



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
19.05.2010 Bulletin 2010/20

(51) Int Cl.:
F25B 21/04 ^(2006.01) **F28F 13/00** ^(2006.01)

(43) Date of publication A2:
02.07.2008 Bulletin 2008/27

(21) Application number: **07120246.9**

(22) Date of filing: **08.11.2007**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE
SI SK TR**
Designated Extension States:
AL BA HR MK RS

(30) Priority: **27.12.2006 TR 200607538**

(71) Applicant: **Vestel Beyaz Esya Sanayi Ve Ticaret
A.S.**
45030 Manisa (TR)

(72) Inventors:
• **Turan, Halil**
35030, IZMIR (TR)
• **Özkiliç, Sibel**
35030 Izmir (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 60/6
GOP
06700 Ankara (TR)

(54) **Heat exchanger**

(57) The present heat exchanger (A) comprises a thermal element (1), one side of which becomes cold and the other side becomes hot once energized with electricity, a high heat-conductive intermediate plate (2) in contact with one surface of this element (1); a high heat-conductive porous material (3) in contact with the other surface of the intermediate plate (2); and an upper plate

(4) provided on the other side of this material (3). Once the thermal element (1) is activated in the heat exchanger (A), the intermediate plate (2) and the porous material (3) are rapidly cooled or heated. Meanwhile, since the temperature of fluid passing through within the porous material (3) is different than the temperature of the material itself (3), heat exchange is ensured between the fluid and the porous material.

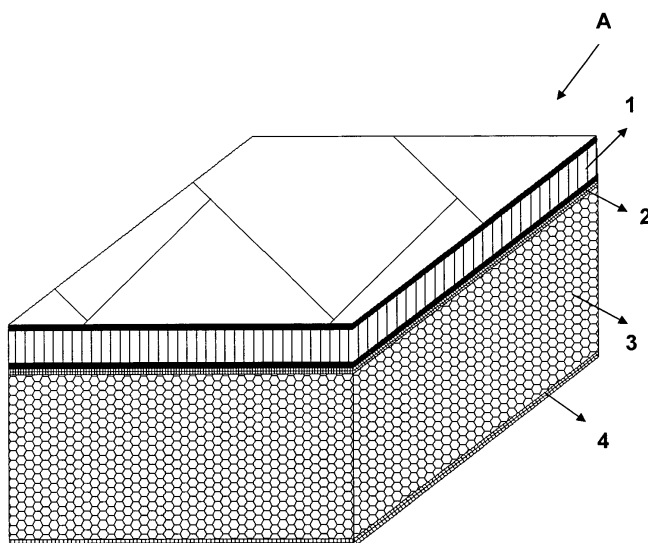


Figure – 1



EUROPEAN SEARCH REPORT

Application Number
EP 07 12 0246

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 092 129 A (BAYES STEPHEN A [US] ET AL) 3 March 1992 (1992-03-03) * column 2, line 32 - column 4, line 64; figure 4 * * column 3, line 38 - column 4, line 5 *	1-2,4	INV. F25B21/04 F28F13/00
X	DE 199 34 554 A1 (STOLLENWERK MICHAEL [DE]) 25 January 2001 (2001-01-25) * column 10, line 9 - column 9, line 5; claims 9,11,19; figure 9 *	1-2,4	
X	US 5 180 293 A (HARTL HANS-GEORG [US]) 19 January 1993 (1993-01-19) * column 3, line 17 - column 4, line 8; figures 3,6 *	1-2,4	
X	US 2002/073715 A1 (LOGAN MARK A [US] ET AL) 20 June 2002 (2002-06-20) * paragraph [0012] - paragraph [0018]; claims 1,11; figures 2,3 *	1-2,4	
X	WO 99/43022 A1 (APPLIED MATERIALS INC [US]) 26 August 1999 (1999-08-26) * page 4 - page 10; figures 1,2,8 *	1-2,4	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) F25B F28F H01L
Place of search Munich		Date of completion of the search 18 January 2010	Examiner Szilagyi, Barnabas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 1
EPO FORM 1503 03.92 (P04C01)



Application Number

EP 07 12 0246

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

see additional sheet(s)

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 07 12 0246

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-4

Heat exchanger with a thermal element being a thermoacoustical material

2. claims: 1, 5

Heat exchanger wherein the porous material is composed of different layers having different pore sizes

3. claims: 1, 6-7

Heat exchanger comprising a fan or a pump

4. claims: 1, 8-14

Heat exchanger further comprising a heat-conductive intermediate plate contacting the other surface of the thermal element and heat -conductive porous material contacting the other surface of the heat-conductive intermediate plate

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 12 0246

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-01-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5092129	A	03-03-1992	NONE
DE 19934554	A1	25-01-2001	AT 249612 T 15-09-2003 AU 6426000 A 13-02-2001 WO 0107858 A1 01-02-2001 EP 1198692 A1 24-04-2002 US 6799428 B1 05-10-2004
US 5180293	A	19-01-1993	DE 69300311 D1 07-09-1995 DE 69300311 T2 15-02-1996 EP 0561114 A1 22-09-1993 JP 6017756 A 25-01-1994
US 2002073715	A1	20-06-2002	NONE
WO 9943022	A1	26-08-1999	US 6018616 A 25-01-2000