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 SHELL INT RES MIJ BV *DE 3310-200-A
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 Inclined baffle plates in reactor for partial oxidn. of fuel - to synthesis
 gas trap effluent slag droplets and avoid blockage downstream

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Prodn. of synthesis gas by partial combustion of a fuel in a reactor, from which the prod. gas leaves at the top and the slag at the bottom, the reactor has one or more baffle plates, attached to the wall, on which ascending gas impinges. Slag droplets gather on the baffle plates, coagulate and fall into a slag-collector in the reactor bottom.

ADVANTAGES

The prod. gas contains less entrained slag, so that the risk of blockage in the quench boiler downstream is reduced. Combustion of the fuel still present in the slag droplets is increased. Back-mixing of gases is reduced, so that reactor height can be reduced while retaining largely complete reaction to CO and H₂.

DETAILS

The fuel can be coal, peat, shale oil, etc. The gasifying

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gas contains O₂ and pref. H₂O or CO₂. Powdered coal (e.g.) may be injected with oxidant gas into the reactor near its base.

There are pref. 2-5 baffle plates, 0.5-2 m apart. They can slope downwards from the wall, at an angle of 40-70° to the reactor's vertical axis. The lowest point is then pref. remote from the wall, so that coagulated slag can fall freely from it. The surface area of each plate, projected perpendicular to the reactor axis, pref. corresponds to 50-75% of the local cross-sectional area of the reactor.

Another pref. form of baffle comprises "discs and doughnuts", i.e. plates with holes (e.g. in the shape of the frustrum of a cone) alternating with plates over these holes, each type being attached to the walls. The baffle plates may be cooled, e.g. by steam or water circulating through pipes which support them. Cooling reduces corrosion, but must be moderated to prevent reactor blockage with solidified slag.

EXAMPLE

Installation of 3 simple downward-sloping baffle plates in a 1.3 cu m reactor used for gasifying 4378 kg/h coal

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powder with O_2 and H_2O reduced the amt. of slag entrained with the prod. gas from 267 to 90.2 kg/h, and increased that removed from the reactor base from 111 to 256 kg/h. (16pp1492NSDwgNo0/0)