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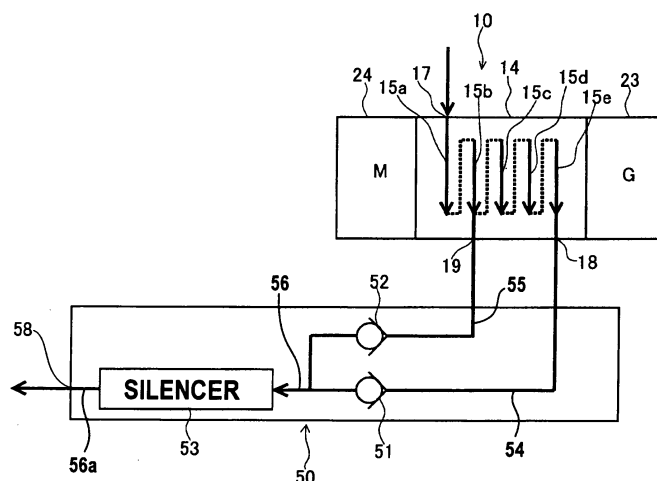
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(54) **Dry vacuum pump apparatus**

(57) A dry vacuum pump apparatus includes a dry vacuum pump (10) having a final outlet port (18) and an intermediate release outlet port (19), an exhaust section check valve (51) connected to the final outlet port (18) and having an outlet port, an intermediate section check valve (52) connected to the intermediate release outlet port (19) and having an outlet port, and an exhaust pas-

sage (56) connected to the outlet port of the exhaust section check valve (51) and the outlet port of the intermediate section check valve (52), a silencer (53) connected to the exhaust passage (56) and having an outlet port connected to a final exhaust passage (56a) which is vented to the atmosphere.

FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 11 00 3265

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|--|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
| Y | EP 1 536 140 A1 (AISIN SEIKI [JP]) 1 June 2005 (2005-06-01) * paragraphs [0008], [0022] * * figures 1,2,3 * ----- | 1-3,5 | INV. F04C29/06 F04C25/02 |
| Y | JP 2008 008302 A (ULVAC CORP) 17 January 2008 (2008-01-17) * abstract * * paragraphs [0002], [0007], [0009], [0014] - [0017] * * figure 4 * ----- | 1-3,5 4 | |
| A | JP 2003 278680 A (AISIN SEIKI) 2 October 2003 (2003-10-02) * abstract * * paragraphs [0016], [0017] * * figures 1-3 * ----- | 5 1,2 | |
| A | US 2007/048162 A1 (IMAI TOSHIO [JP] ET AL) 1 March 2007 (2007-03-01) * paragraphs [0043] - [0047] * * figures 1-2B * ----- | 1 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | F04C |
| The present search report has been drawn up for all claims | | | |
| Place of search Munich | | Date of completion of the search 23 June 2014 | Examiner Lange, Christian |
| 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 03.02 (P04C01)



Application Number

EP 11 00 3265

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:

1-5

☐ 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 11 00 3265

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: 1-5

Multiple stage vacuum pump with final and intermediate outlet port entering into an exhaust passage and a silencer at the exit of the exhaust passage.

2. claims: 6-10

Multiple stage vacuum pump with final and intermediate outlet port.

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

EP 11 00 3265

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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23-06-2014

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| EP 1536140 A1 | 01-06-2005 | CN 2809273 Y | 23-08-2006 |
| | | EP 1536140 A1 | 01-06-2005 |
| | | JP 2005155540 A | 16-06-2005 |
| | | US 2005118035 A1 | 02-06-2005 |
| ----- | | | |
| JP 2008008302 A | 17-01-2008 | NONE | |
| ----- | | | |
| JP 2003278680 A | 02-10-2003 | NONE | |
| ----- | | | |
| US 2007048162 A1 | 01-03-2007 | JP 4767625 B2 | 07-09-2011 |
| | | JP 2007056764 A | 08-03-2007 |
| | | US 2007048162 A1 | 01-03-2007 |
| ----- | | | |