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(54) Title: STORAGE OF EXCESS HEAT IN COLD SIDE OF HEAT ENGINE

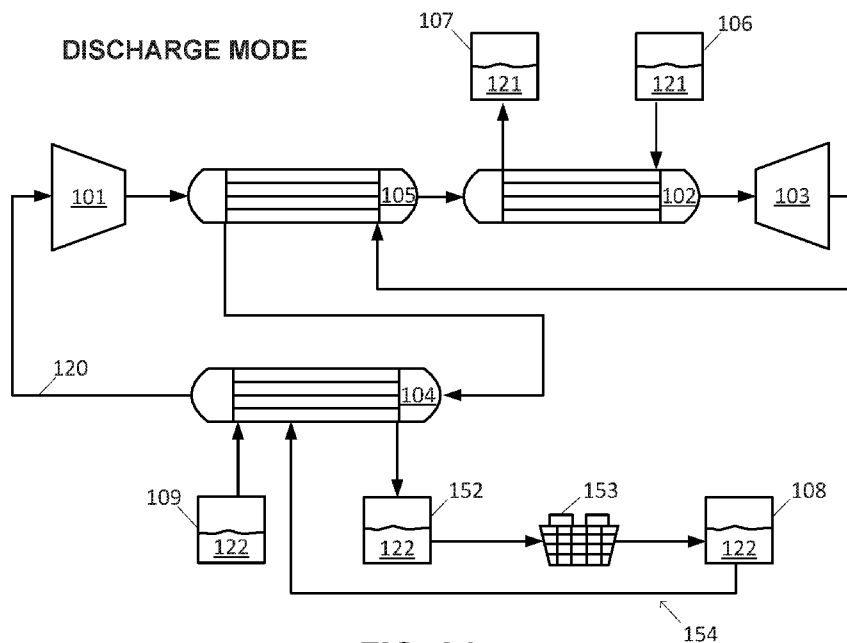


FIG. 34

(57) Abstract: Extra heat in a closed cycle power generation system, such as a reversible closed Brayton cycle system, may be dissipated between discharge and charge cycles. An extra cooling heat exchanger may be added on the discharge cycle and disposed between a cold side heat exchanger and a compressor inlet. Additionally or alternatively, a cold thermal storage medium passing through the cold side heat exchanger may be allowed to heat up to a higher temperature during the discharge cycle than is needed on input to the charge cycle and the excess heat then dissipated to the atmosphere.



MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,  
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## INTERNATIONAL SEARCH REPORT

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**PCT/US2017/064074****A. CLASSIFICATION OF SUBJECT MATTER****F02G 1/043(2006.01)i, F02G 1/055(2006.01)i, F01K 27/02(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)

F02G 1/043; F24J 2/34; F04D 27/02; F28D 20/00; F01K 25/10; H02K 7/18; F01K 7/38; F04D 29/58; F02G 5/02; F17C 9/02; F02C 1/04; F02G 1/055; F01K 27/02

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) &amp; Keywords: heat engine, turbine, compressor, recuperator, heat exchanger, storage, tank, path, Brayton

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015-0260463 A1 (GIGAWATT DAY STORAGE SYSTEMS, INC.) 17 September 2015 See paragraphs [0070]-[0078], [0110], [0143], [0184]-[0210], claim 11 and figures 4A, 7B, 9H, 14A, 15A.	1-20
A	WO 2013-094905 A1 (KOREA INSTITUTE OF MACHINERY & MATERIALS) 27 June 2013 See paragraphs [61]-[71] and figure 7.	1-20
A	US 2016-0290281 A1 (BRIGGS & STRATTON CORPORATION) 06 October 2016 See paragraphs [0021]-[0048] and figure 1.	1-20
A	US 2012-0039701 A1 (DIDDI et al.) 16 February 2012 See paragraphs [0021]-[0027] and figure 3.	1-20
A	US 2011-0289941 A1 (GONZALEZ SALAZAR et al.) 01 December 2011 See paragraphs [0031]-[0035] and figure 1.	1-20

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

\* Special categories of cited documents:

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"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

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2017/064074**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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