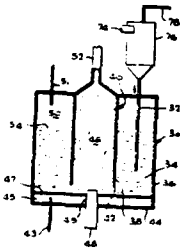


in the fluidized bed and bringing these coated particles into fuel elements or absorber elements. The cooling medium is solely gaseous and only the portion of the inlet tube for the nozzle tips of the gas inlet nozzles within the axis are cooled and the heat flow penetrating from outside is reduced by heat insulation. An apparatus for carrying out the process is also described.

4341598

### FLUIDIZED COAL PYROLYSIS APPARATUS

Norman W. Green; assigned to Occidental Research Corporation



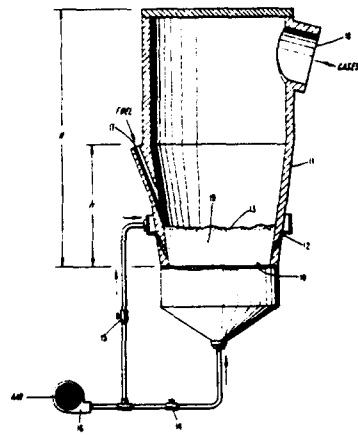
Method and apparatus for pyrolyzing agglomerative coals which comprises introducing a fluidized bed of hot char particles into a pyrolysis chamber or reactor, and injecting upwardly into the chamber a high velocity jet of agglomerative coal particles in a carrier gas, the fluidized hot char particles surrounding the high velocity coal jet and heating the coal particles to yield gaseous products and char. The hot char particles in the fluidized state and disposed around the coal jet are entrained in the upwardly expanding coal jet and mixed with the coal particles, so that by the time the coal particles contact the pyrolysis chamber wall, such coal particles being heated by the char have passed through the tacky state and are no longer tacky and so not adhere to the chamber wall. The gaseous products and char formed during pyrolysis are rapidly removed from the pyrolysis chamber, and such char can be separated, e.g. in a cyclone, reheated and introduced into the fluidized bed of char particles as a fresh

source of heat. The hot char particles from the fluidized bed which are entrained in the coal jet are removed from the pyrolysis chamber with the gaseous product, without any appreciable recirculation or mixing or mixing of such entrained char particles back into the fluidized char within the pyrolysis chamber.

4341515

### HIGH TURNDOWN RATIO FLUIDIZED BED REACTOR AND METHOD OF OPERATING THE REACTOR

Jako Korenberg; assigned to York-Shipley Inc.



A method of operating an adiabatic fluidized bed reactor, and an adiabatic fluidized bed reactor, including the step of providing pressurized air to an adiabatic fluidized bed reactor both through openings located in a support surface and through openings located in the reactor walls having outlets below the surface of the bed of granular material. The structure of the adiabatic fluidized bed reactor includes support surface air distribution nozzles extending through a support surface, reactor wall air distribution openings extending through the reactor walls having outlets below the surface of the bed of granular material, and separate control valves for controlling the flow of pressurized air to the support surface air

distribution nozzles and to the reactor wall air distribution openings. The method and apparatus of the present invention result in higher reactor hydrodynamic turndown ratios than can be achieved with conventional single-bed reactors. For example, a hydrodynamic turndown ratio of 6.6 to 1 can be achieved by the use of the method and apparatus of the present invention.

**4340572**

**PROCESS FOR RECOVERING HEAT FROM STACK OR FLUE GAS**

Da Ben-Shmuel; Philip Zacuto; assigned to Woodside Construction Inc.

A method and apparatus for efficiently recovering heat from a gas stream such as discharged flue gas. The gas stream is countercurrently contacted with a liquid medium in two stages. A first countercurrent contact stage is between a partially cooled gas stream and cold liquid medium in a bed of packing through which the cold liquid medium flows downwards and the partially cooled gas stream flows upwards, so that a warmed liquid medium and fully cooled gas stream are produced. The second countercurrent contact stage is between the warmed liquid medium derived from the first contact stage and the hot initial gas stream in a plurality of parallel vertically oriented passages. The warmed liquid medium flows downward on the inner walls of the vertically oriented passages as a thin liquid film, while the hot initial gas stream flows upward within the vertically oriented passages, so that a fully heated liquid medium and the partially cooled gas stream are produced. The second contact stage accomplished high direct contact heat transfer with low mass transfer, so that minimal heat is lost as heat of vaporization of liquid medium evaporated into the gas stream. The fully heated liquid medium is passed in indirect heat exchange with a fluid, so that the liquid medium is cooled and the fluid, which

may be water, air, or a process fluid stream, is heated.

**4340566**

**CATALYST REGENERATION APPARATUS**

Gregory Thompson; Anthony Vickers; assigned to UOP Inc.

A catalyst regeneration apparatus for the oxidation of coke from a spent catalyst, said coke being converted to CO, and for the conversion of the CO to CO<sub>2</sub>. Hot regenerated catalyst is recycled from a dense bed in the regeneration zone to mix with incoming spent catalyst in a mixer zone. The mixer zone operated in dense phase and is supplied with a relatively small amount of a fluidizing medium, preferably air. After the mixing of spent and fresh catalyst is substantially completed, a relatively large amount of a regenerating gas, preferably air, is admixed with the catalyst mixture, and some coke oxidation occurs. The balance of coke oxidation takes place in a downstream-situated regeneration zone of substantially conventional design. There is a transfer section connecting the mixer zone to the regeneration zone through which the relatively large amount of the regenerating gas is admitted. The transfer section is preferably a substantially horizontal surface having an outside perimeter intermediate the outside perimeters of the regeneration and mixer zones. Regeneration gas addition is made through multiple perforations in the transfer section.

**4340400**

**FLUIDIZED BED FILTERING AND/OR HEAT EXCHANGE APPARATUS PARTICULARLY FOR GASEOUS DISCHARGES FROM INTERNAL COMBUSTION ENGINES AND INDUSTRIAL PLANTS**