CLAIMS

[Claim 1] A powder burner device comprising:

a burner tube,

a fuel supply device that supplies biomass powder to the burner tube, and

a primary air supply pipe connected to the side wall of the burner tube, wherein;

a biomass powder supplied from the fuel supply device falls within the burner tube while being swirled by the primary air supplied from the primary air supply pipe and is discharged from a fuel discharge port at a lower end of the burner tube, characterized in that;

a heat insulating wall having a conical inner wall is provided below the fuel discharge port.

[Claim 2] A burner device according to claim 1, wherein a spreading solid angle of the conical inner wall is 3.5 steradian or less.

[Claim 3] A burner device according to claim 1 or 2, wherein the biomass powder has a maximum particle size of 30mm or less and contains 10% by weight or more of a biomass powder having a particle size of 0.5mm or less.

[Claim 4] A burner device according to any one of claims 1 to 3, further comprising a primary air control means for controlling the temperature and supply amount of the primary air so that the temperature of the conical inner wall is kept at 900°C or higher.

[Claim 5] A combustion furnace comprising:

a burner device according to any one of claims 1 to 4 and

a combustion furnace directly connected to a lower part of the burner device.

[Claim 6] A combustion furnace of claim 5, further comprising:

a primary combustion zone,

a secondary combustion zone downstream of the primary combustion zone for main combustion by a secondary air blown into the secondary combustion zone,

a tertiary combustion zone downstream of the secondary combustion zone for combusting an unburned content by a tertiary air blown into the tertiary combustion zone, and

a secondary air control means and a tertiary air control means for controlling the supply amounts of the secondary air and the tertiary air.

[Claim 7] A combustion furnace according to claim 5 or 6, further comprising an ash removal device for removing a combustion ash accumulated on a bottom surface of the furnace to outside of the system.

CLAIMS

[Claim 1] A powder burner device comprising:

a burner tube,

a fuel supply device that supplies biomass powder to the burner tube, and

a primary air supply pipe connected to the side wall of the burner tube, wherein;

a biomass powder supplied from the fuel supply device falls within the burner tube while being swirled by the primary air supplied from the primary air supply pipe and is discharged from a fuel discharge port at a lower end of the burner tube, characterized in that;

a heat insulating wall having a conical inner wall is provided below the fuel discharge port.

[Claim 2] A burner device according to claim 1, wherein a spreading solid angle of the conical inner wall is 3.5 steradian or less.

[Claim 3] A burner device according to claim 1 or 2, wherein the biomass powder has a maximum particle size of 30mm or less and contains 10% by weight or more of a biomass powder having a particle size of 0.5mm or less.

[Claim 4] A burner device according to any one of claims 1 to 3, further comprising a primary air control means for controlling the temperature and supply amount of the primary air so that the temperature of the conical inner wall is kept at 900°C or higher.

[Claim 5] A combustion furnace comprising:

a burner device according to any one of claims 1 to 4 and

a combustion furnace directly connected to a lower part of the burner device.

[Claim 6] A combustion furnace of claim 5, wherein said combustion furnace comprises:

a primary combustion zone downstream of the fuel discharge port,

a secondary combustion zone downstream of the primary combustion zone for main combustion by a secondary air blown into the secondary combustion zone,

a tertiary combustion zone downstream of the secondary combustion zone for combusting an unburned content by a tertiary air blown into the tertiary combustion zone, and

a secondary air control means and a tertiary air control means for controlling the supply amounts of the secondary air and the tertiary air.

[Claim 7] A combustion furnace according to claim 5 or 6, further comprising an ash removal device for removing a combustion ash accumulated on a bottom surface of the furnace to outside of the system.