(11) **EP 1 065 463 A3** 

(12)

## **EUROPEAN PATENT APPLICATION**

- (88) Date of publication A3: **08.08.2001 Bulletin 2001/32**
- (51) Int CI.<sup>7</sup>: **F28D 9/00**, F28F 3/04, F28F 13/12
- (43) Date of publication A2: 03.01.2001 Bulletin 2001/01
- (21) Application number: 00305448.3
- (22) Date of filing: 29.06.2000
- (84) Designated Contracting States:

  AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU

  MC NL PT SE

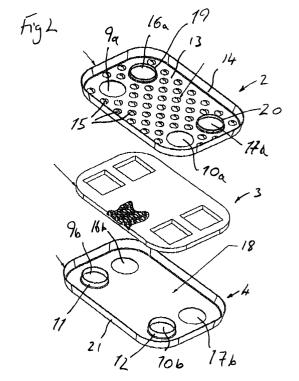
Designated Extension States:

AL LT LV MK RO SI

- (30) Priority: 02.07.1999 GB 9915573
- (71) Applicant: Llanelli Radiators Limited Llanelli, Carmarthenshire SA14 8HU (GB)
- (72) Inventor: Thomas, Gwyn Llanelli SA15 4RY (GB)
- (74) Representative: Davies, Gregory Mark Urquhart-Dykes & Lord Alexandra House 1 Alexandra Road Wales Swansea, Wales SA1 5ED (GB)

## (54) A vehicle heat exchanger

(57) A vehicle heat exchanger (1), typically an oil cooler, has stacked galleries, including a first gallery system for containing a first fluid, and a second gallery system for containing a second fluid. The first and second gallery systems are sealed from one another and formed by a dimpled shell (2), a plain shell (4) nested within the dimpled shell element (2) and having a surface contacted by projecting dimples (15) of the dimpled shell (2)(to define a first gallery being); a turbulator (3) nested within the plain shell (4); and a further dimpled shell (2) nested in the plain shell (4), the further dimpled shell (a second gallery being defined between the further dimpled shell and the nesting plain shell, and occupied by the turbulator (4)).





## **EUROPEAN SEARCH REPORT**

Application Number EP 00 30 5448

Catagory		ndication, where appropriate,	Relevant	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	CO) 13 November 199 * column 2, line 55	NGERER & REICH GMBH &	1	F28D9/00 F28F3/04 F28F13/12
X	DE 93 18 635 U (BEH 3 February 1994 (19 * page 8, line 7 - figure 3 *	94-02-03)	1,3-5, 7-10	
X	GB 2 299 397 A (BEH 2 October 1996 (199 * page 8, paragraph 1; figures *		1-6,8,9	
A	DE 296 22 191 U (KT 13 February 1997 (1 * page 3, paragraph	997-02-13)	1-10	
A	DE 93 09 741 U (MAN 26 August 1993 (199 * page 2, line 31 -	3-08-26)	1,10	TECHNICAL PIELDS SEARCHED (Int.C1.7) F28D
	The present search report has I	peen drawn up for all claims		
	Place of search THE HAGUE	Date of completion of the search 21 June 2001	Moo	Examiner tz, F
X : part Y : part docu	ATEGORY OF CITED DOCUMENTS icularly relevant if taken alone cularly relevant if combined with anotherent of the same category inclogical background	E : earlier patent after the filing her D : document che L : document che	ciple underlying the document, but publi	invention ished on, or
O : non	-written disclosure rmediale document		e same patent famil	

2

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

EP 00 30 5448

This arriex 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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-06-2001

Patent document cited in search report		Publication date	Patent family member(s)		Publication date		
EP	0742418	A	13-11-1996	DE	19517174	С	05-06-1996
				DE	19519312	Α	28-11-199
				DE	59600935	D	21-01-199
DE	9318635	U	03-02-1994	DE	4314808	 А	10-11-1994
				DE	59407818	D	25-03-199
				EP	0623798	Ā	09-11-199
				ES	2127309	T	16-04-199
GB	2299397	Α	02-10-1996	DE	19511991	Α	02-10-199
				FR	2732452	Α	04-10-199
				US	5931219	A	03-08-199
DE	29622191	U	13-02-1997	AT	405571	В	27-09-199
				AT	26696	A	15 <b>-</b> 01-1 <b>99</b>
DE	9309741	U	26-08-1993	BR	9405416	A	08-09-199
				CZ	9500239	Α	14-06-199
				WO	9429659	Α	22-12-199
				EP	0653043	Α	17-05-199
				US	5810071	Α	22-09-199

FORM POA59

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