

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 September 2007 (13.09.2007)

PCT

(10) International Publication Number
WO 2007/103166 A3

- (51) International Patent Classification:
F28F 3/14 (2006.01)
- (21) International Application Number:
PCT/US2007/005333
- (22) International Filing Date: 1 March 2007 (01.03.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/365,767 1 March 2006 (01.03.2006) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

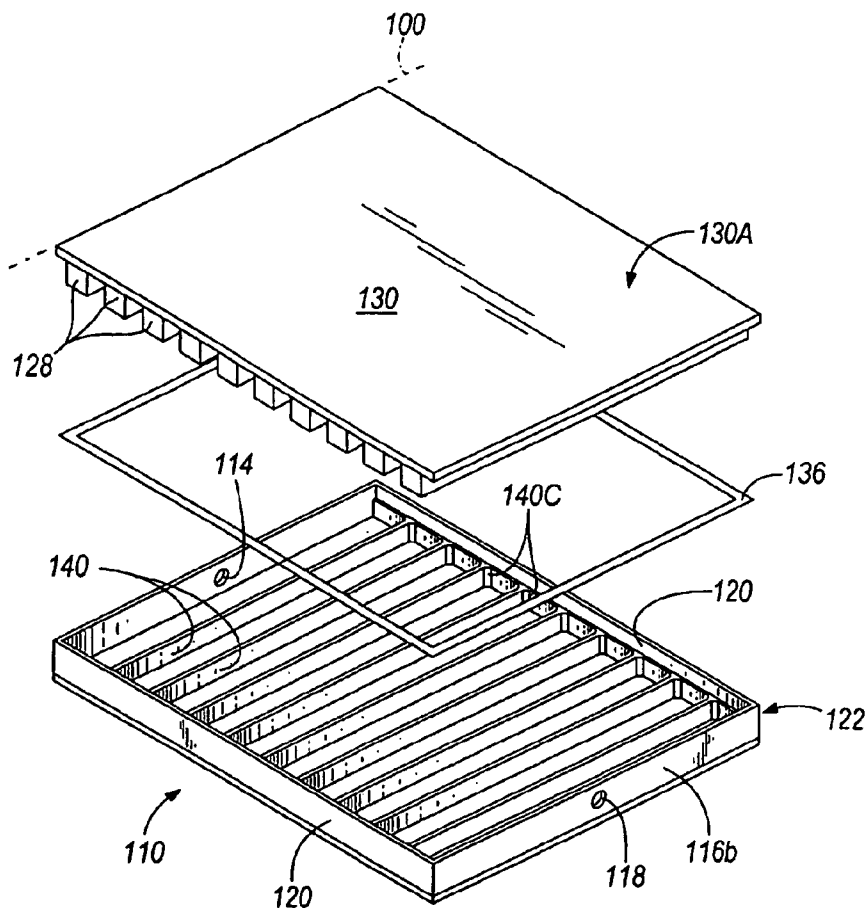
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: COLD PLATE INCORPORATING A HEAT PIPE



(57) Abstract: Apparatus and method for cooling a comestible fluid. The method can include cooling a plate with ice. A heat pipe with a condenser portion can be in heat transfer relationship with the plate, and an evaporator portion can be in heat transfer relationship with the comestible fluid. Heat can be transferred from a comestible fluid to the plate through the heat pipe.

WO 2007/103166 A3



(88) Date of publication of the international search report:
5 June 2008

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 07/05333

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - F28F 3/14 (2007.01) USPC - 165/170 According to International Patent Classification (IPC) or to both national classification and IPC</p>																							
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) USPC: 165/170</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 62/389,394,396,398; 165/104.21,164,170; 222/146.6 - text word limited - see below</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WEST (PGPB,USPT); google scholar Search terms: cold plate, heat pipe, fin, beverage carbonation</p>																							
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 5,619,856 A (Lee) 15 April 1997 (15.04.1997) see entire doc, esp figure 1</td> <td>1-2, 7-15, 32</td> </tr> <tr> <td>Y</td> <td></td> <td>3-6, 16-19</td> </tr> <tr> <td>Y</td> <td>US 2005/0268639 A1 (Hortin et al.) 08 December 2005 (08.12.2005) para [0041]</td> <td>3-5</td> </tr> <tr> <td>Y</td> <td>US 2003/0000240 A1 (Pahl) 02 January 2003 (02.01.2003) para [0049]</td> <td>6</td> </tr> <tr> <td>Y</td> <td>US 2005/0280321 A1 (Du et al.) 22 December 2005 (22.12.2005) para [0119]-[0120]</td> <td>16-18</td> </tr> <tr> <td>Y</td> <td>US 2006/0021372 A1 (Wolski et al.) 02 February 2006 (02.02.2006) para [0007]</td> <td>19</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 5,619,856 A (Lee) 15 April 1997 (15.04.1997) see entire doc, esp figure 1	1-2, 7-15, 32	Y		3-6, 16-19	Y	US 2005/0268639 A1 (Hortin et al.) 08 December 2005 (08.12.2005) para [0041]	3-5	Y	US 2003/0000240 A1 (Pahl) 02 January 2003 (02.01.2003) para [0049]	6	Y	US 2005/0280321 A1 (Du et al.) 22 December 2005 (22.12.2005) para [0119]-[0120]	16-18	Y	US 2006/0021372 A1 (Wolski et al.) 02 February 2006 (02.02.2006) para [0007]	19
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																							
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>																			
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<p>Date of the actual completion of the international search 31 January 2008 (31.01.2008)</p>		<p>Date of mailing of the international search report 28 MAR 2008</p>																					
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: Lee W. Young</p> <p>PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>																					

