

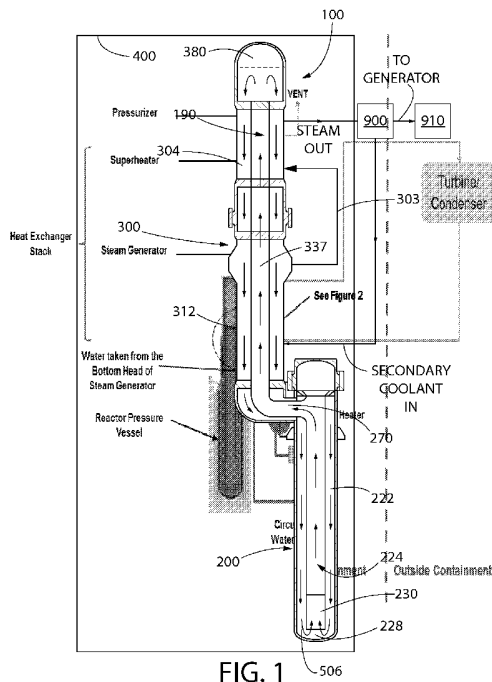


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[Continued on next page]

(54) Title: NUCLEAR POWER GENERATION SYSTEM



(57) Abstract: A nuclear power generation system and related power cycle are disclosed, in one embodiment, the system includes primary coolant circulation through a hydraulically interconnected reactor containing nuclear fuel and a steam generating vessel collectively defining a steam supply system. Liquid secondary coolant for the power cycle flows through the steam generating vessel and is converted to steam by the primary coolant to drive a low pressure turbine of a turbine-generator set. Steam exiting the turbine is condensed and heated prior to return to the steam supply system, thereby completing a secondary coolant flow loop. In one embodiment, a majority of the secondary coolant heating occurs within the steam generating vessel via heat exchange with the primary coolant rather than externally in the secondary coolant flow loop. This creates a temperature differential between the primary and secondary coolant sufficient to create natural thermally induced convective circulation of the primary coolant.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G21D 5/08 (2014.01)

USPC - 376/402; 976/DIG310; 165/104.11

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)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 376/347, 361, 402, 406; 976/DIG187, DIG188, DIG199, DIG310; 165/47, 104.11, 104.19, 164; 60/644.1 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase; PubWEST; Google

Search Terms Used: nuclear, reactor, gravity, natural, flow, circulation, low pressure, turbine, single, high pressure, psi, feedwater, temperature, steam generator, preheat, superheat, vertically, stacked, elongated, sub-atmospheric, extract, heat, shell, tube

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/097597 A1 (SINGH et al.) 11 August 2011 (11.08.2011), entire document especially Figs 1-2; paras [0061]-[0062] [0073], [0077], [0081]-[0082]	1, 3, 5, 10
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Y		4, 6-9, 11, 12, 14-34
Y	US 2010/124306 A1 (YOUNG) 20 May 2010 (20.05.2010), entire document especially Fig 1; paras [0003]-[0004]	1, 2, 8, 12, 13
Y	US 2007/0000250 A1 (CHAKI et al.) 04 January 2007 (04.01.2007), entire document especially Fig 16; paras [0043]-[0044], [0091]-[0093]	1, 2, 6-9, 12-34
Y	US 5,457,721 A (TSIKLAURI et al.) 10 October 1995 (10.10.1995), entire document especially col 4, lns 37-40	4, 14-16, 28-30
Y	US 3,576,179 A (ROMANOS) 27 April 1971 (27.04.1971), entire document especially Fig 1	11, 23, 34
Y	US 2,938,350 A (ZIMMERMANN) 31 May 1960 (31.05.1960), entire document especially col 2, lns 17-20; col 2, lns 36-47	19, 20, 22, 26, 27
Y	US 8,091,361 B1 (LANG) 10 January 2012 (10.01.2012), entire document especially col 7, lns 2-9	21, 22

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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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