



- (51) **International Patent Classification:**
F24J 2/07 (2006.01) F24J 2/34 (2006.01)
- (21) **International Application Number:**
PCT/IB20 12/052275
- (22) **International Filing Date:**
8 May 2012 (08.05.2012)
- (25) **Filing Language:** Italian
- (26) **Publication Language:** English
- (30) **Priority Data:**
RM201 1A000234 10 May 2011 (10.05.2011) IT
- (71) **Applicant (for all designated States except US):**
MAGALDI INDUSTRIE S.R.L. [IT/IT]; Via Irmo 219, I-84135 Salerno SA (IT).
- (72) **Inventor; and**
- (75) **Inventor/Applicant (for US only):** MAGALDI, Mario [IT/IT]; Viale del Bosco 22, I-84134 Salerno (IT).
- (74) **Agents:** PAPA, Elisabetta et al.; Societa Italiana Brevetti S.p.A., Piazza di Pietra 39, I-00186 Rome (IT).
- (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, QA, RO, RS, RU, RW, 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, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, 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:**
20 June 2013

(54) **Title:** FLUIDIZED BED SOLAR COLLECTOR WITH A HIGH LEVEL OF EFFICIENCY AND RELATED CONNECTION METHOD

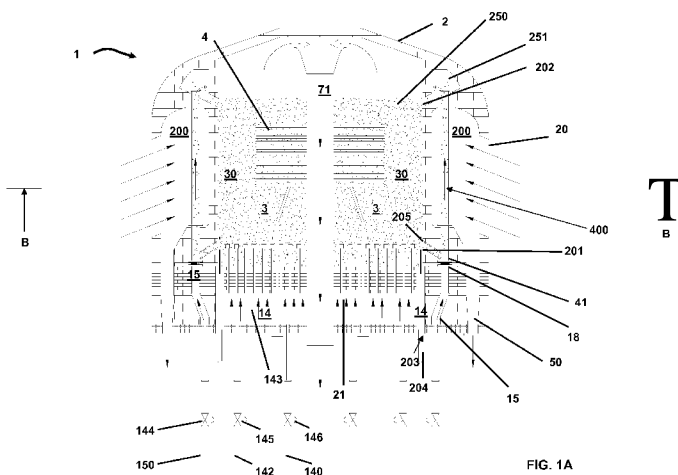


FIG. 1A

(57) **Abstract:** Device (1) for storage and transfer of heat energy for an energy production plant, which device (1) is apt to receive the concentrated solar radiation and is based on the use of a modular fluidizable granular bed, a recirculation outside the bed of the particles inside tubular collectors, a heat exchanger associated with the particle bed and on the activation of a storage step and a production step independently of each other; the said device comprising: - a containment casing (2); - at least one bed (3, 30) of particles suitable for storage and exchange of heat energy, contained in said containment casing (2); - at least one inlet (21) for feeding a fluidization gas through said particle bed (3, 30), the overall arrangement being such that, in use, such fluidization gas moves the particles of said bed (3, 30) causing or fostering heat exchange between the particles themselves and/or between these and further members; and - means (400) for receiving the solar radiation, arranged at said casing (2) and comprising means (40, 41, 44) for circulating particles coming from said bed (30), which circulating means is apt to cause a dedicated flow of said particles at an irradiation region (200) of the device (1) concerned by the solar radiation (Fig. 1A).



INTERNATIONAL SEARCH REPORT

International application No PCT/IB2012/052275

A. CLASSIFICATION OF SUBJECT MATTER
 INV. F24J2/Q7 F24J2/34
 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

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)

EPO-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 4 333 445 A (LEE DONALD M) 8 June 1982 (1982-06-08)	1-4, 9, 11, 14-16, 22, 23, 30
Y	abstract; figures 1, 2 column 2, line 30 - column 5, line 68 -----	5
X	WO 2011/027309 A2 (DE RICCARDIS ANDREA [IT]) 10 March 2011 (2011-03-10)	1, 2, 9, 10, 14-16, 19, 21-26, 29, 31
Y	abstract; claims 1, 2, 9, 10; figures 1-5	11
A	page 10, line 7 - page 18, line 12 ----- - / - -	5, 20

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 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

26 March 2013

Date of mailing of the international search report

05/04/2013

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/IB2012/052275

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 038 557 A (GILDERSLEEVE JR OLIVER DEP ET AL) 26 July 1977 (1977-07-26)	1,2,4,7, , 9, 11,21
Y	abstract; figure 4	5, 11
A	col umn 3, line 3 - line 7 col umn 4, line 30 - col umn 5, line 22 -----	20
A	wo 01/90660 A1 (SMID ANTONIN [CZ]) 29 November 2001 (2001-11-29) abstract; figures 1, 2 page 5, line 23 - page 7 -----	5, 11, 12
X, P	wo 2011/135501 A2 (MAGALDI IND S R L [IT] ; ENEL INGEGNERIA E INNOVAZIONE S P A [IT] ; MAGA) 3 November 2011 (2011-11-03) abstract; claims 1-32 ; figures 1, la, 3, 4 page 4, line 10 - page 6, line 14 page 8, line 22 - page 11, line 36 -----	1-4,7 ,9,, 11, 14-17 , 21,22 , 24-28, 30,31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2012/052275

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4333445	A	08-06-1982	NONE

WO 2011027309	A2	10--03--2011	NONE

us 4038557	A	26--07--1977	NONE

WO 0190660	A1	29--11--2001	AU 5818001 A 03-12-2001
			CZ 20001973 A3 12-06-2002
			WO 0190660 A1 29-11-2001

wo 2011135501	A2	03--11--2011	AR 080977 A1 23-05-2012
			AU 2011246933 A1 13-12-2012
			CN 102859292 A 02-01-2013
			EP 2564127 A2 06-03-2013
			TW 201207330 A 16-02-2012
			US 2013042857 A1 21-02-2013
			UY 33363 A 01-12-2011
			WO 2011135501 A2 03-11-2011
