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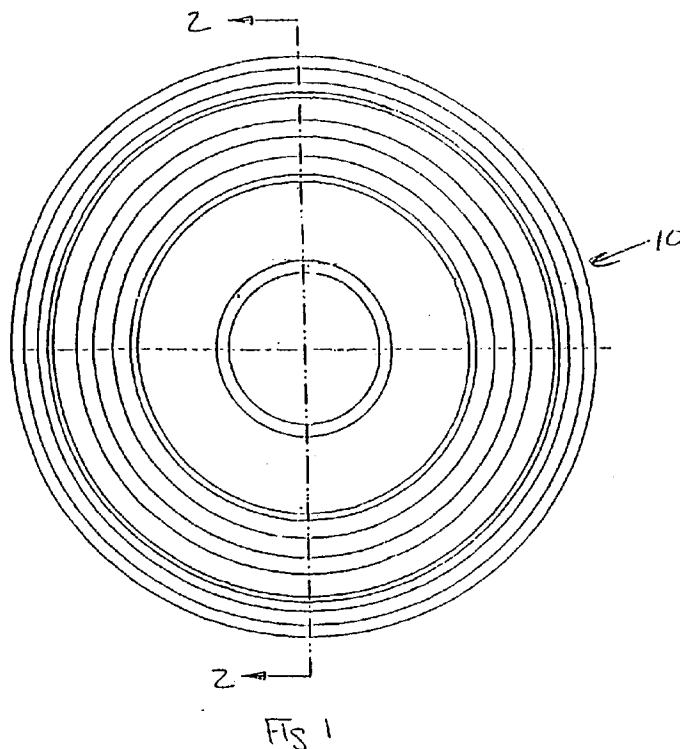
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(54) Neutral shaped pump diaphragm

(57) In the invention, the diaphragm for an air-operated double diaphragm pump is molded in an "S" shape which corresponds to the shape of the diaphragm in the

center (of the pump stroke) or relaxed position. By allowing the pump to be assembled in this center or relaxed position, the diaphragm need not be flexed in order to perform the pump assembly.



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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 3541

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.6)
X	DE 295 05 354 U (ABEL GMBH & CO) 22 June 1995 * page 3, paragraph 3 - page 5, paragraph 3 * * page 6, paragraph 2 - page 7, paragraph 2 * * page 10, paragraph 2 - paragraph 4 * * page 16, paragraph 2 - page 19, paragraph 2 * * figures 1,4,5 *	1-3	F04B43/00 F04B53/22
X	DE 29 06 174 A (DOST FRANZ BORGAS) 10 April 1980 * page 3, line 1 - line 10 * * page 6, line 27 - page 7, line 15 * * page 3-5 *	1-3	
A	EP 0 280 070 A (DEPA VERFAHRENSTECH GMBH) 31 August 1988 * abstract * * figures 2,5,6 *	1,3	
A	US 4 867 653 A (MILLS JOHN B ET AL) 19 September 1989 * abstract * * column 1, line 39 - line 46 * * figure 6 *	1,2	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 7 April 1999	Examiner Kolby, L
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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07-04-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29505354 U	22-06-1995	DE 19511677 A	19-09-1996
DE 2906174 A	10-04-1980	NONE	
EP 0280070 A	31-08-1988	DE 8702941 U	07-05-1987
		JP 63230976 A	27-09-1988
US 4867653 A	19-09-1989	CA 1329729 A	24-05-1994
		FR 2645206 A	05-10-1990
		FR 2645237 A	05-10-1990
		FR 2644852 A	28-09-1990
		DE 3906489 A	06-09-1990
		GB 2228772 A,B	05-09-1990