the feedstock to move downward through the three reaction zones, with the Producer Gas and carbon ash and residue by-product formed after a biomass feedstock has been gasified ("Biochar") exiting through the grate at the bottom of the gasifier into collection chutes. The Biochar is separated from the Producer Gas by gravity.

[0023] The Producer Gas also exits through the grate and is collected by collection vents on the sides of the collection chutes. The pressure within the collection chutes is a function of pipelines connected to the gas collection vents and machinery attached to those pipelines downstream of the gasifier (i.e., engines, collection chambers, etc.) The pressure of the gasifier is not dependent on the pressure of the collection chutes.

[0023a] In view of the above, according to a first aspect of the invention, there is provided a gasifier comprising: a plurality of conjoined and vertically positioned tubes having an interior wall, an exterior wall, a proximal end and a distal end, wherein the proximal end provides an inlet and the distal end provides an outlet; at least three contiguous reaction zones comprising a pyrolysis zone angled toward a central convergence, followed by an oxidation zone wherein a middle portion of the tube corresponding to the oxidation zone is dilated, followed by a reduction zone wherein the interior wall of the tube corresponding to the reduction zone has a greater diameter than the tube corresponding to the oxidation zone; at least two rings of piano air inlets located within the oxidation zone to inject air; and a rotating and vertically adjustable grate positioned below, but not touching, the reduction zone; wherein the gasifier is a partially open core downdraft gasifier used for gasification of feedstock.

[0023b] According to a second aspect of the invention, there is provided a method of gasifying feedstock comprising: filling a gasifier with feedstock; said gasifier comprising a plurality of conjoined and vertically positioned tubes having an interior wall, an exterior wall, a proximal end and a distal end, wherein the proximal end provides an inlet and the distal end provides an outlet, a pyrolysis zone, an oxidation zone and a reduction zone; igniting the feedstock to create an oxidation band; injecting oxidant streams into the oxidation zone using at least two rings of piano air inlets; moving feedstock sequentially through the pyrolysis zone where the feedstock begins to fluidize and decompose, then an oxidation zone where the feedstock changes to producer gas and then a reduction zone

where the producer gas mixes with biochar to cool and form additional producer gas; holding feedstock and a bed of biochar inside the gasifier using a rotating and vertically adjustable grate positioned below the reduction zone; removing biochar and producer gas through a bypass and holes in the grate; and refilling the gasifier with feedstock.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Fig. 1 shows a cutaway front view of a gasifier.

[0025] Fig. 2 shows a cutaway side view of a gasifier.

[0026] Fig. 3 shows the exterior front view of a gasifier.

[0027] Fig. 4 shows the exterior side view of a gasifier.

[0028] Fig. 5 shows a cutaway front view of a gasifier with dimensions shown in inches.

[0029] Fig. 6 shows a cutaway side view of a gasifier with dimensions shown in inches.

[0030] Fig. 7 shows a cutaway side view of a gasifier illustrating the densest portion of an induced and an entrained gradient.

[0031] Fig. 8 shows a cutaway perspective view of a gasifier illustrating the densest portion of an induced and an entrained gradient.

[0032] Fig. 9 shows a cutaway side view of a gasifier with an oxidation band.

[0033] Fig. 10 shows a cutaway perspective view of a gasifier with an oxidation band.

[0034] Fig. 11 shows a perspective view of a grate frame.