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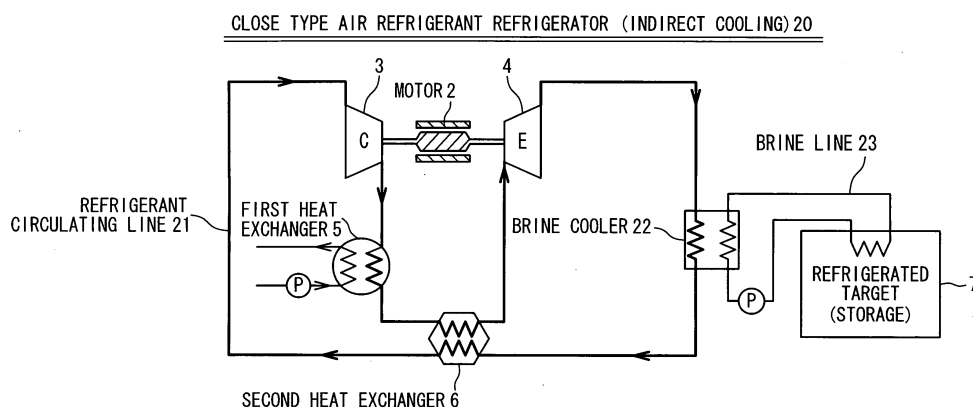
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(54) **Closed type air cycle refrigerator and cooling method using the same**

(57) A closed type refrigerator includes a compressor (3) and an expansion turbine (4) coupled to ends of a rotation shaft of a motor (2), respectively; a refrigerant circulating pipe; a first heat exchanger (5) provided in a portion of the refrigerant circulating pipe from an outlet of the compressor to an inlet of the expansion turbine; and a second heat exchanger (6) provided in a portion of the refrigerant circulating pipe from the first heat exchanger to the inlet of the expansion turbine. The compressor compresses the refrigerant, and the first heat

exchanger carries out heat exchange between the compressed refrigerant and atmosphere to generate a first cooled refrigerant. The second heat exchanger carries out heat exchange between the first cooled refrigerant and a second cooled refrigerant to generate a third cooled refrigerant, and the expansion turbine adiabatically expands the third cooled refrigerant to generate the second cooled refrigerant, which is used to cool a refrigeration storage (7) and supplied to the inlet of the compressor. The refrigerant is dehumidified.

**Fig. 3**





## EUROPEAN SEARCH REPORT

Application Number  
EP 06 00 3379

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 November 2013	Examiner de Graaf, Jan Douwe
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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