Strata

Combustor

The word strata indicates layers, such as layers laid down in an archeological site. The added layers of function shown in the drawing show why this combustor is named Strata.

The Strata combustor can help a TLUD which produces a diffusion flame. A diffusion flame indicates inadequate secondary air and/or mixing. The wood gas comes out of the stove in a column which burns only at its surface where it meets the air. It takes a long time to finish burning, the flame cools by radiating heat and much of the flame is lost to the atmosphere. It produces soot on the cooking surface and particulates in the exhaust gasses.

The air and wood gas are mixed in this layer at the bottom of the combustor. Quick and thorough mixing is needed here and is possible by using a Venturi gas mixer adaptation for TLUDs (more to come on this). Too high a power setting can overload the mixer causing dirty emissions, currently limiting the power level to around 3 kw. Increasing its capacity to 5 kw is my goal.

A stationary fan blade above the mixer spins the flame. This makes it rise at an angle rather than straight up, which gives it a longer path and more time to finish burning before exiting the combustor. It also concentrates the heat of the flame for better combustion.

The top part of the combustor is open and gives the swirling flame time to finish burning.

The combustor sits on top of the stove and provides a more efficient way to burn the wood gas. The wood gas finishes burning in the hot environment of the combustor, improving the completeness of combustion. No flame exits the combustor, only gasses which have thoroughly finished burning. This leads to very clean emissions.

TLUD stove

The stove becomes a wood gas generator, leaving combustion to the combustor.

TLUD stove

The effect of a Strata type combustor on a diffusion flame