

# Simple, Cheap, Energy Technologies.

## Fire and Heat: Part 1.

We take fire for granted but there is a lot going on when something burns.

The burning or heating of any organic material results in a mix of chemical reactions that break down complex molecules into simpler ones.

These molecules escape as tiny solids, vapours or gases into the air. Some are very flammable and burn readily. They ignite, mixing with oxygen from the air, and the reaction is what we see as flames. A lot of energy in the form of heat is released.

Some unburned substances still have potential to burn and will react and break down further if more heat or a longer heat period is applied. Smoke is a result of these unburned vapours, gases and solids escaping into the air.

By simply containing a fire and funnelling the heat correctly, a cleaner burn will take place and more heat will be produced.

Rather than explain any further, I hope these pictures speak to you.

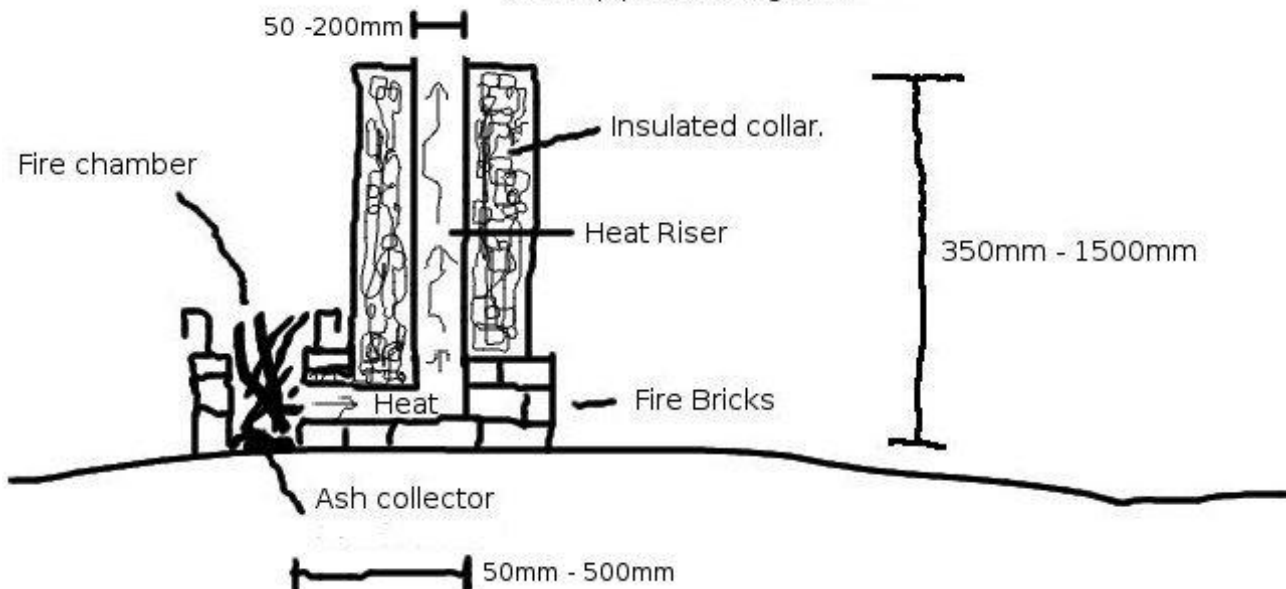
These are the most efficient working design types I've come across.

