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Prod'n. of synthesis gas mfr. by partial oxidn. of carbonaceous fuels - in gasifier associated with radiation chamber, superheater and evaporator

C84-082515

D/S: BE DE FR GB IT NL

CLAIMED PROCESS

Synthesis gas production comprises:

- (a) partially combusting finely divided carbonaceous fuel with an O<sub>2</sub>-contg. gas at elevated temp. and pressure in a gasifier (A);
- (b) removing liquid slag from the bottom of (A);
- (c) removing hot crude synthesis gas contg. entrained slag droplets from the top of (A) and passing it upwards through a radiation chamber (B) in which cooling causes the slag droplets to solidify;
- (d) further cooling the crude synthesis gas by passing it through a superheater (C);
- (e) reversing the flow of the gas in a pipe connecting (C) with an evaporator (D);
- (f) further cooling the gas by passing it downwards through (D); and

(g) sepg. slag particles from the cooled gas.

CLAIMED APPARATUS

The appts. for the above process comprises:

- (i) vertical cylindrical outer pressure shell contg. a water bath (for catching a solidifying liquid slag) and a water tube wall structure above the water bath, (A) being defined by the lower (B) by the intermediate and (C) by the upper part of the water tube wall structure,
- (ii) a vertical cylindrical evaporator (D) contg. tube banks and positioned next to the vertical pressure shell;
- (iii) a pipe connecting the top of (D) with the top of the vertical pressure shell;
- (iv) means for separating slag particles from the cooled gas, connected by a pipe to the bottom of (D).

USES/ADVANTAGES

Process is used for the prodn. of synthesis gas by partial combustion of a wide variety of carbonaceous material at 1200-1700 deg. C and 2-200 bar with a residence time of 1-10 secs. pref. using a moderator (e.g. steam or CO<sub>2</sub>).

Compared to conventional processes, the

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appts. is easily adapted to various types (low ash, high-ash, low-m.pt. ash, high-m.pt ash) of raw material.

PREFERRED

The gas leaving the top of (A) has an average linear velocity of 1-15 m/sec. Cold, clean gas, steam and/or water is injected as quench into the gas leaving the top of (A) in amts. of 0.2-2 kg/kg. The average linear velocity of the gas flowing through (B) is 1-15 m/sec, and the gas is cooled in (B) to 600-1200°C. The average linear velocity of the gas flowing through (C) is 3-15 m/sec. and the gas is cooled in (C) to 400-600°C. The average linear velocity of the gas flowing through (D) is 3-15 m/sec, and the gas is cooled in (D) to 200-350°C. (25pp1639MHDwgNo0/4).  
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