) pipe and I wanted to share that back with you if it can be helpful to your design. The inlet pipe we used was a striaght tube which was angled into the main base drum / lined well / at roughly 20 degrees off the vertical. It was also extended about half a meter ABOVE the rim of the base drum/lined well. The resulting reduction in frictional resistance to flow combined with the 'head' difference (between feed tube inlet and the rim of the base tank, created a rather natural, immedaite and smooth flow into the tank. There was little waste in exterior fermentation and no need for a plunger.

As for daily use, I would only add two precautions which we applied to biogas use. (Please also advise as to whether these would as well apply to your design):
1) The first generation of gas will be mixed with air and should be bled off with no attempt at igniting it. at a certain proportion this combination is quite explosive . Afterwards the gas is used as suggested.
2) For safety in the conventional biogas gas generator at least, we used a water trap. This was nothing much more than an upright 2 to 4 liter, air tight, water filled container installed in the gas line/tube. The tube from the tank entered through the top (lid) of said container and bubbled out the gas --from beneath the surface. The outlet tube also entering the container through the same top, but was set above the water surface, such that it could conduct the bubbled gas off to the house cooking and lighting appliance). If you were clever you would set this jar at a low point int eh line such that it would collect excess moisture generated from the gas. The sulphur smell could have easily been removed by filtering the gas through iron filings but we found that the smell was a great warning device to anyone who had left the gas on.

In all however, the idea of so little waste material generating so much gas, has me thinking about installing one at home allover again. The old rule of thumb of one cow per person per day requiring a 2.5 mtr dia X 2 mtr tall tank over a slightly larger sized well for one family on a continuous basis, was a bit of a stinky and sloppy management proposition but what you are suggesting is very much more interesting indeed.

Richard Stanley

"A.D. Karve" wrote:

> *The biogas plant is a standard, moving dome type of a biogas plant.*
> *It can be fabricated, using two barrels, both of about 200 liter*
> *capacity. Such barrels are available in different sizes, being used as*
> *domestic water tanks. One of the barrels should have a slightly*
> *smaller diameter than the other, so that it can telescope into the*
> *broader barrel. One end of both the barrels is cut open. The broader*
> *barrel is kept on the ground with the open end pointing upwards. This*
> *barrels serves to hold the fermenting liquid.The narrower barrel is*
> *slid into the steel barrel with its open end pointing downwards. It*
> *serves as the gas holder. If two such barrels are not available, one*
> *can construct the broader container out of bricks and cement morter.*
> *The fermenter barrel is provided with an L shaped inlet pipe, that is*
> *5 cm wide. The horizontal arm of the L should be about 40 cm long and*
> *the vertical arm should be 100 cm long. It requires some plumbing*
> *skill to fit the inlet pipe. For fitting the inlet pipe, a hole of*
> *adequate diameter is cut into the vertical side of the barrel, as near*
> *the base as possible. The outer barrel is also provided with an*
> *outlet pipe near its top end, through which the effluent slurry can*
> *flow out. The inner barrel, that serves as the gas holder, is provided*
> *with a gas tap, fitted at the topmost part of the barrel. The gas is*
> *supplied to the burner through this tap. The gas holder barrel is*
> *weighed down by means of a sack filled with sand or any other*
> *material, weighing about 20 kg. In this way, the gas is provided to*
> *the burner under a certain constant pressure. In India, one can buy a*
> *special domestic biogas burner for this gas, but if that is not*
> *available, one can use an LPG burner, with the pin-hole nipple*
> *removed.*
> *To start the system, an aqueous slurry made of about 200 litres of*
> *water, about 10 kg cattle dung and about 200 grams of flour of any*
> *starchy material, is poured into the system through the inlet pipe.*
> *The gas cock of the gas holder barrel is kept open, while filling the*
> *slurry. After filling the slurry, the gas tap is closed. The*
> *fermentation process produces gas which will accumulate in the gas*
> *holder and lift it up. Test this gas for its combustibility. It may*
> *happen, that the gas produced during the first few days does not burn.*
> *Just let it exhaust by opening the gas tap so that the gas holder*
> *barrel sinks back into the outer barrel. But then do not forget to*
> *close the gas tap. Add daily about 200 g of flour, after mixing it*
> *with about a litre of water, to the fermenter, through the inlet pipe.*
> *Use a plunger to push the flour slurry into the barrel. Otherwise it*
> *would remain in the inlet pipe and ferment inside the pipe. Once the*
> *system starts to produce combustible gas, increase the amount of flour*
> *to daily 500 grams. Flour always contains a small quantity of*
> *protein, which gives rise to a small amount of H2S and NH3, which*
> *produce foul odour. Therefore the gas plant cannot be kept inside an*
> *unventilated kitchen. One should keep it outside the house, just*
> *beneath the kitchen window, and take the gas into the kitchen by means*
> *of a rubber pipe.*
> *There was a comment about the amount of methane produced by the*
> *system. It is right that one should get about 400 litres of methane*
> *from 1 kg starch or sugar, but the astonishing thing was that the gas*
> *that one obtained from this system consisted of almost pure methane.*
> *What happens to the carbondioxide? I assume that it is dissolved in*
> *water and just diffuses out of the system. Remember the school*
> *chemistry experiment in which a candle is burnt inside a bell jar? In*
> *this experiment, the water surrounding the bell jar rises up inside*
> *the bell jar because the carbon dioxide produced by the burning candle*
> *dissolves in water.*
> *A.D.Karve*

>
> Richard Stanley wrote:
>
>> Dear Dr KArve,
>>
>> I would like to offer a sincere appreciation of your work on the new
>> methane generator technology AD. and I hope that at
>> some point it can find a home here in biomass-rich Uganda.
>>
>> To that end, I am cc'ing this email to
>> two colleagues here in Uganda, Dr. Charles Kwesiga, Director of the
>> Uganda
>> Industrial research and Technology Institute and \ Mr Olaf Etrz, a
>> senior technical adviser to UIRI.
>> Thanks again for sharing it.
>>
>> Richard Stanley
>> Legacy Foundation
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