CLAIMS

1. A method for cooling and washing biomass syngas, the biomass syngas having a temperature of between 1000 and 1100°C, a dust content of less than 20 g/Nm^3, and a tar content of less than 3g/Nm^3, the method comprising the following steps:

1) introducing the syngas to a quench tower for condensing a slag;

2) introducing the syngas after slag condensation to a waste heat boiler for recovering waste heat and condensing a heavy tar in the syngas;

3) introducing the syngas from the waste heat boiler to a scrubbing-cooling tower for removing dust and decreasing a temperature of the syngas; and

4) introducing the syngas after dust removal and temperature decrease from the scrubbing-cooling tower to an electro-precipitator for further removing the dust and the tar;

wherein in step 1), the syngas is preliminarily cooled by a water-cooling flue device before entering to the quench tower;

in step 1), the quench tower is a water-cooling quench tower;

the syngas is preliminarily cooled by the water-cooling flue device and transported to the water-cooling quench tower; and

the waste heat recovered by the water-cooling flue device and the water-cooling quench tower is transported to the heat-pipe waste heat boiler for conducting steam-water separation, and the water is circulated for use; and

wherein in step 2), the waste heat is recovered in a high temperature section and a low temperature section;

the high temperature section is a water-pipe waste heat boiler, and the

to the quench tower via a water-cooling flue device (1);

wherein the quench tower is the water-cooling quench tower (2);

wherein the waste heat boiler comprises a water-pipe waste heat boiler (13) and a heat-pipe waste heat boiler (4) connected in series;

~~wherein the quench tower is a water-cooling quench tower (2);~~

~~the high-temperature pyrolysis biomass gasifier (10) is connected to the water-cooling quench tower (2) via the water-cooling flue device (1); and~~

a water pipeline of the heat-pipe waste heat boiler (4) is in series connection with a water pipeline of the water-cooling flue device (1) and a water pipeline of the water-cooling quench tower (2) to form a water circulating system; and

the electro-precipitator (6) is a wet electro-precipitator.

7. The system of claim 6, **characterized in that**

the water-cooling flue device (1) comprises: a water-cooling flue and first heating pipes (1.7);

the water-cooling flue is formed by an inlet water-cooling flue (1.1), an upper-bend water-cooling flue (1.2), a straight water-cooling flue (1.3), a lower-bend water-cooling flue (1.4), and an outlet water-cooling flue (1.5) in series and sealed connection;

the first heating pipes (1.7) are circumferentially arranged, and adjacent first heating pipes (1.7) are seamlessly connected via first steel plate strips (1.8) to form an annular water-cooling wall; and

a cavity of the annular water-cooling wall forms the flues of different