Title (en)

Bath vaporiser-condenser with brazed plates and use thereof in an air distillation device

Title (de)

Verdampferkondensor mit hartgelöteten Platten und deren Verwendung in einer Luftdestillationsvorrichtung

Title (fr)

Vaporiseur-condenseur à bain à plaques brasées et son application à un appareil de distillation d'air

Publication

EP 1067344 A1 20010110 (FR)

Application

EP 00401788 A 20000622

Priority

FR 9908791 A 19990707

Abstract (en)

A vaporizer-condenser has one upper and at least one lower plate heat exchanger. Each exchanger has separate sets of passages for a heating fluid and a liquid to be vaporized. A vaporizer-condenser has one upper and at least one lower plate heat exchanger. Each exchanger has separate sets of passages for a heating fluid and a liquid to be vaporized. Liquid is supplied to the bottom of each exchanger. Liquid supplied to the upper exchanger is distributed within vapor coming from the lower exchanger(s). Vapor from the top of the upper exchanger forms the heating fluid for the upper exchanger. An Independent claim is included for an air distillation apparatus including the above vaporizer-condenser for vaporizing liquid oxygen and condensing nitrogen.

Abstract (fr)

Ce vaporiseur-condenseur (1) comprend deux parties d'échangeur superposées (2A, 2B). La partie inférieure (2A), immergée dans le liquide, a ses passages de vaporisation (8A) alimentés en source. La vapeur qui en sort est envoyée à l'entrée des passages de vaporisation (8B) de la partie supérieure, et du liquide est distribué dans le flux de vapeur qui pénètre dans chacun de ces passages. Application à la vaporisation d'oxygène liquide par condensation d'azote. <IMAGE>

Inventor

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Applicant

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IPC 1-7 (main, further and additional classification)

F25J 3/00; F28F 27/02

IPC 8 full level (invention and additional information)

F28D 9/00 (2006.01); **F25J 3/00** (2006.01); **F25J 3/04** (2006.01); **F25J 3/06** (2006.01); **F28F 27/02** (2006.01)

CPC (invention and additional information)

F28F 27/02 (2013.01); **F25J 5/005** (2013.01); F25J 2250/02 (2013.01); F25J 2250/10 (2013.01); F25J 2290/32 (2013.01)

Citation (search report)

- [A] DE 1152432 B 19630808 - LINDE EISMASCH AG
- [A] US 5775129 A 19980707 - SATCHELL JR DONALD PRENTICE [US], et al
- [DA] US 4606745 A 19860819 - FUJITA IKUO [JP]
- [A] US 5901574 A 19990511 - ROHDE WILHELM [DE]

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US9453674B2

Designated contracting state (EPC)

DE FR GB

EPO simple patent family

EP 1067344 A1 20010110; EP 1067344 B1 20031105; DE 60006321 D1 20031211; DE 60006321 T2 20040916; FR 2796137 A1 20010112; FR 2796137 B1 20010914; JP 2001050657 A 20010223; US 6393864 B1 20020528

INPADOC legal status

2010-06-30 [PG25 DE] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO

- Ref Country Code : DE
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20100101

2010-05-31 [PG25 GB] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO

- Ref Country Code : GB
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20090622

2010-04-30 [PG25 FR] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO

- Ref Country Code : FR
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20090630

2010-04-30 [PGFP FR] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE

- Ref Country Code : FR
- Payment date : 20080513
- Year of fee payment : 9

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- Effective date : 20100226

2010-02-24 [GBPC] GB: EUROPEAN PATENT CEASED THROUGH NON-PAYMENT OF RENEWAL FEE
- Effective date : 20090622

2008-12-31 [PGFP GB] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : GB
- Payment date : 20080521
- Year of fee payment : 9

2008-10-31 [PGFP DE] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : DE
- Payment date : 20080523
- Year of fee payment : 9

2004-10-27 [26N] NO OPPOSITION FILED
- Effective date : 20040806

2004-01-21 [GBT] GB: TRANSLATION OF EP PATENT FILED (GB SECTION 77(6)(A)/1977)
- Effective date : 20031229

2003-12-11 [REF] CORRESPONDS TO:
- Document : DE 60006321 P 20031211

2003-11-05 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : B1
- Designated State(s) : DE FR GB

2003-11-05 [REG GB FG4D] EUROPEAN PATENT GRANTED
- Free text : NOT ENGLISH

2003-06-11 [RIN1] INVENTOR (CORRECTION)
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2002-04-24 [RAP1] TRANSFER OF RIGHTS OF AN EP PUBLISHED APPLICATION
- Owner name : L'AIR LIQUIDE, S.A. A DIRECTOIRE ET CONSEIL DE SUR

2001-09-26 [AKX] PAYMENT OF DESIGNATION FEES
- Free text : DE FR GB

2001-09-05 [17P] REQUEST FOR EXAMINATION FILED
- Effective date : 20010710

2001-01-10 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : A1
- Designated State(s) : DE FR GB

2001-01-10 [AX] REQUEST FOR EXTENSION OF THE EUROPEAN PATENT TO
- Free text : AL;LT;LV;MK;RO;SI