



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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A. CLASSIFICATION OF SUBJECT MATTER***B64G 1/50(2006.01)i, F28F 7/00(2006.01)i, F28D 1/00(2006.01)i, F25B 1/00(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B64G 1/50; F28D 15/00; F28F 1/00; F28F 1/10; F28F 13/00; F28D 15/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: heat, pipe, thermal, transfer, module, welding, fluid, channel

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/0196778 A1 (KOBAYASHI, TAKASHI; NOMURA, TAKEHIDE) 23 October 2003 See paragraph 78 - paragraph 277 and figures 1 - 43.	1-30
A	US 2008/0000435 A1 (BAER, STEPHEN C. et al.) 03 January 2008 See paragraph 74 - paragraph 101 and figures 1 - 9D.	1-30
A	US 5,823,477 A (YORK, GARY M.) 20 October 1998 See column 2, line 36 - column 4, line 66 and figures 1 - 3.	1-30
A	US 4,420,035 A (HEWITT, DENNIS R.) 13 December 1983 See column 3, line 53 - column 8, line 23 and figures 1 - 7.	1-30
A	US 4,880,050 A (NAKAMURA, GARY D.; STEPHENSON, JERRY D.) 14 November 1989 See column 3, line 17 - column 5, line 49 and figures 1 - 6.	1-30



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/036561

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003/0196778 A1	23.10.2003	FR 2838817 A1 FR 2838817 B1 JP 03-680040 B2 JP 2003-314978 A US 6,942,016 B2	24.10.2003 20.04.2007 10.08.2005 06.11.2003 13.09.2005
US 2008/0000435 A1	03.01.2008	None	
US 5,823,477 A	20.10.1998	None	
US 4,420,035 A	13.12.1983	None	
US 4,880,050 A	14.11.1989	None	