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(54) Title: APPARATUS AND METHOD FOR DIRECTLY CAPTURING CARBON DIOXIDE FROM AIR

(54) 发明名称: 一种从空气中直接捕集二氧化碳的装置和方法

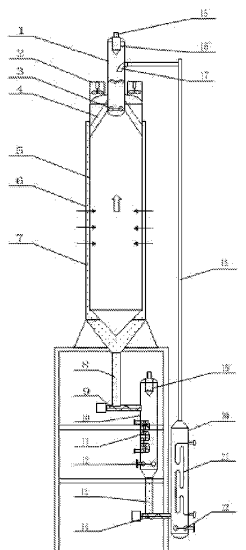


图 1

(57) Abstract: An apparatus for directly capturing carbon dioxide from the air, comprising: a thin-layer moving bed consisting of a filter grating housing and a filter grating inner cylinder, an annular gap being formed between the filter grating housing and the filter grating inner cylinder, a spherical solid amine adsorbent being filled in the annular gap; a high-level tank and a plurality of induced draft fans that are provided on the top of the thin-layer moving bed, the lower part of the high-level tank being with unloading pipes, the top of the high-level tank being provided with a quick separation means; a conical discharging port provided at the bottom of the thin-layer moving bed; a desorber having a feeding port communicated with the conical discharging port, a heating coil, a CO₂ distribution pipe, and a filter cartridge being provided inside the desorber, a CO₂ outlet being provided at the top of the desorber; and an adsorbent discharging port being provided at the bottom of the desorber; and a cooler having a feeding port communicated with the adsorbent discharging port, a cooling pipe being provided inside the cooler, and the top of the cooler being communicated with the quick separation means of the high-level tank by means of a riser. In the apparatus, a spherical solid amine thin-layer moving bed is used to directly capture carbon dioxide from the air, thereby achieving high-efficiency and large-scale carbon dioxide capture and continuous production of high-purity carbon dioxide products.

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NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

本国际公布：
— 包括国际检索报告(条约第21条(3))。

(57) 摘要：一种从空气中直接捕集二氧化碳的装置，包括：由滤栅外壳和滤栅内筒组成的薄层移动床，二者之间形成环形间隙，环形间隙内填充球形固态胺吸附剂；设置在薄层移动床顶部的高位罐和若干引风机；高位罐下部设有下料管，顶部设有空气出口，上部设有快分头；设置在薄层移动床底部的锥形下料口；进料口与锥形下料口相通的解吸器；解吸器内部设有加热盘管、CO₂分布管和过滤筒，顶部设有CO₂出口，底部设有吸附剂出料口；进料口与吸附剂出料口相通的冷却器；冷却器内部设有冷却管，顶部通过提升管与高位罐的快分头相通。该装置利用球形固态胺薄层移动床从空气中直接捕集二氧化碳，实现了高效率、大规模的二氧化碳捕集，并且能够连续生产高纯度二氧化碳产品。