Claims

1. Torrefaction unit (1) for the torrefaction of a material comprising biomass, comprising at least one multiple hearth furnace (2), said multiple hearth furnace (2) comprising a heating system (19) which can be flown through by a heat transfer fluid (16), characterized in that the heating system (19) is connected to a water circuit (20) by which water is heatable and conveyable through the heating system (19),

wherein a single partial oxidation reactor (23) is connected to at least two multiple hearth furnaces (2).

2. Torrefaction unit (1) according to claim 1, further comprising a partial oxidation reactor (23) including a burning chamber (4) being connected to the at least one multiple hearth furnace (2) for the partial oxidation of torrefaction gas (3) with oxygen creating a syngas (8).

3. Torrefaction unit (1) according to one of the preceding claims, further comprising a steam drum (11) having a steam space (22) and a water space (21), wherein the water circuit (20) is connected to the water space (21) of the steam drum (11).

4. Torrefaction unit (1) according to claim 3, wherein the water space (21) and the steam space (22) of the steam drum (11) are in fluid connection with an evaporator (9) which is heatable by syngas (8) generated by partial oxidation of torrefaction gas (3).

5. Torrefaction unit (1) according to claim 3 or 4, wherein the steam space (22) of the steam drum (11) is in fluid connection with a superheater (13) which is heatable by syngas (8) generated by partial oxidation of torrefaction gas (3).

6. Method for the torrefaction of a material comprising biomass, wherein the material is heated to a torrefaction temperature in at least one multiple hearth furnace (2), wherein the atmosphere in the at least one multiple hearth furnace (2) is controlled to provide a sub-stoichiometric amount of oxygen, characterized in that the at least one multiple hearth furnace (2) is heated by a heat transfer (16) fluid comprising water, wherein the torrefaction gas (3) of at least two multiple hearth furnaces (2) is partially oxidized in a single partial oxidation reactor (23).

7. Method according to claim 6, wherein torrefaction gas (3) is generated by the torrefaction of the material, said torrefaction gas (3) being partially oxidized to generate a syngas (8).

8. Method according to one of claims 6 to 7, wherein the heat transfer fluid (16) comprises water taken from a steam drum (11).

9. Method according to claim 8, wherein the heat transfer fluid (16) is guided in a water circuit (20) from the steam drum (11) through a heating system (19) of the at least one multiple hearth furnace (2) and back to the steam drum (11).

10. Method according to one of claims 8 to 9, wherein torrefaction gas (3) is generated by the torrefaction of the material, said torrefaction gas (3) being partially oxidized to generate a syngas (8), the syngas (8) being used to at least in part evaporate water (10) provided from a water space (21) of said steam drum (11), wherein the at least partly evaporated water (10) is provided to a steam space (22) of said steam drum (11) after evaporation.

11. Method according to one of claims 8 to 10, wherein torrefaction gas (3) is generated by the torrefaction of the material, said torrefaction gas (3) being partially oxidized to generate a syngas (8), the syngas (8) being used to superheat steam (12) provided from a steam space (22) of the steam drum (11).

12. Method according to one of claims 6 to 11, wherein the atmosphere in the at least one multiple hearth furnace (2) is controlled to provide an oxygen content of less than 1 vol.-%.