Notes for Trof Patent and Development 2014-06-18

1. I have some miscellaneous notes and sketches dating back to May 2014 when I first had the main idea.

2. I have some photographs of experiences with the initial units when I started.

3. First constructed unit was in May 2014. It was a longitudinally cut half-barrel (55 gal size). Ron VanEtten helped me cut it, at his workshop. Even from that first contact with another person about this idea/concept it was declared by me that it is a confidential project, not for disclosure. As of today there still has not been any disclosure publicly. Only Ron saw the half-barrel unit, which was used only that one day at his workshop. It did not have char removal while in operation. I quickly moved on to the full-barrel design, incorporating the removal of the char

4. Earlier in May I had my first experience with essentially a "cone kiln" as described by Kelpie Wilson and shown in her work. She was progressing to the "pyramid kiln" which is larger (4 x 4 feet) but still symmetrical AND without any method of extracting char during operation AND without any structural aspects to collect and direct the gases and flames. That is, it had no chimney, etc. My first experience with a cone kiln was in a small (15 gallon approx) garbage pail, in my backyard in Normal, IL.

5. Ron VanEtten also helped me make the second unit, which was from a complete 55 gal barrel. See photos. It was first used at Ron's property in late May 2014. It included a door and chimneys and char-extraction portal with a properly fitting cap. There were no openings for entry of air in the lower half of the barrel/kiln.

6. The chronology of the usage of this first "closed top with char extraction kiln" (which I call Trof ™ because it resembles a trough) has been:
a. At Ron VanEtten's property. Present only PSA and Ron V.
b. In my backyard. Only by me, but observed by family members. They remember that the unit partially tipped over.
c. Again in my backyard. Only by me, but observed by family members.
d. At property of Mrs. Tammy Allen near Marua, IL Present only PSA and Tammy Allen.
e. At Burton's Bamboo Garden near Cincinnati, Ohio. Present only PSA and Jerry and Zack Burton.
Precise dates can be provided, as recorded in my daily diary/journal.

7. I prepared a "First Description" document (provided) that was sent on a confidential basis only to Art Donnelly in Oregon, Hugh McLaughlin in Massachusetts, Charlotte O'Brien in Hawaii, David McIntruff in Seattle, and (as a blind copy) to Doug McCarty of Peoria, IL. (I have check my Sent folder, and the message was sent at 3:39 PM on 2014-06-11.) The message said:
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Dear Art, Hugh and David,

Attached is a key First Document about the Trof Kiln Biochar Maker. Not to be shared with others at this time, please.

Note that I am on the road to Ohio (from Illinois) on Thursday AM and not home until very late Friday night. With luck, you might reach me during my 20 hours of driving time at this cell phone: 309-531-6918 I would love to have a conversation while I am driving.

Paul
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8. 16 and 17 June 2014: I had phone conversations with Art Donnelly, David McInturff, and Hugh McLaughlin about the invention. Topics included whether or not I should seek a patent.

9. 17 June 2014 I had my first contact (phone conversation) with Patent Attorney Mike Antoline of Champaign, IL. I decided to apply for a provisional patent within the coming 4 weeks, prior to the Stove Camp in Oregon on 21-25 July, where I MIGHT make the first public disclosure.

10. 18 June 2014, I awoke with thoughts of the invention and decided to start the writing of this file, with the notes about the invention being numbered:

11. SIZE. There are no specific limitations on the size. In general, sizes much smaller than an 55 gallon drum are NOT likely to be practical for the investment of materials; it is probably easier to run a batch and dump out the char, meaning that the patent features would probably not be used in such small devices. But the patent is to cover such small devices that might use the features.

Larger sizes are also included and covered by the patent, even very large units the sizes of shipping containers and even if for whole buildings. The large ones could essentially operate at the sizes of large thermal energy facilities that make electricity. In such cases, the value of the heat becomes increasingly important, and the capacity to make char could have less importance. However, with the issues of global warming and the need to drawdown the CO2 from the atmosphere, the carbon value could also be an important component, something that the fossil-fuel powered facilities cannot accomplish. In fact, a large biomass unit for energy is NOT an emitter of CO2; and it is easily "Carbon neutral"; but it can be easily "Carbon Negative" (which is favorable) on a substantial scale. The main limiting factor could be the supply of sufficient biomass, but that is separate from the issues of the patent. Therefore, there is no upper limit of size concerning the patented processes/devices.

