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(54) Stacked-type multi-flow heat exchangers

(57)A heat exchanger has a laminating tube group communicating between a first tank (31) and a second tank (32). The heat exchanger includes a first heat exchange portion (46), a second heat exchange portion (48), and a third heat exchange portion (47). The first heat exchange portion (46) is disposed at a downstream side of an air passing through the heat exchanger and has a first group of tubes (6) forming a first route of a heat exchange medium. The second heat exchange portion (48) is disposed at an upstream side of the air and at a back side of the first heat exchange portion (46). The second heat exchange portion has a second group of tubes (7) forming a second route of the heat exchange medium. The third heat exchange portion (47) is disposed at both the upstream and the downstream sides of the air and at adjacent to the first (46) and the second heat exchange portions (48). The third heat exchange portion (47) has a third group of tubes (8) forming a third route of the heat exchange medium.

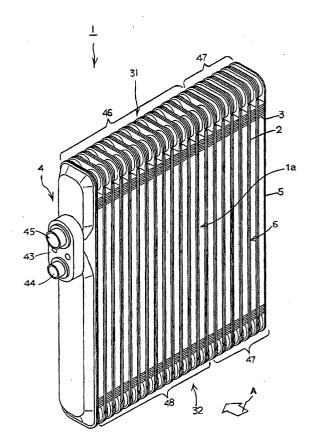


Fig. 1



EUROPEAN SEARCH REPORT

Application Number

EP 02 25 7053

Category	Citation of document with indi		Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
X	PATENT ABSTRACTS OF vol. 2000, no. 21, 3 August 2001 (2001-0-4 JP 2001 116485 A 027 April 2001 (2001-0-4 abstract; figures 2001)	JAPAN D8-03) (SHOWA ALUM CORP), D4-27)	1-4	F28D1/03
X	EP 0 769 665 A (DENSO 23 April 1997 (1997-6 * figures *		1-4	
X	US 4 589 265 A (NOZAI 20 May 1986 (1986-05- * column 4, line 32 -	-20)	1,2	
				TECHNICAL FIELDS SEARCHED (Int.CI.7)
	The present search report has be	en drawn up for all claims		
	Place of search	Date of completion of the sea		Examiner Examiner
	THE HAGUE	12 March 2004	Moo	tz, F
X : parl Y : parl doc	ATEGORY OF CITED DOCUMENTS icularly relevant if taken alone icularly relevant if combined with anothe iment of the same category inological background.	E : earlier pai after the fi r D : document L : document	principle underlying the lent document, but publ ling date cited in the application cited for other reasons	ished on, or

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

EP 02 25 7053

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12-03-2004

	Patent document cited in search repo	rt	Publication date		Patent fam member(Publication date
JP	2001116485	A	27-04-2001	NONE			· · · · · · · · · · · · · · · · · · ·
EP	0769665	Α	23-04-1997	JP	9170850		30-06-1997
				AU	703687	B2	01-04-1999
				ΑU	7026296		24-04-1997
				CN	1157904		27-08-1997
				DE	69610056		05-10-2000
				DE	69610056		11-01-2001
				EP	0769665		23-04-1997
				KR	240826		15-01-2000
				US 	5701760 	A 	30-12-1997
US	4589265	Α	20-05-1986	JP	60082170	U	07-06-1985

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