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(54) **Title:** AXIAL FLOW HEAT EXCHANGER DEVICES AND METHODS FOR HEAT TRANSFER USING AXIAL FLOW DEVICES

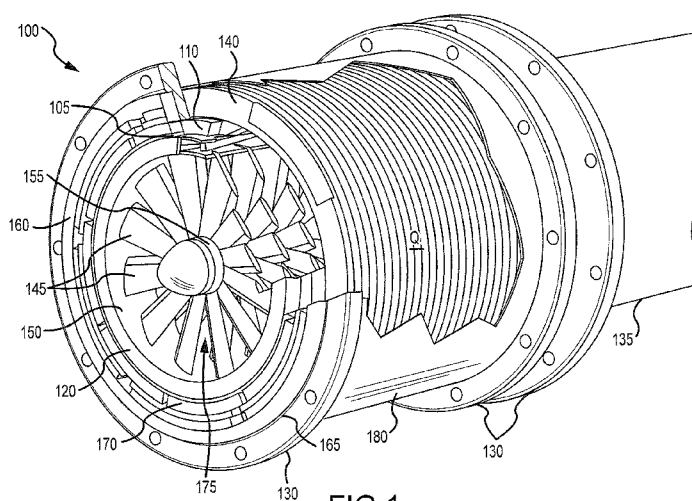


FIG. 1

(57) **Abstract:** Systems and methods described herein are directed to rotary heat exchangers configured to transfer heat to a heat transfer medium flowing in substantially axial direction within the heat exchangers. Exemplary heat exchangers include a heat conducting structure which is configured to be in thermal contact with a thermal load or a thermal sink, and a heat transfer structure rotatably coupled to the heat conducting structure to form a gap region between the heat conducting structure and the heat transfer structure, the heat transfer structure being configured to rotate during operation of the device. In example devices heat may be transferred across the gap region from a heated axial flow of the heat transfer medium to a cool stationary heat conducting structure, or from a heated stationary conducting structure to a cool axial flow of the heat transfer medium.



**A. CLASSIFICATION OF SUBJECT MATTER*****F28D 11/02(2006.01)i, F24F 3/147(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)

F28D 11/02; F28F 7/00; F04D 13/06; H05K 7/20; F03B 17/06; F28D 15/04; F04D 3/00

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: exchange, cooler, cooling, drum &amp; cylinder

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                         | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | JP 2000-054978 A (HITACHI LTD) 22 February 2000<br>See paragraphs 0019-0022, 0029, 0030 and figures 1, 10. | 1-30                  |
| A         | JP 2006-037918 A (KOYO SEIKO CO LTD) 09 February 2006<br>See paragraphs 0023-0029 and figures 1, 2.        | 1-30                  |
| A         | US 2009-0166004 A1 (LAI CHENG-TIEN et al.) 02 July 2009<br>See paragraphs 0014-0017 and figures 1-3.       | 1-30                  |
| A         | US 7100677 B2 (-) 05 September 2006<br>See column 4 lines 35-48 and figures 1-3.                           | 1-30                  |



Further documents are listed in the continuation of Box C.



See patent family annex.

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|-------------------------------------------|---------------------|----------------------------|---------------------|
| JP 2000-054978 A                          | 22.02.2000          | None                       |                     |
| JP 2006-037918 A                          | 09.02.2006          | None                       |                     |
| US 2009-0166004 A1                        | 02.07.2009          | None                       |                     |
| US 7100677 B2                             | 05.09.2006          | TW M244513U                | 21.09.2004          |
|                                           |                     | TW 244513 U                | 21.09.2004          |
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|                                           |                     | US 2005-0061482 A1         | 24.03.2005          |