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(54) METHOD TO CALIBRATE A FUEL INJECTION PUMP

(57) A method (400) for calibrating a fuel injection pump (106) for a start of a fuel delivery includes calibrating a pressure gauge (200) of an air supply system (172) to a target reading by providing an air flow from the air supply system (172) to a calibration nozzle (176). The pressure gauge (200) is configured to monitor a pressure differential across a membrane (184) of the air supply system (172). The method (400) includes passing the air flow from the air supply system (172) through an air gap (160) defined by one or more bores (150,152) of the fuel injection pump (106), and monitoring a reading of the pressure gauge (200). The method (400) includes moving a plunger (140) of the fuel injection pump (106) to close, at least partly, the air gap (160) to attain the target reading on the pressure gauge (200).

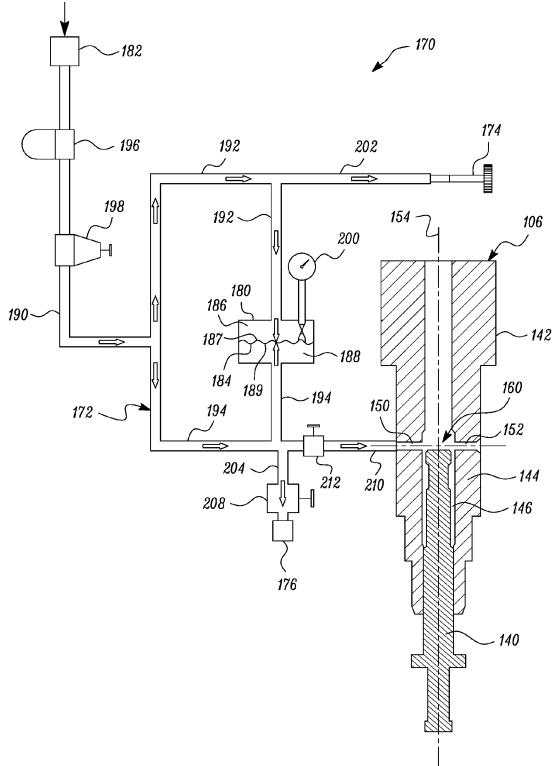


FIG. 3



EUROPEAN SEARCH REPORT

Application Number

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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)
10 A	GB 1 439 932 A (HARTRIDGE LTD LESLIE) 16 June 1976 (1976-06-16) * page 2, line 125 - page 3, line 16; figures 1-9 *	1-9	INV. F02M65/00 F04B51/00
15 A	GB 1 296 284 A (-) 15 November 1972 (1972-11-15) * figures 1-3 *	1	
20 A	US 3 354 874 A (MARCEL DANGAULTIER) 28 November 1967 (1967-11-28) * figures 1,2 *	1	
25 A	GB 736 781 A (FUEL INJECTION & ENGINEERING S) 14 September 1955 (1955-09-14) * abstract; figure 1 *	10	
30			TECHNICAL FIELDS SEARCHED (IPC)
			F02M F04B
35			
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50 3	The present search report has been drawn up for all claims		
55	Place of search The Hague	Date of completion of the search 14 November 2018	Examiner Morales Gonzalez, M
CATEGORY OF CITED DOCUMENTS		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	
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			



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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.

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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:

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see sheet B

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

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

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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:

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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:

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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:

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1. claims: 1-9

Calibrating a pressure gauge by providing a an air flow from the air supply system to a calibration nozzle

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2. claim: 10

Calibration system for calibrating a fuel injection pump, a housing of an air supply system

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

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

14-11-2018

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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15	GB 1296284	A 15-11-1972	NONE	
	US 3354874	A 28-11-1967	NONE	
20	GB 736781	A 14-09-1955	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82