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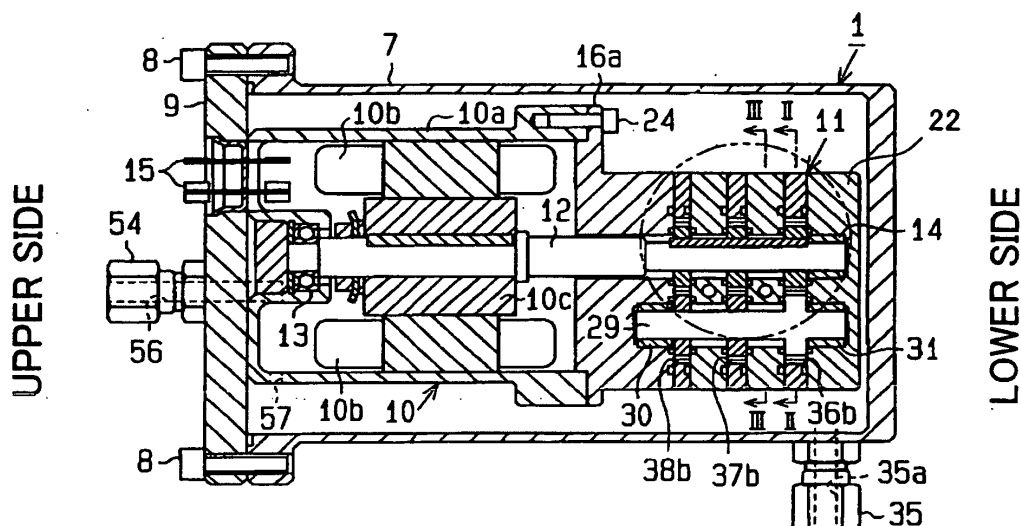
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(54) **Multistage gear pump**

(57) A multistage gear pump for pressurizing fluid includes a housing, a drive shaft and a gear assembly. The drive shaft is rotatably supported in the housing. The gear assembly is disposed in the housing. The gear assembly includes at least first and second gear trains. Each train has a pair of drive and driven gears that are

engaged with each other. The drive gear is provided on the drive shaft and followed by the driven gear. The first gear train and the second gear train are arranged so that fluid sequentially passes therethrough as the drive shaft rotates. A theoretical discharge capacity of the first gear train is larger than that of the second gear train.

FIG. 1A





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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 1344

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)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 July 2004	Examiner Lequeux, F
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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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 1344

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)
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A	US 5 326 232 A (MCDONNEL DAVID A ET AL) 5 July 1994 (1994-07-05) * figure 1 * * column 3, line 66 - column 4, line 19 * * column 5, line 18 - line 36 * -----	9-11, 14-17	
A	EP 0 797 002 A (ULTRA HYDRAULICS LTD) 24 September 1997 (1997-09-24) * figure 2 * * column 3, line 42 - line 55 * -----	9-11, 14-17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search The Hague		Date of completion of the search 22 July 2004	Examiner Lequeux, F
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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Application Number

EP 04 00 1344

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:
- ☐ 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 04 00 1344

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: 1-8,12,13

Multistage gear pump with various relative capacities
between a first and a second stage

2. claims: 1,9-11,14-17

Multistage gear pump with one driven gear formed integrally
with the driven shaft

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

EP 04 00 1344

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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22-07-2004

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