# (19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 15 November 2007 (15.11.2007)

(51) International Patent Classification: H05K 7/20 (2006.01)

(21) International Application Number:

PCT/US2007/010807

(22) International Filing Date: 4 May 2007 (04.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/797,955 4 May 2006 (04.05.2006) US 11/800,303 3 May 2007 (03.05.2007) US

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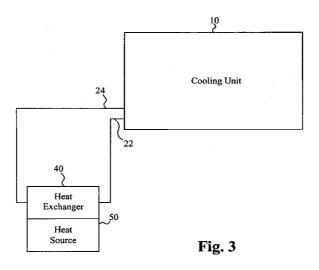
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, 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, ME, 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,

[Continued on next page]

(54) Title: METHODOLOGY FOR THE LIQUID COOLING OF HEAT GENERATING COMPONENTS MOUNTED ON A DAUGHTER CARD/EXPANSION CARD IN A PERSONAL COMPUTER THROUGH THE USE OF A REMOTE DRIVE BAY HEAT EXCHANGER WITH A FLEXIBLE FLUID INTERCONNECT



(57) Abstract: A cooling system includes a cooling unit configured to fit within a single drive bay of a personal computer. The cooling unit includes a fluid-to-air heat exchanger, an air mover, a pump, fluid lines, and control circuitry. The cooling system also includes a cooling loop configured to be coupled to one or more heat generating devices. The cooling loop includes the pump and the fluid-to-air heat exchanger from the cooling unit, and at least one heat exchanger coupled together via flexible fluid lines. The heat exchanger is thermally coupled to the heat generating device. The cooling unit is configured to maintain noise below a specified acoustical specification. To meet this acoustical specification, the size, position, and type of the components within the cooling unit are specifically configured.



## WO 2007/130557 A3



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).

 before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

#### Published:

— with international search report

#### (88) Date of publication of the international search report:

20 November 2008

### INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/10807

| A. CLASSIFICATION OF SUBJECT MATTER IPC: H05K 7/20( 2006.01)                                                                  |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| USPC: 165/80.4;361/699 According to International Patent Classification (IPC) or to both national classification and IPC      |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
| B. FIELI                                                                                                                      | DS SEARCHED                                                                                                                              |                                                                                           |                                                                                                                                                                                                       |  |
| Minimum documentation searched (classification system followed by classification symbols) U.S.: 165/80.4; 361/699             |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
|                                                                                                                               | UMENTS CONSIDERED TO BE RELEVANT                                                                                                         |                                                                                           |                                                                                                                                                                                                       |  |
| Category *                                                                                                                    | Citation of document, with indication, where a                                                                                           |                                                                                           | Relevant to claim No.                                                                                                                                                                                 |  |
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| Further documents are listed in the continuation of Box C.                                                                    |                                                                                                                                          | See patent family annex.                                                                  |                                                                                                                                                                                                       |  |
| Special categories of cited documents:                                                                                        |                                                                                                                                          | "T" later document published after the interded and not in conflict with the application. | national filing date or priority                                                                                                                                                                      |  |
| "A" document particular                                                                                                       | defining the general state of the art which is not considered to be of relevance                                                         | principle or theory underlying theinvent                                                  | tion                                                                                                                                                                                                  |  |
| "E" earlier app                                                                                                               | olication or patent published on or after the international filing date                                                                  |                                                                                           | document of particular relevance; the claimed invention cannot be<br>considered novel or cannot be considered to involve an inventive step                                                            |  |
|                                                                                                                               | which may firow doubts on priority claim(s) or which is cited to<br>the publication date of another citation or other special reason (as | "Y" document of particular relevance; the classifiered to involve an inventive step       | 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 |  |
| "O" document                                                                                                                  | referring to an oral disclosure, use, exhibition or other means                                                                          | obvious to a person skilled in the art                                                    | , Shan Combination Joing                                                                                                                                                                              |  |
| "P" document published prior to the international filing date but later than the priority date claimed                        |                                                                                                                                          | "&" document member of the same patent family                                             |                                                                                                                                                                                                       |  |
| Date of the actual completion of the international search                                                                     |                                                                                                                                          | Date of mailing of the international search                                               | ı report                                                                                                                                                                                              |  |
| 02 September 2008 (02.09.2008)                                                                                                |                                                                                                                                          |                                                                                           |                                                                                                                                                                                                       |  |
| Name and mailing address of the ISA/US                                                                                        |                                                                                                                                          | Authorized officer                                                                        | 11-11                                                                                                                                                                                                 |  |
| Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents                                                                       |                                                                                                                                          | Authorized officer Leonard R. Leo Telephone No. 571-272-3750                              |                                                                                                                                                                                                       |  |
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