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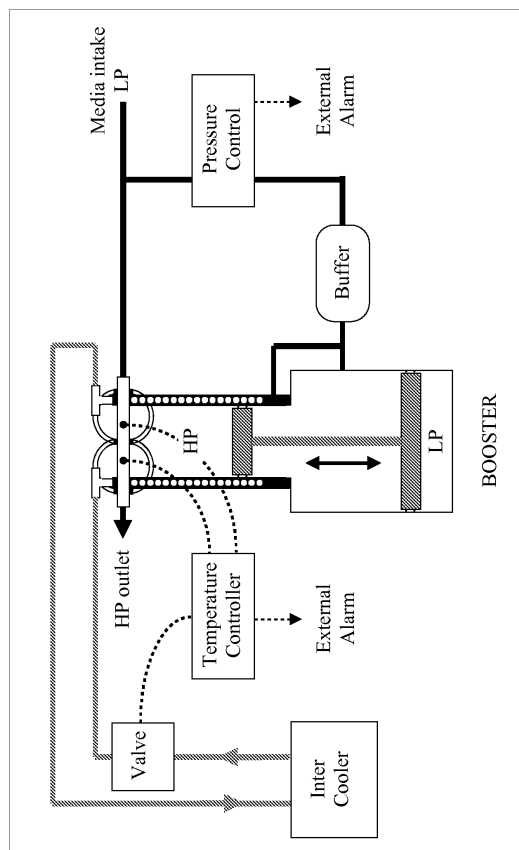
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(54) **Pumping device**

(57) The invention relates to a pumping device comprising a first low pressure plunger with a first plunger surface area and which is up and down moveable in a first cylinder, and a functionally coupled second, high pressure plunger with a second, smaller plunger area and which is moveable in a second cylinder, which first plunger in operation drives the second cylinder causing in operation an amplification of the compressor force for pumping a fluid, wherein further a breathing segment is provided between both plungers, in which the space of the breathing segment is in fluid connection coupled with an inlet of the fluid which needs to be pumped, like a gas, and is provided with a regulator for in operation maintaining a small overpressure on the breathing segment.

*Fig 1*



**EP 2 224 132 A3**



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 15 2003

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 5 520 169 A (GEORGIEFF MICHAEL [DE] ET AL) 28 May 1996 (1996-05-28) * figures * * column 4, line 60 - column 5, line 28 * * claim 1 *	1,4	INV. F04B9/113 F04B49/08 F04B53/16
A	US 4 588 424 A (HEATH RODNEY T [US] ET AL) 13 May 1986 (1986-05-13) * figure 6 *	1-4	
A	US 4 955 195 A (JONES MARVIN R [US] ET AL) 11 September 1990 (1990-09-11) * column 5, line 61 - column 6, line 5; figure 1 *	1-4	
A	US 2 427 616 A (MOHLER WILLIAM F) 16 September 1947 (1947-09-16) * figure 1 * * column 4, lines 7-65 *	1-4	
A	US 3 405 522 A (TAMAKI TOMITA) 15 October 1968 (1968-10-15) * column 3, lines 31-43; figure 2 *	1-4	TECHNICAL FIELDS SEARCHED (IPC) F04B
X	WO 87/02423 A1 (BRAUN ANTON [US]) 23 April 1987 (1987-04-23) * figure 1 *	5,11	
Y	* page 8, line 28 - page 9, line 15 * * page 9, line 32 - page 10, line 9 * * page 10, line 26 - page 11, line 15 * * page 11, line 6 - page 12, line 8 *	12	
Y	WO 2004/060459 A1 (UWS VENTURES LTD [GB]; MASON RODNEY STEWART [GB]; MOOZYCKINE ALEXEI UR) 22 July 2004 (2004-07-22) * figure 1 * * page 6, lines 1-38 *	12	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 February 2011	Examiner Richmond, Robin
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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EPO FORM 1503 03.82 (P04C01)



Application Number

EP 10 15 2003

**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:

☐ 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**

Application Number

EP 10 15 2003

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: 1-4

A plunger type pumping device for pressure amplification of a fluid having a regulator pressure control.

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2. claims: 5-12

A plunger type pumping device having pressure amplification and active temperature control of a fluid.

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

EP 10 15 2003

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.

08-02-2011

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