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(54) **PLATE FIN HEAT EXCHANGER FLEXIBLE MANIFOLD STRUCTURE**

(57) A flexible manifold (14, 16) adapted for use on a plate-fin heat exchanger core (12), the flexible manifold comprising a plurality of individual layers (136), each individual layer defining a lower floor, an upper floor, and two side walls. Each of the plurality of individual layers is adapted to channel a flow of a medium therethrough, each of the plurality of individual layers includes a plurality of vertical members (132), each of the plurality of vertical members extends vertically from the lower floor to the upper floor of the respective individual layer, and each of the plurality of vertical members is configured to provide structural support for the respective individual layer. The vertical members can be vertical guide vanes and/or vertical columns having a round and/or hydrofoil cross-sectional shape.

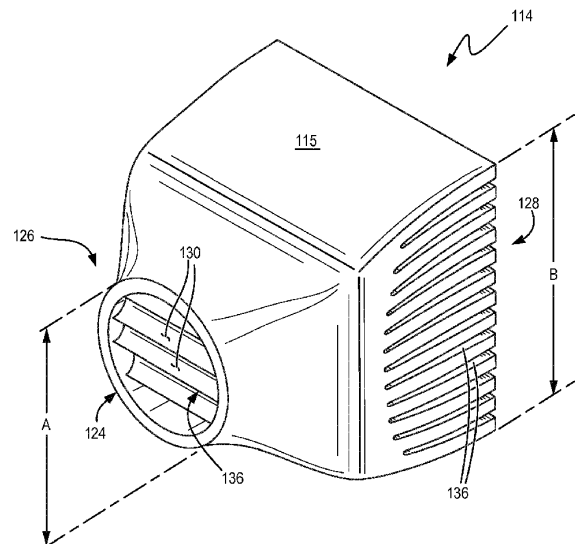


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 19 20 8360

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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	US 2017/146305 A1 (KUCZEK ANDRZEJ ERNEST [US] ET AL) 25 May 2017 (2017-05-25)	1-3,6,7	INV.
Y	* figures 1,2E,2F,2G *	8	F28F9/02
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X,P	EP 3 540 358 A1 (HAMILTON SUNDSTRAND CORP [US]) 18 September 2019 (2019-09-18)	1-3,6,7	B23K1/00
	* figures 1-3 *		B23K1/008
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Y	US 2013/232991 A1 (OTERO EDWIN [US]) 12 September 2013 (2013-09-12)	8	B23K15/00
	* figures 8,9 *		B23K26/242
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A	US 2004/261379 A1 (BRUUN TOR [NO] ET AL) 30 December 2004 (2004-12-30)	1-3,6-8	B23K26/32
	* figure 6 *		

A	US 2017/211888 A1 (SCHWALM GREGORY K [US]) 27 July 2017 (2017-07-27)	1-3,6-8	
	* figure 3 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			F28F
			F28D
			B23K
1 The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		5 March 2020	Schindler, Martin
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			

EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3, 6-8

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION
SHEET B

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-3, 6-8

How to reduce air flow resistance induced by the air flow in the manifold

2. claims: 4, 5, 9

How to improve the heat transfer between a first and second medium

3. claims: 10-15

How to easily manufacture a complex designed metallic manifold.

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

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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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