### Basic Rocket Burner and Heat Concentrator (The Engine)

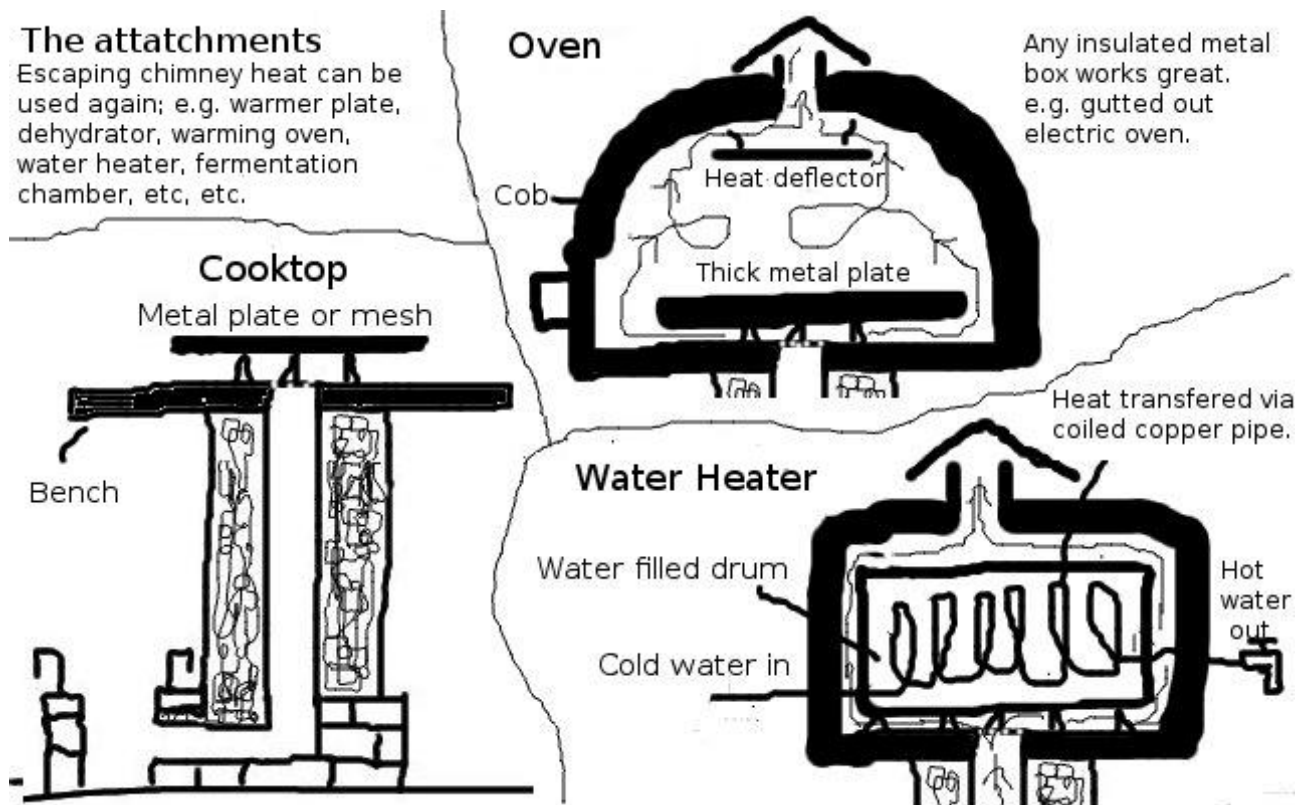
Fed with anything organic that burns. Sticks are good as they self feed.

Made from:  
Cob and tin cans,  
Drums, vermiculite and fire bricks,  
Steel pipe works great

Fuel burns clean and most heat is concentrated at the top, ready to capture and use.



Now we have a good clean heat source, let's use it.



Even room for a simple boiler setup to produce steam to drive something.

The heat can be tunnelled though the floor to heat a house. I've seen it tunnelled through thermal mass bed bases, benches and walls.

Storing the heat in any thermal mass will release it slowly into the surrounds.

I've seen the 44gal drum water heater pictured above, fired twice a day for 30mins, shower at least 25 people/day.

A good cob oven will heat to about 170 C in 30mins. 200 C in 1 hr. It can maintain good temperatures for hours.

Heat storage in thermal mass is the key and insulation to prevent heat loss will increase efficiency.

By heating organic matter to high temperatures in the absence of oxygen, flammable gases can be captured and stored as fuel and many vapours and oils can be condensed and concentrated. Such methods involve temperature and oxygen control of the heating process, condensation capture chambers and gas storage. Another product of the gasification process is bio-char. I will chat more about all that next time.

Happy guilt-free cooking and heating.

Gerard Worm.