

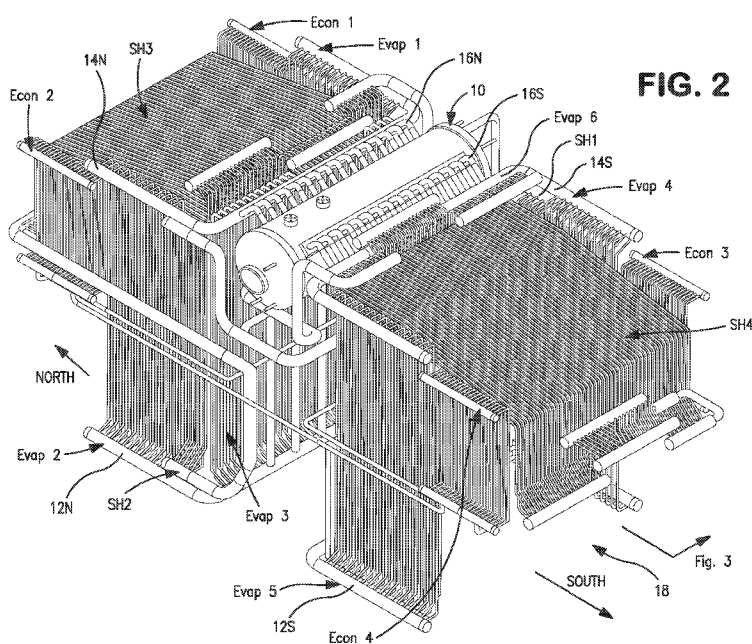


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F24J 2/46 (2006.01) *F01K 21/00* (2006.01)
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

[Continued on next page]

(54) **Title:** GENERATION OF STEAM FROM SOLAR ENERGY



(57) **Abstract:** A cavity-type solar energy receiver for generating high pressure steam, which includes panels of tubes defining a cavity within an outer enclosure. Concentrated solar energy provided by a heliostat enters the cavity opening in the enclosure and evaporates water within some of the tube panels. The evaporating tubes receive hot water from a steam drum by natural circulation and return a mixture of steam and hot water to the steam drum. Additional tube panels are positioned to receive reflected solar energy, which is used to preheat feed water and to superheat steam.



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A. CLASSIFICATION OF SUBJECT MATTER*F24J 2/04(2006.01)i, F24J 2/46(2006.01)i, F03G 6/00(2006.01)i, F01K 21/00(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)

F24J 2/04; F03G 6/00; F24J 3/02; F02C 3/30

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:steam drum, evaporator tube, superheater tube, cavity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6279312 B1 (HENNECKE; KLAUS) 28 August 2001 See abstract, cloumn 4, figure 1.	1-39
A	US 4546758 A1 (EBERNARD; FRANCK) 15 October 1985 See cloumn 7,11, figure 1.	1-39
A	WO 2007-074570 A1 (KAWASAKI JUKOGYO KABUSHIKI KAISHA et al.) 05 July 2007 See pages 11,26,27 and figure 1	1-39

 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

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"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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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6279312 B1	28.08.2001	AU 1998-86240 B2	07.06.2001
		AU 734132 B2	07.06.2001
		AU 8624098 A	21.12.1998
		AU 8624098 A	21.12.1998
		DE 19723543 A1	10.12.1998
		DE 19723543 G2	17.04.2003
		EP 0986695 A1	22.03.2000
		EP 0986695 B1	19.06.2002
		WO 98-55740 A1	10.12.1998
		US 4546758 A1	15.10.1985
WO 2007-074570 A1	05.07.2007	EP 2058515 A1	13.05.2009
		IL 196768D0	18.11.2009
		JP 04-322902 B2	12.06.2009
		JP 2008-039367 A	21.02.2008
		JP 2008-039367 A	21.02.2008
		JP 4322902 B2	02.09.2009
		US 2010-0175365 A1	15.07.2010
		WO 2007-074570 A1	05.07.2007