

Title (en)

Device for maintaining temperature of bulk material

Title (de)

Vorrichtung zum Temperieren von Schüttgut

Title (fr)

Dispositif pour maintenir la température de matière en vrac

Publication

EP 1580511 A3 20091028 (DE)

Application

EP 05005327 A 20050311

Priority

- DE 102004014349 A 20040324
- DE 102004041375 A 20040825

Abstract (en)

[origin: EP1580511A2] An outer housing(5) contains a heat exchange section(2) comprising heat exchanger tubes(7) running downwards in the housing. Heat transfer fluid enters the housing at a feed point(8) and leaves via an outlet(9). An inlet for loose material exists at the upper end of the heat exchanger tubes and a material outlet at the lower end of the tubes. A buffer section(1) for loose material(20) is located prior to the upper end of the heat exchanger tubes(7). A material discharge section(3) lies below the lower end of the tubes. All tubes are held at their upper end in an inlet tube base(14) with feeding funnels(18) for each tube widening in the upward direction. The angle of entry(alpha) of each funnel is 30-120[deg], preferably 40-100[deg]. Inside the housing(5) diverters produce a meandering fluid flow around the tubes. A compressed gas feed enters the discharge section(3) and feeds pulses of gas pressure. The heat exchange section(2) has a circular cross-section. Tubes have 2-12, preferably 3-8, equally spaced internal ribs running along the length. Ribs either connect with each other at the tube center axis or have free ends which stop short of the axis. A vibrator(21) may be located in the heat exchanger section(2) and partial vacuum can be applied to the plant. The relationship between the tube outer diameter(D) and spacing(a) of radially adjacent tubes is $1.10D=a=1.25D$, preferably $1.15D=a=1.20D$. The relationship between the internal diameter(d) of the tubes and the maximum particle diameter(c) is $15c=d$, preferably $10c=d$.

IPC 8 full level

F28D 7/16 (2006.01); **F28F 1/40** (2006.01)

CPC (source: EP)

F28C 3/14 (2013.01); **F28D 7/16** (2013.01); **F28F 1/40** (2013.01); **F28F 9/0221** (2013.01); **F28F 9/22** (2013.01); **F28F 13/003** (2013.01); **F28D 2021/0045** (2013.01)

Citation (search report)

- [XY] US 2703225 A 19550301 - COOPER ALBERT L
- [Y] FR 538935 A 19220617
- [Y] JP H04115261 U 19921013
- [Y] DE 3823166 A1 19890216 - WAAGNER BIRO AG [AT]
- [X] US 2519148 A 19500815 - MCSHEA ROYAL M
- [X] DE 900333 C 19531221 - SOCONY VACUUM OIL CO INC
- [X] WO 9408193 A1 19940414 - KOPPELMAN EDWARD [US]
- [X] DE 3133467 A1 19820415 - OWENS ILLINOIS INC [US]
- [A] "Prospekt der Firma CHEMA RUDISLEBEN GMBH", ANNOUNCEMENT CHEMA ANLAGENBAU, XX, XX, 1 January 2001 (2001-01-01), pages 1 - 11, XP002991500

Cited by

CN103542739A; EP2006628A3; CN102878828A; PL126817U1; CN107255421A; SE2250681A1; SE2250679A1; SE545798C2; SE545972C2; SE2350232A1; SE2250680A1; SE545799C2; WO2009074441A1; WO2020254863A1; CN113713712A; SE2250682A1; SE545800C2; WO2023234847A1; WO2023234846A1; WO2019084294A1; WO2023234845A1

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR

Designated extension state (EPC)

AL BA HR LV MK YU

DOCDB simple family (publication)

EP 1580511 A2 20050928; **EP 1580511 A3 20091028**; **EP 1580511 B1 20190306**; CN 100378426 C 20080402; CN 1683898 A 20051019; DE 102004041375 A1 20051013

DOCDB simple family (application)

EP 05005327 A 20050311; CN 200510056982 A 20050324; DE 102004041375 A 20040825