Of major consequence in the relative short term of less than 5 (five) years are what are called the medium size units. Other names are "field size" or "woodlot size" or "small industry size." This is the driving force for the making of the invention. The problem has been well recognized for several years, with various attempts at resolution (as will be discussed in the notes on "prior art"). The medium size units can have capabilities for greater input of biomass, output of char, portability if desired, and many enhancements as noted below and elsewhere.

Length is an important factor that can help distinguish the patented features from prior art. Long units that pyrolyze have existed for many years, and they notably involve the longitudinal movement of the biomass fuel, often with augers. As such, they require chunky and rather uniform fuel where the W x L x H ratios are rather close (such as 1 x 2 x 4 cm "chips"). In contrast, the biochar maker by Anderson can be lengthy so that it can receive long pieces of fuel, such as bamboo and reeds of diameters from 1 to 10 cm and with lengths of several METERS. And the long fuel does NOT move longitudinally during pyrolysis (but can move longitudinally during extraction of the char). These are vastly different processes and procedures, even though both styles of systems are making charcoal from dry biomass. However, the Anderson invention does also work with and cover the usage of short and chunky pieces of fuels.

12. ENHANCEMENTS. The basic patent is for the process and basic capabilities. These can be enhanced by the addition of many features. Some become viable only at certain sizes and investments, but that is independent of the basic patent.

Enhancements can include:
Sensors of gases, fuel levels, temperatures, and many other issues.

Mechanization (vs. manual) of operations such as fuel input, char removal, movement of materials inside and around the patented device. Methods include but are not limited to augers, closing and opening of "doors", mixers, pushers and pullers, and air flows.

Computerization/automation of controls. This can occur with PLC and other combinations of technology, including remote monitoring and remote control of the operations.

Heat management , including insulation and air flows

Recirculation of some gases back into the system for combustion and other purposes is envisioned, but is not a fundamental distinguishing characteristic.

13. Although a fundamental aspect of the patent is for the EXCLUSION of air/oxygen into the lower (gravity influenced) parts of the devices, there are the needs and advantages of having amounts of air/oxygen introduced into the device at appropriate times and places. This is especially important for SOME combustion of the gases that result in the heat needed for pyrolysis. Also important is for some air to facilitate the processes when amounts of fuel have been added, causing some disruption of the pyrolysis, with resultant "more than desired" gases (some is water vapor), with risk of smoke escaping, therefore the need for additional air controls.

The ways of introducing the air are numerous, and are not limited to those listed here:
Natural draft (ND) and / or forced air (FA); air in from the main door; additional holes (with and without controls); tuyeres (as in standard gasifiers); pipes and channels with various configurations of holes; chimneys that might have additional holes, including Venturi effect).

********** 18 June 2014 (above) **********

28 June 2014 Added below:
****** sent to me by Charlotte **** about issue of sizes **** we are interested In large and small ***

I got a few sizes from the gas company. They don't usually sell their used ones (they rent them) but she is checking for me because she knew of some in private hands.

The gas company has many sizes and here are some of them:

24 inch diameter by 5'6"

37.5 inch diameter by 9ft 10 inches is 499 gals

or 47 inches by 22 feet is 2000 gals.

She is going to get back to me with cost and availability and other sizes and the thickness.

It seems like the 500 gal one is kind of ideal - what do you think?

Could one guy run one that size all day - maybe two side by side?

What would the volume of through put be if the wood were cut into ideal pieces? If you had a base of branches could you sprinkle coarse wood chips over the top of the pile?

