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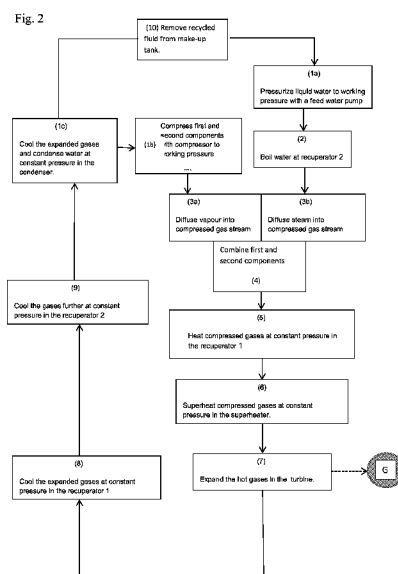
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(54) Title: HEAT ENGINE SYSTEM



(57) Abstract: The present invention provides methods and apparatus for a heat engine system for converting thermal energy to mechanical work by expansion and condensation of working fluids. The heat engine system comprises of means for combining a second component with a first component, means for compressing the first component, means for compressing at least most of the second component, means for heating the first and second components, means for expanding the first and second components to produce the work, and means for transferring at least some of the energy of the working fluid from the outlet of the means for expanding to the working fluid from the outlet of the apparatus. The transferring means may be one or more recuperators. A portion of the energy transferred in the means for transferring is at least a portion of the latent heat of the second component from the outlet of the expander.



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

F01K 25/06 (2006.01) F01K 25/04 (2006.01) F02C 1/04 (2006.01) F15D 1/00 (2006.01) F03B 1/00 (2006.01)
F01K 17/00 (2006.01)

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)

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)

WPI; EPODOC: IPC, CPC - F01K25 OR F02C1 OR F15D1/00 OR F03B1/00 and key words:

Gas, nitrogen, argon, helium, hydrogen, methane, carbon dioxide, air, PCM, liquid, propane, butane, ethanol, water, LNG, LPG, mercury, PCM, combine, mix, dissolve, solution, soluble, blend, amalgam, synthesis, heat, thermal, thermodynamic, burn, recuperate, exchange, radiate, convection, cool, heat exchanger, expand+, turbine, scroll+, impellor, inducer, piston, van, wiper, pump, generate and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent but published on or after the international filing date	"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
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 27 August 2013		Date of mailing of the international search report 27 August 2013	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au Facsimile No.: +61 2 6283 7999		Authorised officer Ian Hill AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262833145	

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2013/000746
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2009/0048479 A1 (DOTY SCIENTIFIC INC) 16 April 2009 Abstract; pages 8 lines 17 to 28 , p9 (table 1), p14 lines 21 to 25, p15 (table 2), p18 lines 14 to 23, 25 lines 25 to 27; fig 1	1-4, 6, 7, 9, 11-24, 26, 27
X	DE 3218303 A1 (INTERATOM INTERNATIONALE ATOMREAKTORBAU GMBH) 17 November 1983 ESPACNET translation and all figures	1-27
A	US 2009/0121488 A1 (BHATTI et al) 14 May 2009 Abstract and figure 1	1-27
A	WO 2011/081666 A1 (ECOTHERMICS CORPORATION) 07 July 2011 Abstract and all figures	1-27
A	WO 2012/116174 A1 (XU) 14 May 2009 Abstract and all figures	1-27
A	WO 1996/038656 A1 (CABOT CORPORATION) 05 December 1996 Abstract and all figures	1-27

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INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2013/000746	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
WO 2009/0048479 A1	16 Apr 2009	None	
DE 3218303 A1	17 Nov 1983	None	
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End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(July 2009)			