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Declarations under Rule 4.17:

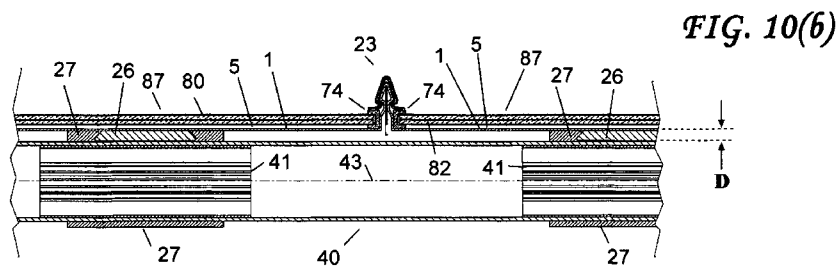
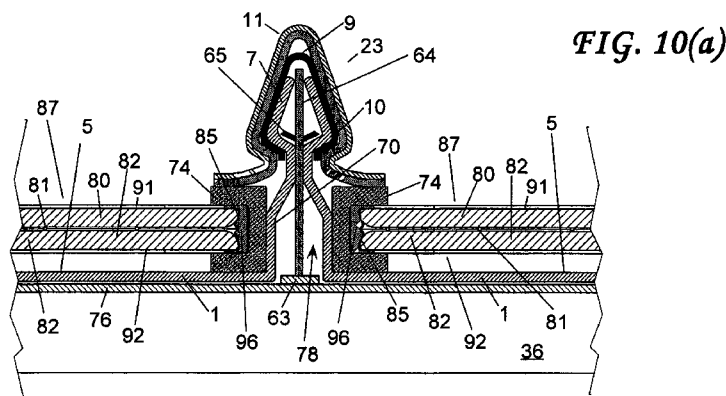
— of inventorship (Rule 4.17(iv))

Published:

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

(88) Date of publication of the international search report:
27 December 2013

(54) Title: SOLAR THERMAL APPARATUS



(57) Abstract: The present invention is related to the field of solar-thermal collectors and associated energy conversion apparatus that are integrated into a solar panel or into a roofing system. More particularly, the invention discloses flat solar-thermal panels incorporating solar selective absorbers and arrays of integrated linear heat pipe or other heat transfer elements, and utilizing a standing-seam construction in combination with vacuum barrier assemblies insertable into said standing seam construction.

WO 2013/133900 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/00063

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E04D 13/18 (2013.01)

USPC - 126/621, 623, 704

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)

IPC(8) Classification(s): E04D 13/18; F24J 2/46 (2013.01)

USPC Classification(s): 126/563, 569, 592, 621, 622, 623, 626, 704, 906

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)

MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); DialogPro (Derwent, INSPEC, NTIS, PASCAL, Current Contents Search, Dissertation Abstracts Online, Inside Conferences); Google; IP.com; Search Terms: solar, water, roof, heater

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,513,518 B1 (GIRERD, S.) February 4, 2003, Figures 1-4, column 3, lines 15-50, column 4, lines 1-30	1, 3 --- 2
Y	US 4,201,193 A (RONC, M.) May 6, 1980, Figure 3, column 2, lines 20-40	2
A	US 2004/0134483 A1 (PAJK, A.) July 15, 2004, Figure 1, paragraphs [0014]-[0016]	1-3
A	US 4,178,910 A (GRAMER, E. et al.) December 18, 1979, Figures 4, 8 and 9, column 5, lines 45-67, column 6, lines 1-45	1-3

Further documents are listed in the continuation of Box C.

* 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

17 July 2013 (17.07.2013)

Date of mailing of the international search report

04 OCT 2013

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See Extra Sheet.

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-3

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

-Continued from Box III:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-3 are directed toward a panel, comprising a thin planar support structure, non-porous material, a first side, a second side, a spectrally selective coating, a seam structure formed, opposing edges, a heat pipe structure, a contacting structure, and a metallic interlayer.

Group II: Claim 4 is directed toward a transparent, vacuum-insulated glazing for providing thermal insulation, comprising a first glass panel, a first side and a second side, a plurality of glass spacers, a second glass panel, a cavity, planar dimensions, metal gasket, interior of the metal gasket, a glass-to-metal seal, and an evacuated space.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features.

Group I and Group II do not share any special technical features, thus Groups I and II lack unity.