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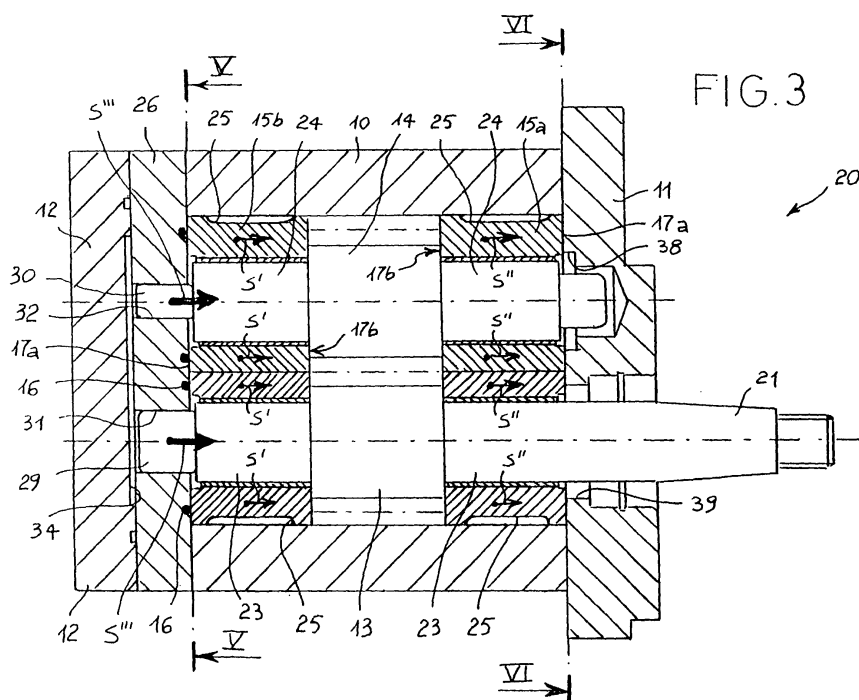
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(54) Gear pump

(57) A positive-displacement rotary pump comprising a pair of meshing gears (13, 14) or rotors, consisting of a driving gear and a driven gear, contained in a shell (10) having an output opening and an intake opening for a fluid. The gears (13, 14) comprise shafts (23, 24) which are supported by bushings (15a, 15b) having two

faces (17a, 17b) which are subjected, in use, to pressures which bring about an axial load on the bushing itself, characterized in that the resultant of the axial loads (S', S'') on the two bushings has a predetermined direction so as to move the bushings (15a, 15b) and the gears (13, 14) as a whole into close abutment with a predetermined reference plane (VI-VI).





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# EUROPEAN SEARCH REPORT

Application Number  
EP 02 02 0146

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 2 855 855 A (MURRAY JOHN F ET AL) 14 October 1958 (1958-10-14)	1,2	F04C2/18 F04C15/00
Y	* column 3, line 17 - line 22; claim 1; figure 3 *	12	
Y	---		
Y	US 2 891 483 A (MURRAY JOHN F ET AL) 23 June 1959 (1959-06-23)	12	
A	* column 4, line 64 - column 5, line 10; figure 7 *	13	
X	---		
X	FR 1 343 908 A (CLARK EQUIPMENT CO) 22 November 1963 (1963-11-22) * page 5, left-hand column, paragraph 7 - right-hand column, paragraph 2; figure 1 *	1,2	
X	---		
X	GB 880 539 A (CLARK EQUIPMENT CO) 25 October 1961 (1961-10-25) * claim 1; figure 1 *	1,2	
A	---		
A	US 2 756 684 A (RENZO PETER C) 31 July 1956 (1956-07-31) * column 4, line 4 - line 13; figure 5 *	12,13	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	---		
A	US 5 641 281 A (RUSSELL CHARLES R ET AL) 24 June 1997 (1997-06-24) * figure 7 *	12,13	F04C F01C
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<del>The present search report has been drawn up for all claims</del>			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>28 August 2003</b>	Examiner <b>Dimitroulas, P</b>
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 more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims 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 the first ten claims.

### 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:  
1,2,12,13
- ☐ 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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**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
EP 02 02 0146

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: 1,2

Positive displacement rotary pump, where the axial loads on the bushings always act in the same direction

2. Claims: 1,3-7

Positive displacement rotary pump, having helical teeth with axial load means acting on the shaft of the gears

3. Claims: 1,8,9

Positive displacement rotary pump, where at least one bushing comprises of two separate pieces

4. Claims: 1,10,11

Positive displacement rotary pump, where the outer face of one of the two bushings is affected by the intake pressure

5. Claims: 12,13

Positive displacement rotary pump, where depressions are provided on one of the faces of a bushing

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

EP 02 02 0146

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.

28-08-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2855855	A	14-10-1958	NONE	
US 2891483	A	23-06-1959	NONE	
FR 1343908	A	22-11-1963	NONE	
GB 880539	A	25-10-1961	NONE	
US 2756684	A	31-07-1956	NONE	
US 5641281	A	24-06-1997	NONE	

EPO FORM P0489

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