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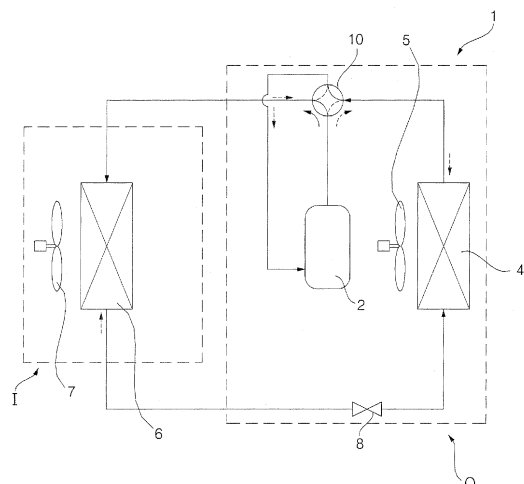
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(54) **Heat pump**

(57) A heat pump is provided. The heat pump that may include an outdoor heat exchanger, in which a refrigerant may be condensed by being heat-exchanged with outdoor air in a cooling operation, and evaporated by being heat-exchanged with the outdoor air in a heating operation, and an outdoor fan that allows the outdoor air to be moved to the outdoor heat exchanger. The outdoor heat exchanger may include a front-row heat exchange device, through which the outdoor air moved by the outdoor fan may pass, and a rear-row heat exchange device, through which the outdoor air having passed through the front-row heat exchange device may pass; a water-repellent coating layer formed on a surface of the front-row heat exchange device, which the outdoor air contacts; and a hydrophilic coating layer formed on a surface of the rear-row heat exchange device, which the outdoor air contacts. Accordingly, the outdoor heat exchanger may have a longer frost formation time in comparison to a hydrophilic coated double-row heat exchanger, and a high heat exchange performance and lower pressure loss in comparison to a water-repellent coated heat exchanger.

FIG. 1





## EUROPEAN SEARCH REPORT

Application Number  
EP 13 15 4501

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2005 106349 A (SHINKO KOGYO KK) 21 April 2005 (2005-04-21) * abstract; figures 1,4 * * paragraph [0013] *	1-8	INV. F25B39/02 F28F19/02 F25B30/02
X	JP H10 2690 A (HITACHI LTD) 6 January 1998 (1998-01-06) * abstract; figure 1 *	1-8	
X	JP 2000 074588 A (TOSHIBA CORP) 14 March 2000 (2000-03-14) * abstract; figures 2,4 *	1-8	
A,P	EP 2 455 687 A2 (LG ELECTRONICS INC [KR]) 23 May 2012 (2012-05-23) * the whole document *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			F25B F28F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 December 2014	Examiner Bidet, Sébastien
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	

 1  
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 15 4501

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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08-12-2014

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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 2005106349	A	21-04-2005	NONE		
-----					
JP H102690	A	06-01-1998	NONE		
-----					
JP 2000074588	A	14-03-2000	NONE		
-----					
EP 2455687	A2	23-05-2012	CN	102538297 A	04-07-2012
			EP	2455687 A2	23-05-2012
			KR	20120054321 A	30-05-2012
			US	2012125030 A1	24-05-2012
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82