



(51) International Patent Classification:
F24J 2/34 (2006.01) *F24J 2/46* (2006.01)

(21) International Application Number:
PCT/US2010/025502

(22) International Filing Date:
26 February 2010 (26.02.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
200910025618.2 3 March 2009 (03.03.2009) CN

(71) Applicant (for all designated States except US): **A.O. SMITH CORPORATION** [US/US]; 11270 West Park Place, Milwaukee, WI 53224 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **AO, Kaiping** [CN/CN]; 336 Yaoxin Avenue, NETDZ, Nanjing, Jiangsu Province 210038 (CN).

(74) Agent: **PRICE, David, R.**; Michael Best & Friedrich LLP, 100 East Wisconsin Avenue, Suite 3300, Milwaukee, WI 53201-4108 (US).

(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.

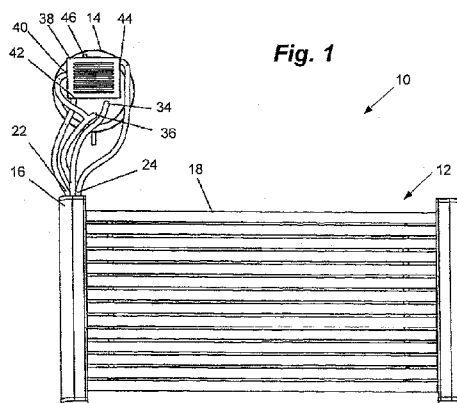
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, 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).

Published:

- with international search report (Art. 21(3))
- 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))

(88) Date of publication of the international search report:
16 December 2010

(54) Title: SOLAR WATER HEATER WITH THE FUNCTIONS OF REFILLING AND DISSIPATION



(57) Abstract: This invention relates to a type of solar water heater, which belongs to the field of solar energy application technology. The water heater (10) consists of a solar heat collector (12) and a thermal storage tank (14). The aforesaid solar heat collector (12) is equipped with a liquid-refilling port (22), a backflow port, and a characteristic refill-dissipation tank (38). The refill-dissipation tank (38) is equipped with a water-refilling port (40), a liquid-refilling port (42), a backflow port (44) located higher than the aforesaid liquid-refilling port (42), and a ventilation-overflow port (46) at the upper part. The aforesaid water-refilling port (42) is connected with the water source with a linking control unit (48), while the aforesaid liquid-refilling port (42) and the backflow port (44) are connected with the corresponding ports on the solar heat collector (12), thus forming a circular dissipation loop. This invention combines refilling and dissipation, to refill water and at the same time solve the problem of overheating.



WO 2010/101774 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2010/025502

A. CLASSIFICATION OF SUBJECT MATTER

INV. F24J2/34 F24J2/46
ADD.

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 F24D

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 practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/011193 A1 (RONG JIANGMING [CA]) 19 January 2006 (2006-01-19)	1,5-7,10
Y	page 13, paragraph 44; figure 3 page 14, paragraph 51 - page 15, paragraph 57; figures 4, 5 page 15, paragraph 68	2-4
Y	DE 91 01 673 U1 (PEPERLE, WOLFRAM, DR.) 6 June 1991 (1991-06-06) page 3, line 16 - line 22; figures 1, 2	2
A	EP 2 003 404 A1 (PARADIGMA EN UND UMWELTTECHNIK [DE]) 17 December 2008 (2008-12-17) * abstract; figure 2 ----- -/-	1-10

☒ 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 document 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 another 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

22 October 2010

Date of mailing of the international search report

02/11/2010

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Berkus, Frank

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2010/025502

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	AU 71814 81 A (UNISEARCH LTD) 17 December 1981 (1981-12-17) * abstract; figure 3 page 6, line 5 - line 9 -----	4
Y	US 4 483 320 A (WETZEL JR OTTO K [US] ET AL) 20 November 1984 (1984-11-20) page 14, column 1, line 21 - line 65; figure 3 -----	3
A	FR 2 870 928 A1 (ROUX ALAIN JEAN FRANCOIS [FR]) 2 December 2005 (2005-12-02) * abstract; figure 8 -----	3
A	GB 1 573 701 A (MCKEE F B; MCKEE J D) 28 August 1980 (1980-08-28) page 1, line 75 - page 2, line 44; figure 1 -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/025502

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2006011193	A1	19-01-2006	NONE	
DE 9101673	U1	06-06-1991	NONE	
EP 2003404	A1	17-12-2008	NONE	
AU 7181481	A	17-12-1981	NONE	
US 4483320	A	20-11-1984	NONE	
FR 2870928	A1	02-12-2005	NONE	
GB 1573701	A	28-08-1980	NONE	