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/05333

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- Group 1: Claims 1-19 and 32
- Group 2: Claims 20-27
- Group 3: Claims 28-31 and 33-38
- Group 4: Claims 39-51
- Group 5: Claims 52-60
- Group 6: Claims 61-71 and 77-84
- Group 7: Claims 72-76
- Group 8: Claims 85-90

-- see extra sheet at the end of this form --

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-19, 32

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/05333

Group 1: Claims 1-19 and 32
Group 2: Claims 20-27
Group 3: Claims 28-31 and 33-38
Group 4: Claims 39-51
Group 5: Claims 52-60
Group 6: Claims 61-71 and 77-84
Group 7: Claims 72-76
Group 8: Claims 85-90

The special technical feature of Group 1 is a cold plate for cooling a dispensable liquid, the cold plate comprising: a plate including at least one surface for contact with a low temperature heat sink; and a heat pipe in heat transfer relationship with the plate and the dispensable liquid, which is not present in Groups 2-8.

The special technical feature of Group 2 is a cold plate for cooling comestible fluid, the cold plate comprising: a top plate for supporting a heat sink and maintaining a temperature substantially the same as the heat sink; a plurality of heat pipes, each one of the plurality of heat pipes including a condenser portion adjacent the top plate and an evaporator portion substantially opposite the condenser portion; and a buffer between an adjacent pair of the plurality of heat pipes, the buffer at least partially defining a comestible fluid flow path through the cold plate, which is not present in Groups 1 and 3-8.

The special technical feature of Group 3 is a cold plate for cooling comestible fluid, the cold plate comprising: a plate in contact with a heat sink; a base parallel to the plate and spaced a distance from the plate; and a plurality of heat pipes positioned between the plate and the base; at least one of the plurality of heat pipes including upper notches adjacent to the plate and lower notches adjacent to the base, the upper notches and the lower notches defining at least part of a comestible fluid flow path through the cold plate, which is not present in Groups 1, 2 and 4-8.

The special technical feature of Group 4 is a cold plate for cooling a comestible fluid, the cold plate comprising: a top plate that is ice-cooled; a second plate located a distance below the top plate and substantially parallel to the top plate; a comestible fluid passage between the top plate and the second plate; and at least one heat pipe with at least a portion of the at least one heat pipe being in heat transfer relationship with the top plate and the second plate, which is not present in Groups 1-3 and 5-8.

The special technical feature of Group 5 is a cold plate for cooling a comestible fluid, the cold plate comprising: a top plate that is ice-cooled; a molded block positioned below the top plate; a comestible fluid flow passage formed in the molded block; and at least one heat pipe in heat transfer relationship with the top plate and the molded block, which is not present in Groups 1-4 and 6-8.

The special technical feature of Group 6 is a cold plate for cooling a comestible fluid, the cold plate comprising: a plate in contact with a heat sink; a chamber partially defined by the plate; a liquid within the chamber; a comestible fluid line positioned at least partially within the chamber; and a heat pipe positioned to transfer heat from the comestible fluid to the plate via the liquid, which is not present in Groups 1-5, 7 and 8.

The special technical feature of Group 7 is a beverage dispenser for cooling a comestible fluid and dispensing at least one liquid beverage containing the comestible fluid, the beverage dispenser comprising: an interior volume for containing ice; a cold plate positioned at least partially within the interior volume, the cold plate including a heat pipe to exchange heat energy between the comestible fluid and the ice; and at least one dispense head for dispensing the at least one liquid beverage, which is not present in Groups 1-6 and 8.

The special technical feature of Group 8 is a method of cooling a comestible fluid, the method comprising: cooling a first plate with ice; providing a heat pipe with a condenser portion adjacent the first plate and an evaporator portion adjacent the comestible fluid, the heat pipe drawing heat energy from the comestible fluid into at least one of the first plate and the ice; and transferring heat from the comestible fluid to the first plate through the heat pipe, which is not present in Groups 1-7.

Accordingly, unity of invention is lacking under PCT Rule 13.1.

Where two or more of the Groups share one or more substantial technical features, you must show those technical features to be known (i.e. not ?special?) in order to distinguish them. In some cases, this may require prior art to show that the common technical feature(s) was/were known and therefore not ?special.?