

Title (en)  
Improved heat exchanger for use in high temperature applications

Title (de)  
Verbesserter Wärmetauscher für Hochtemperatur-Anwendung

Title (fr)  
Echangeur de chaleur amélioré pour applications à haute température

Publication  
**EP 0777098 A2 19970604 (EN)**

Application  
**EP 96308593 A 19961128**

Priority  
US 56364495 A 19951128

Abstract (en)  
A heat exchanger (10) achieves a more uniform internal temperature gradient within its sections during normal operation as well as subsequent to an unexpected power shutdown. Internal fouling (65) of tubes containing the process gas and entrained solids is reduced. An external shell (15) is utilized which is insulated on its inner surface and optionally provided with cooling medium flowing within the shell wall. A double bottom tube sheet (35) enclosing a secondary cooling medium chamber (80) is also provided. The top of the process gas tube (65) is preferably enclosed within a shielded chamber (140) to facilitate a thermal gradient proximate thereto. A ferrule (145) is similarly affixed to the bottom of the process gas tube (65) at the point where it passes through the double bottom tube sheet (35). Cooling medium flow is diverted and passed directly into the cooling chamber (80) of the double bottom tube sheet (35). Cooling medium from the double bottom tube sheet (35) is then vented to the top of the heat exchanger (10) to a point adjacent the top tube sheet (40). A secondary blower (100) for propulsion of the cooling medium is provided in line with the normal flow of cooling medium from the primary blower (95). Under unexpected shutdown conditions, the primary blower operation is discontinued and the secondary blower continues its propulsion of cooling medium through the double bottom tube sheet (35) and the main cooling medium chamber (12).

IPC 1-7  
**F28F 9/02**

IPC 8 full level  
**F28D 7/16** (2006.01); **F28F 9/02** (2006.01); **F28F 19/00** (2006.01)

CPC (source: EP)  
**F28F 9/0229** (2013.01); **F28F 19/00** (2013.01); **F28D 2021/0075** (2013.01)

Citation (applicant)  
• US 4585057 A 19860429 - MARBURGER DAVID C [US]  
• DE 4404068 C1 19950817 - ENGELHARDT WOLFGANG [DE]

Cited by  
EP3786561A1; WO2021043751A1; AU2008327543B2; US8524326B2; US10006719B2; US7628121B2; US8597384B2; US9581395B2; US2022333880A1; WO2009066260A1; WO2007116045A1; WO2011037697A3; US8424591B2; US9127896B1; US9149742B1; US9303924B1; US9494372B2; WO2010033070A1; US9302205B1; US9630130B2

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