Multistage rotary compressor

The present invention relates to a multistage rotary compressor, in the multistage rotary compressor, a motor-operating element (5) and a rotary compressing element (6) are provided at upper and lower portions in a closed vessel (1). In the rotary compressing element (6), a low stage side rotary compressing element (9) and a high stage side rotary compressing element (11) are positioned on the upper and lower sides respectively. An upper supporting member (12) is attached onto the low stage side rotary compressing element (9), and a substantially cup-shaped cover material (16) is attached onto the upper supporting member (12) to close an opening surface of a muffling chamber (12b) formed in the upper supporting member (12). The substantially cup-shaped cover material (16) is formed in a high dimension so that the upper end of the cover material (16) is positioned at an upper end or near an upper end of a bearing portion (12a) formed in the upper supporting member (12). Further, a discharge hole (16b) for discharging a refrigerant gas is provided in the upper end surface of the cover material (16) near an outer diameter portion of the bearing portion (12a). Consequently, the level (h) of the oil surface for oil filled in the closed vessel (1) can be set so as to be near the upper end of the cover material (16). According to the present invention, the amount of oil filled in the closed vessel can be increased and the oil separation in the closed vessel can be efficiently made.
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (IPC)</th>
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<tr>
<td>A</td>
<td>PATENT ABSTRACTS OF JAPAN vol. 014, no. 247 (M-0978), 25 May 1990 (1990-05-25) &amp; JP 02 067497 A (SANYO ELECTRIC CO LTD), 7 March 1990 (1990-03-07) * abstract; figure 1 *</td>
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<td>US 5 597 293 A (BUSHNELL ET AL) 28 January 1997 (1997-01-28) * column 3, line 13 - line 43; figure 1 *</td>
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**TECHNICAL FIELDS SEARCHED (IPC)**

- F04C

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*The present search report has been drawn up for all claims.*

**Place of search** | **Date of completion of the search** | **Examiner**
---|---|---
Munich | 22 March 2006 | Descoubes, P

**CATEGORY OF CITED DOCUMENTS**

- X: particularly relevant if taken alone
- Y: particularly relevant if combined with another
- A: technological background
- Q: 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
- S: member of the same patent family, corresponding document
## 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:

- [x] 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
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. claim: 1

   Multistage rotary compressor with high oil level.

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2. claims: 2,3

   Multistage rotary compressor with a discharge hole on the upper end surface of the muffling chamber.

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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 22-03-2006.
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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