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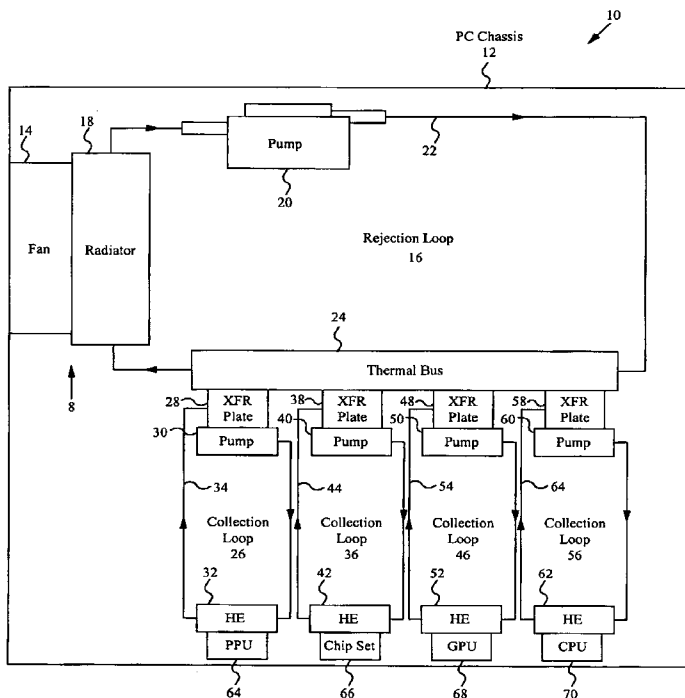
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(54) Title: METHODOLOGY OF COOLING MULTIPLE HEAT SOURCES IN A PERSONAL COMPUTER THROUGH THE USE OF MULTIPLE FLUID-BASED HEAT EXCHANGING LOOPS COUPLED VIA MODULAR BUS-TYPE HEAT EXCHANGERS



(57) Abstract: A cooling system is used to cool heat generating devices within a personal computer. The cooling system has a first fluid loop and an expandable array of one or more second fluid loops. For each of the second fluid loops, heat generating devices transfer heat to fluid flowing through corresponding heat exchanging devices in the loop. Heat is transferred from the fluid in each second fluid loop to a thermal bus of the first fluid loop via a thermal interface. The second fluid loop can be a pumped fluid loop or can include a heat pipe. Within the first fluid loop, a fluid is continuously pumped from the thermal bus to a fluid-to-air heat exchanging system and back to the thermal bus. Heat transferred to the thermal bus from the first fluid loop is transferred to the fluid in the second fluid loop passing through the thermal bus. The heated fluid is pumped through the fluid-to-air heat exchanging system where the heat is transferred from the fluid to the ambient. The thermal bus provides a modular, scalable cooling system which allows for the expansion of cooling capacity without breaking the fluid lines.

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A. CLASSIFICATION OF SUBJECT MATTER

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USPC - 165/104.33

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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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)

PatBase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/0057211 A1 (KONDO et al) 25 March 2004 (25.03.2004) entire document	1-17, 20, 23-26
Y		18, 19, 21, 22, 27-55
Y	US 2004/0206477 A1 (KENNY et al) 21 October 2004 (21.10.2004) entire document	18, 19, 48
Y	US 6,272,012 B1 (MEDIN et al) 07 August 2001 (07.08.2001) entire document	21, 22, 50, 51
Y	US 2004/0050231 A1 (CHU et al) 18 March 2004 (18.03.2004) entire document	27-55

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