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62/433,020 12 December 2016 (12.12.2016) US
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(54) Title: THERMOELECTRIC DEVICES, SYSTEMS, AND METHODS

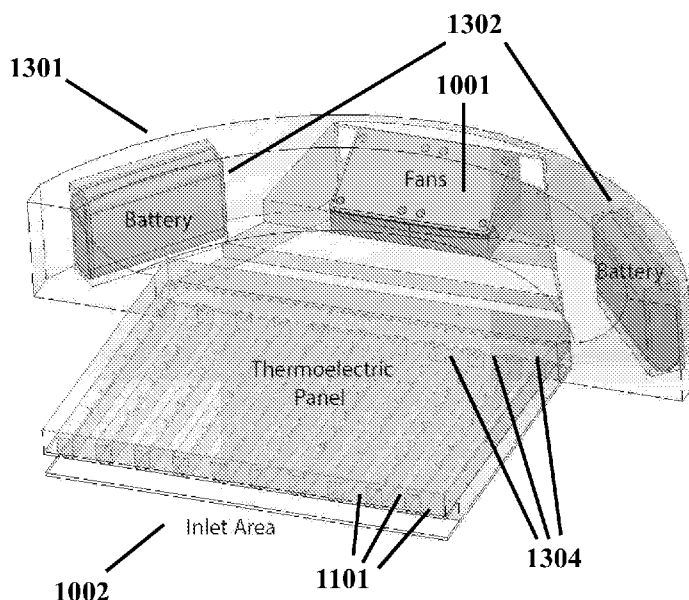


FIG. 20B

(57) Abstract: The present disclosure provides thermoelectric systems and methods for heating and cooling, and methods of forming thermoelectric systems for heating and cooling. A thermoelectric system of the present disclosure may comprise a panel and a plurality of thermoelectric elements connected by individual conductors. The panel may comprise an electrically and/or thermally insulating material. The thermoelectric system may include integrated components. The integrated components may include occupancy and load sensors, massage transducers, thermal protection units, heat exchangers, and foam-molding components for use with or in, for example, wearables or furniture.



KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR,
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A. CLASSIFICATION OF SUBJECT MATTER**H01L 35/34(2006.01)i, H01L 35/30(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)

H01L 35/34; B64D 13/00; B60N 2/44; A47C 7/74; H05B 3/20; B60N 2/56; A47C 21/04; H05B 3/00; H01L 35/30

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: thermoelectric system, load sensor, thermal protection unit, massage transducer, heat exchanger, molding frame

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 2012-0198616 A1 (TAREK MAKANSI et al.) 09 August 2012 See paragraphs [0047]-[0073], [0090]-[0093] and figures 1a-5, 8, 10-13c.	1-26,31-41 27-30,42-83
Y A	JP 2015-168357 A (NIDEC ELESYS CORP.) 28 September 2015 See paragraphs [0026]-[0030], [0040], [0042] and figures 1-2.	1-26,31-41
A	JP 2011-014281 A (TOYOTA BOSHOKU CORP.) 20 January 2011 See paragraph [0014] and figure 1.	1-83
A	US 2015-0266405 A1 (FAURECIA AUTOMOTIVE SEATING, LLC.) 24 September 2015 See paragraphs [0083], [0086], [0089] and figures 7-13.	1-83
A	US 2011-0240751 A1 (HANS-GEORG RAUH et al.) 06 October 2011 See paragraph [0041] and figure 1.	1-83

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"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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PCT/US2017/032959

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