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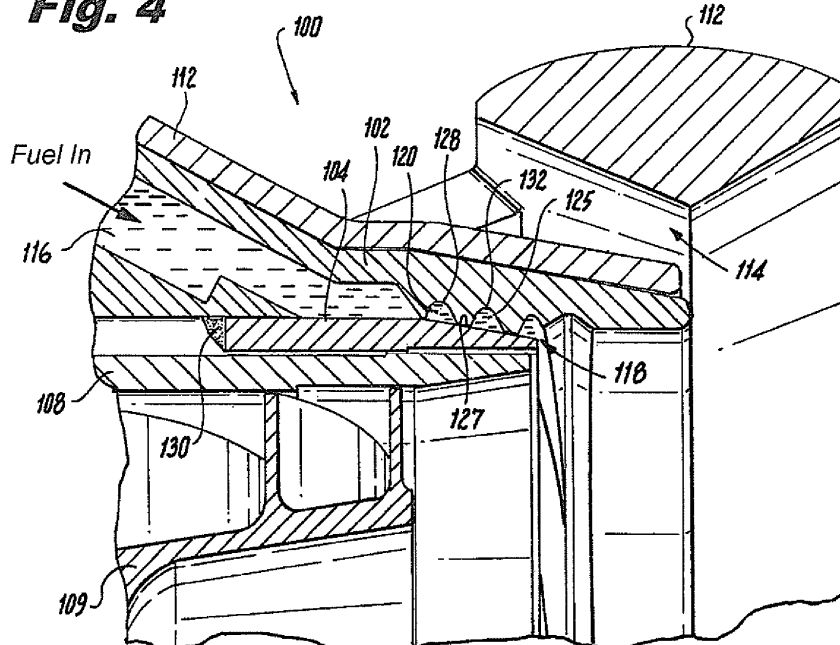
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(54) **Airblast injectors for multipoint injection and methods of assembly**

(57) A method of assembling an airblast injector (100) includes forming a fluid passage (128) on an internal conical surface (127) of a first nozzle component (102) and/or on an outer conical surface of a second nozzle component (104) configured and adapted to mate with the first nozzle component to form at least a portion of a fluid circuit (120) therebetween. The fluid passage

is configured and adapted to provide passage for fluid in the fluid circuit between the first and second nozzle components. The method also includes joining the first and second nozzle components together by engaging the second nozzle component within the first nozzle component.

Fig. 4



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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 2007/101727 A1 (PROCIW LEV A [CA]) 10 May 2007 (2007-05-10)	1,2,9,10	INV. F23D11/10 F23R3/28
Y	* paragraphs [0011], [0022], [0025], [0027]; figure 3 *	3-6	
Y	BE 488 386 A (ROLLS ROYCE LIMITED) 9 April 1949 (1949-04-09)	3-6	
A	* page 6, paragraph 2; figure 1 *	11,12	
X	GB 2 131 154 A (EX CELL O CORP) 13 June 1984 (1984-06-13)	1,7-12	
Y	* page 2, line 84 - line 100; figure 1 *	13-15	
Y	GB 2 459 771 A (DELAVAN INC [US]) 11 November 2009 (2009-11-11)	13-15	
A	* page 9, line 15 - line 18 * * page 15, line 3 - line 10 *	1	
A	WO 89/05195 A1 (DEUTSCHE FORSCH LUFT RAUMFAHRT [DE]) 15 June 1989 (1989-06-15) * figures 12,13,18 * * column 8, line 6 - line 24 * * column 9, line 5 - line 25 *	3-6	TECHNICAL FIELDS SEARCHED (IPC) F23R
A	GB 2 459 041 A (DELAVAN INC [US]) 14 October 2009 (2009-10-14) * page 9, line 5 - line 9; figures 3,4 *	1,13-15	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 December 2016	Examiner Mougey, Maurice
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	

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**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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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007101727 A1	10-05-2007	CA 2551211 A1	07-07-2005
		EP 1706671 A1	04-10-2006
		JP 2007517181 A	28-06-2007
		US 2005144952 A1	07-07-2005
		US 2007101727 A1	10-05-2007
		WO 2005061964 A1	07-07-2005

BE 488386 A	09-04-1949	NONE	

GB 2131154 A	13-06-1984	CA 1213738 A	11-11-1986
		FR 2536465 A1	25-05-1984
		GB 2131154 A	13-06-1984
		JP S59145412 A	20-08-1984
		US 4600151 A	15-07-1986

GB 2459771 A	11-11-2009	DE 102009019978 A1	26-11-2009
		FR 2930980 A1	13-11-2009
		GB 2459771 A	11-11-2009
		GB 2486083 A	06-06-2012
		US 2009277176 A1	12-11-2009

WO 8905195 A1	15-06-1989	EP 0346417 A1	20-12-1989
		EP 0604741 A2	06-07-1994
		US 5067655 A	26-11-1991
		WO 8905195 A1	15-06-1989

GB 2459041 A	14-10-2009	DE 102009017056 A1	15-10-2009
		FR 2930321 A1	23-10-2009
		GB 2459041 A	14-10-2009
		US 2009255258 A1	15-10-2009

EPO FORM P0459

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