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(54) **Manifold with multiple passages and crosscounterflow heat exchanger incorporating the same**

(57) A manifold (22) having multiple chambers for use in a cross-counterflow heat exchanger assembly (20) includes a first member (24) having arms (26) extending from a base (28) to arm ends (30). A second member (42) is secured to the first member to define the manifold. The second member includes an inner plate edge (50) that defines a first mating surface (54) that extends inwardly along the inner plate edge from each of the plate ends to mate with the arm ends (30). A wall (46) extends transversely to the inner plate edge to a wall end (56). The wall end mates with an inner base surface (34) to divide the interior of the manifold into a plurality of chambers (58,60). At least one lip (64) extends transversely to the inner plate edge to define a second mating surface that extends perpendicularly from the first mating surface and mates with an inner arm surface of the arms.

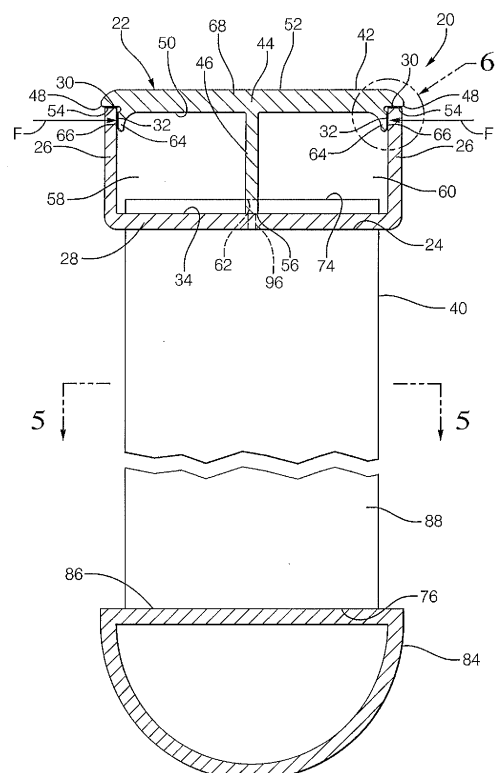


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 09 16 7201

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 H07 305991 A (ZEXEL CORP) 21 November 1995 (1995-11-21) * abstract; figures 1-5 *	1-15	INV. F28F9/02 F28D1/053
X	US 2005/161200 A1 (HOFFMANN HANSKARL [DE] ET AL) 28 July 2005 (2005-07-28) * paragraphs [0064], [0086]; figure 7c *	1-15	
A	US 2002/144805 A1 (KIM YONGHO [KR] ET AL) 10 October 2002 (2002-10-10) * figure 22 *	1-15	
A	JP 2004 324938 A (CALSONIC KANSEI CORP) 18 November 2004 (2004-11-18) * figures 7-14 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			F28D F28F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 September 2013	Examiner Martínez Rico, Celia
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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11-09-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H07305991 A	21-11-1995	NONE	
US 2005161200 A1	28-07-2005	DE 102004002252 A1 US 2005161200 A1	04-08-2005 28-07-2005
US 2002144805 A1	10-10-2002	JP 3728534 B2 JP 2002364994 A US 2002144805 A1	21-12-2005 18-12-2002 10-10-2002
JP 2004324938 A	18-11-2004	NONE	

EPO FORM P0459

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