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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: METHODS OF REMOVING CONTAMINANTS FROM A HYDROCARBON STREAM BY SWING ADSORPTION AND RELATED APPARATUS AND SYSTEMS

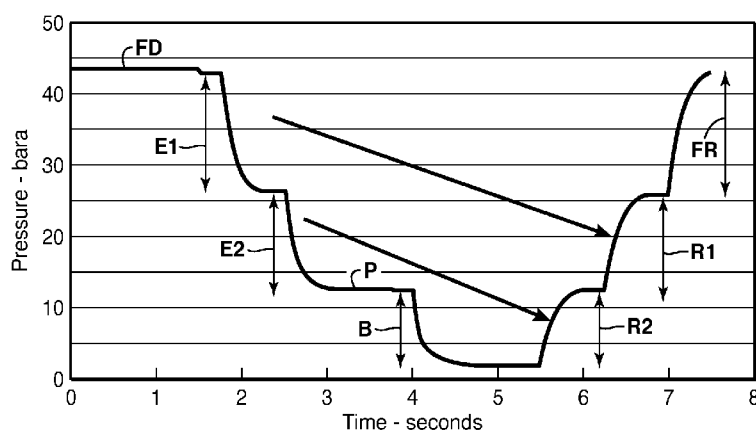


FIG. 14B

(57) Abstract: A pressure swing adsorption process for removal of CO₂ from natural gas streams through a combination of a selective adsorbent material containing an effective amount of a non-adsorbent filler, adsorbent contactor design, and adsorption cycle design. The removal of contaminants from gas streams, preferably natural gas streams, using rapid-cycle swing adsorption processes, such as rapid-cycle pressure swing adsorption (RC-PSA). Separations at high pressure with high product recovery and/or high product purity are provided through a combination of judicious choices of adsorbent material, gas-solid contactor, system configuration, and cycle designs. For example, cycle designs that include steps of purge and staged blow-down as well as the inclusion of a mesopore filler in the adsorbent material significantly improves product (e.g., methane) recovery. An RC-PSA product with less than 10 ppm H₂S can be produced from a natural gas feed stream that contains less than 1 mole percent H₂S.



— as to the applicant's entitlement to claim the priority of — before the expiration of the time limit for amending the
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