I have been thinking about how to approach this with the sustainable farm folks and I am getting some good ideas of how we will be left with a loan that will be the money needed for materials to build them as needed here in Hawaii and maybe other places. We will be talking again soon.

https://www.google.com/search?q=used+propane+tanks+repurposed&rlz=1C5CHFA_enUS582US582&espv=2&tbm=isch&tbo=u&source=univ&sa=X&ei=7dysU-1_y_WgBOGzgYgF&ved=0CHQQ7Ak&biw=1280&bih=605#facrc=_&imgdii=_&imgrc=j9_6E6Au8rgmWM%3A;RvOGphtDclmoTM;http%3A%2F%2Fwww.repurposedmaterialsinc.com%2Fwp-content%2Fuploads%2Fpropane-tank-BBQ.jpg;http%3A%2F%2Fwww.repurposedmaterialsinc.com%2Fstore%2Fproducts%2Frepurposes-used-500-gal-propane-tank%2Fattachment%2Fpropane-tank-bbq%2F;640;480

some photos on the internet

Start with these sizes for your calculations. I am curious.
********** end **********

Business notes:
Charlotte,

I am thinking of proceeding along these lines.

1. I will file for a provisional patent before I arrive at Stove Camp.

2. I will NOT be making any public disclosures, and all contacts will only be done on the condition of confidentiality of the information. I will not be posting any photos.

3. As I get things better organized, I will be gradually in contact with highly selected people. Art + David for SeaChar are already in this group. Another is Charlotte O'Brian. Another is Paul Wever of Chip Energy, to be under a license and disclosure agreement just like everyone else. (This char maker is 100% Paul Anderson, but I am only a small part of Chip Energy. So I am maintaining my personal control separate from the business of Chip Energy.) I also have some highly appropriate contacts regarding Africa and SE Asia.

4. I will add others slowly, probably selling construction plans / permits to use the patent and my consultancy. When I have several units producing biochar and providing me will data (a requirement of being in the agreement with me), then I can make a more open approach to

others. Eventually (several months away?) a full announcement of the capabilities will launch the business for all to see. Paul Anderson will NOT be personally directly involved with the physical **production** of units (except prototypes and helping those who are going into production). I will participate (as appropriate, yet to be defined) with marketing and education and awareness about this form of char production. There are many many many additional aspects to be discussed and resolved.

5. So, you are in the inner circle, with whom I will be developing the business strategy. Please make comments about this above and below:

6. While working privately without disclosure to others, we will develop the best options for business and service. I am sure that Chip Energy will focus on large and automated units for North America. Charlotte is interested in the Hawaii scene for biochar at the modern farm scale. SeaChar's focus is not yet defined, but Central America (and the Pacific Northwest area) are the likely geographic foci.

7. So, I want to make a very attractive deal with SeaChar and Charlotte and Chip Energy. Basically together we will set up the pilot of the business for your operations. I intend that I will separately take the businesses worldwide (or do so with partners who are yet to be identified). And you are to have viable activities for defined areas that can include making the char producers, marketing them, and working with the users of those devices to make char and to do all of the business aspects related to char, such as increased crop production.

8. I do NOT want to give exclusivity to anyone (which results in others being turned away, making them become competitors). I will be building networks and cooperative efforts. Those who are not willing to play by the rules will be excluded. When the working agreement is in place with me, Iwill assist you to have the best results in your territory, including bringing in others who will help things expand. Examples of territories could be some countries in Central America and the State of Hawaii.

9. So, what do we want to do together? Except to maintain confidentiality of the information, you have no obligation to me. On the other hand, you are among the very few who know that something is coming for this mid-size (and small) type of char maker. We need to discuss the issues of what, and of where and how and when. Financial aspects are very important. Currently, with so many unknowns, the funds go into all forms of R&D and start-up.

Please send me your comments. Note that I will be working from home until Monday 14 July, then a week of travel to Oregon, then Stove Camp 21-25 July for PRIVATE discussions face to face. We can wait, or we can move this ahead. Feel free to propose or reject anything.

Paul

Doc / Dr TLUD / Prof. Paul S. Anderson, PhD
Email: psanders@ilstu.edu
Skype: paultlud Phone: +1-309-452-7072
Website: www.drtlud.com

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